HIGH PERFORMANCE WORK SYSTEMS AND FIRM PERFORMANCE:

A SYNTHESIS OF RESEARCH AND MANAGERIAL IMPLICATIONS

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ABSTRACT

The strategic role of human resource management (HRM), and specifically, the influence of a firm's HRM system on its financial performance, has generated considerable interest within the academic and practitioner communities. This paper reviews the theoretical foundations for a HRM–firm performance relationship and focuses particularly on the potential of a *high-performance work system* to serve as an inimitable resource supporting the effective implementation of corporate strategy and the attainment of operational goals. Special attention is devoted to the methodological challenges inherent in the prior empirical work that has adopted this systems perspective, and what we can learn from research at different levels of analysis. We next summarize the evolution of our own work on the subject and present new findings that bear on the magnitude of the HRM strategy–firm performance relationship.

We conclude by outlining several possible areas of future research and a discussion of how practitioners might implement the findings throughout their organizations.

INTRODUCTION

The role of human capital as a potential source of sustainable competitive advantage has recently been the focus of considerable interest in the academic and popular press. The current "terms of art" such as *intellectual capital, knowledge work and workers*, and *high-performance work systems* (HPWS) all reflect a new interest in "people" as a source of competitive advantage, rather than a cost to be minimized. By extension, intellectual assets and the organizational systems that attract, develop, and retain them are emerging as significant elements in strategic decisionmaking. This evolution in the role of human resources (HR) follows directly from the demands of rapidly changing product markets and the corresponding decline of command and control organizational structures. A skilled and motivated workforce providing the speed and flexibility required by new market imperatives has increased the strategic importance of human resource management (HRM) issues at a time when traditional sources of competitive advantage (quality, technology, economies of scale, etc.) have become easier to imitate. In effect, while the markets for other sources of competitive advantage become more efficient, the subtleties surrounding the development of a high performance workforce remain a significant unrealized opportunity for many organizations.

In addition to widespread practitioner interest in the role of "people" as a source of competitive advantage, the subject has also captured the attention of academics. Recent special issues in the *Academy of Management Journal, Industrial Relations, Journal of Accounting & Economics*, and the *Strategic Management Journal* have focused broadly on the relationship between intellectual assets and firm performance. While still a nascent field of inquiry, both the theoretical and empirical work in this area is broadly consistent with the conclusion that there is a strong relationship between the quality of a firm's HRM system and its subsequent financial performance. Paradoxically, these research findings come at a time when the HRM *function* in many firms is under significant pressure to justify its existence. On the one hand, CEOs understand the essential strategic value of a skilled, motivated, and flexible labor force. On the other hand, the traditional HRM function has not typically been thought of as a strategic asset, and consequently is under pressure to reduce expenses and demonstrate *efficiency* in the delivery of their services. In essence, the HRM function within many organizations is being asked to develop new strategic capabilities while at the same time more effectively managing, and perhaps outsourcing, many of its traditional administrative responsibilities (Corporate Leadership Council, 1995; Ulrich, 1997).

Despite this turmoil, the changing competitive realities have provided the HRM function with an unprecedented opportunity to create significant shareholder value, through the *effective* (in contrast to the *efficient*) management of the firm's HRM *system*. We emphasize the importance of the global or overall HRM system because we believe that it is the systemic and interrelated influence of HRM policies and practices that provides their inimitability, and therefore provides a strategic lever for the firm. Such internally consistent and externally aligned (with firm competitive strategy) work systems are generally thought to include rigorous recruitment and selection procedures, performance-contingent incentive compensation systems, management development and training activities linked to the needs of the business, and significant commitment to employee involvement (Arthur, 1994; Huselid, 1995; Ichniowski, Shaw, & Prennushi, 1997; Jackson & Schuler, 1995; MacDuffie, 1995; Milgrom & Roberts, 1995; Pfeffer, 1994). An internally consistent and coherent HRM system that is focused on solving operational problems and implementing the firm's competitive strategy is the basis for the acquisition, motivation, and development of the underlying intellectual assets that can be a source of sustained competitive advantage. In contrast, elements of the HRM function that focus on transactions and compliance activities do not play an equivalent strategic role, and will continue to be evaluated as cost centers. Indeed, while the HRM system is typically thought of as the responsibility of the HRM function, such HPWS can be implicit in smaller firms without such a function, or diffuse in larger firms that have attempt to embed them more broadly in management (e.g., Hewlett-Packard). In our view, one of the most significant impediments to developing a *strategic* system that provides solutions to business problems rooted in human capital, is thinking of the HRM system as a *traditional* HRM responsibility.

Overview of the HRM–Firm Performance Literature

Much of the work in this area is organized around several themes and research approaches that set it apart from conventional research in the field of HRM. Perhaps the most important of these differences is that *systems* of HRM practices, rather than individual practices and policies in isolation, have been the level of analysis in much of the recent work. HRM systems are the most appropriate level of analysis because they more accurately reflect the multiple paths through which HRM policies will influence successful strategy implementation. Alignment also becomes important in this context: both internal to the HRM system (among HRM policies) and externally (with other organizational policies and goals), such that the entire system is appropriate for the firm's competitive strategy and helps to achieve the firm's operational goals. The focus on alignment necessarily invokes the possibilities for complementarities or synergies within an appropriately aligned system. These complementarities

can be positive, where the "whole is greater than the sum of the parts," or negative, where elements of the system conflict (internally or externally) and actually destroy value rather than create value. The more subtle the alignment requirements and more idiosyncratic to the particular firm, the more the HRM system can provide an inimitable strategic asset.

Unless the HRM–firm performance relationship is to be largely driven by a more efficient management of a firm's HR, and the consequent contribution to lower operating costs, the notion of HRM as a strategic asset must be able address the question of inimitability. This is a second reason for the focus on HRM systems. It represents an important departure from the traditional view of HRM that emphasizes "best practices" and "benchmarking" as the foundation for their contribution to firm success. Thinking first about the strategic role of an HRM system is a considerably different perspective for both academics and practitioners who have largely focused on individual HRM policies and practices within narrow functional silos (staffing, training, compensation, etc.). For academics, it means an interdisciplinary research perspective incorporating HR, strategy, organizational economics, and finance. For HRM managers and the HRM function, it means new competencies and perhaps competing roles, requiring both value creation and cost containment.

As described above, the impact of a firm's HRM strategy on financial performance has been the subject of several recent special issues in leading academic journals. This paper may necessarily cover some of the same ground, though we include the results of more recent research and attempt to focus on several issues that we believe have been underdeveloped in the prior work. Our presentation of these ideas is organized as follows. First, we highlight the key research issues in this literature and discuss both the conceptual foundations for this work and several of the methodological challenges. Second, we describe the evolution of our own work on the subject drawing on three separate national surveys of HRM practices in publicly-held firms. Third, we discuss future research directions and challenges. Finally, we develop the implications of this research stream for practicing managers in the fourth section.

THEORETICAL FOUNDATION

While the strategic HRM literature in its broadest form might have several motivating themes, the most fundamental question in our judgment is whether a firm's HRM system can provide a long-lived source of competitive advantage, or whether it represents an organizational attribute that can easily be replicated by competitors. Indeed "the questions of the day" in the field of competitive strategy is generally "What is the source of competitive advantage within the firm?...[and] How is advantage created, and how is it sustained?" (Schendel, 1996, p. 2) If a firm's system for human capital management is a

partial answer to those questions, then in fact it has a strategic role to play, and can potentially provide a source of economic rents.

Conceptually, one can develop a plausible prediction that the HRM system can indeed be a strategic asset, capable of generating above-normal economic rents. Driven by market imperatives to develop more efficient organizational structures and practices, there is an increasing emphasis among both academics and practitioners on *behavioral* competitive strategies that rely on core competencies and capabilities among employees, not only because they provide the most effective response to market demands, but also because they are not easily copied by competitors (Hamel & Prahalad, 1994; Stalk, Evans, & Shulman, 1992). With as much emphasis on the effective *implementation* of corporate strategies as their *content*, organizational policies and infrastructure are increasingly considered a potential source of sustainable competitive advantage. Within that context what is sometimes called a HPWS plays a strategic role; first as a resource to support the development of core competencies , and second as an essential ingredient for effective strategy implementation (Dyer, 1993; Levine, 1995; Pfeffer, 1994).

The conceptual literature focuses on two questions: By what mechanism does a HPWS affect firm performance?, How can these systems represent a source of sustained value creation, rather than simply locus of cost control? The *behavioral* perspective (Jackson, Schuler, & Rivero, 1989) answers the first question very simply. Firms that rely on human capital as a source of competitive advantage, ultimately require the productive behaviors necessary to implement their strategies. A fundamental source of those productive behaviors, both in terms of the initial acquisition and subsequent development and motivation, is the firm's HRM system (Bailey, 1993; Jackson et al., 1989; Pfeffer, 1994; Schuler & MacMillan, 1984). The influence of the HRM system over valued employee behaviors, however, is not sufficient to generate a strategic impact.

The strategy literature, and in particular, the *resource-based view of the firm* (Barney, 1991) provides the other key element. If HRM systems are to create sustained competitive advantage, they must be difficult to imitate. Collis and Montgomery (1995) describe two features of a strategic resource that enhance inimitablity, and that characterize HPWS: path dependency and causal ambiguity. Path dependency characterizes resources that are developed over time such that learning and experience provide a cumulative "first mover" advantage. A competitor cannot simply purchase an equivalent resource from the market and "catch up". Causal ambiguity describes resources whose content and essential ingredients are so subtle and difficult to fully comprehend that observers outside the firm are not able reproduce the resource in their own organization. The causal ambiguity of an appropriately aligned HPWS that embeds effective strategy implementation throughout the firm is a good illustration (Lado & Wilson, 1994; Lengnick-Hall & Lengnick-Hall, 1988).

Notions of alignment and fit are common themes in this literature (Butler, Ferris, & Napier, 1991; Cappelli & Singh, 1992; Jackson & Schuler, 1995; Milgrom

& Roberts, 1995; Ulrich & Lake, 1990; Wright & MacMahan, 1992). *Internal or horizontal fit* improves as the various elements of the HRM system reinforce one another and send consistent signals regarding valued behaviors in the organization. A simple example of poor internal fit would be job structures based on teams, but incentive systems and career opportunities entirely linked to individual performance. *External or vertical fit* improves as those behaviors produced by the HRM system are increasingly appropriate for the implementation of the firm's strategy. Reflecting both elements of a high performance HRM system, MacDuffie (1995) emphasized that:

> an HR bundle or system must be integrated with complementary bundles of practices from core business functions (and thereby the firm's overall business strategy) to be effective (p. 198).

A related debate that runs throughout this literature is whether there is a *best* HRM system with universal applicability, or whether the strategic impact of HRM is *contingent* on the fit between the HRM system and corporate strategy (Delery & Doty, 1996). This contingent perspective typically adopts a conceptual approach that explicitly specifies a limited set of strategic options with a corresponding set of HRM systems that fit those strategic choices (Miles & Snow, 1984; Schuler & Jackson, 1989; Snell & Dean, 1992). At the risk of engaging in academic sophistry, we believe that because these approaches imply such a limited range of strategy-HRM matches, there is little difference in their implications for HRM as a source of competitive advantage. As Schendel (1996) observed, "the central issue [in competitive advantage] is imitability. With imitability, rents disappear, without it, rents continue" (p. 3). While conveniently measured, it is not clear why the fit between HRM and two or three strategic typologies would provide sufficient inimitablity to generate a sustainable source of competitive advantage.

Recent theoretical work in the field of strategic management by Amit and Shoemaker (1993) develops the concept of *strategic assets* as "the set of difficult to trade and imitate, scarce, appropriable, and specialized *resources* and *capabilities* that bestow the firm's competitive advantage" (p. 36). HPWS represent a source of "invisible assets" (Itami, 1987) that both create value and are difficult to imitate. These systems produce tacit knowledge "which is embodied in individual and organizational practices and cannot be readily articulated" (Spender & Grant, 1996, p. 8) The strategic value of this knowledge is a function of its *appropriateness* for the implementation of strategy at each level of the firm. This implies that the most important aspect of fit is its embeddedness throughout the organization; it then represents an "invisible" capability for effective strategy implementation. Operationally, this will take the form of similar corporate strategies (e.g., focus, cost leadership, etc.) being reflected in a variety of unit level operating objectives and problems that are substantially influenced by the skills, motivations, and structure of the workforce.
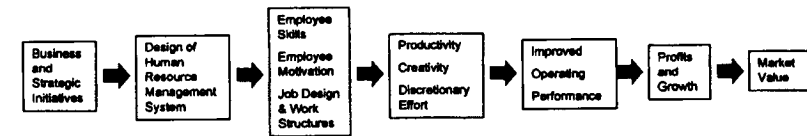

Figure 1.   A model of the HR-shareholder value relationship.

Do we consider a HPWS a "best practice?" Yes and no. Schuler (1992) argued that strategic HRM is comprised of five interlocking activities: HRM philosophies, HR policies, HR programs, HR practices, and HR processes. In Schuler's framework, efforts to develop a high-performance workforce are reflected in a firm's *philosophy* concerning its human resources, which in turn is directly reflected in the architecture of policies, programs, practices, and processes. An HR *philosophy* that takes as its strategic foundation an HRM system that is aligned both internally and externally to successfully implement a firm's strategy is a best practice. The nature of that fit is not. It is in fact very firm specific and idiosyncratic, which is the basis of its inimitablity. For example, policies that reward and develop high-performing employees are part of the architecture of a HPWS, and a best practice. The appropriate pay "practice," however, will depend the behaviors required to implement a specific firm's strategy. Once the requirements of a particular firm's compensation policy have been developed, based on strategic considerations, it may very well be that a "best practice" for such a policy exists. However, the focus is actually at the level of practice, not strategy or philosophy. Firms may benefit by benchmarking against other organizations at this level, but they should not confuse this with the need to develop a firm specific HRM architecture that by its nature is not appropriately imitated. Figure 1 describes our understanding of this value creation process.

HRM Strategy and Organizational Economics

The strategic HRM literature is also informed by agency theory and the larger contracting literature in economics (Brickley, Smith, & Zimmerman, 1997). The common theme in this body of work is an emphasis on fit and alignment, though the focus in the contracting literature is on the alignment of individual employee interests with those of the firm, in contrast to the HRM strategy literature which explores the role of internal and external fit. Contracting problems between employees and the firm occur when the two parties have competing interests and important information is distributed asymmetrically. The conventional model of the implicit employment contract is one in which both employee and employer

have a common interest in maximizing the value of their relationship, but competing interests in how that value is distributed. Employees have private information about their skills and intended effort at the point of hire. This results in adverse selection problems because employees have an incentive to misrepresent their true skills, abilities, and motivations since they have better information on these attributes than the employer. Similarly, moral hazard problems can occur once an employee is hired because employers cannot easily or accurately measure actual performance. The difference between the behaviors contracted-for and the behaviors actually provided impose a cost on the firm that are minimized with the appropriate combinations of contract monitoring and incentives.

While the contracting literature in economics has been applied extensively to executive compensation issues, it has not been widely extended to the broader HRM strategy literature. In part this is because the field of economics has historically not been much concerned with the organization and structure of work within the firm. However, given the crucial role that "embedded alignment" appears to play in successful strategy implementation, the importance of incentives and appraisal (monitoring) and the alignment between those policies and firm strategy is paramount. For example, the contracting literature speaks directly to the challenges of relying on employee empowerment and teams as a method of strategy implementation. Flatter organizational structures with decentralized "decision rights" are a reaction to product markets demands for more timely and consumer friendly responses. Firms understand that individual employees have valuable "local specific knowledge" (Brickley et al., 1997), and indeed many now have no choice but to rely on employees to use that information to successfully implement the firm's strategy. Similarly, MacDuffie (1995) summarized the necessary conditions for an HRM–firm performance relationship as follows:

a. when employees possess knowledge and skills the managers lack;

b. when employees are motivated to apply this skill and knowledge through discretionary effort; and

c. when the firm's business or production strategy can only be achieved when employees contribute such discretionary effort (p. 199).

Organizations that are more successful at eliciting the appropriate use of that information will have a competitive advantage.[1]

The contracting and HRM strategy literatures, however, differ in some important areas. The contracting literature describes employment issues in terms of pre-contracting and post contracting problems. Adverse selection is a precontracting problem in which applicants have unfavorable private information about their abilities that is not shared with a potential employer (Aoki, 1988). The implication is that such asymmetric information combined with opportunistic behavior (shirk-

ing) on the part of the applicants results in a less productive labor force. The thrust of the extant HRM and I/O psychology research on selection, however, is not consistent with the assumption that applicants have better information about their qualifications than employers. The implicit assumption of the selection literature is that neither party knows what attributes will predict job performance, and since the employer is investing in the validation research, if information is asymmetrically distributed, it is likely to be distributed in favor of the employer.

Applicants *do*, however, have private information on potential motivation and effort levels, and this is a familiar focus of the agency theory literature as an explanation for why the agent may not satisfy the precontract expectations of the principal. While we have no interest in revisiting the debate between economists and organizational theorists on the appropriate motivational expectations one might have for employees (Barney, 1990), if the HRM system is to provide a source of sustainable competitive advantage, then a solution to the moral hazard problem will be required. The contracting literature describes moral hazard as a postcontracting problem where "the firm provides incentives that will discourage individual employees from shirking work under the condition of imperfect monitoring" (Aoki, 1988, p. 69). However, framing the problem in a context where work has disutility and the employer–employee relationship is one in which "it's the employee's job to shirk and the employer's job to catch them" is not a useful foundation for a HPWS. Incentives, rewards and "contract compliance mechanisms" in the broadest sense are crucial, but the emphasis on shirking and opportunistic behavior is too narrowly drawn. It not only has a negative connotation, it focuses attention on a form of behavior that, even if substantially diminished, probably has little effect on the competitive advantage of the firm. Alternatively, the contracting literature can be effectively integrated with the strategic HRM literature when the behavioral focus is the discretionary and value creating choices appropriate for strategy implementation.

In sum, we do not subscribe to the notion that the strategic HRM literature lacks a solid theoretical foundation (Delery & Doty, 1996). There is a strong theoretical foundation in both the strategy and organizational economics literatures that is consistent with the hypothesis that a firm's HRM system can be a source of competitive advantage. Conceptually, the key is whether the HRM system is sufficiently aligned and embedded within the organization to serve as an inimitable source of competitive advantage. This theoretical foundation needs to be sharpened, we believe, with a better understanding of *how* the HRM system affects bottom line performance *and* why other firms cannot easily imitate such a strategy. At this point, however, we need a richer empirical literature to inform that theoretical development.

Measurement Issues

We agree with Becker and Gerhart (1996) that it is as important for this literature to progress empirically as well as theoretically. Prior empirical work in this

literature, while supportive of the HRM–firm performance relationship, has high-lighted several methodological challenges to work in this area. Two of those involved the appropriate level of measurement for the HRM system and the notion of fit. For example, while the notion of a *strategic* influence for HRM implies a firm level analysis involving an inimitable alignments between an HRM system and the demands of strategy implementation, much of the prior research in the field has focused on the plant and unit level (Arthur, 1992; Ichniowski, et al., in press; MacDuffie, 1995; Youndt, Snell, Dean, & Lepak, 1996). Alternatively, there exists a considerable literature that focuses on individual HRM policies such as pay (Gerhart, Trevor, & Graham, 1996) or teams (Banker, Field, Schroeder, & Sinha, 1996) on firm performance. However, while there are strong methodologi-cal reasons in favor of these narrower approaches, they either fail to link the HRM system to ultimate strategic outcomes (firm level financial performance) or by focusing on just part of the HRM system risk overstating the effects of those indi-vidual policies by capturing part of the larger HRM system effects.

HPWS and Levels of Analysis

There is a considerable literature exploring the relationship between individual HRM policies or practices and various levels of organizational performance. At one end of the continuum is the work in the field of utility analysis, which attempts to isolate the impact of an HRM practice (most often the use of validated selection tests) on individual performance and aggregate those gains to the level of the firm, if not the economy (Boudreau, 1991; Schmidt, Hunter, McKenzie, & Muldrow, 1979). At the other end of the continuum are studies that examine the effect of executive compensation on firm profitability (see Gerhart et al., 1996 for a review). While we might agree that any link between an individual HRM policy and bottom line firm performance is evidence of "strategic impact," in our view the strategic HRM literature necessarily takes a broader view of HRM as an inde-pendent variable. Indeed, much of the theoretical work suggesting that HRM can be a source of competitive advantage focuses on the entire HRM system, though not always the *same* HRM system (Becker & Gerhart, 1996). To the extent that a systems view is appropriate, and the choice of HRM policies are correlated, work that focuses on just a limited number of HRM polices would be attributing the effect of the larger HRM system to those individual policies.

Even among those empirical studies that examine more than one or two HRM policies, the variation in the breadth of the HRM system measures is quite dra-matic. Several studies, while including multiple HRM policies focus only on employee involvement systems (Freeman, Kleiner, & Ostroff, 1997; Lawler, Mohrman, & Ledford, 1995) and largely exclude those elements affecting selec-tion, training, appraisal, and compensation. Arthur (1994), Ichniowski et al. (1997), MacDuffie (1995), and Youndt et al. (1996) adopted a broader measure of the HRM system, but one that is necessarily circumscribed by their analysis at the plant level. Each of these studies focuses on a narrow class of jobs, if not one job, within one industry. Delery and Doty (1996) also focus on one job in one industry, but while they examine more than a single HRM practice, they do not treat these practices as a single system since their analysis focuses on the effects of individual policies. Only Huselid and Becker (1995, 1996, 1997) and Delaney, Lewin, and Ichniowski (1989) have attempted to develop a comprehensive firm-wide measure of an organization's HRM system.

Our view is that each of these approaches, while somewhat different, usefully contributes to the cumulative empirical literature. Studies focusing on a more lim-ited set of jobs within a narrow industry grouping benefit from natural controls on important job and industry differences that can confound the estimated relation-ships. For example, prior work in the automobile and steel industries has the desir-able feature of controlling for a wide variety of factors such as capital intensity, job structures, competitive postures, and so forth. Such work is limited, of course, by questions of its generalizability to new and different settings. Alternatively, firm level studies provide greater generalizability, and more important, measures of dependent variables that directly reflect bottom-line firm performance. Research at both levels of analysis is essential to the further development of a comprehen-sive empirical literature in this field. Hopefully, future researchers will begin to overcome the data collection challenges associated with linking these two approaches in the same study.

The level of analysis is linked closely to the choice of measures to reflect the HRM system. On the one hand, as described above, the conceptual literature strongly suggests that an interrelated system of practices and policies forms an inimitable capability for strategy implementation. There is broad consensus that such a HPWS would include rigorous recruitment and selection procedures, per-formance-contingent incentive compensation systems, management development and training activities linked to the needs of the business, and significant commit-ment to employee involvement (Arthur, 1994; Huselid, 1995; Ichniowski et al., 1997; Jackson & Schuler, 1995; MacDuffie, 1995; Milgrom & Roberts, 1995; Pfeffer, 1994). This suggests that it is theoretically appropriate to focus on a single comprehensive measure of the HRM system. The alternative approach is to rely on empirical methods to measurement development, such as factor analysis. Such an approach assumes that multiple HRM practices and policies may represent more than one distinct dimension of the HRM system, and that to arbitrarily combine multiple dimensions into one measures creates unnecessary reliability problems.

The overwhelming preference in this literature has been for a unitary index that contains a set (though not always the same set) of theoretically appropriate HRM practices derived from prior work (Arthur, 1992; Ichniowski et al., 1997; Lawler et al., 1995; MacDuffie, 1995; Youndt et al., 1996). While confirmatory factor anal-ysis might be used to validate multiple items measuring the same type of practice (Youndt et al., 1996), Huselid (1995) is the only published study that factor ana-lyzed a large group of HRM practices in an effort to identify an underlying set of

dimensions for the HRM system. More recent work by Huselid and Becker (1995, 1996) has shown that the two dimensions reported by in Huselid (1995) have equivalent effects on firm performance and when combined into one HRM system index provide very robust results across multiple data sets.

While not without its limitations, we agree with the extant practice in the empirical literature that an index derived from the prior empirical work is the more appropriate measure of the HRM system. First, a single index reflects the notion of a single HRM system as a strategic asset. Second, since the typical index is a summation of individual elements of the HRM system, it implies that within the broad middle range of the index there are multiple ways to increase its value. For example, a strong emphasis on one or two policies will have the same index value as more modest attention to a wide range of policies. While an index does not explicitly test such equifinality, it is flexible enough to allow for it. Conceptually, since our concept of "idiosyncratic fit" would suggest considerable flexibility across firms in the emphasis given to different aspects of the HRM system, an index measure would be a more appropriate reflection of this phenomenon. Ultimately, however, an index measure simply indicates that "more is better," and an evaluation of this assumption awaits future study.

To determine whether there are systematically different, but equally effective, HRM systems (equifinality), or whether there is a best practice, requires additional analysis. Arthur (1994) and Huselid and Becker (1997) have both used cluster analysis to determine whether observations (work units or firms) can be grouped based on a common set of HRM practice patterns.[2] The importance of whether there exists multiple paths to creating a strategic HRM system will tend to increase where the level of analysis is the level of the firm. By their nature, the potential range of variation is more circumscribed where the focus is on one job or one industry group.

Complementarities and Fit

Conceptual work suggests that tests for complementarities and fit should focus on both *internal* and *external* fit (Milgrom & Roberts, 1995). What support exists for the fit hypothesis is largely at the level of internal fit and takes two forms. Neither approach attempts to measure fit directly, but rather relies on a statistical relationship to draw the inference that fit increases firm performance. Perhaps the most common approach is to test for significant interaction terms among a variety of HRM policies with the expectation that such terms will have a positive sign reflecting synergies among such policies. We know of no successful tests of *n*-way multiplicative models using a wide range of HRM practices.[3] MacDuffie (1995, p. 213) reported a significant three way interaction term among his three bundles of practices that constitute the "organizational logic" of flexible manufacturing systems in auto plants. However, this result was limited to models where the dependent variable was labor productivity, and did not extend to product quality.

Huselid (1995) dimensionalized the HRM system into *employee skills and organizational structures* and *employee motivation*, but found no support for interactions between these terms using multiple measures of firm-level performance.

A second approach has been to construct additive indices of the HRM system that only increase as the firm uses a wider range of high-performance HRM policies. This is one of the few results that has consistent support in both business unit and firm-level data. Ichniowski et al. (in press) tests several configurations of this type of measure and all provide consistent support for the importance of internal complementarities within steel plants. Huselid and Becker (1995, 1996, 1997), using a multi-industry sample of firms, found similar evidence of the effects of internal fit on corporate financial performance. Ichniowski et al. (in press) and Huselid and Becker (1995, 1996, 1997) tested for these effects in two ways. The first was an overall measure of the HRM system that increased in value as the use of individual HRM practices exceeded the sample mean. The second approach was to create different "bundles" of practices ranging from little use of *any* high performance HRM practices, to different combinations of HRM emphases (e.g., compensation or teams) to uniformly high involvement across all policies. Both studies reported statistically and economically significant differences in the effects of these configurations that were consistent with the importance of internal fit.

Support for the external fit hypothesis is much weaker, and what evidence does support this hypothesis does not extend to the HRM-corporate strategy relationship. MacDuffie (1995) arguably provided the strongest support for the external fit hypothesis. One of the three elements of his "organizational logic of flexible production" includes production buffers such as extra inventory and repair space. This is one of the few studies that provides the level of organizational detail necessary to test theoretical models of complementarity (Milgrom & Roberts, 1995) that have tended to rely on case studies for support. However, this approach requires a very narrowly defined and uniform context (automotive assembly plants), and makes it difficult to generalize these results either to other industries or ultimately to firm financial performance. Youndt et al. (1996) tested for external fit at an intermediate level focusing on manufacturing strategies. Based on four different manufacturing strategies and two different HRM strategies, Youndt et al. found only one result that supported (i.e., human capital enhancing HRM and a manufacturing quality strategy) the external fit hypothesis. Finally, Huselid (1995) and Huselid and Becker (1995, 1996, 1997) have tested for significant interactions between measures of a HPWS and corporate strategy (i.e., focus, differentiation, and cost leadership) in three different national samples, and found no support for the external fit hypothesis.[4]

There is also surprisingly little analysis of data that would provide corroborative support for the "external fit" hypothesis. For example, if external fit was a source of competitive advantage and firms were not entirely ignorant of this opportunity, we should expect to see a strong empirical relationship between a firm's strategic

choices and the nature of its HRM system. Arthur (1992), Huselid and Rau (1997), and Snell and Dean (1992) all provided some evidence of this type of empirical regularity, though these are presumably just the necessary, but not sufficient, conditions for HRM-strategy complementarities ultimately influencing firm performance. In fact, when the data sets used by Huselid and Rau (1997) and Snell and Dean (1992) also were used to test the fit hypothesis within HRM-firm performance models (Huselid, 1995; Youndt et al.,1996), they produced very limited results.

The measurement of external fit will no doubt remain a continuing challenge in this literature. Ideally, researchers would be able to measure fit directly and estimate the relationship between those measures and firm performance directly. However, this presents increasingly daunting data challenges as one moves to higher levels of analysis. The researcher needs to measure the actual extent to which the HRM system is embedded in the firm's operations in a way that is appropriate for that particular firm's strategic goals. To do this directly would typically require the time intensity of a case study, which makes large cross-sectional samples unrealistic. An alternative approach is to rely on subjective assessments by survey respondents. For example, in our surveys we regularly ask the question, *To what extent does your firm make an explicit effort to align business and HR strategies?* In a firm performance model, in which this is the only "HR" variable, we found a one standard deviation improvement in "alignment" to be associated with a 17% increase ($p < .01$) in shareholder value (Huselid & Becker, 1997). However, this effect largely disappears when other subjective assessments about HRM policies and strategies are included in the model. Our experience is that research in this area should rely primarily on measures of policy *levels* and estimate the relationship between those levels and firm performance. Alternatively, it is not very useful to ask respondents for their assessments of organizational relationships (e.g., fit or impact) and then estimate the relationship of those "effects" to firm performance. Unfortunately, measuring the level of fit cross-sectionally remains a considerable obstacle as the focus of analysis moves away from very narrowly defined jobs and industry groups.

Survey Response Bias

One of the principal challenges in this literature is developing data sets that rely on mailed surveys. Ichniowski et al. (1997) and MacDuffie (1995) avoided the problem by intensive data collection efforts in a small number of steel or auto assembly plants.[5] The richness and accuracy of these data, and the inherent controls for interindustry differences, are important benefits from this approach. Others (Delaney et al. 1989; Delery & Doty, 1996; Freeman et al., 1997; Huselid, 1995; Huselid & Becker, 1995, 1996, 1997; Youndt et al., 1996) have utilized mailed surveys to provide estimates over a broader industry experience and at a level of the firm that can be linked to bottom line measures of firm performance.

Table 1. Survey Response Rates

Study	Target Population	Response Rate (%)
Delaney et al. (1989)	Compustat business units, (1986)	6
Huselid (1995)	All publicly held companies with employment > 100 employees (1991)	28
Huselid and Becker (1995)	All publicly held companies with employment > 100 employees (1993)	20
Huselid and Becker (1997)	All publicly held companies with employment > 100 employees (1995)	18
Freeman et al. (1997)	SHRM members with employment > 200 (1993)	20
Delery and Doty (1996)	Stratified random sample of banks, president and HR managers (1992)	11
Youndt et al. (1996)	512 Pennsylvania metal working plants; plant and HR managers (multiple years)	19

However, each of these efforts has resulted in similarly modest response rates (see Table 1). Our own experience with three national surveys over the last seven years is that it is becoming increasingly difficult to get organizations to participate in this form of research. The firms in our samples consistently tell us that not only are they receiving an increasing number of surveys (particularly the *Fortune* 1,000 firms), but that staff cutbacks and increasing workloads have made it more difficult to find the time to complete them. Our expectation is that this trend will continue for the foreseeable future.

The important methodological challenge to the use of survey data in this context is whether or not the resulting estimates from these samples are hopelessly compromised by response bias. Unfortunately, there is little systematic evidence one way or the other. The most common approach to analyzing the problem is to compare the mean characteristics of the sample with characteristics of the larger population. However, it is not the measured, but rather the *un*measured characteristics in the sample that create the potential problem. If the respondents and nonrespondents differ on a measured variable, and that variable is included as a control variable in the regression model, that aspect of response bias is largely mitigated.[6] The more compelling concern is whether, whatever the sampling context, the response decision is influenced by the HRM system-firm performance relationship in a particular firm.[7] For example, if only a minority of firms have the potential to benefit from a HPWS, and those firms respond disproportionately, the resulting effect sizes will be more substantive than would be observed in the average firm. Or, perhaps in the population there is no relationship between the HRM system and firm performance, but successful firms with "low performance" HRM systems do not have the HRM staff to respond to such surveys, or believe in their premise. If this group is less likely to respond, the sample would show a positive relationship

between HRM and firm performance when in fact one did not exist in the target population. Only Huselid (1995) and Ichniowski (1990) have made an effort to use available econometric techniques (Heckman, 1979) to estimate the magnitude of selection bias, and neither found evidence that their estimates were materially influenced by nonresponse bias. There is also some comfort provided by the range of studies across a variety of samples and contexts that all indicate a consistent positive relationship between the HRM system and firm performance. This issue, however, will remain a continuing methodological challenge in this literature.

The Importance of Point Estimates and Economic Significance

Cohen (1994) and Schmidt (1996) have recently argued that empirical research in psychology should move away from its traditional reliance on tests of statistical significance and focus more on point estimates of effects sizes and confidence intervals if it hopes to build the cumulative body of knowledge common in such fields as economics. Becker and Gerhart (1996) have argued that such attention to point estimates is particularly important in the strategic HRM literature. This means reporting results of 'raw' regression coefficients that reflect both the direction and the *magnitude* of the effect. Cohen (1994) suggested that the conventional disinterest in reporting effect sizes in meaningful units is largely an indictment of measures that have no inherent meaning. Presumably, this should not be a problem in the strategic HRM literature where the dependent variables typically reflect meaningful, objective measures of firm performance. Research in this area is in a unique position to make statements describing how meaningful and understandable changes in an HRM system influence commonly accepted measures of firm financial performance.

By contrast, efforts to evaluate the impact of HRM systems based on explained variance will be largely a function of sampling variance in the dependent variable. For example, Delery and Doty (1996, p. 828) observed that they find a "stronger relationship" than Huselid (1995) because their HRM variables explain 6–11% of the variance in firm performance compared to the 1–3% explained by Huselid's HRM index. The limitations of such a comparison are obvious when one observes that Delery and Doty's measure of ROA, for firms in one industry, has a sample mean nearly twice the standard deviation. By comparison, Huselid's equivalent measure, which is calculated across a wide range of industries, has a sample mean just one-fifth of the standard deviation. Higher R^2s are exactly what one expects when all of the between-industry variance in the dependent variable is eliminated. The point is that R^2s and incremental R^2s are largely a function of the "other" influences on the dependent variable that constitute the residual variance in the model. Those "other" influences are not constant across samples or studies. Two models in two different industries could have exactly the same raw regression coefficients, but dramatically different R^2s because one industry is subject to a wider range of "other" influences on firm performance.

Focusing research on point estimates, the unstandardized regression coefficients, where the dependent variable is in meaningful units is essential to building a cumulative empirical literature. Attention to explained variance, or incremental R^2, as measures of importance miss the point that "[i]t is the regression coefficients which give us the laws of science" (Blalock, 1964, p. 51). Indeed, Blalock (1964, p. 19) defined causation as: "X is a direct cause of Y if and only if a change in X produces a change in the mean value of Y." The raw regression coefficient provides just such an estimate of the change in the mean of Y in an appropriately specified regression model. Finally, the emphasis on statistical significance, whether in terms of individual coefficients or incremental R^2 is entirely confusing to practitioners who might want to actually benefit from this research. The term "significance" is overwhelmingly confused with practical significance rather than more humble evidence that the effect is simply not zero.

Finally, focusing on the effects of the HRM system in meaningful units (i.e. dollars, labor productivity, turnover) provides a direct validity check on these results. Effects that are implausibly large or trivially small are easily identified irrespective of the variance explained or the statistical significance of the coefficient in question. For example, Delery and Doty (1996, p. 825) concluded that "financial performance was estimated to be approximately 30% higher for banks one standard deviation above the mean on each of the three significant practices than it was for those banks at the mean." This suggests that an average bank in this sample could nearly double its return on assets (90% increase) simply by increasing the availability of profit sharing, the use of results oriented performance appraisals, and the degree of employment security each by about 34% (one standard deviation above the mean). The magnitude of such benefits from policies that are easily imitated would seem to be implausibly large. Ichniowski et al. (in press) and Huselid and Becker (1995, 1996, 1997) also reported point estimates of economic effects, but in both cases they reflect the effects of a *system* of HRM practices. Ichniowski et al. calculated that innovative HRM practices increase uptime by 3.5% implying a minimum increase of $105,000 in operating profits per month. Huselid and Becker reported estimated effects over multiple samples and multiple measures of HRM systems of $20,000–$40,000 in market value per employee for a one standard deviation change in the HRM system index. Since firms in these samples average about $300,000 per employee in market value, these effects constitute about a 10% change in shareholder wealth for a one standard deviation change across 11–25 policies and practices.

One of the advantages of point estimates is that in principle they provide common metrics; the mean change in the dependent variable for a one unit change in the HRM variable. However, a unit change in the HRM system is not always inherently meaningful, either because the HRM measure is a Likert-type scale or an index, or both. A common approach to this problem is to describe the effects on firm performance associated with a one standard deviation change in the HRM measure (Delery & Doty, 1996; Huselid & Becker, 1995, 1996, 1997). While the

approach is arguably unit free and uses comparable percentage changes for a given level of sample variation, it does have at least one undesirable property. As with any standardization, it tends to mask the underlying magnitude of policy changes required to implement the one standard deviation change. This is particularly true when multiple policies are combined into an index. One of the advantages of cluster analytic approaches is that much of this ambiguity is resolved. For example, Huselid and Becker (1997) developed four clusters of HRM systems that provide a clear picture of the mix and magnitude of each HRM policy for the particular cluster, and at the same time make it possible to test the economic effects of each system. We describe this work in greater detail below.

HIGH PERFORMANCE WORKS SYSTEMS AND CORPORATE FINANCIAL PERFORMANCE

The empirical literature that explicitly attempts to estimate the relationship between a firm's HRM system and its performance remains quite limited to date. What does exist varies considerably by level of analysis, and measures of both the HRM system and firm performance. In our work, we have chosen to emphasize the link between a HPWS and *corporate* financial performance. We do not argue that this is the only appropriate level of analysis, or that this research question is not without significant methodological challenges. It is, however, ultimately the raison *d'être* for a strategic HRM role in the firm. This section describes the methods and key results of our work to date, and reports new results that bear on some of the issues discussed in earlier sections.

Initial Results

The bulk of our empirical results are based on national surveys of organizational HRM practices conducted in 1992, 1994, and 1996, covering the HRM system used by each firm in the preceding calendar year. The target population in each survey was all publicly held U.S. firms with more than 100 employees, approximately 4,000 firms in each year. The same protocol was followed in each survey:

* the name and address of the senior manager with HRM responsibilities is confirmed by telephone;
* each firm receives a letter notifying them of the impending survey;
* surveys are mailed with a cover letter promising an executive summary to respondents;
* nonrespondents receive a follow-up letter; and
* approximately 8 months later responding firms receive an executive summary of the survey results.

Table 2. Questionnaire Items for the 1992 HR Strategy Measures

Questionnaire Item	Alpha
Employee Skills and Organizational Structures	**.67**

What is the proportion of the workforce who are included in a formal information sharing program (e.g., a newsletter)?

What is the proportion of the workforce whose job has been subjected to a formal job analysis?

What proportion of nonentry level jobs have been filled from within in recent years?

What is the proportion of the workforce who are administered attitude surveys on a regular basis?

What is the proportion of the workforce who participate in Quality of Work Life (QWL) programs, Quality Circles (QC), and/or labor-management participation teams?

What is the proportion of the workforce who have access to company incentive plans, profit-sharing plans, and/or gain-sharing plans?

What is the average number of hours of training received by a typical employee over the last 12 months?

What is the proportion of the workforce who have access to a formal grievance procedure and/or complaint resolution system?

What proportion of the workforce is administered an employment test prior to hiring?

Employee Motivation	**.66**

What is the proportion of the workforce whose performance appraisals are used to determine their compensation?

What proportion of the workforce receives formal performance appraisals?

Which of the following promotion decision rules do you use most often? (a) merit or performance rating alone; (b) seniority only if merit is equal; (c) seniority among employees who meet a minimum merit requirement; (d) seniority. Reverse scored.

For the five positions that your firm hires most frequently, how many qualified applicants do you have per position (on average)?

The results from the 1992 survey (for 1991 HRM practices) are described in Huselid (1995). This initial survey focused on 13 HRM practices (see Table 2) developed as very broad based exemplars of firm wide practices that, through their effects on the skills and motivation of the workforce, would be expected to have a positive influence on labor force performance. These 13 items added three practices (i.e., selection ratio, hours of training per year, merit versus seniority promotion criteria) to the 10 included in Delaney et al. (1989), and were consistent with other depictions of high-performance work practices (U.S. Department of Labor, 1993). An important feature in the design of these questions was an effort to pro-

vide a continuous measure of the intensity of policy implementation, rather than rely on an arbitrary dichotomy to indicate the presence of absence of such policies. The 13 HRM practices were factor analyzed with 11 of those practices loading on two factors (Table 2) that broadly reflected *motivation* and *skills*. Each of the two scales was an index (Cronbach's α = .66–.67) based on the mean standardized value for the questions included in the scale. Finally, the scales were validated against two external measures reflecting the degree to which the firm considered their employees strategic assets.

Huselid (1995) examined the effects of the two HRM systems scales on firm-level turnover, labor productivity (sales/employee), gross rate of return on assets, and a variant of Tobin's Q (i.e., firm market value/book value), controlling for a range of other firm and industry characteristics.[8] The results strongly supported the hypothesis that a HPWS will have a positive effect on multiple measures of firm performance. Using the one-standard deviation shift in HRM practices as a benchmark, the implied economic effects were increases in sales/employee of more than $27,000 and market value/employee of more than $18,000. Alternatively, there was little support for either the internal or external fit hypotheses. Finally, Huselid explicitly tested for the presence of simultaneity (profitable firms are more likely to have HPWS) and selectivity bias using conventional econometric techniques, and found no significance evidence of such biases.

The 1994 survey (for 1993 HRM practices) provided an opportunity to test several hypotheses that were not feasible with just one cross-sectional data set. Huselid and Becker (1996) combined the 1992 and 1994 data sets into a two-period panel to test for heterogeneity bias in the HRM-firm performance relationship. The concern was that the positive cross-sectional relationships in Huselid (1995) might be attributable to unobserved firm characteristics that are related to both the HRM system and firm performance. If these unobserved characteristics are fixed over time, but there was variation in both the HRM systems and firm performance, in principle it is possible to estimate an unbiased relationship based on the within firm variation (over time) of these variables (Hsiao, 1988). Unfortunately, while panel data provide a method to control for heterogeneity bias, the attenuating effects of measurement error are exacerbated (Griliches & Hausman, 1986). Calculation of both biases suggested that the observed decline in the panel coefficients was well within the expected attenuation attributable to measurement error given the reliability of our HRM measures, and as a result such estimates were not materially different than those derived from cross-sectional data. Perhaps more importantly, the panel data do not provide a solution to biases attributable to firm characteristics that change over time with the HRM system. An example would be other management policies (e.g., marketing strategies, operations) that along with a high-performance HRM strategy are having a positive effect on firm performance. This does not necessarily imply that HRM has no effect, but simply that it may be overstated in these cross-sectional models.

Table 3. The Effects of 1991 HRTOTAL on 1991, 1992, and 1993 Values of the Dependent Variables (Standard Errors in Parentheses)

Variable	1991 q	1992 q	1993 q	1991 GRATE	1992 GRATE	1993 GRATE
HRTOTAL	.1479**	.1899**	.1694**	.0113	.0266*	.0197*
	(.0843)	(.0815)	(.0847)	(.0162)	(.0177)	(.0137)

Source: From Huselid and Becker (1996, Table 3). Estimates of the effects for HRTOTAL are based on a model with identical control variables, but dependent variables that correspond to the respective year..

We also developed some initial tests of the implementation-to-benefit-lag that might exist for changes in the HRM systems. Observing the "level" of an HRM system in a particular year provides little indication of whether that system has reached equilibrium. To the extent that cross-sectional observations in part reflect significant recent changes, the full effects of those changes may not be reflected in contemporaneous measures of firm performance. Huselid and Becker (1996) reported the long-run effects of the 1991 HRM systems measure on firm performance in years 1991, 1992, and 1993 (see Table 3). The results in Table 3 are for firms responding in both 1992 and 1994. They suggest that there was a lag for the effects on both the market value (q) and accounting profits, but that the lag was relatively greater for accounting profits (gross rate of return on assets or GRATE). These results also provide some additional confidence that the positive HRM-firm performance relationship is not simply attributable to reverse causation.

### Broader Measures of the HRM System

While the 1992 survey provided promising evidence that a firm's HRM system could have a strategic impact, the measures of the policies in the HRM system were quite limited. With the 1994 survey, we significantly extended the focus of the policy measures to provide a more comprehensive and in-depth image of the firm's HRM system. At the same time, for both theoretical and empirical reasons, we adopted a single index measure of the HRM system. Beyond the conceptual basis for a single index described above, formal tests of the two dimensions developed in Huselid (1995) could not reject the hypothesis that the effects of the two dimensions on firm performance were equal (Huselid & Becker, 1996). Another reason to avoid the type of factor analysis used in Huselid (1995) is that not all of the policies that might theoretically be expected to be part of a system that affects firm performance necessarily load on a specific factor. For example, in Huselid (1995), both internal promotion policies and recruiting selectivity were excluded from the analysis for this reason. Factor analysis is appropriate where the survey intentionally includes multiple items covering the same construct. In those instances, confirmatory factor analysis within a priori determined dimensions,

Table 4. Questionnaire Items for the 1994 HR Strategy Measures

Questionnaire Item	Alpha
HR Strategy	.75

To what degree is the **HR department** involved in your firm's **strategic planning process?**

To what degree do you **align business and HR strategies?**

To what degree does your firm have a **clear strategic mission** that is **well communicated and understood at every level throughout the firm?**

How many **hours of training per year** are typically received by an *experienced* employee (i.e., someone employed **more than** one year)?

What proportion of the workforce has access to a **formal grievance procedure and/or complaint resolution system?**

What proportion of your **training efforts** are devoted to **skill enhancement?**

Employee Motivation	.75

What proportion of the workforce has their **merit increase or other incentive pay determined by a performance appraisal?**

What proportion of the workforce receives **formal performance appraisals?**

What proportion of the workforce is **promoted based** *primarily* on merit (as opposed to seniority)?

What proportional **change in total compensation** could a *low performer* normally expect **as a result of a performance review?**

Selection and Development	.47

What proportion of the workforce is *eligible* for *cash* **bonuses based on individual performance or company-wide productivity or profitability?**

What proportion of **nonentry** level jobs have been **filled from within** in recent (i.e., over the past five) years?

If profits were to *increase (decrease)* **by 50%** below their **average level**, by what proportion would the bonus pool be *increased (decreased)?* (Items reflects the mean of the responses to these two items.)

What proportion of the workforce is regularly administered **attitude surveys?**

What proportion of the workforce is **administered an aptitude, skill, or work-sample test prior to employment?**

If the market rate for *total* **compensation** (Base + Bonus + Benefits) is considered to be the 50th percentile, what is your firm's **target percentile** for *total* **compensation?**

What proportion of the workforce has **any part** of their compensation determined by a **skill-based compensation plan?**

such as the approach used in Youndt et al. (1996), is very useful. In light of the multi-industry focus of our sample, we chose to emphasize a wider range of HRM policies and were not able to include multiple items for each dimension of the HRM system. A factor analysis of such items under these circumstances yields results that MacDuffie (1995) charitably described in his own work as "not readily interpretable" (p. 210).

The broader measure of the HRM system consists of 17 policy characteristics (Huselid & Becker, 1995), including a more complete coverage of both the level of compensation and the various ways that compensation can vary with both individual and firm performance (Table 4). In addition several new items focused on the relationship between HRM and strategy implementation, in effect providing a relatively crude, but direct measure of strategy-HRM alignment. Once again the effects were very robust and economically significant. A one standard deviation change in the index was associated with a 11–13% change in market value per employee. We also tested for nonlinearities in the HRM-firm performance relationship using a spline function (Figure 2). Based on the 17-item HRM index measure, these results suggest a very interesting nonlinear relationship between more sophisticated HRM systems and shareholder equity. The nature of the relationship in Figure 2 is entirely consistent with the notion of the firm's HRM system repre-

Quintile Changes in Sophistication of HR Architecture
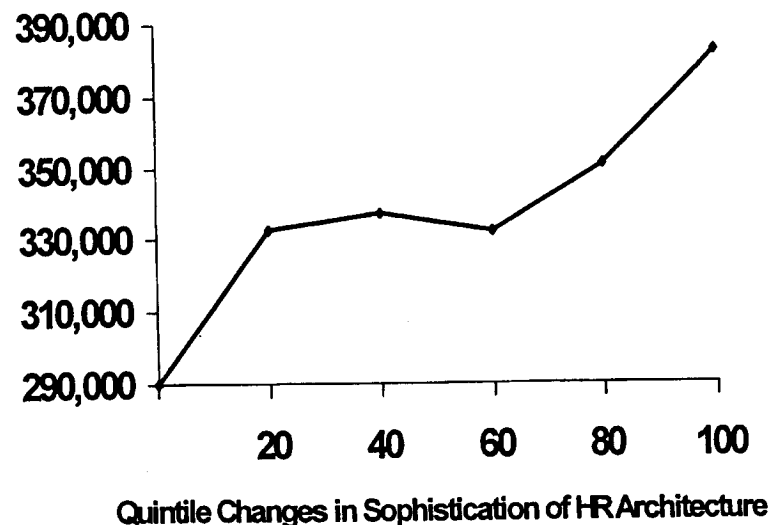
Source: Huselid and Becker (1995).

Figure 2. Dollar change in market value per employee.

senting a source of competitive advantage. The first of these strategies, where the firm improves their HRM system to the point where they are "part of the pack," has a high payoff because it represents a minimum threshold. Beyond that point (i.e., plus or minus one standard deviation around the mean), changes in the HRM system have much smaller effects. At this point firms are competitive, but they have not optimized their HRM system to the point where they have begun to enjoy a sustained competitive advantage. Firms only begin to build that competitive advantage when they have moved at least one standard deviation above the mean, or the upper 16% of the distribution.

While HPWS measures taken from both the 1992 and 1994 surveys show consistent positive relationships with firm performance, such measures are necessarily ambiguous regarding their policy configurations. For example, do all of the individual components actually improve firm performance? Are they all necessary for a high-performance HRM system? How can an organization know what to change when such measures are used? Are all of the elements equally important in their influence on firm performance? We certainly have not been able to resolve all of these questions, though we address those with more practical applications in a later section. We have, however, given some explicit attention to two of these issues.

Bureaucratic HR

Huselid and Becker (1995) raised some question about the appropriateness of two policies that are often included in the concept of a HPWS; that is, the presence of a formal grievance procedure and a policy of promotion from within. When these two practices were treated as a separate category (*bureaucratic HR*) and the remaining elements were termed *positive15*, there were dramatic differences in the effects of these two subsystems. Both had economically and statistically significant effects on shareholder wealth, but the effect of *bureaucratic HR* was negative. The elements comprising an organizational HPWS are ultimately an empirical issue. Conceptually, the constituent parts include a wide range of features that, if implemented properly, will have the expected performance-enhancing effects. However, several of these features have considerable downside risks. Two of these may be what we have termed *bureaucratic HR* (i.e., a policy of promotion-from-within and a formalized grievance and complaint resolution procedure). On the one hand, promotion-from-within is consistent with an effort to develop core competencies among employees, encourages greater employee commitment, and increases the returns to investments in firm-specific skills (Pfeffer, 1994). Formalized grievance procedures, in turn, reinforce an environment that encourages equitable treatment of employees (Ichniowski, 1986). On the other hand, if not properly implemented, a promotion-from-within strategy can reflect an entitlement culture, not unlike what might be expected in the public sector. Similarly, formalized grievance procedures could provide so much protection that

legitimate performance-based decisions are difficult to implement. Interestingly, in several other studies (Arthur, 1992, 1994; Ichniowski et al., 1997), both of these dimensions were elements of more rigid HRM systems often associated with unionized environments. This suggests the need for caution in the adoption of such procedures. There is no doubt that very successful firms would score high on these two dimensions. Nevertheless, the more common experience appears to be one where these elements of the HRM system are an impediment to higher firm performance.

Managerial Compensation as a Separate SubSystem

We have also made an effort to determine if a major component of a HPWS, the use of incentive compensation for managers, has an independent effect on firm performance. Using the 1994 survey data, we constructed (Becker & Huselid, 1996) a separate set of measures (Table 5) broadly representing managerial compensation (exempt employees). Both firm market value and accounting profits were used as dependent variables in the firm performance models described previously. In each model, three of the six compensation policies were individually significant at conventional levels. While all six measures were jointly significant

Table 5. Items Contained in the Exempt Employee Compensation Scale

Total Compensation Percentile	If the market rate for **total** compensation (Base + Bonus + Benefits) is considered to be the 50th percentile, what is your firm's **target percentile** for **total** compensation?
Cash Bonuses	What proportion of the workforce is **eligible** for **cash** bonuses based on **individual performance or company-wide productivity or profitability?**
Deferred Bonuses	What proportion of the workforce is **eligible** for **deferred** bonuses (placed into pension or 401k plans) **based on individual performance or company-wide productivity or profitability?**
PA Differentiation	What proportional **change in total compensation** could a **high performer** normally expect **as a result of a performance review?—Minus —**What proportional **change in total compensation** could a **low performer** normally expect **as a result of a performance review?**
Total Pay At Risk	What proportion of the average employee's **total compensation** is accounted for by **cash bonuses plus deferred bonuses?**
Share Ownership	What proportion of the workforce **owns shares of the company's stock?**

in both models, the hypothesis that the coefficients were equal could not be rejected in either case. Therefore, the compensation measures were summed in one index of managerial compensation. A one standard deviation increase in a firm's managerial compensation index is predicted to increase the firm's market value (conceptually, the present value of current and anticipated cash flows) by 19% and accounting profits (current cash flow) by 27% (Becker & Huselid, 1996). Perhaps more importantly, unlike prior compensation research, these estimates are independent of other characteristics of the firm's HRM system.

Our results demonstrate that, other things equal, firms with managerial compensation systems emphasizing high pay levels relative to the market, performance-contingent incentive compensation, and stock ownership are significantly more profitable than firms without such emphases. The average firm market value/per employee was $332,000 in this sample. The effect of a one-standard deviation increase in the managerial compensation index is an increase of $63,000 per employee in market value for the average firm. Recall that since the dependent variable reflects "net" cashflows, these effects already incorporate any costs associated with this new compensation system. While the effects on the market measure of firm performance reflect the present value of a cumulative effect, the accounting measure of profits describes the single year effect. GRATE is a percentage where the numerator is a measure of annual cash flow. A one standard deviation increase in the managerial compensation measure increases GRATE by 2.3 percentage points, which represents approximately 27% of the sample mean of 8.3%. To transform these effects into dollars, we used the numerator of GRATE on a per employee basis, which averages $17,592 per employee in this sample. A 27% change in that value is $4,752 in annual profits per employee.

These are dramatic effects. Are they plausible? We believe that they are. These effects imply that the form and structure of the compensation system for the *entire* managerial workforce can have a meaningful impact on firm performance. It is much more difficult to implement these policies for all managers than it would be for the CEO or the top management team. We also believe these effects represent the commitment and culture required to effectively bring all levels of management into the strategy implementation process. Therefore, there are certain barriers to entry that can create an opportunity for a sustained competitive advantage. Second, we have used standardized measures of the managerial compensation system and other HRM variables that emphasize relative positioning compared to a firm's competitors. Given that one unit is equivalent to one standard deviation, the average firm would be predicted to observe these effects by moving from the 50th to the 84th percentile in their managerial compensation system. However, a one-standard deviation change in the managerial compensation measure is not easily accomplished, which is another reason why the effects are so large. For example, our compensation variable consists of six standardized compensation policies. Each of them would have to be changed by one-standard deviation (or an equivalent combination) to obtain the effects described above. This represents a wide

Table 6. Questionnaire Items and Scale Construction

Questionnaire Item	Alpha
HR System	.71
For the five positions that your firm (or business unit) hires most frequently, how many qualified applicants do you have per position (on average)?	
What proportion of all new hires have been selected based primarily on the results of a validated selection test?	
What proportion of nonentry level jobs have been filled from within in recent (i.e., over the last five) years?	
What proportion of the workforce is promoted based primarily on merit (as opposed to seniority)?	
What proportion of the workforce is included in a formal written human resource or staffing plan that includes recruitment and succession?	
How many hours of training are typically received by a new employee in the first year of employment?	
How many hours of training per year are typically received by an experienced employee (i.e., someone employed more than one year)?	
What proportion of the workforce is qualified or capable (either through training or job rotation) to perform more than one job?	
What proportion of the workforce regularly receives a formal performance appraisal?	
What proportion of the workforce has their merit increase or incentive pay determined by a performance appraisal?	
What proportion of the workforce holds jobs where an employee's performance appraisal is primarily determined by an objective measure of individual performance (e.g., sales, number of claims processed, etc.)	
If the market rate for total cash compensation is considered to be the 50th percentile, what is your firm's target percentile for total cash compensation?	
What proportion of the average employee's total compensation is accounted for by CASH + DEFERRED BONUSES.	
What proportion of the workforce is eligible for annual cash incentive plans, profit-sharing plans, and/or gain-sharing plans?	
What proportion of the workforce is eligible for annual deferred incentive plans, profit-sharing plans, and/or gain-sharing plans?	
If your firm's actual financial performance was 50% below its target level, by what proportion would the target incentive be decreased?	
If your firm's actual financial performance was 50% above its target level, by what proportion would the target incentive be increased?	
What percentage merit increase could a high performing employee normally expect as a result of a performance review?—MINUS—What percentage merit increase could a low performing employee normally expect as a result of a performance review?	
What proportion of the workforce owns shares of the company's stock?	
What proportion of the workforce is included in a formal information sharing program (e.g., a newsletter or regular meetings) that provides information on a wide variety of topics relevant to the business and its operations?	
What proportion of the workforce is regularly administered attitude surveys?	
What proportion of the workforce holds jobs that have been subjected to a formal job analysis?	
What proportion of the workforce participate in Quality of Work Life (QWL), Quality Circles (QC), and/or labor-management participation programs?	
What proportion of the workforce has access to a formal grievance procedure and/or complaint resolution system?	

(continued)

Table 6. (Continued)

Questionnaire Item	Alpha
Effectiveness & Alignment	.90
To what extent does your firm effectively hire qualified employees?	
To what extent does your firm structure jobs and work in a way that enhances business performance?	
To what extent does your firm provide employee training that effectively enhances business performance?	
To what extent does your firm's performance management and appraisal system effectively reward employee behaviors that are consistent with the firm's competitive strategy?	
To what extent does your firm effectively distribute rewards based on individual and team contributions?	
To what extent does management effectively address chronically poor performing employees?	
To what extent does your firm effectively communicate important organizational information to employees?	
To what extent does your firm effectively elicit and act on suggestions and feedback provided by employees (e.g., though employee surveys and suggestion systems)?	
To what extent does your firm effectively address workforce diversity issues related to gender, race, age, physical challenge, etc., as an integral part of its HR strategy?	
To what extent are HR managers throughout the firm viewed by those outside the function as partners in the management of the business and agents for change?	
To what extent does your firm make an explicit effort to align business and HR strategies?	
To what extent is the HR department involved in your firm's strategic planning process?	
To what extent is HR (i.e., the people side of the business) seen primarily by senior management as a cost to be minimized versus a source of value creation throughout the organization?	
How well or poorly does the following statement describe the executive leadership in your firm? They are vision setters: studying emerging trends, and concentrating on the formulation and communication of basic organizational purpose and direction.	
How well or poorly does the following statement describe the executive leadership in your firm? They are sources of motivation and energy for the rest of the organization: challenging people with new goals, emphasizing company values, and getting people to be enthusiastic.	
To what extent does your firm have a clear strategic mission that is well communicated and understood at every level throughout the firm?	

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Table 7. Effects of One Standard Deviation Increase in 24 item HPWS Index (1996 survey)[a]

	In Market Value	In Market Value/Book Value	Gross Rate of Return on Assets	Sales per Employee	Turnover Rate
Percent effect of 1 SD increase in the HR system index	24%***	17%***	25%**	4.8%*	−7.6%**

Note: [a] The model used to estimate these results include as control variables: firm employment, percentage unionization, R&D expenses/ sales, firm specific risk (beta), 5 year percentage sales growth. When *In* Market Value or Gross Rate of Return is the dependent variable, *In* book value of net plant and equipment is also included as a control.
* $(p. < .10)$
** $(p. < .05)$
*** $(p. < .01)$

ranging commitment to using compensation as a strategic variable and not just a fine tuning of a bonus system.

1996 Survey

Our 1996 survey (for 1995 HRM systems) was the most comprehensive to date. It continued to broaden our measure of the HRM system, yet at the same time was detailed enough to provide a separate measure of the extent to which this system was effectively implemented and aligned with other organizational policies (Table 6). The HRM system index now includes 24 items (Cronbach's $\alpha = .75$). This broader measure continues to demonstrate the same strong positive relationship with firm financial performance as did the earlier measures. Using models similar to those described above, other things equal, firms with a one standard deviation higher value on the HPWS measure have 24% higher market value of shareholder equity and 25% higher accounting profits in 1995 (Huselid & Becker, 1997). Equally meaningful relationships were observed using sales per employee, market/book value and employee turnover as dependent variables (Table 7). We would caution that while these are substantial effects, they reflect the equivalent of meaningful changes across 24 elements in the firm's HRM system.

The Role of Inter- and Intra-Industry Differences in HPWS Strategies

One of the advantages of a national survey is that it provides some indication of the diffusion of HPWS across firms. Given our use of a continuous HPWS index we have not established an a priori threshold of how much of such a system a firm must adopt to qualify as a high-performance work system. At minimum, however,

Table 8.   24-item HPWS Index by Industry
Classification of Respondent (1996 Survey)

Industry Classification—SIC code	Mean Index Value	Standard Deviation Within Industry Category	Percentile Within Sample	Number of Observations
Mining and Extraction—1000	-.1569	.414	33.1	30
Nondurable Manufacturing—2000	-.0368	.395	45.7	82
Manufacturing—3000	-.0049	.368	49.2	241
Transportation and Communication—4000	.0208	.422	51.9	71
Wholesale/Retail Trade—5000	-.0250	.279	47.0	75
Financial Services—6000	.1202	.327	64.0	109
Services—7000	.0079	.374	50.4	48
Health Care—8000	-.0673	.320	42.4	35
Total	.0026	.366	na	691

the prior results suggest that more is better and it is useful to get some sense of whether there are meaningful interindustry differences in the development of these HRM systems. Table 8 describes the mean values of the 24-item 1995 HPWS index by one digit standard industrial classifications (SIC). Since the index is created by summing standardized variables with zero mean and unit standard deviations, the overall index mean is nearly zero (.0026) with a .367 standard deviation. Despite the fact that there is a statistically significant ($F_{7,683} = 2.88, p > .006$) difference in the HPWS index means across industry categories, except for Financial Services and Mining-Extraction the industry averages are remarkably similar. Financial Services as an industry segment appears to farthest along the high-performance continuum, but still their industry average is just at the 64th percentile for the entire sample.

Ignoring Mining and Extraction, which is very capital intensive and probably would not be expected to enjoy the same benefits from a HPWS as a less capital intensive industry might, we can also calculate the economic implications of these industry differences. For example, the differences between the average index value of Health Care and Financial Services, the two ends of the continuum, is approximately one-half a standard deviation in this sample (.187/.366). Based on the estimates reported above, this would suggest that firms in the Health Care industry, other things equal, have 12–13% lower market value and accounting profits than those in Financial Services, *ceteris paribus*, simply due to their more limited strategic use of HRM systems. This, of course, makes rather strong assumptions that our models have sufficiently captured other interindustry differences related to both HRM practices and profitability so that our estimates do not reflect such differences.

Table 9.   The Effects of HPWS Index on Firm Performance Manufacturing and Nonmanufacturing Industries (Standard errors in parentheses)

Sector Model[a]	Dependent Variables				
	ln Market Value (1000s)	ln Market Value/Book Value	ln Sales/ Employee (1000s)	Gross Rate of Return	Turnover
Manufacturing	.532***	.329**	.459***	.094**	-6.53***
	(.179)	(.179)	(.135)	(.051)	(2.11)
Sample Size	268	268	310	264	311
Adj. R^2	.678	.142	.155	.191	.048
Nonmanufacturing	.559**	.391*	.169*	.095*	-4.16*
	(.237)	(.268)	(.117)	(.067)	(2.87)
Sample Size	280	275	348	264	363
Adj. R^2	.449	.168	.297	.078	.393

Note: [a] The estimation model on which these results are based is the same base model used for the other estimates.
* ($p. < .10$)
** ($p. < .05$)
*** ($p. < .01$)

While the sample size precludes any detailed evaluation of differences in the strategic impact of HRM systems within industry groups, we are able to make some comparisons across broad categories such as manufacturing and nonmanufacturing. Table 9 reports the coefficients on the 1995 HPWS index variable using five different dependent variables and estimation equations similar to those described above. Using the natural log of market value, the natural log of market value/book value, and gross rate of return on assets (GRATE) as measures of financial performance, we found no economically significant differences in the effects of the HRM system across these industry groups. By contrast, more comprehensive use of HPWS apparently provides slightly larger benefits in terms of turnover and employee productivity in the manufacturing sector. The differences in sales/employee are the most striking particularly considering that since the dependent variable is expressed in natural logs, the coefficients represent percentage effects.

A multi-industry sample also provides an opportunity to explore the potential role of HPWS as source of competitive advantage both across industries and within industries. While we consider this analysis entirely exploratory it does provide some interesting contextual background to a literature that has largely focused on one industry or a narrow set of firms. Our basic question was the extent to which the strong positive relationship between HPWS and firm performance is a characteristic of individual firms, or largely a function of firms in the same industry pursuing similar HRM strategies. To evaluate this query we first constructed mean HPWS values for all 1- and 2-digit SIC classifications in our sam-

ple. Where the 2-digit classifications resulted in too few observations, they were combined with neighboring classifications within the same 1-digit code. The result was 35 2-digit classifications. The ith firm's HPWS index (A) was decomposed as follows:

B. HPWS mean for 1 digit SIC industry of ith firm

C. HPWS mean for 2 digit SIC industry of ith firm minus B

D. HPWS index for ith firm (A) minus C

The HPWS index value (A) for the ith firm equals B + C + D. The intent is to get a better understanding of what is driving the influence of HPWS on firm performance. Is it largely due to industry differences in HRM practices at the 1- and 2-digit level? If so, then most of the HPWS effect will be reflected in B and C. However, the less the HPWS-firm performance relationship is linked to industry prac-

tices, and more a firm specific decision, the more the HPWS effect will be concentrated in D.

The results of this analysis are reported in Table 10. Column 1 reports the base model with the 24-item HPWS index as the measure of the HRM system for the ith firm as a comparison. Columns 2 and 3 decompose the index (A) into B, C, and D as defined above. Column 3 includes the 35 2-digit industry dummies to provide the most conservative estimates. First, it is clear that most of the variation in firm level HPWS is between firms at the 2-digit industry group (and probably more detailed level). This is what one would expect if a HPWS were a potential source of firm level competitive advantage. The effects of component D, the deviation of the firm's index value from the 2-digit mean, has essentially the same effect as the full index measure in Column 1, whether we use the estimate in Column 2 or Column 3.[9] This again provides some confidence that we are not simply observing an industry practice, but rather a firm level effect.

The effects for component C, the difference in mean HPWS between the 1- and 2-digit industry classifications of the *i*th firm, add another 9–12% improvement in market value for a one standard deviation increase in this differential. This suggests that customary industry practices, whether institutionally or technologically determined, are economically important, but that firm level HRM strategies have more than twice the impact on a firm's financial performance.

New Efforts to Measure Fit and Complementarities

The results to this point strongly support the conclusion that "more is better" when our measure of the HRM system is a summed index. However, while using an index allows for equifinality, it does not provide a direct test of whether there is a "best" way to achieve "more." One the one hand, we believe that many of the elements of the HRM system described by the 24-item HPWS index are a "best practice" in the sense that they are foundational and a necessary, but not sufficient condition, for a strategic impact. Firms farther along the HPWS continuum have developed the foundation of a competitive advantage, but without the proper firm specific alignment of these policies with one another and the firm's strategic objectives, the full benefits will never be observed. Unfortunately, direct measures of alignment and fit are very difficult to collect in multifirm mail surveys and the reliable estimates of these effects are a continuing challenge. This section describes new work that attempts to provide at least a partial answer to the role of fit.

Equifinality vs. Systematic Increases in HPWS

One of the ways to test for the presence of potential complementarities is to determine if it makes a difference whether a firm moves along the HPWS continuum through equivalent increases across all elements of the system or simply

Table 10. Role of Inter-industry Differences in Strategic Impact of HPWS (1996 Survey)

HPWS Characteristics	Natural Log of Market Value (in 1000s)[a] (Mean = 12.29)		
	Base Model	Without 2-digit Industry Dummies	2-digit Industry Dummies Included
A. Firm Level 24 item HPWS Index	.594**		
mean value = .0000	(.152)		
B. Mean HPWS for 1 digit SIC code		.628	−.0007
		(.903)	(1.612)
mean value = −.0002			
C. Mean HPWS for 2 digit SIC code minus (B)		.914**	.721*
		(.412)	(.513)
mean value = .0009			
		.607***	.585***
D. (A) minus Mean HPWS for 2 digit SIC code		(.158)	(.158)
mean value = −.0001			
Adj. R^2	.555	.537	.553
Sample size	548	548	548

Note: [a] The estimation model on which these results are based is the same base model used for the other estimates.
 * (p. < .10)
 ** (p. < .05)
 *** (p. < .01)

Table 11.   Tests for the Role of Equifinality
in the Effects of HPWS (1996 Survey)

	Dependent Variable			
	Natural Log of Market Value[a]			Homogeneity Index
HPWS Measures	(1)	(2)	(3)	(4)
24-item HPWS index	.594***		.246	7.95***
	(.152)		(.270)	(.194)
Homogeneity Index (each of 24 HR elements > = the 75th percentile adds 1.0 to index) (mean = 8.81)		.0672***	.0454*b	
		(.0164)	(.0290)	
Adj. R^2	.554	.556	.556	.706
Sample size	548	· 548	548	699

Note: [a] The estimation model on which these results are based is the same base model used for the other estimates.
   [b] Joint F test (2,505) = 8.83; p < 001.
   *(p. < .10)
   **(p. < .05)
   ***(p. < .01)

emphasizes a few elements and realizes a dramatic improvement in firm performance. We developed a simple test using a similar specification as Ichniowski et al. (1997). A new variable (i.e., homogeneity index) measures the extent to which the usage of each element in the HRM system exceeds the 75th percentile in the sample. For each of the 24 elements that is used at a rate beyond the 75th percentile, the homogeneity index increases by 1.0. The mean and standard deviation of this measure is 8.31 and 3.68, respectively.[10] Table 11 reports our findings.

The first measure of their respective effects is based on a comparison of their implied effects in separate regressions (columns 1 and 2). While the coefficient on the Homogeneity Index is much smaller, the effect on market value of a one standard deviation change in the HRM system is approximately 15% larger (24.7% vs. 21.6%) for the Homogeneity index than the HPWS index. Alternatively, the high intercorrelation between the two measures indicates that they move together very closely. While the point estimates in Column 3 are somewhat unstable as a result, combined with the result in Column 4, it is possible to approximate how much of the benefits from an improved HPWS are associated with homogeneous increases. These calculations indicate that of the 22% gain associated with a one standard deviation change in the HPWS index, about two-thirds of this change appears to be attributable to the indirect effect of a more homogeneous and balanced HRM system. Such results are at best exploratory, but they do provide some additional support for the hypothesis that "internal" complementarities are important.

External Complementarities Between HRM and the Larger Organization

In addition to a more detailed depiction of the HRM system, the 1996 survey also included a much larger range of questions on the "organizational logic" that would be expected to support and leverage a HPWS (see Table 6). This contextual alignment includes the functional effectiveness of the HRM function, the involvement and alignment of HRM with the firm's business strategy, the role of the HRM function in the organization (as a business partner), and the leadership style of top management including the success in communicating the firm's mission. We believe that each is an integral part of an organizational context that supports and reinforces the returns from a high-performance HRM system. Prior work (Arthur, 1992; MacDuffie, 1995; Youndt et al., 1996) often tests the effects of two alternative HRM systems. However, rather than substitutes, we consider the HRM system and supporting organizational logic to be separate elements in a high performance organization. Sixteen items were used to construct an Effectiveness and Alignment index with a Cronbach's alpha of .90. We formally tested the assumption that the two indexes represented separate factors with a maximum likelihood confirmatory factor analysis. The one factor hypothesis was rejected with a $X^2 = 372$, $p < .001$.

When the HRM system and Effectiveness and Alignment indices are included as separate variables in a model with market value as the dependent variable, both coefficients are statistically significant ($p < .01$, one-tailed test) and reflect economically meaningful relationships with firm performance (Huselid & Becker, 1997). However, the 1996 survey also includes a question that asked respondents to rate the quality of *other* functional areas (in the aggregate) within their firm relative to those same functions in their direct competitors.[10] Controlling for the effects of "other management functions" has virtually no effect on the relationship between the HPWS system and firm performance. However, the coefficient on the Effectiveness and Alignment falls by nearly 70% and is no longer statistically significant. The effect on the Effectiveness and Alignment variable reflects the high correlation between the index ($r = .51$) and the quality ratings for other management functions.

Cluster Analysis as a Test for Complementarities

The theoretical frameworks underlying the potential strategic impact for HRM highlight the importance of a system of practices and policies that are internally consistent within the HRM system, yet appropriately aligned with non-HRM policies. At the level of one firm, and perhaps a narrow range of jobs within one industry, a priori specification of this system may be feasible. At the more general level, across multiple firms and industries, our theories provide only broad guidance as to the nature of a HPWS. Theory development at that level requires considerably more empirical work that focuses on two research questions:

- Is there any systematic evidence that distinct "bundles" or systems of HRM practices currently exist?
- If there are distinctly different HRM systems in practice, does the choice of HRM systems have an impact on firm performance?

The 1996 survey provided data on 40 elements of the HRM system and surrounding "organizational" logic in sufficient detail to address these two questions.

While we continue to find strong positive relationships between the more detailed HPWS indices and firm performance, those results tell us little about the appropriate mix of practices *within* a HPWS. The apparent importance of "homogeneous" systems described earlier is at best suggestive. In an effort to provide a clearer picture of the whether different "bundles" of HRM practices actually exist, we analyzed the 40 elements of the HRM system and Effectiveness and Alignment indices using cluster analysis (Huselid & Becker, 1997). The important advantage of cluster analysis is that it analyzes the data from the theoretically appropriate perspective; namely, at the level of the system rather than at the level of the practice. Firms are sorted into groups that use a common mix or bundle of HRM practices and policies. In contrast to factor analysis, which focuses on commonalities across individual HRM policies, the emphasis in cluster analysis is on identifying commonalities across entire HRM systems. While the limitations of cluster analysis are familiar, they are mitigated in this literature for two reasons. First, we do have a sufficiently developed theoretical literature to evaluate the plausibility of the resulting clusters. Second, and more important, we only rely on cluster analysis to answer the penultimate research objective. The ultimate question, and in fact the basis for a validation of these clusters, is whether there is a relationship between firm performance and the choice of a particular HRM system (cluster). A clustering result that is largely arbitrary will not reflect important underlying firm characteristics, and therefore would not be expected to have an economically meaningful relationship with firm performance.

The firms in our sample combined HRM system and Effectiveness and Alignment dimensions in four distinct ways. The first of these, the Personnel cluster, is characterized by firms that are well below average on *both* dimensions. These firms have neither developed an HRM system that can build on the skills and motivation of the labor force as a source of competitive advantage, nor have they aligned the remainder of the organizational context with the principles of a high-performance work organization. We use the term Personnel to characterize an approach to both the HRM system and the workforce that gives both a low priority in the strategic success of the organization. The next two clusters, Alignment and Compensation, occupy the middle range of the cluster results. Each is above average on one of the two dimensions, but below average on the other. The Alignment cluster is generally above average on the variables that comprise the Effectiveness and Alignment index, but below average on the variables that make up the HRM System index. These

Table 12. HR System Distributions Within Industry Classification of Respondent (1996 Survey)

Industry Classification—SIC code	Personnel	Alignment	Compensation	High Performance	Number of Firms
Mining and Extraction—1000	43.3	20.0	13.3	23.3	30
Nondurable Manufacturing—2000	17.3	30.9	11.1	40.7	81
Manufacturing—3000	24.5	17.0	21.6	36.9	241
Transportation and Communication—4000	31.0	18.3	11.3	39.4	71
Wholesale/Retail Trade—5000	28.0	9.3	18.7	44.0	75
Financial Services—6000	17.6	16.7	16.7	49.1	108
Services—7000	35.4	20.8	18.7	25.0	48
Health Care—8000	25.7	25.7	17.1	31.4	35
Total	25.2	18.7	17.4	38.6	689

Note: Taken from Becker et al. (1997).

are firms that appear to have implemented the supporting organizational logic, but without fundamental changes in the HRM system. In short, these firms "don't walk the talk." Alternatively, the Compensation cluster is above average on the HRM system variables, but below average on the Effectiveness and Alignment variables. We refer to this cluster as the Compensation cluster because the primary reason for the high value of the HRM system index in this cluster is the very high values on the compensation variables. These firms rely overwhelmingly on a strong pay-performance link to enhance the performance of the workforce. For example, firms in the Compensation cluster have much higher scores on policies that provide bonuses and incentive pay, as well as policies that make meaningful pay distinctions between high and low performers. Finally, the High-Performance cluster is well above average on both indices. This is the system that theoretically would be expected to have the greatest effect on firm performance.

Table 12 describes the distribution of these four HRM strategies within major industry classifications. The X^2 (21) = 37.9 (p = .013) for this distribution indicates that the choice of HRM systems varies significantly across industries. Interestingly, the two ends of the continuum (High-Performance and Personnel strategies) are the most common systems overall. Personnel strategies are the most common, and High Performance systems least likely, in Mining and Services. The Compensation strategies are most common in durable goods Manufacturing, and least likely in Transportation/Communication, Nondurable Manufacturing and Mining. The Alignment strategy is most heavily used in Nondurable Manufacturing. High Performance strategies are the most common

systems outside of Mining and Services, and are the most widespread in Financial Services.

The advantage of the cluster analysis is that it does not impose any a priori constraints on the nature of the complementaries between the HRM system and the "organizational logic" supporting that system. For example, instead of the four clusters simply reflecting the same relative changes in those two features as we move from the Personnel to the High-Performance cluster, the cluster results indicate that there are two subsets of firms that pursue dramatically different strategies. One emphasizes a stronger pay-performance link, the other a much stronger emphasis on changes in organizational logic supporting HRM, but one that does not change the underlying HRM system. This mix of roles may be an indication of potential complementarities. The point estimates indicate that firms in the High-Performance, Compensation, and Alignment clusters had 63%, 43%, and 32% higher market value, respectively, compared to firms in the Personnel cluster (Huselid & Becker, 1997).

Another simple test for the presence of complementarities is to determine if the "whole is greater than the sum of the parts" for each cluster. For example, including the HRM system Index and Effectiveness and Alignment Index as separate variables in the base market value model allows us to estimate the market value gains from improving each of those indices separately. Those effects would be the additive effects of improvements on either dimension. Likewise, each of the four cluster results has a mean HRM system and Effectiveness and Alignment Index value associated with it. From those mean values we can calculate how much of a difference in the effect on firm performance we could expect between the Personnel and High Performance clusters based solely on the mean difference in the two indexes, using the additive model described above. Based on the additive model the High Performance cluster should have a 32% higher market value than the Personnel cluster, but in fact the actual difference is 41%. We would argue that this 21% (9/32) relative difference reflects a synergy between the two HRM System and Effectiveness and Alignment strategies, one that does not exist when those synergies are measured as interaction effects (Huselid & Becker, 1997).

The cluster results indicate that, in practice, firms in our sample have taken two routes to a high performance HRM strategy. One, the High Performance cluster, is consistent with our theoretical expectation that both the HRM System and Effectiveness and Alignment matter. The above average levels of both strategic dimensions in this cluster is consistent with complementarities that are both difficult to implement and imitate. The presence of complementaries is further supported by the effect of this cluster exceeding the summed effects of the two strategic dimensions. The second strategy, the Compensation cluster, was about 75% as effective, though the point estimates were statistically indistinguishable. This suggests to us that incentive compensation and performance management systems, while effective, are also relatively easy to replicate. The difference in economic returns between

the Compensation and High Performance clusters may therefore reflect the marginal economic returns to those firms who have tailored their compensation practices more closely with their competitive strategies and operational goals. It has been our experience that such systems are much more difficult to successfully replicate.

Clusters and Configurations

The respective effects of the different HRM clusters on firm performance raises the question of how, and if, a firm can improve upon their particular HRM system short of fully transforming into a different system. This is a variant of the configurational hypothesis that any deviation from an ideal type would undermine the complementarities within the system. A further analysis of the cluster data suggests for at least two systems, High Performance and Personnel, improvement within these systems is possible. For example, even though each cluster solution represents systematic differences in the average values of the constituent HRM and organizational policies, there is a surprising amount of within-cluster variation in the configuration of those policies. The diversity of these configurations is reflected in the standard deviation of standard scores across practices within each firm's index. Surprisingly, there is as much system diversity (HPWS and Effectiveness and Alignment) within clusters as there is within the entire sample.

We explored potential policy options, given cluster membership, by including both HRM indices in firm performance models (market value) that also included three dummy variables indicating High-Performance, Alignment, and Compensation systems. While the Effectiveness and Alignment index was economically and statistically insignificant in this model, the HPWS index was statistically significant at conventional levels ($p < .05$, one-tailed test) with an effect size approximately 60% as large as the HPWS effect in the base models. In other words, improvements along the high performance continuum continued to benefit these organizations, even after we controlled for the influence of cluster configuration. Moreover, these effects were not constant across all clusters. There were significant *negative* interaction effects between HPWS and the Alignment and Compensation cluster. The net result was that for the High Performance and Personnel clusters, improving the HRM system along the high performance continuum yielded economically significant returns approximately equal to the base model in Table 7.[12] The net result of such a change in the Alignment or Compensation clusters was a slight *negative* effect on firm performance.

SUMMARY AND IMPLICATIONS FOR FUTURE RESEARCH

What We Know

Despite the growing academic and practitioner interest in strategic HRM, what we can say with confidence about the HRM-firm performance relationship is actu-

ally quite limited. Theoretically, there is a strong foundation for the expectation that superior human capital strategies will be reflected in valued firm-level outcomes. Empirically, however, we have only begun to "peel back the onion" to gain an understanding of the *processes* through which HPWS add value, as well as to provide significant econometric evidence of the *magnitude* of such an effect. We do know, however, that changing market demands and organizational structures have increased the strategic importance of a skilled and motivated workforce (Pfeffer, 1994). As firms move away from centralized command and control management structures, HPWS should be able to provide a significant, and increasingly important, source of value creation. Within this context, a firm's workforce, and its systems for managing people, are seen as an investment rather than a cost to be minimized. Much more than simply following orders or simple job routines, employee performance reflecting the discretionary application of employee "local knowledge" constitutes the firm's intellectual capital. A HPWS serves both to develop and motivate the optimal deployment of that intellectual capital.

Beyond the explicit internal and external alignment of the elements of a HPWS, many of the functional recommendations that can be derived from this line of research are entirely consistent with familiar principles of sound HRM, including:

- careful selection and hiring that is consistent with the firm's competitive strategy and operational goals;
- reward systems that reflect the elements of successful strategy implementation in appraisal systems and compensation; and
- development strategies that emphasize training and performance management systems guided by business objectives.

There is more tentative evidence that it is more effective to improve the elements of the HRM system systematically and holistically than to optimize individual elements of the system. For example, in our most recent work we have found that the most effective human capital strategy appears to include both a high-performance HRM system as well as the appropriate supporting "organizational logic"; however, a strategy that focused primarily on the pay-performance linkage has nearly 75% of the effect on firm performance. While we would advise firms to pursue systemic solutions to the human capital elements of their business strategies and operational goals, this finding is consistent with the central role of pay in prior strategic HR research.

Future Research Directions

We have gained a considerable understanding of the HRM-firm performance relationship in the last 10 years, though many questions remain. While our work examines the links between the HRM system and firm performance (Figure 1), we believe that the paths through which any effect actually develops, and subse-

quently the implications for management, necessarily operate at lower levels of analysis, including the individual. As a result, one of the most important gaps in this literature is the absence of good empirical work that links the levels of analysis implied in Figure 1 (i.e., from HRM system → Employee Behaviors → Strategy Implementation → Operating Performance → Firm Performance). This not only will require more labor intensive and case intensive research methodologies, but also a wider range of dependent variables. As a practical matter, we believe that one promising approach to the development of such models is the application of the *Balanced Scorecard* framework (Kaplan & Norton, 1996) to this literature. The balanced scorecard is a model of organizational measurement and change management that emphasizes measures of strategy implementation across the people, operations, customer, and financial dimensions of the firms and how they link together for successful strategy implementation, and ultimately firm performance. HPWS are a natural foundation for the development of the "people dimension" of this implementation process, and we would expect future research that marries these two perspectives to be very fruitful.

A clearer sense of the full causal model from HRM system to firm performance will also no doubt make it easier to overcome one of the most significant challenges in this literature, overcoming the inherent problems of organizational change. Cross-sectional research implicitly uses between-firm variance to simulate the potential impact of a change in a firm's work system on its subsequent financial performance. This approach assumes that such changes in the work system are possible. Despite the growing empirical support for a broad HRM-firm performance relationship, getting "from here to there" is not easily accomplished (Pfeffer, 1996), and if in fact it were, it would likely be just as easily replicated. While not the only barrier, we believe that the prospects for successful change are significantly increased as the "line of sight" improves between the HRM policy changes and firm performance. As the strategic HRM literature more clearly defines that relationship, using a hierarchical and organizationally relevant set of dependent variables such as those suggested by Kaplan and Norton's (1996) Balanced Scorecard approach, the benefits of change should become more apparent. This perspective will also force HRM and operating managers to think of the HRM in the same way and increase the prospects that HRM managers will get the necessary organizational support required to embed the change in the operations of the firm.

Another aspect of this literature that has gotten little attention, but which will also have an influence on the prospect for change, is the extent to which the value created by a HPWS or other relevant organizational innovation is shared with the employees. A HPWS is premised on the assumption that an organization's employees are more than a cost to be minimized, but rather a potential source of competitive advantage. A properly implemented HPWS creates a firm specific relationship between employees and shareholders, similar to a bilateral monopoly. Shareholders can not appropriate all of the gains from this relationship without

losing the cooperation of the employees. The gains to employees could take the form of both greater employment security and higher compensation and benefits. While Huselid (1995) provides some limited evidence of a positive HPWS-pay relationship, we have no systematic research on the magnitude of employee gains, or how they might change over time.

Finally, the diffusion of HPWS requires a clearer delineation of how these principles are translated into practice. If this literature is going to make a difference in the strategic role of HRM in most organizations, there needs to be a more careful discussion of implementation issues. In the last section of this paper we highlight several issues that practicing managers should consider as they try to use HRM systems to create value in their organizations. We consider this type of discussion a useful validity check for our academic research as well. If the applications of this literature are not consistent with prior research or are not workable in practice, that should be a signal that we need to reexamine our conceptual frameworks.

MANAGERIAL IMPLICATIONS

The emerging strategic focus of academic HRM research and the accompanying interest in interdisciplinary models and HRM systems is also reflected in applied HRM practice. Special issues of practitioner-oriented journals (see *Human Resources Management*, 1997) are devoted nearly exclusively to how the HR function and HR managers should adapt to the new demands on the profession. For example, Ulrich (1997) described the tension between competing roles of strategic partner, administrative expert, employee champion and change agent. Beer (1997) and Becker, Huselid, Pickus, and Spratt (1997) drew the contrast more simply between a traditional HR emphasis on transactions and compliance versus the strategic role as "business partner." The theme in each of these papers is the same: the need for HR to develop as an effective strategic partner, and how this development can be facilitated. The conceptual literature strongly argues for the importance of developing such a role, and the empirical results point to significant economic returns to the organization for doing so. So, why is it so difficult to implement these ideas in practice?

Becker et al. (1997) and Beer (1997) pointed to two fundamental barriers to such a change: the capabilities of HR managers and the expectations of chief executive officers (CEOs). Both follow from the traditional role of HR in the business that bore little relationship to the strategic success of the firm. In a typical silo-based organization, HR managers were not expected to understand much of the business outside of their own functional area. However, now that product market demands are requiring more from an organization's workforce, and indeed for many firms their labor force is a basis for their competitive advantage, the CEO requires a strategic partner in HR. While a focus on administrative efficiency, and to some extent employee contribution, may be familiar territory to many HR pro-
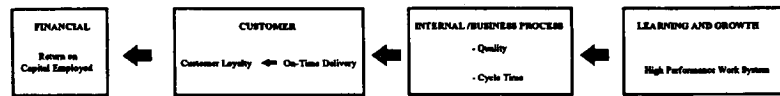
fessionals, a facility with strategy execution and change management is generally much less well developed. For example, drawing on the experience in large publicly-held firms, Huselid, Jackson, and Schuler (1997) reported that most HR managers are very proficient in the delivery of traditional HRM activities, but much less so in what they termed "business-related" capabilities. HR managers were particularly limited in their ability to translate the firm's strategy and operational goals into actionable HR goals, and thereafter to implement those goals. Yet Huselid et al. found that it was just this type of capability that had the strongest relationship with corporate financial performance, and it is just this same domain that represents the area of greatest economic opportunity. They noted that traditional HR skills have not diminished in value, but simply are no longer adequate to satisfy the wider strategic demands on the function.

Implementing the New Strategic Role and HPWS

For HR to become a successful strategic partner and to effectively implement the principles of a high performance work system, HR managers must premise that role and the development of the HR system based on its contribution to effective strategy implementation. This new perspective is the most fundamental of the necessary changes in HR capabilities (Becker et al., 1997). Moreover, if HR can achieve this change in competencies, we believe the strategic expectations and acceptance of both the importance of HR and of the HRM function by senior management will follow.

The guiding philosophy that the HRM system is first, and foremost, a vehicle to implement the firm's strategy provides a definitive answer to the question we hear most often from managers: Where do we begin? HR must begin with an understanding of the firm's strategy, as well as the unit objectives and business problems confronting line managers attempting to implement that strategy. The HR manager then develops an HRM system that addresses the "human capital" impediments to the successful accomplishment of those strategic initiatives facing line managers. As noted above, the Balanced Scorecard approach developed by Kaplan and Norton (1996) is a new approach to managing strategy implementation that highlights this very process. It is an especially useful organizing framework for developing a HPWS because it provides a systematic method to describe and measure effective strategy implementation. It also is premised on an appreciation for the central role of intellectual assets, and by implication the HR system, in building sustainable competitive advantage.

Figure 3 depicts a generic framework for strategy implementation adapted from Kaplan and Norton (1996). While there is no one "best practice" statement of such a model, major areas of attention focus on financial outcomes driven by customer success in targeted markets. Customer success, in turn, is driven by critical internal operations that provide both quality and timely products and services which are themselves driven by the firm's intellectual assets. Financial performance is the

Figure 3.   HPWS role within strategy implementation.

ultimate measure of firm performance and strategic success, but as a lagging indicator these outcomes provide little guidance on the interim objectives required to successfully implement the strategy. The notion of the Balanced Scorecard is described as set of causal linkages among the drivers of firm performance. The Customer, Business Process, and Learning and Growth dimensions are both *outcomes* of successful strategy implementation and *performance drivers* for subsequent variables in the causal relationship. Most important, for our purposes, intellectual capital and the systems that support it are posited as the very foundation of successful strategy implementation.

Kaplan and Norton (1996) suggested that while the major categories are sufficiently broad to fit most companies, the objectives and measures of success within those categories will be firm specific. They further conclude that:

> ...when it comes to specific measures concerning employee skills...and organizational alignment, companies have devoted virtually no effort for measuring either the outcomes or the drivers of these capabilities. This gap is disappointing since one of the most important goals for adopting the scorecard...framework is to promote the growth of individual and organizational capabilities (p. 144).

This, of course, perfectly reflects the historical absence of a strategic role for HR and the HR system. At the same time, it is further confirmation of the significant opportunity facing HR managers.

The entire organization does not have to adopt a Balanced Scorecard for HR to take advantage of this methodology. As a method to management strategy implementation, Kaplan and Norton (1996) envisioned such an approach being introduced from the top down with broadening areas of consensus such that all employees understand how their job and their immediate unit objectives contribute to firm success. This is a new approach, however, and many organizations may never formally go through this process. Nevertheless, the essential precepts can still serve as a guiding framework for the development and alignment of a high performance work system. It means orienting the HR system to answer such questions as:

- What are the firm's strategic objectives?
- How are these translated into unit objectives?

- What do unit managers consider the "performance drivers" of those objectives?
- How do the skills, motivation and structure of the firm's workforce influence those performance drivers?
- How does the HR system influence the skills, motivation and structure of the workforce?

If a firm's HR function hopes to fill in the "black box" in the HR–firm performance relationship, they have to first be guided by these questions, and secondly, be able to answer them. While the strategic integration of HR will be more straightforward in those firms that have committed more broadly to the Balanced Scorecard as an overall management framework, HR can adopt such a perspective independently. It means that HR takes as its strategic objectives, the goal to become a genuine business partner with operating managers and to assume a strategic role that, first and foremost, is a resource that solves real business problems. In Ulrich's (1997) terms, HR becomes a strategic asset that emphasizes "deliverables" rather than "doables." It provides a clear answer to one of HR's most compelling problems; being able to measure results in terms that senior managers value. Adopting this perspective should allow the HRM function to provide a clear and convincing link between the HR system and firm performance by pointing to the cumulative resolution of human capital problems that impeded the successful implementation of the firm's strategy throughout the organization.

CONCLUSION

Researchers in strategic HRM, as well as HR managers attempting to play a strategic role in their organizations, are facing remarkably similar challenges. Both traditional HR research and the traditional HR function could successfully emphasize a rigorous focus on individual HR policies and comfortably ignore all but the most casual attention to the effect of these policies on the larger success of the organization. Such an approach was entirely appropriate in an economic environment with limited demands for change, where products and services were not "knowledge" driven, and a firm's labor force was a factor of production, but rarely a source of competitive advantage. The new economic environment, however, has provided an opportunity for the HR function, and more generally the HR system, to play a strategic role in the organization. Just as this means a broader understanding of the business and its strategic goals for HR managers, research in strategic HRM must necessarily reflect a similar interdisciplinary focus and measures of strategic success.

Research at multiple levels of analysis provides strong support for the thesis that the HR system can have a strong, positive influence on firm performance. Future work, however, must do a much better job of specifying *how* these high perfor-

mance HR systems should be configured, and most importantly, *how* they are embedded within the larger strategy implementation process. This, of course, is exactly the challenge confronting HR managers under pressure to craft a HPWS in their own firm. Researchers and HR managers will benefit most from new theoretical and empirical work that continues to broaden the focus of HR research and attempts to integrate HR more fully into the essential strategic foundation of the organization. This also represents a unique opportunity for a mutually beneficial collaboration between researchers and HR managers that will result in both better theory and better practice.

NOTES

1. Recent work in the contracting literature provides important insights into the appropriate rewards and appraisal systems that will encourage those behaviors. See Brickley, Smith, and Zimmerman (1997) for an overview of this literature. Also Ichniowski, Shaw, and Prennushi (1997) as it applies to the HRM-firm performance question.

2. MacDuffie (1995) also used cluster analysis, but as method to validate a theoretically determined set of bundles. Unlike Arthur (1992) and Becker and Huselid (1997) the clusters are not taken as the measure of the HRM system.

3. System measures of internal fit tend to rely on weaker specifications of these complementarities, in the form of additive models. The interaction terms are typically two-way, or occasionally three-way, interactions (MacDuffie, 1995), but never the strictly system-wide multiplicative relationships implied by Milgrom and Roberts (1995).

4. Delery and Doty (1996) also tested for HRM-Corporate strategy contingencies, but they do not take a systems approach. Rather they measure seven individual HRM practices and find evidence of significant interactions with strategy decisions for just three of them, and one of these (with participation) is negative.

5. Arthur's (1992, 1994) response rate for steel mini-mills (> 50%) was not as high as the plant level studies by MacDuffie (1995) and Ichniowski et al. (1997), but considerably higher than subsequent studies.

6. This would not, of course, eliminate potential interaction effects that might exist. For example, if all responding firms employed more than 1,000 and the HRM system had different effects in firms with employment less than 1,000, even controlling for firm size would not eliminate this aspect of response bias. However, this is probably a limited threat to the validity of these estimates since we have few theoretical reasons to predict many of these specific interactions and these sample typically include firms with the full range of experience on most variables, even where there are mean differences.

7. If those decisions are correlated with measurable variables, and those variables are included in the regression model as described above, then again the problem is mitigated.

8. The models typically included control variables such as annual expenditures on R&D/sales, 5-year sales growth rate, firm unionization coverage, total employment, net capital and equipment, and 2-digit SIC code dummy variables.

9. Note that the standard deviation of $D = .336$ which is virtually identical to the .36 standard deviation for the HPWS index (A) in column 1.

10. Since both the Homogeneity Index and HPWS Index are essentially two versions of the same variable ($r = .84$), a joint F test was appropriate and significant at $p < .001$.

11. This measure (Other Management) is a 6-point Likert scale ranging from "much better than" (6) to "much worse than."

12. We also tested configuration models in using both absolute and squared deviations the cluster means. The coefficients on these terms were always trivial and statistically insignificant at conventional levels.

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