

THE STRATEGIC IMPACT OF HIGH PERFORMANCE WORK SYSTEMS

by

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The Strategic Impact of High Performance Work Systems

Abstract

The purpose of this paper is to extend the emerging empirical literature on the firm-level impact of organizational *High Performance Work Systems*. We refer to this relationship as the strategic impact of human resources (HR) and our results suggest that the impact of such systems on firm performance is both economically and statistically significant. The analyses validate earlier work by Huselid (1995) and extends this work with a broader measure of the HR system in a new sample of 740 publicly-held firms. Our estimates suggest that a one-standard deviation change in a firm's High Performance Work System has a per employee impact on firm market value of \$38,000 - \$73,000. Moreover, changes in the HR system yield substantially greater benefits when the improvements occur at either the low or the high end of the distribution.

The Strategic Impact of High Performance Work Systems

Introduction

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 (Stalk, Evans, & Shulman, 1992; Prahalad and Hamel, 1990). 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 sustained competitive advantage. Within that context a broadly defined *High Performance Work System* (HPWS) can be viewed as a key strategic lever, both as a means to develop and sustain core competencies and as a necessary condition for strategy implementation (Dyer, 1993; Pfeffer, 1994; Levine, 1995). Such systems include rigorous recruiting and selection protocols, performance management and incentive compensation systems, and employee training and development activities that are designed to acquire, refine, and reinforce employee skills and behaviors necessary to implement the firm's competitive strategy (Huselid, 1995).

While there has been a *strategic* HR management literature for more than a decade (Schuler & MacMillan, 1984) more recent work in this area is motivated less by the locus of decision making and more by the locus of influence. Earlier work in strategic human resources emphasized those activities within the province of the HR function (e.g., HR planning), though there was little empirical evidence that such activities had any direct influence on firm performance. In contrast, the new dimension of this literature focuses explicitly on the *impact* of the HR management system, irrespective of whether that system is a product of the HR function, general management, or some combination. The motivating assumption is that if the HR management system is to be considered a strategic lever in the organization, it has to have an impact at the strategic level; namely, the firm's financial success.

While there is a substantial and developing literature on the impact of HPWS on plant level and other intermediate measures of firm performance, the empirical evidence supporting what could be termed the strategic impact of HR, between the HR system and the firm's bottom line, is quite limited. This paper extends that literature in several ways. First, we consider the theoretical and empirical challenges posed by several emerging themes in prior work and offer a new perspective in an effort to reconcile theory and empirical observation. Based on that discussion we draw on a new national survey of HPWS to validate prior estimates (Huselid, 1995) of the HR-firm performance relationship and develop a broader measure of organizational HR management systems. Both of our measures have economically and statistically significant effects on the firm performance, as measured by the market value of shareholder equity, and our estimates suggest that a one standard deviation change in a firm's HPWS has a per employee impact on market value of \$38,000 - \$73,000. Finally, we explore the potential for non-linearities in the HR-firm performance relationship. These estimates suggest that the largest returns to improvements in a firm's HR system occur either when a firm is well behind their peers and can "join the pack" or when a firm can improve their HR system to the point where they are among the industry leaders. Changes within the broad middleground have much lower payoffs.

Relationship to Prior Conceptual Literature

The prior conceptual literature speaks both to the mechanism through which the HR management system might affect firm performance as well as the necessary conditions for these systems to have a strategic impact. The *behavioral* perspective (Jackson, Schuler, & Rivero, 1987) suggests that an effective HR management system will acquire, develop and motivate the behaviors necessary to enhance firm performance (Bailey, 1993; Jackson et al., 1987; Pfeffer, 1994; Schuler & MacMillan, 1984). Complementary work argues that HR management systems provide additional value when they are purposively designed to be internally consistent and are thereafter linked with

firm competitive strategy (Butler, Ferris, & Napier, 1991; Cappelli & Singh, 1992; Jackson & Schuler, 1995; Milgrom & Roberts, 1995; Ulrich & Lake, 1990; Wright & MacMahan, 1992). In essence, prior theoretical work in this area concludes that competitive advantage is in part a product of HR management systems that elicit employee behaviors consistent with the firm's broader strategic and environmental contingencies (Jackson & Schuler, 1995).

Promoting desirable employee behaviors, however, is not sufficient to create a strategic impact. Following the *resource-based view of the firm* (Barney, 1991) it is clear that if HR management systems are to in fact create sustained competitive advantage, they must be difficult to imitate. High Performance Work Systems are characterized by at least two features that are associated with inimitability: path dependency and causal ambiguity (Collis and Montgomery, 1995). Path dependency describes organizational practices that are developed over time and cannot be simply purchased in the market by competitors. A competitor can understand that a practice is valuable and would like to do the same thing, but is precluded from immediate imitation by the time required to fully implement the strategy. Causal ambiguity is reflected in policies that are easily understood in concept, but in practice require numerous and subtle interrelationships that are not readily observed by those outside the firm. An example is the challenge of aligning HR management practices with the firm's strategy and their larger "embeddedness" in management practice (Lengnick-Hall & Lengnick-Hall, 1988; Lado & Wilson, 1994).

The *behavioral perspective* describes how the HR management system creates new firm capabilities, while *resource-based* theory emphasizes the attributes required for these capabilities to generate competitive advantage. These complementary dimensions are consistent with recent theoretical work in the field of strategic management (Amit and Shoemaker, 1993) that 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" (pg. 36). Our view is that HR strategies that successfully develop and implement a coordinated HPWS create "invisible assets" (Itami, 1987) that both create value and are difficult to imitate. These asset values are maximized when the HPWS is so embedded in the operational systems of the organization that it enhances a firm's *capabilities*. Therefore, unlike more traditional "personnel" activities, organizational *High Performance Work Systems* have a strategic impact at the level of the firm. This interpretation is also consistent with the recent emphasis on "core competencies" developed by Hamel and Prahalad (1994) who argue that conventional measures of economic rents such as the difference between market and book value of assets (i.e., Tobin's q) reflect "core competence, (or) people embodied skills" (pg. 232).

Relationship to Prior Empirical Work

Prior empirical research on HR management practices and organizational performance can be divided into four categories that vary along two dimensions: the breadth of HR practices under consideration and level of organizational performance. Most work examines one or a few types of HR policies or intermediate levels of organizational performance such as employee turnover or productivity. A much smaller number use a broad measure of the HR management system and intermediate measures of performance or a narrow set of HR management practices (e.g. compensation or unionization) and firm level measures of organizational performance. The best of these (Arthur, 1994; Cutcher-Gershenfeld, 1991; Delaney, in press; Ichniowski, Shaw, & Prennushi, 1994; MacDuffie, 1995) suggest that "progressive" or "innovative" HR management practices have economically significant effects on intermediate measures of organizational success, primarily in certain manufacturing industries. Not only do such studies provide a greater opportunity to fully specify the HR management system, but by design they are able to eliminate alternative explanations that might be associated with industry differences across firms. These studies provide important insights into what otherwise is a "black box" between the HR management system and firm performance. While they do not establish an HR management system-firm performance relationship, such studies suggest that if such a relationship were observed, it would be consistent with the necessary organizational precursors.

If a firm's HR management practices are to represent a strategic lever for the development and implementation of competitive strategy, then the appropriate unit of analysis for this relationship is the comprehensive system of practices and policies in place throughout the organization. Examinations of individual policies and their effects on individual or intermediate levels of organizational effectiveness are useful, but they bear only indirectly on the HR-firm performance relationship. However, as a nascent empirical literature, research based on broad measures of the HR management system should proceed at both the intermediate (e.g., productivity, turnover) and strategic (corporate financial performance) level of firm performance. The empirical challenge is to trace the effects of a HPWS through a variety of micro and intermediate organizational outcomes, and ultimately link those outcomes to corporate financial performance. Incorporating each of those elements in one study would require in-depth data on the HR management system, individual performance, unit level productivity and financial performance, as well as firm level financial performance for a large sample of firms. To our knowledge there have been no studies of this magnitude conducted, and none are planned. Reflecting these data challenges, empirical work will understandably continue at two levels.

There has been very little work exploring the direct relationship between HR management systems and firm performance. Only two prior studies have examined the impact of a comprehensive range of HR management practices on corporate financial performance. In the first of these, Ichniowski (1990) constructed a range of HR strategies based on survey data collected from business lines contained in the Compustat database. Binary responses to the presence or absence of particular HR management practices were categorized using cluster analysis. Ichniowski's scale ranged from the prototypical unionized environment of rigid job design and seniority based promotion-from-within to the "progressive" high commitment strategies emphasizing flexible job designs, training, and communication. Data limitations restricted the sample size to 65 business lines, but the results were consistent with the hypothesis that *High Performance Work Practices* have a positive influence on market measures of firm performance (Tobin's q).

The second study (Huselid, 1995) is the only published research that combines both a comprehensive measure of the HR management system with measures of corporate financial performance for a broad sample of U.S. firms. In contrast to Ichniowski, Huselid measured both the presence and depth of coverage of a firm's HR management practices, which in turn were factor analyzed. Following Bailey (1993), the resulting factors were termed *Employee Skills and Organizational Structures* and *Employee Motivation*. Both dimensions were positively related to a measure similar to Tobin's q , though the impact of the *Employee Motivation* dimension was more stable and economically significant. Alternatively, only the *Employee Skills and Organizational Structures* dimension had a statistically and economically significant influence on a measure of accounting profits.

An Integrated Perspective

Prior empirical work in this area has attempted to incorporate several, sometimes competing, themes. One issue running through this literature is whether or not a set of "best practices" exists. Is there an optimal way to organize the HR management system and a set of practices that, if adopted by any firm, would result in improved financial performance? Second, as a necessary condition, must these practices be internally consistent, as well as aligned with other business policies and ultimately the firm's strategy? Third, does either of these features represent a barrier to implementation that is sufficient to provide for sustained competitive advantage? As suggested earlier, we believe that the HR management system-firm performance relationship is characterized by both a "best practice" and "alignment/contingency" dimension, and that both dimensions have a powerful influence at different levels of analysis.

At the most fundamental level, a human resource management system can be described by its *architecture*; the underlying themes or philosophies that guide its development and implementation. For example, part of the architecture may be that rewards should be linked to the performance of employees and the success of the firm (Pfeffer, 1994). In addition, for any particular

element of an HR system's architecture, there may be a variety of specific HR *policies and practices* that are an appropriate fit with the firm's strategy and operational demands. This implies that two firms could have a similar HR architecture with respect to a reward-performance linkage, though manifestly different pay practices. This distinction regarding the level of analysis of the HR system bears directly on the "best practice" vs. "alignment" issue. "Best practice" implies a certain generalizability, where more is better. The architectural elements of an HR system are appropriately thought of in this way. In short, this is the foundation on which a firm develops a skilled, motivated and properly organized work force. At the same time, based on the firm's strategy or particular operational problems, it may choose to emphasize certain elements of this architecture more than others, which introduces an element of alignment to the process of developing a HR management system. Thus, while we might expect more successful firms to use more of these elements, there is no *particular* cluster or bundle of HR management practices that are universally effective. Thus, the alignment issue is more directly involved at the level of practice. Once the HR architecture is determined, a wide range of policies and practices are available to implement a particular element of the architecture. Returning to the example of the reward-performance link, the particular form of the policy and, more importantly, the choice of behaviors to incent must reflect a very clear alignment with the firm's strategy and operational goals. This is the point at which the "contingency/alignment" dimension becomes relatively more important.

The focus of the conceptual framework has clear implications for the level of the empirical research. Case studies and analyses that focus on multiple units of one organization, or even multiple firms in the same industry can more easily answer these questions at the level of practice. By contrast, studies that focus on the level of the firm and attempt to incorporate the experience of hundreds or even thousands of businesses across different industries are necessarily limited to a focus on the "architecture" of the HR management system.

We believe that much more empirical work is required before meaningful theoretical progress can be achieved on this issue. However, the only work to date that uniformly explores these interrelationships, namely case studies, supports our interpretation. For example, Milgrom and Roberts (1995) develop a theoretical rationale for both the internal (within the HR management system) and external (with firm competitive strategy) alignment of an HR management system. In their view complementarities or synergies related to HR management practices are possible when an internally consistent and externally aligned system of such practices is adopted. Their most persuasive empirical test of these propositions was the familiar experience of Lincoln Electric. Alternatively, we can think of other case studies (Hewlett-Packard) where the firm has adopted a high performance HR "architecture" though the actual HR practices and policies are dramatically different from those at Lincoln Electric. Likewise, Cappelli & Crocker-Hefter (1993) provide a number of very convincing case analyses in support of this view. Unfortunately if field research in this area is limited to specific forms of HR practices and strategic alignments, it will be impossible to move beyond the rich, but narrow, world of the case study.

Implications for Estimation Methods

The test of an HR management system-firm performance relationship is premised on the notion that a firm's HR strategy must be captured *in toto* at the level of the system rather than focusing on a subset of practices (Huselid, 1995; Ichniowski et al., 1994; MacDuffie, 1995). This formulation has both a weak form and strong form. The weak form adopts a comprehensive measure of the elements in the HR management system, but takes the system as the sum of its parts. The strong form requires that the elements of the system contribute synergistically so that their value exceeds the sum of the parts (Milgrom & Roberts, 1995). At the extreme, this hypothesis implies a synergistic process that creates no value for the firm if even one element of the system is missing. To date, only case studies have provided enough richness to examine the strong form hypothesis. This paper, like earlier statistical based studies (Arthur, 1994; Cletcher-Gershenfeld, 1991; Huselid, 1995; Ichniowski et al., 1994; MacDuffie, 1995), implicitly tests the weak form of this hypothesis.

The weak form of the systems hypothesis has typically been tested with an implicit “best practice” framework. Prior work (Arthur, 1992; 1994; Cutcher-Gershenfeld, 1992; Huselid, 1995; Ichniowski, 1990; Ichniowski et al., 1994; MacDuffie, 1995) attempts to identify the common dimensions of the HR management system using factor or cluster analyses. While the intent of this approach is to provide a more reliable measure of the HR management system, it also imposes a certain conceptual framework on the analysis. Factor analysis will identify those elements of the HR management system that tend to be positively correlated across firms. A test of the effects of these HR factors on firm performance is necessarily a test of “best practice” because it constrains high (low) values on this measure to those firms that have more (less) of the same bundle of elements. Alternatively, the emphasis of prior theoretical work on contingent models and HR alignment suggests considerable variability in those elements of the potential architecture that would be appropriate for a particular firm. This in turn would require a more flexible estimation model. Does this mean that any combination of elements in any quantity is appropriate? It is an empirical question, but not one that is easily tested with conventional statistical methods. If in fact a purely idiosyncratic model were correct, conventional statistical methods could not distinguish such effects from the traditional null hypothesis. Following this discussion, the principal test of the effects of an HR system on firm performance is reflected in the following null hypothesis:

Hypothesis 1: HR management systems have no effect on firm performance.

Failure to reject this hypothesis implies either that the HR management system has no effect on firm performance, or that the relationship is so idiosyncratic that one cannot observe these effects using statistical procedures designed to identify systematic patterns across firms. This, of course, would have widely different implications regarding the possible magnitude of any HR-firm performance relationship. However, while such results might not be definitive, consistent support for Hypothesis 1 would make it very difficult to continue an examination of that hypothesis within the context of large samples at the level of the firm.

Since our study is based on multiple firms and industries our focus emphasizes the architectural level of the HR system in each firm. By implication we predict a largely “best practice” relationship between the HR system and firm performance, though we also develop a measure of the HR system that is sufficiently flexible to accommodate firm level contingencies. The two variations of this hypothesis are:

Hypothesis 2: Optimal HR management systems have aspecific architecture.

This “best practice” hypothesis is evaluated by factor analyzing a wide array of elements describing a firm’s HR management system. This commonality of practice is then implicitly imposed on the HR-firm performance relationship with the expectation that firms that make broader use of these same factors should enjoy more financial success. It assumes that one or more subsets of HR systems will emerge and that firm’s that implement those sub-systems more comprehensively will be more successful.

Hypothesis 3: Optimal HR management systems have aflexible architecture.

Compared to Hypothesis 2, we do not assume that any particular subset or bundle of HR subsystems are more effective than any other. Again, this is consistent with a “best practice” approach since it assumes that more of each practice is better. However, because this measure does not constrain firms to any specific features of the HR architecture, it allows for an element of contingency to be introduced into the model. Therefore, rather than relying on a factor analysis of the various architectural elements of the HR system, we simply measure the extent to which a firm is above the sample average on those dimensions as an estimate of the degree to which the firm has emphasized any particular policy.

METHODS

Sample and Data Collection

The data for this study are drawn from an ongoing national mailed survey of firm-level HR management systems. To date two waves of data have been collected. The first is based on HR policies and practices in place in 1991, the second based on firm experience in 1993. In both waves, the sampling frame was drawn from all publicly-held businesses with more than 100 employees, that were not foreign-owned, holding companies, or divisions or business units of larger firms. The response rates were 28 percent and 20 percent, respectively, in each year. Table 1 compares the sample and population industry distributions by one-digit SIC code and indicates that in both years the sample is broadly representative of the U.S. industrial structure.¹ Firm financial data were taken from *Compact Disclosure*, a database containing comprehensive financial information from 10-K reports on nearly 12,000 publicly held U.S. firms.

(Put Table 1 about here)

Measurement of the HR Management System

1992 Survey. The 1992 survey focused on the firm's experience in 1991 and included a set of 13 items designed to reflect the primary elements of a firm's HR management system. Ten items were chosen to be consistent with the only other empirical research on the subject (Delaney, Lewin, & Ichniowski, 1989), and three were added to incorporate other literatures that suggested a potential relationship with firm performance. Using principal component extraction with varimax rotation, two scales were developed based on a factor analysis of the items (eight and three, respectively) that loaded unambiguously at .30 or greater on a single factor (Huselid, 1995). Following Bailey (1993), one factor was termed *Employee Skills and Organizational Structures* and the other *Employee Motivation*, and scales for each factor were constructed by calculating the mean of the standardized values for each item. The items contained in each factor are described in Table 2.

(Put Table 2 about here)

1994 Survey. The 1994 survey focused on the respondent firm's HR management system in 1993. The same 13 questions used in the 1992 survey were also included in the 1994 survey, allowing for a cross validation of the original results. However, the 1994 survey also focuses more specifically on the strategic architecture of the HR management system and includes measures not available in 1992. Therefore, one of the purposes of this paper is to report the results for the expanded measure available in 1994 and compare those results with the more limited measures available in Huselid (1995). Specifically, in our analyses of the 1994 data we combine nine items from our 1992 survey with eight new items. These items were chosen in light of the recent conceptual work describing the importance of aligning HR and business strategies and the important role of compensation, performance management, and training systems in facilitating these goals (Jackson & Schuler, 1995). In all, seventeen items are included in our subsequent analyses.

The HR Management System. We measure the HR management system in two ways reflecting the development of Hypotheses 1-3. The specific HR architecture hypothesis is tested following Huselid (1995). A set of variables, either the 13 original elements of the HR management system available in both years, or the larger set of 17 elements available in 1994, were factor

¹ Response bias cannot be usefully determined by simply comparing unconditional mean differences such as those reported in Table 1. More accurate evaluations of response bias require that differences in conditional means (regression coefficients) be compared for respondents and non-respondents. Huselid (1995) examined this issue using conventional econometric procedures (Heckman, 1979) and found no evidence of response bias in the 1992 wave of this survey. Past discussions with non-respondents and other members of the HR community suggests that the overwhelming reason for non-response is a firm-wide policy against such participation that bears no relation to the sources of bias that might affect our results.

analyzed. Elements that load unambiguously on a particular factor are standardized and scales for each factor were created based on the mean of those standardized scores. Our measure of the flexible HR architecture does not constrain the “better” architecture to have any particular elements. Table 3 describes the 17 elements of the HR management system drawn from the 1994 survey. Since each of the HR elements is a continuous measure reflecting the degree to which each practice has been broadly adopted within each firm, each element is redefined as being above or below the sample average. The flexible HR management system measure is the number of those elements that is above the mean for the i th firm. Again, this assumes that more is better, but does imply that successful firms the *same* architectural elements of the HR system.

(Put Table 3 about here)

Estimation Models

The focus of this research is to broadly estimate the impact of a firm’s HR management system on corporate financial performance. As such it is not designed to test any particular theoretical formulation, though we believe our estimation models are informed by the extant theory. By corporate financial performance we specifically mean the firm’s economic performance as measured by conventional financial indicators. The emphasis on strategic impact and HR as a source of competitive advantage strongly implies a measure of firm performance that reflects sustained firm success. We believe the most appropriate measure of such success is the extent to which a firm’s market value exceeds its asset base, and we therefore focus on a variant of the familiar Tobin’s q as our dependent variable (Hirschey & Wichern, 1984).

Our approach is to explore Hypotheses 1-3 within the conventional models of firm performance that have been well developed in this literature (Huselid, 1995; Ichniowski; 1990) and elsewhere (Hall, Cummins, Laderman, & Mundy, 1988; Hirsch, 1991; Hirschey & Wichern, 1984). The challenge in specifying these models is not to fully explain the dependent variable, but rather to specify the model sufficiently so that we have confidence that our HR variables are not confounded by the effects of omitted variables. The conventional control variables in such a model include prior firm growth in sales, investment in research and development (normalized by sales), unionization, firm systematic risk (beta), industry concentration (the four-firm concentration ratio), and 34 dummy variables that represent 35 2 digit SIC industry codes. To these we have included additional information on the firm’s competitive strategy (a focus on *Cost Leadership*, Porter, 1985) in both years, and a measure of management style available in the 1994 analysis. The means, standard deviations, and intercorrelations for all variables are reported in Table 4.

(Put Table 4 about here)

We have also modified the traditional measure of corporate financial performance that reflects a firm’s market value relative to its asset base. Tobin’s q is such a ratio and is typically expressed in natural logarithms. However, as a more direct theoretical representation of the strategic import of the HR management system we have incorporated the notion of numerator vs. denominator management described in Hamel and Prahalad (1994). They observe that while the numerator in most financial ratios is the objective for managers whose goal is to create value for their firm, too many managers focus on the denominator (reflecting the fact that increasing the ratio of market to book value can be achieved by *either* increasing market value *or* decreasing book value). Using Tobin’s q we cannot separate the effects of HR on the numerator from the denominator. The latter has typically been the focus of HR policies in the past where HR activities are viewed as costs to be minimized rather than revenue generators. In contrast, the new strategic role for HR suggests that the effects on these ratios are to expand the numerator rather than to limit the size of the denominator. Since the conventional q measure is the natural logarithm of a ratio we can simply move the denominator to the right hand side of the equation and estimate the effects on

the numerator of the HR systems directly.²

Finally, we use contemporaneous values of firm performance in our analyses. The potential for simultaneity bias is a common reservation in this literature, the concern being that more profitable firms can afford more of these policies and any positive HR-firm performance relationship is therefore positively biased. Of course the alternative bias is equally plausible; less profitable firms have a greater need for high performance HR strategies and are therefore more likely to pursue them. However, there is little theoretical or empirical reason to believe that contemporaneous measures of firm performance pose a fundamental problem. First, prior empirical tests (Huselid, 1995; Huselid & Becker, 1995; Ichniowski, 1990) have found no evidence of meaningful simultaneity bias in these relationships. Second, many of the elements of a High Performance Work System are not inherently more expensive than “low performance” measures. For example, compensation policies that link pay to performance or promotion policies based on merit rather than seniority are not necessarily more expensive than any alternative approach. Third, the elements of the HR architecture that we are examining are expected to increase productivity and profitability, and therefore will presumably pay for themselves. We are not focusing on policies that simply reflect greater corporate largesse. Finally, we assume that these policies are not effectively implemented overnight and that, in fact, we are observing “equilibrium” relationships. In short, the effects of these policies are not observed immediately and probably take several years to influence firm performance. Using contemporaneous measures of firm performance simply assumes that across firm differences are in the HR management systems are relatively stable.³ To the extent that the contemporaneous “levels” of the HR system include recent changes our estimates are likely to underestimate the true effects given the evidence from prior work of an implementation-benefit lag of several years (Huselid and Becker, 1995).

RESULTS

The central research question in our analysis goes to the nature and magnitude of any HR management system-firm performance relationship. We organized the analyses around three issues. First, we draw on two years of data to extend the 1992 survey results reported in Huselid (1995). Second, we evaluate Hypotheses 2 and 3 by examining whether our results are consistent with a *specific* or *flexible* HR architecture. We do this for both the restricted set of measures initiated in the 1992 survey as well as for the broader set of measures available in 1994. Finally, we extend the *flexible* measure of the HR architecture in an exploratory analysis to determine if there is an optimal set of such policies and whether investments in those policies have effects that are constant across all levels of investment.

² For example if,

$$\ln(\text{Market value}/\text{Book Value})=f(X), \tag{a}$$

where X is a vector of independent variables, the dependent variable can be rewritten as

$$\ln(\text{Market value})-\ln(\text{Book Value}), \text{ so (a) is now,}$$
$$\ln(\text{Market value}) =f(X) + f \ln(\text{Book Value}). \tag{b}$$

Now $\ln(\text{Book Value})$ is simply a control variable in equation b. We have also calculated comparable estimates based on the ratio form of the dependent variable (available from the authors) and show that the results are not materially different in those models.

³ Prospective (t+1 year) measures of firm performance, which are equivalent to the values at time t plus a one year change, would still largely reflect the effects on the time t measure unless the effects of any system changes were immediate.

Extension of 1992 Results Using Two Years' of Data

Table 5 reports the results that combines both 1992 and 1994 survey responses, although the observations from the firms responding in both years (222 observations) have been excluded to avoid double counting.⁴ The model in Column 1 utilizes the two dimensional factor analytic measure of the HR management system described in Huselid (1995), *Employee Skills and Organizational Structures* and *Employee Motivation*, calculated for the pooled sample. The coefficients on both variables are statistically significant at the conventional levels and consistent with the economic magnitudes reported in Huselid (1995). The combined effects of a one standard deviation change in these elements of the HR management system would be expected to produce an 11-12 percent change in a firm's market value, other things equal.

Huselid (1995) relied on a factor analysis of the characteristics of the firm's human resources system to identify two separate factors, *Employee Motivation* and *Employee Skills and Organizational Structures*. We have replicated those results in our combined sample. However, while various HR system characteristics in the sample may load on two different dimensions, it does not necessarily follow that these two dimensions will have different effects on firm performance. *A priori* there is no theoretical reason why a bundle of staffing related policies should have a different effect than a bundle of policies that influence employee motivation. In fact economic theory suggests that firms would continue to expand more beneficial sets of policies until the marginal benefits of all bundles were equalized. Therefore, we made no *a priori* assumptions about the appropriate specification and tested directly whether the HR system should be specified multidimensionally or unidimensionally. Our results are consistent with a unidimensional approach. A joint F test for these two coefficients (one that constrains them to be equal) cannot reject the hypothesis that they have equal effects ($F_{1,1209} = .4744$). Therefore, Column 2 reports the results that combines the two factors into one.⁵ A one standard deviation change in the combined measure, SPECIFIC₉₂₋₉₄, would be associated with a 9.4 percent change in market value.

(Put Table 5 about here)

The results of the factor analytic approach therefore rejects Hypothesis 1 in favor of Hypothesis 2. Next we constructed a more flexible measure of the HR management system using the same 11 variables described above. The eight variables in the *Employee Skills and Organizational Structures* dimension were transformed into binary variables taking the value of 1 if

⁴ The 1992 and 1994 surveys produced 968 and 740 respondents, respectively. 222 of the 1992 respondents also responded to the 1994 survey. We have excluded those firms from the 1994 observations when analyzing the combined sample since they would not be entirely independent of other observations in the sample. To do otherwise would artificially inflate the significance levels of our estimates.

⁵ Note that while one would normally anticipate that the effects of these two factors would be estimated separately, if the effects of the two factors are equal, combining the two measures does not change the underlying effects of the factors on firm performance. For example if Y is the dependent variable and X₁ and X₂ are two dimensions developed from a factor analysis, then an OLS regression would be:

$$Y = a_0 + b_1X_1 + b_2X_2 + e. \quad (1)$$

If $b_1=b_2$, then Equation 1 could be written as:

$$Y = a_0 + b_1X_1 + b_1X_2 + e. \quad (2), \text{ or}$$

$$Y = a_0 + b_1(X_1 + X_2) + e. \quad (3).$$

The regression estimates will be more efficient with the fewer degrees of freedom consumed by the additional independent variable. The cost of this gain is the constraint that $b_1=b_2$ in 3. The joint F test (which was insignificant at conventional levels) is a test of the statistical significance of that constraint (see Greene, 1990).

the observation was above the sample average, otherwise they were coded as zero. The same was done with the three items contained in the *Employee Motivation* factor. The number of items that were “above average” was then taken as the measure of the HR management system on that dimension. Using the base estimation model, the “summed” variables were now used to estimate the effects of the HR management system on firm performance. The initial analysis revealed that both terms were statistically significant at conventional levels but again we could not reject the hypothesis that the two coefficients were equal ($F_{1,1209}=.0848$), so we report only the combined terms in Column 3. The coefficient on this term, FLEXIBLE11, is significant at the $p<.01$ level. We therefore reject Hypothesis 1 in favor of Hypothesis 3.

At this point we really have not compared Hypotheses 2 and 3 because the items in FLEXIBLE11 are the same items chosen as a result of the initial factor analysis. Not surprisingly the results are nearly identical with a standard deviation change in FLEXIBLE11 having a 9.67 percent effect on market value while the effect of SPECIFIC₉₂₋₉₄ was approximately 9.4 percent. A more appropriate approach is to include in the *flexible* variable the other two items that did not load cleanly on either factor. These two items (described in Table 2), the propensity to promote from within and the firm’s selection ratio, were added to the original summed variable which was then called FLEXIBLE13. The results for this variable (Column 4) remain statistically significant although the economic magnitude of the effect has declined. The effect of a one standard deviation change is only 7.2 percent change in market value; still very substantial in financial terms, but less than the 9.5 percent range in the factor analytic based models.

Both of these approaches implicitly assume that the underlying characteristics of the HR management system described in Table 2 have a positive effect on firm performance. Factor analysis, of course, emphasizes the interrelationships among the items rather than the effects of those items on the dependent variable. The “summed” variables are somewhat more flexible, though our *a priori* judgements were that individual items would have no worse than a trivial negative effect on firm performance. We have also preferred to avoid any effort to evaluate the effects of individual HR policies and practices, concentrating instead on the systems approach outlined in Huselid (1995), Ichniowski et al. (1994), and MacDuffie (1995). Nevertheless, our very simple exploratory analysis of individual elements in the system suggest that two of the practices - the presence of a formal grievance procedure and percentage of non-entry level positions filled from within - have strong negative effects on firm performance. The second of these was one of two additional items included in FLEXIBLE13 which explains why those effects are somewhat smaller than the FLEXIBLE11 effects. We explore the implications of these results later in the paper.

1994 Results with an Expanded Measure of the HR Management System

The 1994 survey of HR management systems focused much more on what might be considered the strategic architecture of the firm’s HR management system and less on traditional HR management practices or the activities of the HR function. While the narrower 1992 measures always had economically significant effects on firm performance, in developing our second survey we believed that a broader measure would provide a better test of the strategic impact of HR.

As described above, seventeen items were selected as representative of a firm’s strategic HR architecture (Table 3). The first approach, as a another test of Hypothesis 2, was to factor analyze these 17 items using principal components extraction with Varimax rotation. Thirteen of the seventeen items loaded onto one of three factors denoted in Table 3. The first factor, which we named *HR Strategy* ($\alpha = .75$) reflects efforts on the part of the firm to link HR and business strategies. The second factor, *Employee Motivation* ($\alpha = .75$), represents those elements of the HR system that link individual employee behaviors with firm level outcomes. The third factor is relatively more heterogeneous, but in general contains items pertaining to the selection and development of employees. Reflecting this heterogeneity, *Selection and Development* had a much lower alpha (.47).

Table 6 reports the effects of the HR management system on firm market value using these dimensions. The remaining control variables are identical to those reported in Table 5, though “year”

is omitted since we are only using 1994 survey data. The results for the control variables are available from the authors, but are not included in an effort to conserve space. The results for the three factors described in Table 3 are reported in Column 5 of Table 6. Individually, only one of the categories is significant at conventional levels, though a joint F-test cannot reject the hypothesis that all three categories have equal effects ($F_{2,582}=.2469$). Therefore the three factors are once again combined into one variable, SPECIFIC₉₄. The results for this combined variable are reported in Column 6 and indicate once again that the HR management system has an economically and statistically significant effect on the firm's market value. A one standard deviation change in SPECIFIC₉₄ results in a 13.5 percent change in market value. This is a 35 percent greater effect than observed for the narrower measure (SPECIFIC₉₂₋₉₄). Once again Hypothesis 1 is rejected in favor of Hypothesis 2.

(Put Table 6 about here)

The flexible architecture hypothesis (Hypothesis 3) is tested as described above. All 17 elements of the HR management system are recoded to take the value 1 if the firm's value is above average, and their total value on this measure is the sum of those elements that are above average (FLEXIBLE17). These results are reported in Column 7 of Table 6. This coefficient is both economically and statistically significant at conventional levels. An increase of one standard deviation change in this variable would be expected to increase the firm's market value by nearly 11 percent.

A simple comparison of the *specific* (Hypothesis 2) vs the *flexible* (Hypothesis 3) hypotheses suggests somewhat more support for the former. While our comparisons of Hypotheses 2 and 3 are merely based on inspection of the results, it is important to understand the underlying basis for any differences. Previously we suggested that two of the items that we might expect to have positive effects, in fact, are quite negative. One of these was captured in the factor analysis of the narrower measure, SPECIFIC₉₂₋₉₄ and the other was included in SPECIFIC₉₄. However, both were included in the summed variables that represent the test of Hypothesis 3. While we consider this element of our analyses entirely exploratory, it is interesting to examine the effects of the HR management system when these two elements (the presence of a formal grievance procedure and a policy of promotion from within) are treated as a separate category we call *Bureaucratic HR*. The remaining elements are termed *Positive15*. The results, reported in Column 8 of Table 6 show the dramatic difference in the effects of these two categories. The coefficient on FLEXIBLE17, a weighted average of these two variables, was .036. The *Positive15* coefficient is .075, while the coefficient for *Bureaucratic HR* is -.23. Both represent substantial effects on firm value, financially and statistically. A one standard deviation change in the *Positive15* aspect of the HR management system would increase market value by nearly 21 percent.⁶

Finally, we take the analyses one step further in an effort to determine whether the gains from investing in the HR management system are monotonic. While there are several approaches that might be used to test such a hypothesis, we adopted a simple test of whether the effects of the HR management system were different as the firm moved from one-standard deviation below the sample mean to one-standard deviation above the mean on our measure of the HR management system (*Positive15*). Therefore *Positive15* was transformed into a spline function defined as three variables:

⁶ We would note that it is not uncommon to operationalize market value as including the book value of long-term debt. Because we do not expect HR management systems to have a significant influence on this variable, we focus instead on the market value of shareholder's equity. The impact on shareholder interests is certainly the principal concern of top management and is also consistent with the approach used in Huselid (1995). However, for completeness we have analyzed our data in a model that controls for long-term debt as an independent variable and we find equivalent results. For example replicating the model in Table 6, column 8, produces coefficients (standard errors) for *Positive15* and *Bureaucratic HR* of .072 (.016) and -.227 (.060), respectively.

LOW15: If *Positive15* is more than 1 standard below the mean, LOW15 equals *Positive15*, otherwise LOW15 equals the mean minus one standard deviation;

MED15: If *Positive15* is more than 1 standard deviation below the mean, MED15 equals 0. If *Positive15* is less than 1 standard below the mean and less than 1 standard deviation above the mean, MED15 equals *Positive15* minus 2 standard deviations, otherwise MED15 equals the mean plus one standard deviation;

HIGH15: If *Positive15* is less than 1 standard above the mean, HIGH15 equals zero. Otherwise HIGH15 equals *Positive15* minus the mean plus one standard deviation.

Positive15 is now divided into three incremental categories that sum to the value of *Positive15* for any firm.⁷ Similarly the coefficients represent the effects of changes in the HR management system over the specific range of *Positive15*.

The results for the spline function are reported in Table 7. The Column 9 results indicate that each of the spline coefficients are statistically significant at conventional levels. They also suggest that the gains from both the initial investment in a High Performance Work System and the changes required to really set the firm apart from their peers (HIGH15), are considerably greater than changes within the middle of the pack. A formal test of the hypothesis that the effects at the HIGH15 and LOW15 end of the range are equal cannot be rejected ($F_{1,581}=.3623$). Column 10 therefore reports the results when the coefficients for HIGH15 and LOW15 are constrained to be equal (HIGHLOW). These results indicate that the value of improving a firm's HR management system is nearly four times greater at both low and high end of the distribution compared to changes within the larger middle ground of the distribution.

(Put Table 7 about here)

DISCUSSION

The purpose of this paper was to extend the emerging empirical literature on the firm level impact of HR by reporting new results on the relationship between organizational HR management systems and the firm's market value. We refer to this relationship as the strategic impact of HR and our results suggest that the impact is both economically and statistically significant. We have made a modest attempt to reconcile the "best practice" and "contingency/alignment" elements of the strategic HR literature and find some support for a more flexible measure of the HR management system. Finally, in an exploratory analysis, we examine whether the HR-firm performance relationship is monotonic, and find that there are substantially greater gains from investments at both the low and the high end of the distribution.

The Economic Significance of High Performance Work Systems

The central focus of this paper was to estimate the economic impact of a firm's HR management system. We have focused on the marginal effects of the HR management system on

⁷A numerical example will clarify the calculation of the spline measure. *Positive15* has a mean of 6.90 and a standard deviation of 2.84. The upper threshold for *Low15* is 4.06 (or 6.90-2.84), the end points for *MED15* are 4.06 and 9.74 (or 6.90+2.84), and the lower threshold for *High15* is 9.74. Following the decision rule described above if *Positive15* equals 10, then *Low15*=4.06, *Med15*=5.68, and *High15*=.26. If *Positive15*=6, then *Low15*=4.06, *Med15*=1.94 and *High15*=0. For a complete discussion of spline functions, see Greene (1990). We adopt the particular specification of Clark (1984), since it returns the actual slopes over the range in question, rather than the difference in slopes.

the firm's market value in an effort to be consistent with the strategic elements of this literature, and at the same time, frame the results in a way that is directly relevant to practicing managers. The direction and magnitude of our results are entirely consistent with the literatures on firm competencies as a source of competitive advantage and the growing emphasis on strategic *implementation* as a dimension of equal importance with strategic *content* (Huselid, Jackson, & Schuler, 1995).

Using either the factor analytic measure or the more flexible measure of the HR management system, the results suggest a 7-9 percent effect on market value for the narrower measure, and 11-13 percent effects for the broader measure, when either is changed by one standard deviation. Based on average employment at different levels of firm market value, these effects are equivalent to a per employee impact of \$38,000-\$73,000.⁸ Since these are capital market valuations of future cash flows to the firm, these estimates should be interpreted as present values. While effects of this size are quite dramatic, they are consistent with the underlying conceptual model of how a High Performance Work System might create value for an organization. We believe there are substantial barriers to successful implementation of these systems. Our earlier interpretation of this relationship as an equilibrium condition makes the same point. Firms cannot make a one-standard deviation change in their HR management system in six months and expect to see changes in market value of the magnitude described here. However, firms that take the longer perspective can develop an HR management system that strategically positions them to support their underlying core competencies and create sustained competitive advantage.

Similarly, the spline function results are consistent with these conclusions and our earlier discussion of the HR management system as a strategic lever. As we noted, some strategies simply get a firm "into the game," while others that will set it apart from its competitors. The spline results suggested very large payoffs in both contexts. The first of these strategies, where the firm improves their HR management system to the point where they are "part of the pack," has a high payoff because it represents a minimum threshold. Beyond that point (plus or minus one standard deviation around the mean) changes in the HR management system have much smaller effects. At this point firms are competitive, but they have not optimized their HR management 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 percent of the distribution.

The Implications of Bureaucratic HR Management

The elements comprising an organizational *High Performance Work System* 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, some of these features have considerable downside risks. Two of these would be the factors that constitute what we termed *Bureaucratic HR* - 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; encouraging greater employee commitment, and increasing 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., 1994), both of these dimensions were elements of more rigid

⁸ The choice of a representative effect, particularly at the per employee level, is sensitive to the assumptions one makes about the average employment level in a firm with a particular market value. Rather than use the two sample averages we ran a simple regression of employment level on market value which provides the average employment conditioned on the firm's market value. We consider this approach more accurate.

HR management systems often associated with unionized environments. This is not to argue against the adoption of such procedures, however. Indeed, there is no question that there are very successful firms that would score high on these two dimensions. Nevertheless, the more common experience appears to be one where these elements of the HR management system are an impediment to higher firm performance.

Flexible Vs. Specific HR Management Architectures

Our reading of the prior conceptual and empirical literature in this area suggested an underlying conflict between two recurring themes. The first was the notion that a set of best practices, or an optimal approach, existed that all firm's would benefit from if adopted. In contrast, if the HR management system was to create sustained competitive advantage, it had to have characteristics that were not easily or quickly imitable (Wright & MacMahan, 1992). Requiring that the system be internally consistent and aligned with the firm's particular competitive strategy provided that strategic advantage, but was not entirely consistent with a best practice approach. One of the purposes of this paper was to explore alternative measures of the HR management system that might capture both of these features.

We argued that a factor analytic approach was more comparable to the "best practice" notion because the statistical relationship between the HR management system and firm performance would focus on a specific bundle or cluster of HR attributes. Alternatively, we constructed a measure that simply assumed that more of these elements were better, but did not restrict the measure to any particular collection of those elements. This approach was more likely to avoid the conflict discussed previously because it allows firms to adopt those elements of an HR management system that were most appropriate for their unique strategy or market, rather than being constrained a specific set of practices. It was not an entirely independent test of the two hypothesis because there was an *a priori* restriction on the universe of elements that would be factor analyzed. The results are more likely to diverge as the total set available for the flexible measures (the summed variables) exceeds the set of characteristics that load on the factor dimensions. As the factor analysis captures more of those elements, or the average firm includes more of these elements in their HR management system, the results will be more similar.

Our multiple tests of Hypotheses 2 and 3 did not suggest that one approach was necessarily more appropriate. Both measures yield HR management system effects that were quite stable and economically significant. While we would recommend that future research use both measures, for several reasons we would tend to focus more of our attention on the flexible measure. First, the flexibility is conceptually more consistent with the contingencies that may be required to create the competitive advantage that is the foundation for the HR-firm performance relationship. Second, it is much easier to operationalize and does not lend itself quite so easily to including elements, such as *Bureaucratic HR*, that may be positively correlated with other dimensions of the system but, in fact, not have a positive effect on firm performance. Third, to the extent that the effects of the separate dimensions of a factor analysis are equal, as we observed in this study, the factor analytic approach begins to further approach the summed variables used to test the flexible measure in Hypothesis 3. Thus, the factor analytic approach adds little value if the interest is in estimating the economic impact of the HR management system on the performance of the firm.

Caveats and Future Research

This paper extends the very limited empirical literature evaluating the HR management system-firm performance nexus at the level of the firm. Using multiple measures and estimates over multiple time periods, we find further support for what we have called the strategic impact of HR. However, there are continuing challenges to empirical research in this area, several of which are issues in this study as well. Perhaps the most difficult to resolve empirically is the possibility that other firm characteristics correlated both with the HR management system and firm performance are confounding the observed effects. On the one hand the set of these variables is probably quite limited. Most of these characteristics that are likely to affect firm profitability, such as the quality or

marketing or manufacturing strategies, probably have little bearing on the firm's HR management system. Likewise, those firm characteristics that might be related to the HR management system probably have little effect on firm performance. In our judgement the most compelling challenge to these results is the possibility that they could just represent widespread good management throughout the firm, rather than the marginal effect of the HR management system. For example, although one could well argue that "good" management is the result of an organizational *High Performance Work System* in prior years, the fact remains that firms that are generally well run are likely to rate very high in marketing, finance, production, etc. as well as having a high performance HR strategy.

There are at least three reasons why we believe the HR-firm performance relationship is something more than an artifact, however. First, if we can think of there being a "market" for good management, the market for HR is certainly less efficient and well developed than the market for finance, marketing, or production systems. In other words, we believe that one reason we observe effects of the magnitudes reported in this paper is that the strategic value of the HR management system is not generally appreciated, and while many firms might have state of the art marketing and finance competencies, many fewer would have the same quality HR management system. Indeed, there is probably much less agreement on what a high performance HR management system might include. This "market failure" tends to diminish any correlation between the HR management system and other management dimensions in the firm. Second, research in this area that focuses on plants within the same industry, or units within the same firm, is much less subject to this alternative explanation, and these studies also show strong performance effects for the HR management system. Third, Huselid and Becker (1995) report evidence from a panel data set that focuses on these same issues. The panel estimates effectively control for those cross-sectional commonalities with "good management" that are fixed over time. Unless all of the internal management functions move in lock step, those results suggest a remaining HR-firm performance relationship. Nevertheless, future work at the firm level should make every effort to directly rule out this alternative explanation.

The empirical literature on this subject remains so limited that more work is needed simply to replicate these results in other samples. However, equally important is research that would begin to consider the policy implications of this line of research. For example, we have argued that our cross-sectional estimates are equilibrium results. This assumes that firms have developed an HR strategy, that this strategy has been fully implemented, and that its effects have been fully realized throughout the organization. The implication is that between-firm differences in HR management systems, and their associated effects on firm performance, could be translated into within firm effects if a firm implemented a change in its HR management system. Our research offers no insight into *how* to make that change and how long it will take before the benefits are observed. Certainly if the effects observed in this study are genuine, we believe there must be substantial barriers to implementation and/or considerable delays before the full benefits are realized. Otherwise every firm would adopt these changes overnight and the HR management system would move from being a source of competitive advantage to another minimum condition for market presence.

In sum, the emerging literature on the strategic impact of HR has significant implications for both research and practice. Both conceptually and empirically, the strategic view of HR must be firmly embedded in conceptual frameworks that emphasize organizational and employee competencies as a basis of competitive advantage. Likewise, there is considerable opportunity to draw on the areas of organizational development and change in an effort to test alternative approaches for successfully transforming the firm's HR management system. Firms that can move quickly and effectively to take advantage of this new strategic lever will be the big winners. Over time, as the market for HR management systems becomes better developed, the strategic value of HR will decline, and like product and service quality, organizational *High Performance Work Systems* will become the cost of entry into competition. Until then, however, researchers and managers alike have an opportunity to participate in a important extension of both theory and practice.

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Table 1
Description of Respondents by Industry Classification

SIC Code	Short Industry Title	1992 Sample	%	1992 Res- ponse	%	1994 Sample	%	1994 Res- ponse	%
000- 999	Ag, Forestry, Fishing	6	0.2	2	0.2	11	0.3	1	0.1
1000-1999	Mining & Construction	121	3.5	33	3.5	114	3.0	25	3.4
2000-2999	Mfg: Food, Tobacco, Chemicals Printing	444	12.8	96	10.2	486	12.6	90	12.3
3000-3999	Mfg: Metal Industries, Industrial Equip., Elect., Transport	997	28.7	313	33.1	1097	28.5	224	30.5
4000-4999	Transportation & Public Utilities	370	10.6	89	9.4	376	9.8	77	10.5
5000-5999	Wholesale & Retail Trade	377	10.8	90	9.5	464	12.1	76	10.4
6000-6999	Finance, Insur., & Real Estate	755	21.7	206	21.8	750	19.5	141	19.2
7000-7999	Service Industries	248	7.1	66	7.0	336	8.7	63	8.6
8000-8999	Health, Legal, Social, & Engineering Services	159	4.6	51	5.4	213	5.5	37	5.0
9000-9999	Public Administration	0	0.0	0	0.0	0	0.0	0	0.0
Totals		3477	100.0	946	100.0	3847	100.0	734	100.0

Table 2^a
Questionnaire Items and Factor Structure for the 1992 HR Strategy Measures

Questionnaire Item	Factor 1	Factor 2
<i>Employee Skills and Organizational Structure</i> Alpha=.67		
What is the proportion of the workforce who are included in a formal information sharing program (e.g. a newsletter)?	.54	.02
What is the proportion of the workforce whose job has been subjected to a formal job analysis?	.53	.18
What proportion of non-entry level jobs have been filled from within in recent years?	.52	-.36
What is the proportion of the workforce who are administered attitude surveys on a regular basis?	.52	-.07
What is the proportion of the workforce who participate in Quality of Work Life (QWL), Quality Circles (QC), and/or labor management participation teams?	.50	-.04
What is the proportion of the workforce who have access to company incentive plans, profit-sharing plans, and/or gain-sharing plans ?	.39	.17
What is the average number of hours of training received by a typical employee over the last 12 months?	.37	-.07
What is the proportion of the workforce who have access to a formal grievance procedure and/or complaint resolution system?	.36	.13
What proportion of the workforce is administered an employment test prior to hiring?	.32	-.04
<i>Employee Motivation</i> Alpha=.66		
What is the proportion of the workforce whose performance appraisals are used to determine their compensation ?	.17	.83
What proportion of the workforce receives formal performance appraisals?	.29	.80
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.	-.07	.56
For the five positions that your firm hires most frequently , how many qualified applicants do you have per position (on average)?	-.15	.27

^an = 826. Taken from Table 1 in Huselid (1995). Bold type indicates that the associated question loads unambiguously on a single factor.

Table 3^a
Questionnaire Items and Factor Structure for the 1994 HR Strategy Measures

Questionnaire Item	Factor 1	Factor 2	Factor 3
HR Strategy Alpha = .75			
To what degree is the HR department involved in your firm's strategic planning process ?	.85	.14	-.03
To what degree do you align business and HR strategies ?	.83	.18	-.01
To what degree does your firm have a clear strategic mission that is well communicated and understood at every level throughout the firm ?	.71	.02	.02
How many hours of training per year are typically received by an experienced employee (i.e., someone employed more than one year)?	.37	.14	.21
What proportion of the workforce has access to a formal grievance procedure and/or complaint resolution system ?	.22	-.09	.17
What proportion of your training efforts are devoted to skill enhancement ?	.09	-.02	.04
Employee Motivation Alpha = .75			
What proportion of the workforce has their merit increase or other incentive pay determined by a performance appraisal ?	.09	.78	-.12
What proportion of the workforce receives formal performance appraisals ?	.09	.66	-.01
What proportion of the workforce is promoted based primarily on merit (as opposed to seniority)?	.11	.47	-.09
What proportional change in total compensation could a low performer normally expect as a result of a performance review ?	-.04	.25	.10
Selection & Development Alpha = .47			
What proportion of the workforce is eligible for cash bonuses based on individual performance or company-wide productivity or profitability ?	.00	.45	.61
What proportion of non-entry level jobs have been filled from within in recent (i.e., over the past five) years?	.06	-.26	.57
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).	-.01	.44	.55
What proportion of the workforce is regularly administered attitude surveys ?	.21	.02	.51
What proportion of the workforce is administered an aptitude, skill, or work-sample test prior to employment ?	.05	-.31	.39
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 ?	.07	.00	.36
What proportion of the workforce has any part of their compensation determined by a skill-based compensation plan ?	-.06	-.07	.07

^an = 632. Bold type indicates that the associated question loads unambiguously on a single factor.

Table 4
Means, Standard Deviations, and Intercorrelations for all Variables ^a

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Selection & Development</i>	0.00	0.52	---														
<i>Employee Motivation</i>	0.01	0.80	23	---													
<i>HR Strategy</i>	0.01	0.71	28	18	---												
<i>SPECIFIC₉₄</i>	0.01	1.42	64	74	70	---											
<i>FLEXIBLE₁₇</i>	8.01	3.19	65	64	63	91	---										
<i>POSITIVE₁₅</i>	6.83	2.86	61	64	66	91	98	---									
<i>BUREAUCRATIC HR</i>	1.17	0.73	41	25	18	39	53	33	---								
Ln of Market Value	18.93	1.85	20	02	23	20	18	17	11	---							
Ln of Book Value	18.12	2.03	19	-09	19	12	12	07	21	79	---						
Union Coverage	10.74	22.87	04	-36	-06	-22	-20	-23	04	21	35	---					
R&D Intensity	0.01	0.06	-06	13	-02	-04	00	04	-12	-01	-17	-14	---				
Ln of Total Employment	6.86	1.47	14	-07	21	12	13	10	21	72	73	28	-14	---			
Growth in Sales (5-years ¹)	0.44	0.84	-01	-04	02	03	03	04	-06	09	01	-11	06	01	---		
Systematic Risk (beta)	1.07	0.21	03	-10	-03	05	06	09	-09	-11	-16	-26	10	-04	13	---	
<i>Cost Leadership Comp. Strategy</i>	29.14	25.34	07	-18	03	-06	-05	-08	-08	21	31	27	-08	17	-03	-14	---
Industry Concentration	0.39	0.15	-08	00	-03	-04	-07	-06	-06	-01	-03	04	-03	04	13	14	-04

^a n = 628. All correlations >= .05 are significant at the .05 level, those >= .07 are significant at the .01 level, and those >= .10 are significant at the .001 level (one-tail test).

Table 5
Regression Analysis for Market Value
(Standard Errors in Parentheses)

Independent Variables	1	2	3	4
Constant	3.167*** (0.279)	4.406** (2.297)	-1.144 (2.035)	
<i>Employee Skills and Organizational Structures</i>	0.137** (0.073)			
<i>Employee Motivation</i>	0.068* (0.057)			
<i>SPECIFIC</i> ₉₂₋₉₄		0.093*** (0.036)		
<i>FLEXIBLE</i> 11			0.044*** (0.016)	
<i>FLEXIBLE</i> 13				0.029** (0.014)
Year	0.281*** (0.071)	0.279*** (0.071)	0.295*** (0.071)	0.291*** (0.071)
Ln of Book Value	0.509*** (0.027)	0.509*** (0.027)	0.509*** (0.027)	0.509*** (0.027)
Union Coverage	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
R&D Intensity	2.685*** (0.559)	2.649*** (0.557)	2.672*** (0.556)	2.704*** (0.557)
Ln of Total Employment	0.416*** (0.034)	0.418*** (0.034)	0.416*** (0.034)	0.419*** (0.034)
Growth in Sales	0.185*** (0.031)	0.185*** (0.031)	0.185*** (0.031)	0.185*** (0.031)
Systematic Risk (Beta)	-0.022 (0.127)	-0.028 (0.126)	-0.028 (0.126)	-0.011 (0.126)
Cost Leadership Competitive Strategy	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Industry Concentration	-0.387** (0.198)	-0.386** (0.198)	-0.381** (0.197)	-0.382** (0.198)
Sample size	1251	1251	1251	1251
R ²	0.697	0.697	0.698	0.697
F _{4,1209}	67.95***	69.67***	69.75***	69.45***

* $r < .10$; ** $r < .05$; *** $r < .01$. All equations include 34 dummy variables representing 35 2-digit SIC codes. All significance levels reflect one-tail tests.

Table 6
Regression Analysis for Market Value
(Standard Errors in Parentheses)

Independent Variables	5	6	7	8
Constant	0.532* (1.445)	1.885*** (0.522)	-1.144 (2.035)	0.003** (0.001)
<i>Selection & Development</i>	0.055 (0.085)			
<i>Employee Motivation</i>	0.132** (0.059)			
<i>HR Strategy</i>	0.086** (0.068)			
<i>SPECIFIC</i> ₉₄		0.097*** (0.031)		
<i>FLEXIBLE</i> ₁₇			0.036*** (0.014)	
<i>POSITIVE</i> ₁₅				0.075*** (0.016)
<i>BUREAUCRATIC HR</i>				-0.233*** (0.060)
Sample size	628	628	628	628
R ²	0.75	0.75	0.75	0.76
F _{45,582}	39.87***	41.85	41.51***	42.27***

* $r < .10$; ** $r < .05$; *** $r < .01$. All equations include 34 dummy variables representing 35 2-digit SIC codes. All significance levels reflect one-tail tests. All equations otherwise specified identically to the equations in Tables 5, with the exception of the "year" variable, which is omitted since these analyses contain only the 1994 survey data.

Table 7
Regression Analysis for Market Value
(Standard Errors in Parentheses)

Independent Variables		
	9	10
Constant	0.532* (1.445)	1.885*** (0.522)
<i>LOW15</i>	0.176** (0.065)	
<i>MED15</i>	0.046** (0.025)	
<i>HIGH15</i>	0.123** (0.079)	
<i>HIGHLOW</i>		0.151*** (0.051)
<i>MED15</i>		0.045** (0.025)
Sample size	628	628
R ²	0.76	0.76
F _{45,582}	40.27***	41.24***

* $r < .10$; ** $r < .05$; *** $r < .01$. All equations include 34 dummy variables representing 35 2-digit SIC codes. All significance levels reflect one-tail tests. All equations otherwise specified identically to the equations in Tables 5, with the exception of the "year" variable, which is omitted since these analyses contain only the 1994 survey data.