# High Performance Work Systems and Intermediate Indicators of Firm Performance Within the US Small Business Sector

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*Within this manuscript I present conceptual and empirical evidence that indicates that within the US small business sector high performance work systems (HPWS) are associated with outcomes that are key to the success of small US firms. I also present empirical evidence that indicates that within this sector of the US economy HPWS do not necessarily produce outcomes that exceed the labor costs associated with the use of these systems.*
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Human resource management (HRM) research has produced evidence that has important implications for the success of small firms (Golhar & Deshpande, 1997). Theoretical (e.g., Jackson & Schuler, 1995; Lado & Wilson, 1994) and empirical HRM research (e.g., Huselid, 1995; MacDuffie, 1995) has led to a general consensus that the method used by a firm to manage its workforce can have a positive impact on firm performance (Becker & Huselid, 1998; Delery & Shaw, 2001; Wright & Boswell, 2002). Within this area of research empirical studies have reported a positive association between the use of high performance work systems (HPWS) and subjective (e.g., Delaney & Huselid, 1996) and objective indicators of firm performance (e.g., Guthrie, 2001). Scholars (e.g., Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995) conceptualize HPWS as a set of distinct but interrelated HRM practices that together select, develop, retain, and motivate a workforce: (1) that possesses superior abilities (i.e., superior (a broad repertoire of) skills and behavior scripts); (2) that applies their abilities in their work-related activities; (3) whose work-related activities (i.e., actual employee behaviors/output) result in these firms achieving superior intermediate

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indicators of firm performance (i.e., those indicators over which the workforce has direct control) and sustainable competitive advantage. Consistent with other HRM scholars (e.g., Jackson & Schuler, 1995; Wright & Snell, 1998), HPWS scholars (e.g., Huselid, 1995) posit that the actual behaviors (i.e., output) of a firm's employees is a critical determinant of intermediate indicators of firm performance (e.g., workforce turnover and labor productivity) and sustainable competitive advantage.

Within the small business sector, gaining access to a workforce that produces superior employee output is key to firm success (Deshpande & Golhar, 1994; Golhar & Deshpande, 1997; Holt, 1993; Hornsby & Kuratko, 1990; McEvoy, 1984) and a source of sustainable competitive advantage (Flanagan & Deshpande, 1996). The US small business sector encompasses the vast majority of US firms (Blanchard & Thacker, 1999). Moreover, "small business productivity has been the driving engine of the US economy for the past two decades" (Kuratko, Goodale & Hornsby, 2001: 293). In recent years this sector has created the greatest number of net new jobs within the US economy (Holt, 1993). The large size of this sector and the high rate of failure among small firms however means that the small business sector may also have been responsible for the greatest number of jobs lost (see Picot, Baldwin & Dupuy, 1994). Therefore any method that can aid in the success of small US firms is important not only to these firms but also to the entire US economy (Kuratko et al., 2001).

Multi-industry HPWS research (e.g., Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995; Huselid & Becker, 1997) has excluded firms with fewer than 100 employees. This exclusion has created a lack of understanding of the impact of HPWS within the US small business sector. In this paper I attempt to address this lack in two ways. First, within the context of US small firms I conceptually illuminate the link between HPWS and superior intermediate indicators of firm performance (e.g., lower workforce turnover and higher labor productivity). Second, using a sample of 446 small US firms I empirically test the hypothesized association between HPWS and superior intermediate indicators of firm performance.

## Theoretical Background and Hypotheses

*The Resource-Based View*

The way in which internal resources contribute toward a firm achieving sustainable competitive advantage has become known as the resource-based view (Barney & Arikan, 2001—see Barney, 2001; Barney & Arikan, 2001; Priem & Butler, 2001a, 2001b for discussions of whether or not the resource-based view is tautological and/or a theory). The resource-based view has been used as the theoretical grounding within most of the research that posits that HRM can have a positive impact on firm performance (Wright, Dunford & Snell, 2001). Within this line of research scholars have concluded that a firm's workforce can be a source of sustainable competitive advantage (e.g., Delery, 1998; Wright, McMahan & McWilliams, 1994). Scholars (e.g., Barney, 2001; Boxall, 1998) have cautioned that the external environmental factors that impact a firm (e.g., the sector in which the firm operates—Boxall, 1998) must be considered in the process of determining if an internal resource is valuable,

rare, imperfectly imitable, and without a strategically equivalent substitute (i.e., a source of sustainable competitive advantage).

Scholars (e.g., Deshpande & Golhar, 1994; Hornsby & Kuratko, 1990; McEvoy, 1984) have concluded that the inability of small firms to select, develop, retain, and motivate (i.e., gain access to) a competent workforce has produced major barriers to firm success and is a leading cause of firm failures within the small business sector (i.e., employee output is a valuable internal resource). Furthermore, Wright and McMahan (1992) and Wright et al. (1994) assert that because human performance is normally distributed gaining access to a workforce that produces superior employee output is both valuable and rare. Moreover, a workforce that produces superior employee output is expected to be the result of individual and firm practices, histories, and/or cultures, which cannot be readily articulated and that would be very difficult and costly to imitate (Becker & Huselid, 1998; Delery, 1998; Wright et al., 1994; Wright et al., 2001). Among small US firms achieving competitive advantage via superior employee output is unlikely to have a strategically equivalent substitute because these firms are typically more labor-intensive compared to their larger counterparts (see Miller, 1987) and other sources of competitive advantage are very limited (Flanagan & Deshpande, 1996; Pfeffer, 1994). Thus, within the US small business sector gaining access to a workforce that produces superior employee output is a source of sustainable competitive advantage.

### Illuminating the Linkages Between HPWS and Superior Employee Output

HPWS can aid in eliciting superior employee output via the system's set of HRM practices selecting, developing, and retaining a workforce comprised of individuals that possess superior abilities (skills and behavior scripts) and motivating these individuals to apply their superior abilities in their work-related activities (see Becker & Huselid, 1998; Delery, 1998; Huselid, 1995; Jackson & Schuler, 1995; MacDuffie, 1995; Wright & Boswell, 2002). However, Becker and Gerhart (1996) and Gerhart, Wright, McMahan and Snell (2000) have suggested that among empirical studies, which have examined the link between HRM and firm performance, there is little consistency in regards to the individual HRM practices that have been included within these studies' systems. Based upon my examination of six exemplary empirical studies (Arthur, 1994; Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995; Ichniowski, Shaw & Prennushi, 1997; MacDuffie, 1995) I suggest that most of the HRM practices included within these studies fit into one of six broad categories of HRM practices (see Appendix A). These broad categories are (1) staffing, (2) compensation, (3) flexible job assignments, (4) teamwork, (5) training, and (6) communication (Appendix A). Becker and Huselid (1998) and Delery and Shaw (2001) suggest that HPWS should be comprised of HRM practices that previous research has indicated are theoretically appropriate. Therefore, within each of the six broad categories the specific HRM practices to be included within this study's HPWS must be linked to selecting, developing, retaining, and/or motivating (gaining access to) a workforce that produces superior employee output.

*Staffing.* Extensiveness of staffing refers to the extent that a firm's staffing process uses information gathered from several selection devices (e.g., interviews, tests, work samples, etc.) to evaluate job candidates. Such a staffing process creates numerous barriers for job

candidates and may result in the selection of individuals that possess superior skills and behavior scripts (Dessler, 2000; Olian & Rynes, 1984; Way & Thacker, 2001). Extensiveness of staffing (a component of this study's HPWS) can be used by a firm to select a workforce that is comprised of individuals that possess superior skills and behavior scripts, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Compensation.*  Group-based performance pay is a component of almost all of the systems I examined in Appendix A (e.g., Guthrie, 2001; Huselid, 1995). Within the economics literature group-based performance pay has been conceptualized as a way in which firms can align the desired goals of employees with those of the firm (see Blasi, Kruse, Sesil, Kroumova & Carberry, 2000; Kruse, 1993; Weitzman & Kruse, 1990). Furthermore within this literature results indicate that group-based performance pay (a component of this study's HPWS) can enhance employee retention and the motivation of employees to apply their skills and behavior script in their work-related activities. Group-based performance pay can increase a firm's ability to retain employees that possess superior skills and behavior scripts and who are motivated to apply these skills and behavior scripts in their work-related activities, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

The pay level of the workforce has been identified as playing a central role in the relationship between HPWS and firm performance (Becker & Huselid, 1998). It has been proposed that firms that pay more than their competitors will attract a workforce that is comprised of individuals that possess superior abilities and these individuals are motivated to apply their abilities in their work-related activities because they would loathe losing these high paying jobs (i.e., efficiency wages—see Shapiro & Stiglitz, 1984; Stiglitz, 1975). A firm can use pay level to increase the quality of their applicant pool, which can increase the likelihood that the firm will select new employees that possess superior skills and behavior scripts. A firm can also use pay level to increase the retention of employees that possess superior skills and behavior scripts and who are motivated to apply these skills and behavior scripts in their work-related activities. Thus, pay level (a component of this study's HPWS) may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Flexible job assignments.*  Ichniowski et al. (1997) and MacDuffie (1995) have both included job rotation as a component of their proposed HRM systems (see Appendix A). Participation in job rotation can broaden employee skills and behavior scripts (Noe, Wilk, Mullen & Wanek, 1997; Wright & Snell, 1998). Job rotation (a component of this study's HPWS) can broaden (develop) the skills and behavior scripts of a firm's workforce, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Teamwork.*  Research conducted among small service firms in the United Kingdom has reported evidence that may indicate that there is a positive association between self-directed teams and indicators of firm performance (Chaston, 1998). Self-directed teams can enhance (a) employee skills and behavior scripts and (b) employee motivation to apply their skills

and behavior scripts in their work-related activities (Elmuti, 1996). Self-directed teams (a component of this study's HPWS) can develop employee skills and behavior scripts and motivate employees to apply their skills and behavior scripts in their work-related activities, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Training.* Training is a component of all of the systems I examined in Appendix A (e.g., Arthur, 1994; Becker & Huselid, 1998). Formal training can have a positive impact on employee skills, employee behavior scripts, employee motivation, employee output, and firm performance (see Blanchard & Thacker, 1999; Kirkpatrick, 1998). Formal training (a component of this study's HPWS) can develop employee skills and behavior scripts and motivate employees to apply their skills and behavior scripts in their work-related activities, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Communication.* A formal process in which employees can provide their opinions and/or express their views is a component of all of the systems I examined in Appendix A (e.g., Huselid, 1995; MacDuffie, 1995). Research has indicated that systems that do not include procedures that allow members of the workforce to have their views considered will not be perceived as procedurally fair and such systems may be associated with negative outcomes (Greenberg, 1990; Lind & Tyler, 1988; Shaw, Delery, Jenkins & Gupta, 1998; Tyler, Rasinski & Spodick, 1985). Systems that allow employees to have their views considered (even if employees don't expect to have an impact on decisions) will have a positive impact on employees' perceptions of fairness and their behavior output (Greenberg, 1990; Lind & Tyler, 1988; Tyler et al., 1985). The positive outcomes associated with HPWS are more likely to result when an establishment includes a procedure (e.g., involvement in meetings discussing work-related issues) that allows workers to have their views considered. Involvement in meetings discussing work-related issues (a component of this study's HPWS) can motivate employees to apply their skills and behavior scripts in their work-related activities, which may enhance the firm's ability to gain access to a workforce that produces superior employee output.

*Summary.* The seven HRM practices that are components of this study's HPWS (see Table 1) are consistent with those practices included in previous empirical HRM systems research (see Appendix A). This HPWS should enhance the ability of firms to gain access to a workforce that produces superior employee output. Furthermore, small US firms that use a system such as this study's HPWS are expected to achieve superior intermediate indicators of firm performance.

### High Performance Work Systems and Intermediate Indicators of Firm Performance

*Workforce turnover.* Within the small business sector the inability to retain a competent workforce has been identified in previous research as a barrier to firm success (e.g., Holt, 1993; McEvoy, 1984). Multi-industry HPWS studies which have examined the impact of HPWS on workforce turnover within firms with 100 or more employee have reported

Table 1
The components of the HPWS

| |
|---|
| Staffing |
|   1. Extensiveness of staffing |
| Compensation |
|   2. Group-based performance pay |
|   3. Pay level |
| Flexible job assignments |
|   4. Job rotation |
| Teamwork |
|   5. Self-directed teams |
| Training |
|   6. Formal training |
| Communication |
|   7. Involvement in meetings discussing work-related issues |

a negative association between the use of HPWS and workforce turnover (e.g., Huselid, 1995). Systems such as this study's HPWS may engender a work environment in which employees experience enhanced satisfaction, organizational commitment, and motivation, which may result in lower workforce turnover (see Appelbaum, Bailey, Berg & Kalleberg, 2000; Arthur, 1994; Freeman & Rogers, 1999; Guthrie, 2001; Huselid, 1995; Shaw et al., 1998). Thus systems such as this study's HPWS may enhance the ability of small US firms to retain a competent workforce. Within the US small business sector it is expected that there will be a negative relationship between the use of HPWS and workforce turnover.

*Hypothesis 1:* Among small US firms there is a negative association between the use of HPWS and workforce turnover.

*Labor productivity.* In their review of the literature Ichniowski, Kochan, Levine, Olson and Strauss (1996) conclude that systems such as this study's HPWS can have a positive impact on productivity. A potential problem associated with HPWS is that these systems may create higher labor costs (Guthrie, 2001) that are not recovered by the firm via superior employee output. This may be of greater concern for smaller firms because their larger counterparts are expected to enjoy greater economies of scale from HPWS—lower HRM costs per employee (Ferris, Arthur, Berkson, Kaplan, Harrell–Cook & Frink, 1998). Among firms that employ 100 or more employees, research (e.g., Huselid, 1995) has indicated that the gains (superior employee output) produced by HPWS exceed the labor costs associated with the use of these systems; HPWS are positively associated with labor productivity. Within the US small business sector HPWS can enhance the ability of firms to select, develop, retain, and motivate a workforce that can produce superior employee output, which is a source of sustainable competitive advantage (Flanagan & Deshpande, 1996) and key to firm success (e.g., Holt, 1993). Therefore, within the US small business sector it is expected that there will be a positive relationship between the use of HPWS and labor productivity.

*Hypothesis 2:* Among small US firms there is a positive association between the use of HPWS and labor productivity.

## Method

### The NES Phase II Data Set

This study's data come from the National Employer Survey (NES) Phase II data set, a national probability sample of private sector for-profit establishments. The NES Phase II was administered by the US Bureau of the Census by means of computer assisted telephone interviewing. Although the survey was designed to allow for multiple respondents the target respondent was the plant manager within the manufacturing sector and the local business site manager within the non-manufacturing sector (Cappelli & Neumark, 2001). The NES Phase II achieved a response rate of over 70% and the data set includes responses from 3081 establishments. For more information regarding the NES Phase II refer to Cappelli and Neumark (2001).

### This Study's Data Set

The number of employees is typically used as the criterion to define a small firm (Ahire & Golhar, 1996). However the actual number used as the criterion has ranged from "fewer than 50 employees" to "no more than 500 employees" (see Ahire & Golhar, 1996; Chaston, Badger & Sadler–Smith, 2001; Golhar & Deshpande, 1997). Although 98% of US firms employ fewer than 100 employees (Blanchard & Thacker, 1999) this group of firms has been excluded in previous US multi-industry HPWS research. Firms that employ 100 or more employees but fewer than 500 employees have been included within previous US multi-industry HPWS research, which has reported a positive association between HPWS and indicators of firm performance (e.g., Becker & Huselid, 1998; Huselid, 1995). To avoid the possibility that the results reported in this study are simply reflecting effects that have already been established in previous HPWS research this study's sample only includes firms with fewer than 100 employees.

Although the NES Phase II data set consists of establishment level data it does include a dummy code that identifies those establishments that are part of a multiple establishment firm (i.e., a firm with more than one establishment). Among these establishments however it is not possible to determine if there are fewer than 100 employees at the firm level (i.e., the total employment of all the firm's establishments). Therefore only single establishment firms that employ at least 20 but fewer than 100 employees are included in this study's sample; the NES Phase II data set does not include establishments with fewer than 20 employees. Firms without the complete data necessary to create the HPWS unitary index were removed from this study's sample, which is comprised of 446 US single establishment firms. Eleven percent (10.5%) of these 446 firms reported having employees that were covered by a collective agreement and 57.0% employed between 20 and 49 employees and 43.0% employed between 50 and 99 employees. Table 2(A) presents this study's variable definitions; Table 2(B) presents the definitions of this study's HPWS' seven components.

Table 2
Variable definitions

| | Definitions |
| --- | --- |
| **(A) Variables** | |
| HPWS | The additive score of the seven components: extensiveness of staffing, group-based performance pay, pay level, job rotation, self-directed teams, formal training, and involvement in meetings discussing work-related issues. Maximum score = 7 |
| Workforce turnover (Ln) | Ln (i.e., natural logarithm) of the percent of the workforce that left the firm within the past year |
| Labor productivity | Ln of the [total value of sales, receipts, or shipments/total labor costs] |
| Capital intensity | Ln of (total book value of fixed capital) |
| Unionization | Percent of non-managerial and non-supervisory employees covered by a collective agreement (sample range—0.0 to 1.0) |
| Firm size | Two dummy codes; 20–49 employees and 50–99 employees (20–49 the omitted category) |
| Voluntary turnover (Ln) | Ln of the percent of the workforce that voluntarily left the firm in the past year |
| Perceived productivity | Respondents evaluation of their employees' productivity compared to their major competitors' employees: higher (1); lower (−1); same (0) |
| Industry | Twenty-one dummy codes (food and tobacco manufacturing the omitted category) |
| **(B) The components of the HPWS** | |
| Extensiveness of staffing | An additive score of the extent that the five selection devices are used to evaluate candidates for front-line jobs; each of the selection devices are on a 5-point scale ("never" to "always"). Score = (interviews + tests + work samples + drug/alcohol screens + references from previous employers)/25. Maximum score = 1 |
| Group-based performance pay | Establishment contributes to employee stock options or profit sharing: Yes = 1; No = 0 |
| Pay level | Average pay of front-line employees/60,000 (the maximum average front-line pay in sample). Maximum score = 1 |
| Job rotation | Percent of non-managerial and non-supervisory employees involved in job rotation. Maximum score = 1 |
| Self-directed teams | Percent of non-managerial and non-supervisory employees involved in self-managed teams. Maximum score = 1 |
| Formal training | In the past year, percent of front-line employees who received formal training. Maximum score = 1 |
| Involvement in meetings discussing work-related issues | Percent of non-managerial and non-supervisory employees involved in regularly scheduled meetings to discuss work-related issues. Maximum score = 1 |

## *High Performance Work Systems as a Unitary Index*

Previous research has provided several theoretical and methodological arguments for why a systems approach is preferable within HPWS research (e.g., Becker & Gerhart, 1996; Becker & Huselid, 1998; Delery, 1998). Becker and Huselid conclude that this literature

has a preference "for a unitary index that contains a set (though not always the same set) of theoretically appropriate HRM practices derived from prior work" (1998: 63). I created this study's HPWS unitary index by summing the standardized scores of the seven equally weighted components of this study's HPWS (maximum score per component is one—see Table 2); I use an additive approach (maximum HPWS unitary index score is seven). Refer to Becker and Huselid (1998) and Delery (1998) for discussions regarding the strengths and weaknesses of using an additive approach to create a unitary index in HPWS research.

### Dependent Variables

Dyer and Reeves (1995) identify three categories of the most defensible firm performance measures for HRM systems research: (1) human resource (HR) outcomes (e.g., workforce turnover); (2) organizational outcomes (e.g., labor productivity); and (3) financial/accounting outcomes (e.g., R.O.I.). This study only examined HR and organizational outcomes, as the NES Phase II data set does not contain the data necessary to develop financial/accounting outcome variables.

*Workforce turnover.* The distribution of the data necessary to develop this study's workforce turnover variable is skewed. Following the recommendations of Tabachnick and Fidell (1996) a natural logarithm transformation was performed; the workforce turnover variable used in this study is the natural logarithm (Ln) of the percentage of employees who left the firm in the past year (see Table 2).

*Labor productivity.* Similar to previous studies in this area (e.g., Guthrie, 2001; Koch & McGrath, 1996) labor productivity was used as a proxy for productivity. The labor productivity variable used in this study is the natural logarithm of the firm's total sales, receipts, or shipments/total labor costs (see Table 2).

### Control Variables

Every regression model reported in this paper (Appendix B, Tables 4 and 5) includes the following control variables: (1) capital intensity (the natural logarithm of the firm's book value of fixed capital stock); (2) unionization (the percentage of the firm's non-managerial and non-supervisory employees that are covered by a collective agreement); (3) a dummy code for firm size (there are two dummy codes for firm size: 20–49 employees and 50–99 employees; 20–49 employees is the omitted category); and (4) 20 dummy codes for industry (there are 21 dummy codes for industry; the food and tobacco manufacturing industry is the omitted category).

Only 340 firms provided the data necessary to create the capital intensity variable. To test for bias, all analyses were first run using the listwise approach. Then all of the analyses were re-run substituting the sample mean of capital intensity (13.78) for each of the 146 cases that were missing the data to create the capital intensity variable. The results are consistent regardless of the method used. Therefore, all of the reported results of this study use the latter approach (the substitution approach) as this approach avoids substantially reducing the sample size due to a control variable.

*Supplemental Analyses Dependent Variables*

*Voluntary turnover.* The voluntary turnover variable used in this study's supplemental analyses is the natural logarithm of the percentage of the workforce who voluntarily left the firm in the past year (see Table 2).

*Perceived productivity.* The perceived productivity variable used in this study's supplemental analyses is created from the response provided by NES Phase II respondents to the following question: "Compared to your major competitors, do you consider your employees' productivity to be higher, lower, or the same." Responses to this question are scored on a 3-point scale with "higher" $= 1$, "lower" $= -1$, and "the same" $= 0$ (see Table 2).

## Results

Table 3(A) presents the means, standard deviations, and correlation matrix for this study's key variables: HPWS, workforce turnover, labor productivity, capital intensity, unionization, firm size (the 50–99 employees category), voluntary turnover, and perceived productivity.

Table 3(B) presents the means, standard deviations, and correlation matrix for the seven human resource management practices that are components of this study's HPWS (see Tables 1 and 2). Among this study's sample of small US firm the mean HPWS unitary index score is 2.61 (S.D. $= 1.17$) out of a possible score of seven (Tables 2 and 3). Consistent with the conclusions of Becker and Huselid, based upon their studies of publicly-held US firms with 100 or more employees, this study's mean HPWS unitary index score (2.61) indicates that the use of HPWS "remain a significant unrealized opportunity for many firms" (1998: 54). A sample of larger firms was extracted from the NES Phase II data set so that the prevalence of HPWS among small US firms could be compared to that of larger US firms. This sample of larger firms ($n = 319$) consists of all the single establishment firms within the NES Phase II data set that have 100 or more employees and the complete data necessary to create this study's HPWS unitary index. Between these two groups there was not a significant difference in the prevalence of HPWS, group-based pay, pay level, self-directed teams, or involvement in meeting discussing work-related issues. However, formal training and extensiveness of staffing are more prevalent among larger firms and job rotation is more prevalent among smaller firms.

To test this study's hypotheses, block hierarchical regression was used. That is, for each regression model, first (Step 1) all control variables were simultaneously entered into the model, then (Step 2) the independent variable of interest was entered into the model.

Table 4 (Models 1 and 2) shows the regression results for workforce turnover, which provide empirical support for Hypothesis 1. Results (Table 4, Model 2) indicate a negative association between HPWS and workforce turnover ($B = -.092$, $t = -2.076$, $\Delta R^2 = .009$, $F = 3.843$, $n = 390$). Within this sample of small US firms, firms with this study's mean HPWS unitary index score (2.61) would be predicted to have a 13.76% rate of workforce turnover vs. 12.35% (a 10.24% reduction) for firms with a HPWS unitary index score that is one standard deviation above the mean (HPWS unitary index score $= 3.78$). The results

Table 3
Descriptive statistics and correlations[a]

| | $n$ | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| **(A) Variables** | | | | | | | | | | |
| 1. HPWS | 446 | 2.61 | 1.17 | | | | | | | |
| 2. Workforce turnover (Ln) | 390 | 2.63 | 1.01 | −.196** | | | | | | |
| 3. Labor productivity | 386 | 1.45 | .76 | −.018 | −.091 | | | | | |
| 4. Capital intensity | 446 | 13.78 | 1.38 | .105* | −.061 | .121* | | | | |
| 5. Unionization | 446 | .08 | .25 | .070 | −.169** | −.054 | .070 | | | |
| 6. 50–99 employees | 446 | .43 | .50 | .007 | .085 | .026 | .205** | −.003 | | |
| 7. Voluntary turnover (Ln) | 366 | 2.27 | 1.04 | −.208** | .876** | −.092 | −.032 | −.203** | .038 | |
| 8. Perceived productivity | 408 | .47 | .50 | .152** | −.089 | −.039 | .117* | −.052 | −.032 | −.132* |
| **(B) The components of the HPWS** | | | | | | | | | | |
| 1. HPWS | 446 | 2.61 | 1.17 | | | | | | | |
| 2. Extensiveness of staffing | 446 | .60 | .16 | .377** | | | | | | |
| 3. Group-based performance pay | 446 | .35 | .48 | .518** | .163** | | | | | |
| 4. Pay level | 446 | .42 | .17 | .343** | .177** | .258** | | | | |
| 5. Job rotation | 446 | .24 | .35 | .348** | −.018 | −.051 | −.032 | | | |
| 6. Self-directed teams | 446 | .17 | .32 | .517** | .067 | .026 | .080 | .169** | | |
| 7. Formal training | 446 | .32 | .41 | .639** | .228** | .143** | .142** | .046 | .234** | |
| 8. Involvement in meetings discussing work-related issues | 446 | .51 | .45 | .575** | .148** | .025 | .023 | .038 | .203** | .265** |

[a] All correlations are Pearson's correlation two-tailed tests; "pairwise" deletion procedure.

* $p < .05$.

** $p < .01$.

Table 4
HPWS in the US small business sector

| Variables | HR outcome | | Organizational outcome | |
|---|---|---|---|---|
| | Workforce turnover (Ln) | | Labor productivity | |
| | Model 1 B | Model 2 B | Model 3 B | Model 4 B |
| Step 1: Control variables | | | | |
| Capital intensity | −.020 | −.016 | .053 | .053 |
| | (−.509)[a] | (−.396) | (1.831) | (1.836) |
| Unionization | −.653** | −.630** | −.258 | −.258 |
| | (−3.141) | (−3.041) | (−1.715) | (−1.712) |
| 50–90 employees | .175 | .177 | .036 | .036 |
| | (1.683) | (1.711) | (.457) | (.455) |
| Industry | Yes[b] | Yes | Yes | Yes |
| Step 2: HPWS | | −.092* | | −.011 |
| | | (−2.076) | | (−.330) |
| $\Delta R^2$ | | .009* | | .000 |
| Model $R^2$ | .192 | .202 | .175 | .175 |
| Model $F$ | 3.789*** | 3.843*** | 3.338*** | 3.196*** |
| $n$ | 390 | 390 | 386 | 386 |

[a] The $t$-scores are in parentheses.

[b] Yes indicates that the 20 industry dummy variables were included within the model.

* $p < .05$, two-tailed test.

** $p < .01$, two-tailed test.

*** $p < .001$, two-tailed test.

presented in Table 4 (Models 3 and 4) do not provide support for Hypothesis 2. Within this study's sample of US small firms, HPWS are not associated with labor productivity ($B = −.011, t = −.330, \Delta R^2 = .000, F = 3.196, n = 386$).

## Discussion

From the results reported in Table 4 there is mixed empirical support for the hypothesized association between HPWS and superior intermediate indicators of firm performance within the US small businesses sector. Although HPWS are associated with lower workforce turnover they are not associated with labor productivity. Before discussing these results further there are two issues that should be addressed within this study.

First, research has suggested that within the small business sector the inability of firms to retain a competent workforce has inhibited firm success (e.g., McEvoy, 1984). Voluntary turnover represents a situation when the member of the workforce who is leaving the firm may still be desired by the firm (i.e., the firm is losing a potentially competent employee). Thus voluntary turnover may be of greater importance than workforce turnover within the US small business sector. Supplemental analyses (Table 5, Models 5 and 6) indicate that there is a negative association between HPWS and voluntary turnover ($B = −.105, t = −2.227, \Delta R^2 = .011, F = 4.055, n = 366$). Within this sample of small US firms,

Table 5
Supplemental analyses

| Variables | HR outcome | | Organizational outcome | |
|---|---|---|---|---|
| | Voluntary turnover (Ln) | | Perceived productivity | |
| | Model 5 | Model 6 | Model 7 | Model 8 |
| | $B$ | $B$ | $B$ | $B$ |
| Step 1: Control variables | | | | |
| Capital intensity | −.009 | −.005 | .045[*] | .045[*] |
| | (−.210)[a] | (−.120) | (2.246) | (2.244) |
| Unionization | −.841[***] | −.808[***] | −.143 | −.153 |
| | (−3.868) | (−3.730) | (−1.414) | (−1.516) |
| 50–90 employees | .080 | .085 | −.039 | −.041 |
| | (.736) | (.786) | (−.744) | (−.782) |
| Industry | Yes[b] | Yes | Yes | Yes |
| Step 2: HPWS | | −.105[*] | | .054[*] |
| | | (−2.227) | | (2.437) |
| $\Delta R^2$ | | .011[*] | | .014[*] |
| Model $R^2$ | .211 | .222 | .102 | .115 |
| Model $F$ | 3.969[***] | 4.055[***] | 1.886[**] | 2.078[**] |
| $n$ | 366 | 366 | 408 | 408 |

[a] The $t$-scores are in parentheses.

[b] Yes indicates that the 20 industry dummy variables were included within the model.

[*] $p < .05$, two-tailed test.

[**] $p < .01$, two-tailed test.

[***] $p < .001$, two-tailed test.

firms with this study's mean HPWS unitary index score (2.61) would be predicted to have a 9.53% rate of voluntary turnover vs. 8.43% (a 11.54% reduction) for firms with a HPWS unitary index score that is one standard deviation above the mean (HPWS unitary index score = 3.78). The associations between HPWS and turnover (workforce and voluntary) indicate that within the US small business sector the use of HPWS enhance the ability of these firms to retain their workforces. Thus, HPWS may aid in addressing a problem that inhibits firm success within the US small business sector.

Second, research indicates that firm performance is a multi-dimensional construct (Meyer & Gupta, 1994). Within research that has examined the relationship between HRM and firm performance, firm performance has been measured using a perceptual approach (e.g., Bae & Lawler, 2000) and an objective approach (e.g., Guthrie, 2001). The NES Phase II data set contains the data necessary to create a subjective (or perceived) measure of productivity. Using a perceived measure of productivity in this study may have some merit. The ability to gather "hard" financial data is difficult if researchers wish to include private firms in their studies as there is not any publicly available objective financial data which includes these firms (Priem, Rasheed & Kotulic, 1995; Sapienza, Smith & Gannon, 1988). This often results in small business researchers not being able to obtain accurate objective measures of firm performance (Sapienza et al., 1988). However, Becker and Gerhart (1996) and Gerhart et al. (2000) have suggested that due to bias, results of studies that use

subjective measures in which a single source is used to gather both dependant and independent variables should be viewed with skepticism. It is with this in mind that the reader is cautioned when interpreting the perceived productivity results presented below.

Table 5 (Models 7 and 8) reports evidence indicating that within this study's sample of US small firms, there is a positive association between the use of HPWS and perceived productivity ($B = .054$, $t = 2.437$, $\Delta R^2 = .014$, $F = 2.078$, $n = 408$). This measure of perceived productivity is not significantly correlated to this study's measure of labor productivity (Table 3), which may be an indication that (similar to firm performance) productivity is a multi-dimensional construct.

The perceived productivity variable was created from respondents' perceptions of employee productivity (Table 2). Therefore the association between HPWS and higher perceived productivity may indicate that among small US firms the use of HPWS enhance the ability of firms to select, develop, and motivate a workforce comprised of employees that produce superior output. The association between HPWS and lower turnover (workforce and voluntary) indicates that HPWS enhance the ability of small US firms to retain their workforces. These results provide some support for the proposition that among small US firms the use of HPWS may enhance the ability of firms to gain access to a workforce that produces superior employee output, which would eliminate major barriers to firm success and reduce the likelihood of firm failure. However, results (Table 4, Models 3 and 4) indicate that within the US small business sector the outcomes produced by HPWS do not exceed (nor do they fail to meet) the labor costs associated with the use of these systems (i.e., HPWS are not associated with labor productivity).

Supplemental analyses were also conducted to see if some components of this study's HPWS were of greater importance than other components of the system. To achieve this for each of the seven HRM practices included in this study's proposed HPWS a new control variable was created—a unitary index of the remaining six HRM practices. While controlling for the impact of the other six HRM practices included in this study's proposed HPWS, analyses (following the hierarchical block regression technique highlighted above) were conducted to examine the individual association of each of the seven HRM practices included within this study's HPWS. This required running seven separate regression analyses (one for each component of this study's proposed HPWS) for each of this study's four intermediate indicators of firm performance; 28 models in all. The results of these analyses are presented in Appendix B.

Results (Appendix B) indicate that group-based performance pay is the only HRM practice included within this study's HPWS that is associated with lower workforce turnover, lower voluntary turnover, high labor productivity, and higher perceived productivity (when controlling for the other six practices). Pay level is associated with lower workforce turnover and lower voluntary turnover (when controlling for the other six practices—Appendix B). Finally, extensiveness of staffing is associated with higher perceived productivity (when controlling for the other six practices—Appendix B). When controlling for the impact of the other six HRM practices, the results presented in Appendix B do not show any other significant associations between this study's four intermediate indicators of firm performance and (a) self-directed teams, (b) job rotation, (c) formal training, or (d) involvement in meetings discussing work-related issues. The results reported in Appendix B seem consistent with previous research conducted among publicly-held US firms with 100 or more

employees that has indicated that much of the firm performance gains associated with the use of HPWS may be attributable to the compensation practices of the firm (Becker & Huselid, 1998). However, the results reported in Appendix B should be interpreted cautiously because "the influence of a specific practice could be markedly different depending on the presence or absence of other practices" (Shaw et al., 1998: 521).

*Limitations*

One of this study's limitations is that the NES Phase II data set does not include firms with fewer than 20 employees; however the data set did provide an opportunity to begin to address the lack of multi-industry HPWS research conducted within the US small business sector.

A second limitation of this study is that the NES Phase II data set does not include the information necessary to develop a measure of firm performance that would be classified as an "accounting/finance outcome" (see Dyer & Reeves, 1995). However, the intermediate indicators of firm performance used in this study should provide an acceptable initial test of the relationship between HPWS and firm performance within the US small business sector.

A third limitation is that this study's intermediate linkages were not empirically tested. Based in the resource-based view (note that I do not test the resource-based view), I propose that HPWS can have a positive impact of intermediate indicators of firm performance. However, I do not propose that HPWS directly impact intermediate indicators of firm performance, I propose that it is via the system's impact on the skills, behavior scripts, motivation, and outputs of the workforce (i.e., the intermediate linkages). Unfortunately, the data necessary to empirically test these intermediate linkages is not available in the NES Phase II data set. Scholars could make a significant contribution to the HPWS literature by empirically examining these intermediate linkages. Future studies examining the link between HPWS and firm performance should be designed so that the intermediate linkages posited within this literature can be empirically tested.

A fourth limitation is that the cross-sectional data used in this study resulted in temporally backward predictive models; the workforce turnover, the voluntary turnover, and the labor productivity models are all temporally backward predictive models. For example, the HPWS in place at the time of data collection is used to predict the rate of workforce turnover within the past year (i.e., within the 12 months prior to the date of data collection). Studies using longitudinal data would provide a better test of the effects of HPWS (Wright & Boswell, 2002; Wright et al., 2001). Longitudinal studies would allow researchers to (1) control for fixed characteristics of the firm, (2) look for changes in performance, HRM, etc., and (3) may aid researchers in identifying causality. Furthermore, longitudinal data may provide a greater opportunity to examine if HPWS are associated with the most important measure of firm performance—firm survival.

## Conclusions

Within this study's sample of 446 US firms with fewer than 100 employees, HPWS are associated with lower workforce turnover, lower voluntary turnover (supplemental analy-

ses), and higher perceived productivity (supplemental analyses). HPWS may enhance the ability of small US firms to select, develop, retain, and motivate a workforce that produces superior employee output, which may be key to the success of small US firms and a source of sustainable competitive advantage within the US small business sector. However, results indicate that among small US firms, HPWS do not necessarily produce outcomes that exceed the labor costs associated with the use of these systems. Finally, supplemental analyses are presented that indicate that within this study's sample of small US firms group-based performance pay, pay level, and extensiveness of staffing may be the most important components of this study's HPWS.

## Acknowledgments

## Appendix A.  Broad Categories of HRM Practices

Six empirical studies were included in this examination: Arthur (1994), Becker and Huselid (1998), Guthrie (2001), Huselid (1995), Ichniowski et al. (1997), and MacDuffie (1995).

*Staffing*

Selection ratio (Becker & Huselid, 1998; Huselid, 1995), high screening (Ichniowski et al., 1997; MacDuffie, 1995), internal promotions (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995), performance based promotions (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995), and testing (Becker & Huselid, 1998; Huselid, 1995).

*Compensation*

Compensation level of production and maintenance workers (Arthur, 1994), extensive benefits (Arthur, 1994), percentage of total average employment cost accounted for by bonus or incentive payments (Arthur, 1994), compensation level (Becker & Huselid, 1998), compensation linked to performance appraisals (Becker & Huselid, 1998; Huselid, 1995), group-based performance pay (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995; Ichniowski et al., 1997; MacDuffie, 1995), and skilled-based pay (Guthrie, 2001).

*Flexible Job Assignments*

Qualified or capable to perform +1 job (Becker & Huselid, 1998), job rotation (Ichniowski et al., 1997), number of job classifications (Ichniowski et al., 1997), and job rotation within and across teams (MacDuffie, 1995).

*Teamwork*

Employee participatory programs—quality circles, quality of work life programs, and/or labor management participation teams (Arthur, 1994; Becker & Huselid, 1998; Guthrie, 2001), non-supervisory employees empowered to make work-related decisions (Arthur, 1994), teams (Guthrie, 2001), high participation (Ichniowski et al., 1997), multiple teams (Ichniowski et al., 1997), in multiple teams (Ichniowski et al., 1997), employee involvement in production-related problem solving (MacDuffie, 1995), and formal work teams (MacDuffie, 1995).

*Training*

Formal training (Arthur, 1994; Becker & Huselid, 1998; Huselid, 1995; MacDuffie, 1995), training focusing on future skills required (Guthrie, 2001), cross training/cross utilization (Guthrie, 2001), off-the-job training (Ichniowski et al., 1997), new hire training (MacDuffie, 1995), and experienced employee training (MacDuffie, 1995).

*Communication*

Grievance procedure (Arthur, 1994; Becker & Huselid, 1998; Huselid, 1995), number of social gathering organized by management for employees (Arthur, 1994), attitude surveys (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995), information sharing (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995; Ichniowski et al., 1997), customer visits (Ichniowski et al., 1997), worker meetings held off-line (Ichniowski et al., 1997), employee suggestions (MacDuffie, 1995), and employee suggestions implemented (MacDuffie, 1995).

*Other Practices/Policies*

Number of production workers per supervisor and percentage of maintenance and craft workers (Arthur, 1994), firm committed to employee security (Ichniowski et al., 1997), formal job analysis (Becker & Huselid, 1998; Huselid, 1995), performance appraisal (Becker & Huselid, 1998; Huselid, 1995), union (Ichniowski et al., 1997), low grievances (Ichniowski et al., 1997), production workers carrying out quality tasks (Arthur, 1994; MacDuffie, 1995), and status barriers (MacDuffie, 1995).

**Appendix B. The Impact of the Individual HRM Practices**

| Variables | HR outcomes | | Organizational outcomes | |
|---|---|---|---|---|
| | Workforce turnover (Ln) | Voluntary turnover | Labor productivity | Perceived productivity |
| | *B* | *B* | *B* | *B* |
| Extensiveness of staffing | −.054[a] (−.161)[b] | −.505 (−1.462) | −.326 (−1.292) | .283[+] (1.709) |
| Group-based performance pay | −.222* (−2.088) | −.187[+] (−1.668) | .143[+] (1.780) | .135* (2.500) |
| Pay level | −1.014** (−2.834) | −1.051** (−2.727) | −.300 (−1.143) | .124 (.679) |
| Job rotation | −.011 (−.072) | −.002 (−.014) | −.154 (−1.387) | −.073 (−.992) |
| Self-directed teams | −.164 (−1.063) | −.060 (−.371) | −.112 (−.965) | .013 (.168) |
| Formal training | −.037 (−.281) | −.140 (−1.005) | .098 (.980) | .074 (1.107) |
| Involvement in meetings discussing work-related issues | .108 (.952) | .087 (.725) | −.056 (−.630) | .008 (.128) |

[a] For the purposes of reducing the number of tables presented in this section, for each of the 28 models only the unstandardized regression coefficients for each individual HRM practice is reported. Note that all of the unstandardized regression coefficients for the above 28 models are available from the author; that is, the unstandardized regression coefficients for all controls discussed in the methods section and the new controls for each HRM practice (the single index of the other six components of the HPWS).

[b] The $t$-scores are in parentheses.

[+] $p < .10$, two-tailed test.

[*] $p < .05$, two-tailed test.

[**] $p < .01$, two-tailed test.

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