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Authors	Soens, Nele;Buyens, Dirk;Taylor, Susan
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**FIRST-LINE IMPLEMENTATION OF HIGH-PERFORMANCE WORK SYSTEMS:
EXPLORING DIRECT AND MEDIATED RELATIONSHIPS WITH
WORK UNIT PERFORMANCE**

NELE SOENS

Nele.Soens@vlerick.com

DIRK BUYENS

Dirk.Buyens@vlerick.com

M. SUSAN TAYLOR

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NELE SOENS

Vlerick Leuven Gent Management School

DIRK BUYENS

Vlerick Leuven Gent Management School
Ghent University

M. SUSAN TAYLOR

Robert H. Smith School of Business
University of Maryland

Contact: Nele Soens, Vlerick Leuven Gent Management School, Reep 1, B-9000 Gent. E-mail:
nele.soens@vlerick.com

ABSTRACT

This study examines whether and how implementation of high-performance work systems (HPWS) by first-line managers relates to work unit performance. We hypothesized and tested a positive relationship between first-line implementation of HPWS and work unit performance and we explored cognitive (work unit human capital) and motivational (work unit empowerment) mechanisms through which this relationship may occur. Data were obtained from 135 employees of 62 Belgian branches of an employment agency and 10 middle managers overseeing these branches. Results revealed that first-line implementation of HPWS was positively related to work unit productivity and work unit customer service. Also, the relationship between first-line implementation of HPWS and work unit productivity was mediated by work unit human capital. These findings contribute to both theory and practice by providing an initial evidence-base of the proclaimed importance of first-line managers in establishing effective HPWS.

Keywords: Strategic human resource management, high-performance work systems, implementation, first-line managers, performance

INTRODUCTION

A firm's human resources have been identified as one of the most important sources of sustained competitive advantage in today's global and hypercompetitive business world (Pfeffer, 1994; Wright, McMahan & McWilliams, 1994). Within the literature on strategic human resource management (HRM), an extensive body of research has studied high-performance work systems (HPWS) as a means to optimally manage these human resources toward realizing the business strategy and maximizing firm performance (e.g., Bae & Lawler, 2000; Becker & Huselid, 1998; Combs, Liu, Hall & Ketchen, 2006; Huselid, 1995). HPWS have been described as a coherent set of HRM practices including selective hiring, promotion from within, extensive training, performance appraisal, employee participation, information-sharing, teamwork and broad job design, and have repeatedly been shown to relate positively with firm performance (e.g., Combs et al., 2006; Subramony, 2009).

However, one avenue that provides a largely untapped research opportunity in this field is the role that line managers play in establishing these performance-enhancing HRM systems (Guest, 2011; Purcell & Kinnie, 2007). Raising the notion of implementation, strategic HRM scholars have argued that the reality of HPWS as applied on the shop floor may not always match up to the formal set of high-performance work policies designed by top and HR management (Gratton, Hope-Hailey, Stiles & Truss, 1999; Khilji & Wang, 2006; Kinnie, Hutchinson, Purcell, Rayton & Swart, 2005; McGovern, Gratton, Hope-Hailey, Stiles & Truss, 1997; Purcell & Hutchinson, 2007; Wright & Nishii, 2006). Variability in line managers' actual implementation of HPWS has been contended as one of the main explanations of this gap (Purcell & Hutchinson, 2007; Wright & Nishii, 2006). A great amount of research on devolution of HRM responsibilities to the line has shown that line managers, especially first-line managers with direct supervisory responsibility for employees, are a crucial delivery mechanism for a variety of HPWS practices (e.g., Hall & Torrington, 1998; Harris, Doughty & Kirk, 2002; Hutchinson & Purcell, 2003; Hutchinson & Purcell, 2010; Renwick, 2003; Watson, Maxwell & Farquharson, 2007). However, although first-line managers have been acknowledged as central to the effectiveness of HPWS (Purcell & Hutchinson, 2007), very few studies have explicitly investigated the extent to which they actually implement HPWS and the performance outcomes associated with their HRM work.

Furthermore, an increasing amount of studies has started to investigate the mechanisms that underlie the relationship between HPWS and firm performance (e.g., Chuang & Liao, 2010; Gittell, Seidner & Wimbush, 2010; Sun, Aryee & Law, 2007; Takeuchi, Lepak, Wang & Takeuchi, 2007), but most of these studies have also remained silent on the role of line managers. HPWS have been

described to operate by increasing employee knowledge, skills and abilities (KSA's), motivation, and effort, which, in turn, are expected to lead to high productivity, low turnover, and, ultimately, superior firm performance (Appelbaum, Bailey, Berg & Kalleberg, 2000; Becker, Huselid, Pickus & Spratt, 1997; Guest, 1997). Because first-line managers are key implementers of HPWS and because they are closely positioned to employees, we expect that it is their HRM actions that, to a large extent, may elicit the employee skills, attitudes and behaviors that mediate between a firm's HPWS and its performance. Therefore, in order to fully understand how HPWS operate, we need to examine the role of first-line managers.

The purpose of this study is to address the abovementioned research gaps by examining whether and how first-line managers' implementation of HPWS is related to performance. To accomplish this, we scale down the HRM-performance link from the firm level of analysis to the local level of work units within the organization. This work unit corresponds with a first-line manager and his or her subordinate employees. Accordingly, in the present study, first-line implementation of HPWS is conceptualized as a work unit level variable that refers to employees' shared perceptions of the extent to which their first-line manager undertakes the high-performance work responsibilities that are vested with him or her and puts these practices into operation within the work unit. This is in line with leadership studies that have conceptualized leader behavior as a group-level construct assuming that managers direct similar behaviors toward their employees and thus create a shared perception among employees (Bono & Judge, 2003; Chen & Bliese, 2002).

This study contributes to the strategic HRM literature in two ways. First, whereas scholars have found exploratory, qualitative evidence that, within an organization, actual implementation of HRM practices may vary across first-line managers (e.g., Bartel, 2004; McGovern et al., 1997; Purcell, Kinnie, Hutchinson, Rayton & Swart, 2003), we are aware of no empirical studies that have directly assessed within-firm variability in first-line implementation of HPWS, with the exception of Knies (2012). In light of this lack of research, this study makes an important contribution to the literature.

A second contribution is that we provide one of the first empirical attempts to link first-line implementation of HPWS with work unit performance and to explore mediating mechanisms through which this relationship occurs. Some scholars have considered the large causal distance between HRM practices and firm performance problematic and have criticized firm-level performance measures for being far removed from the local settings in which HRM practices are implemented (Guest, 1997; MacDuffie, 1995; Paauwe & Boselie, 2005). As a consequence, within-firm business-unit level studies have started to investigate associations between HPWS and more proximal outcomes, such as business unit productivity and business unit service performance (e.g., Liao & Chuang, 2004; Wright, Gardner & Moynihan, 2003; Wright, Gardner, Moynihan & Allen, 2005). In keeping with these

studies, the present study resides at the work unit level of analysis within the organization and investigates whether and how first-line implementation of HPWS relates to work unit performance. Figure 1 summarizes our conceptual model.

In what follows, we begin by reviewing relevant literature on the role of first-line managers in HPWS and turn next to a discussion of how first-line implementation of HPWS relates to work unit performance through the mediating processes of work unit human capital and work unit empowerment.

Insert Figure 1 About Here

LITERATURE REVIEW AND HYPOTHESES

First-line implementation of HPWS and work unit performance

Strategic HRM research has typically evidenced the existence of a positive relationship between HPWS and organizational performance at the level of the firm (e.g., Combs et al., 2006; Guthrie, Flood, Liu & MacCurtain, 2009; Huselid, 1995; Subramony, 2009). As noted earlier, more recently, actual implementation of HPWS within the firm has started to garner attention. The realization that there may be a gap between “intended” HRM policies and “actual” HRM practices (Wright & Nishii, 2006, p. 11) has led strategic HRM scholars to emphasize the need to investigate the role that first-line managers play in the implementation of HPWS (Purcell & Hutchinson, 2007).

General evidence of first-line involvement in HRM work is plentiful. Devolution studies have shown that first-line managers are usually involved in different areas of HPWS (e.g., Hall & Torrington, 1998; Renwick, 2003). For instance, scholars have reported on the pivotal role that direct supervisors play in performance management systems, as they are charged with setting performance objectives, undertaking the performance appraisal, and giving performance feedback (den Hartog, Boselie & Paauwe, 2004). With regard to training, research has shown that direct supervisors are involved in identifying training needs, deciding who should be trained and creating a supportive environment for training transfer (Heraty & Morley, 1995; Noe, 2007). Furthermore, important responsibilities with regard to internal career progression and career development are vested with direct supervisors. Because of their frequent interaction with employees, direct supervisors can stay in touch with employee development and career aspirations and have an accurate perception of

employee performance and potential in light of internal promotions (Gutteridge, Leibowitz & Shore, 1993; Yarnall, 1998). Also, direct supervisors are central to employee participation, as they are the primary representatives of the organization to whom employees can voice and express their ideas, suggestions and concerns (Detert & Burris, 2007). In short, first-line managers have been identified as important contributors to HRM operations (Hutchinson & Purcell, 2003; Hutchinson & Purcell, 2010; Purcell & Hutchinson, 2007).

Having discretion in the way they implement formal HRM policies, first-line managers may create different local high-performance work environments, which, in turn, may result in differences in work unit or branch performance (Bartel, 2004). Basically, in line with extant strategic HRM theory, linking first-line implementation of HPWS to work unit performance is based on the rationale that first-line managers may enhance their work unit members' skills and motivation by using HPWS practices. In turn, highly skilled and motivated work unit members are expected to yield higher work unit performance. We further elaborate on these explanatory mechanisms in the next sections.

Empirical support for the contention that differences in first-line implementation of HPWS may be associated with differences in work unit performance has remained predominantly qualitative in nature. In their case study research, McGovern et al. (1997) found that, within the organizations they studied, local implementation of HRM practices by line managers significantly varied in the consistency of implementation and in the quality of practice, because not all line managers were equally effective in leading and developing their staff. Furthermore, during branch visits in preparation of a large longitudinal study in a bank, Bartel (2004) found that specific actions by line managers created differences in local HRM environments within the organization and she suggested that these local differences produced differences in branch performance. Finally, based on their case study findings in four stores of a large supermarket chain in the UK, Purcell et al. (2003) argued that the most important explanation for variation in store performance was the different ways in which employees were managed by their store managers.

Whereas these authors have found substantial qualitative support for the existence of local within-firm variation in first-line implementation of HPWS and while they have suggested that this variation may explain differences in work unit performance, these assertions have not been directly tested yet. In this study, we address this gap and hypothesize that:

Hypothesis 1. First-line implementation of HPWS is positively related to work unit performance.

As noted above, in the next sections, we take a closer look at the mechanisms through which first-line implementation of HPWS relates to work unit performance. Along the lines of strategic HRM

theory, we propose that first-line implementation of HPWS is associated with work unit performance through the mediation of work unit human capital and work unit empowerment.

Work unit human capital as a mediator between first-line implementation of HPWS and work unit performance

Within the strategic HRM literature, employees' KSA's, which have also been referred to as human capital, have been widely mentioned as one of the most important mechanisms linking HPWS to firm performance (e.g., Huselid, 1995; Wright et al., 1994). Strategic HRM theory has conceptualized human capital at both the individual and collective level of analysis. Basically, the logic is that HPWS practices such as selective hiring, extensive training, performance appraisal and feedback may develop employee knowledge and skills and thereby the collective human capital of the firm, which in turn is expected to positively influence firm performance (Lepak, Liao, Chung & Harden, 2006; Ostroff & Bowen, 2000).

Empirically, the relationships between HPWS, human capital, and performance have been examined at different levels of analysis. At the firm level of analysis, Yang & Lin (2009) found that human capital mediates between several HRM practices (recruitment and selection, training and development, and health and safety) and organizational performance. At the establishment level, Takeuchi et al. (2007) found that collective human capital mediates between HPWS and establishment performance. Finally, at the individual level of analysis, Liao and her colleagues found that individual employee human capital mediates between employee perceptions of HPWS and individual service performance (Liao, Toya, Lepak & Hong, 2009).

In this study, we explore the work unit level of analysis as an important collective level at which relationships between HPWS, human capital and performance may unfold. More specifically, we propose that first-line implementation of HPWS positively relates to work unit performance through the mediation of work unit human capital. To define work unit human capital, we adopt Ployhart and Moliterno's (2011) definition of human capital as "a unit-level resource that is created from the emergence of individuals' knowledge, skills and abilities, and other characteristics" (Ployhart & Moliterno, 2011, p. 128).

A first manner in which a positive relationship between first-line implementation of HPWS and work unit human capital may be brought about, is when first-line managers focus attention to recruiting and hiring highly knowledgeable and skilled employees for their work unit. Furthermore, by identifying work unit members' training needs, allowing and encouraging them to attend training,

and providing them with opportunities to apply newly learned knowledge to their work, first-line managers may foster the development of their work unit's KSA's. In a similar vein, when first-line managers support and encourage their employees' internal career mobility, regularly appraise their performance, identify areas for development and provide feedback on how to improve, they may create an environment conducive of advancing the knowledge and skills of the work unit. Finally, when first-line managers make effort to, on a daily basis, design their work unit members' jobs to include a broad range of tasks and to be challenging, the work unit is more likely to develop a wide variety of knowledge and skills. Based on these arguments, we hypothesize that:

Hypothesis 2: First-line implementation of HPWS is positively related to work unit human capital.

On the basis of resource-based theory (Barney, 1991), strategic HRM scholars along with strategy scholars have strongly agreed on the critical importance of human capital for achieving superior organizational performance (Barney & Wright, 1998; Wright et al., 1994; Wright & McMahan, 2011). Having the potential of being a valuable, rare, inimitable and non-substitutable resource (Wright et al., 1994), human capital has been shown to be positively associated with firm performance (e.g., Crook, Combs, Todd, Woehr & Ketchen, 2011).

In a similar vein, within the literature on work units and teams, considerable research has confirmed that work unit knowledge and cognitive ability are positively related to work unit performance (e.g., Devine & Philips, 2001; LePine, 2003; Mathieu & Schulze, 2006; Ployhart, Weekley & Ramsay, 2009). The explanation for this relationship is that work unit members with high knowledge and skills are more likely to be competent and effective in their roles, which is expected to yield better work unit performance (LePine, 2003). Based on these arguments and evidence from different literatures, we hypothesize that:

Hypothesis 3: Work unit human capital is positively related to work unit performance.

Taken together, we argue that work unit human capital mediates the positive relationship between first-line implementation of HPWS and work unit performance. Since strategic HRM research has tested and supported other mechanisms that mediate between HPWS and organizational performance, including citizenship behavior (Sun et al., 2007), degree of social exchange (Takeuchi et al., 2007), and work climate (Chuang & Liao, 2010; Rogg, Schmidt, Shull & Schmitt, 2001), we expect the mediation of work unit human capital to be partial.

Hypothesis 4: Work unit human capital partially mediates the positive relationship between first-line implementation of HPWS and work unit performance.

Work unit empowerment as a mediator between first-line implementation of HPWS and work unit performance

Strategic HRM theory asserts that HPWS contribute to firm performance not only by ensuring that employees have the KSA's to perform well, but also by motivating them to apply their KSA's for the best interest of the organization (Lepak et al., 2006; Liao et al., 2009; Ostroff & Bowen, 2000). We investigate these motivational mechanisms through the lens of empowerment, which has been conceptualized in two ways, i.e., as a structural and as a psychological construct. The structural approach (e.g., Leach, Wall & Jackson, 2003; Mills & Ungson, 2003) is rooted in work on job design and job characteristics and defines empowerment as a "set of practices that involve delegation of authority and responsibility to employees" (Mathieu, Gilson & Ruddy, 2006, p. 97). The psychological approach (e.g., Spreitzer, 1995; Thomas & Velthouse, 1990) conceptualizes empowerment as a psychological state defined as employees' experiences of having authority and responsibility at work (Mathieu et al., 2006).

In this study, our focus is on psychological empowerment, which has been conceptualized and examined at both the individual and collective (i.e., team) level of analysis. It refers to an individual employee's or a collective team's increased intrinsic task motivation that is manifested along four dimensions, i.e., meaningfulness, competence, autonomy and impact. Meaningfulness refers to individual or collective experiences of value and importance of work goals and tasks. Competence is an individual or collective belief in the own ability to accomplish work. Autonomy reflects individual or collective perceptions of choice and discretion at work. Impact refers to individual or collective perceptions of influence over strategic, administrative or operating outcomes at work (Kirkman & Rosen, 1997, 1999; Spreitzer, 1995, 1996; Thomas & Velthouse, 1990).

Focusing on the work unit level of analysis, we propose that work unit psychological empowerment serves as a second mechanism through which the relationship between first-line implementation of HPWS and work unit performance may be realized. Interestingly, in existing work, HRM practices on the one hand and leadership behaviors on the other have been studied as antecedents of psychological empowerment. With regard to HRM, Kirkman & Rosen (1999) as well as Mathieu et al. (2006) found that team-based HRM practices such as formal training and feedback mechanisms were positively related to team members' experience of team empowerment. At the

individual level of analysis, Spreitzer (1995, 1996) found that the work practices of information sharing, performance-based pay and participation were positively associated with employees' individual psychological empowerment. Similarly, Butts, Vandenberg, DeJoy, Schaffer & Wilson (2009) and Liao et al. (2009) found that high-involvement or high-performance work practices were positively related to employees' individual psychological empowerment. With regard to leadership, Kirkman & Rosen (1999) found that team leaders' empowering leadership behaviors such as delegating responsibility, soliciting and using team input in decision-making and enhancing team members' sense of personal control, were positively associated with team empowerment. Furthermore, Chen and his colleagues found that leadership climate had a positive relationship with team empowerment (Chen, Kirkman, Kanfer, Allen & Rosen, 2007).

Extending this work, we merge the insights on organizational HRM practices and managerial leadership by recognizing first-line managers' involvement in HRM practices and by studying their actual implementation of HPWS in relation to psychological empowerment of their work unit. Specifically, we build on theoretical arguments linking HPWS and psychological empowerment that prior studies have used (Butts et al., 2009; Liao et al., 2009), to explain why first-line implementation of HPWS may relate to work unit psychological empowerment. When first-line managers place great importance with selecting only the best candidates for their work unit or with providing their work unit with extensive training and developmental opportunities, the work unit will likely be highly skilled and feel competent to accomplish its tasks. Furthermore, by recognizing and rewarding high-performing work unit members, first-line managers may enhance their experiences of competence and impact. Feelings of meaningful tasks, competence and autonomy may more readily develop within the work unit when first-line managers allow their work unit members to participate in setting performance goals and provide performance and developmental feedback on a regular basis. Likewise, first-line managers who keep their work unit well informed may facilitate their work unit in exploiting its autonomy and first-line managers who solicit and use work unit members' input in making decisions may create a sense of impact. Finally, first-line managers who design their work unit members' jobs to be broad and challenging may induce work unit feelings of autonomy and impact at work. Based on the theoretical and empirical arguments outlined above, we hypothesize that:

Hypothesis 5: First-line implementation of HPWS is positively related to work unit psychological empowerment.

Furthermore, there is considerable evidence available that work unit empowerment is positively associated with work unit performance. Justification of this relationship relies on the argument that work unit members who believe their tasks are meaningful and important to the organization and who have the competence and autonomy to successfully fulfill these tasks, are more likely to be intrinsically motivated and exert greater effort, which, in turn, is expected to result in enhanced work unit performance (Chen et al., 2007). In support, team empowerment has been shown to be positively related to team productivity and proactivity (Kirkman & Rosen, 1999), team customer service (Kirkman & Rosen, 1999; Mathieu et al., 2006), and team performance (Chen et al., 2007; Mathieu et al., 2006; Seibert, Silver & Randolph, 2004). So we hypothesize that:

Hypothesis 6: Work unit psychological empowerment is positively related to work unit performance.

Viewed in combination, we expect that work unit empowerment mediates the relationship between first-line implementation of HPWS and work unit performance. Again, since first-line HRM interventions may relate to work unit performance through other mechanisms as well, we expect the mediation of work unit empowerment to be partial.

Hypothesis 7: Work unit psychological empowerment partially mediates the positive relationship between first-line implementation of HPWS and work unit performance.

METHOD

Sample and procedure

We conducted a field study to test our hypotheses. All Belgian branches of an employment agency were invited to participate in the study. Each branch was led by a branch manager (i.e., first-line manager (n+1)), who had 1 to 7 employees or branch consultants (n) reporting to him or her and who was responsible for the smooth running of the branch in terms of costing and budgeting, prospecting, maintaining contacts with clients, administration and taking care of HRM issues toward the branch consultants. The main responsibilities of branch consultants included continually and proactively looking for interesting profiles via various channels, screening candidates, analyzing clients' needs, matching job seekers to open jobs, and keeping expertise up to date about the local labor market in their specialist areas. Furthermore, area or business unit managers (i.e., middle

managers (n+2)) had oversight responsibility for the business operations and people management aspects of 2 to 13 branches.

To reduce common method bias, we obtained information from two different sources (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Data were collected from employees and middle managers using online questionnaires. Employees were asked to rate their first-line manager's implementation of HPWS and work unit empowerment. Middle managers were asked to rate the human capital and performance of each of the branches they oversaw.

Respondents completed surveys on company time and were assured that their responses would remain confidential. Following procedures to enhance response rates in survey research, we clearly described the purpose and importance of the study in our cover e-mail, we obtained endorsements of the survey from senior, middle and HR management in the company, and we sent reminders to employees and middle managers who had not yet responded to encourage them to complete the survey (Mangione, 1998).

Dependent on their mother tongue, respondents completed either a Dutch-language or a French-language survey. We took several steps to ensure the accuracy and readability of our survey translations. First, the first author of this article translated measures that were originally in English into Dutch. Second, another Dutch-speaking faculty member who is proficient in English checked the Dutch translation for accuracy. Third, the company's HR manager as well as a target respondent from each data source improved and validated the Dutch translation by raising any concerns about the readability and ease of comprehension of the questions. Fourth, a bilingual (Dutch/French) HR professional of the company translated the surveys from Dutch into French.

A total of 161 employees (69%) and 10 middle managers (91%) completed the survey. The final sample with complete matched employee-middle manager information consisted of 135 employees from 62 branches overseen by 10 middle managers. This means that, from a total of 81 branches, 62 or 76% were represented in our sample. The employees, on average, were 30.16 years old ($SD = 6.14$), had 4.72 years of work experience at the company ($SD = 4.17$), were predominantly female (94.1%), and were mainly Dutch-speaking (54.8%).

Measures

With the exception of the control variables, all measures were on a 5-point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (5).

First-line implementation of HPWS. We generated a 48-item scale of first-line implementation of HPWS by rewording items from well-established measures of HPWS (Ahmad &

Schroeder, 2003; Bae & Lawler, 2000; Bartel, 2004; Chuang & Liao, 2010; Delery & Doty, 1996; Huselid, 1995; Lepak & Snell, 2002; Liao et al., 2009; Paré & Tremblay, 2007; Rogg et al., 2001; Sun et al., 2007; Wright et al., 2005) to reflect the implementation role of the first-line. In addition, we adapted items from existing measures of line manager involvement in HRM practices such as performance management (Major, Davis, Germano et al., 2007), training (Dysvik & Kuvaas, 2008; Noe, 2007; Valverde, Ryan & Soler, 2006), career development (Yarnall, 1998), employee participation (Arnold, Arad, Rhoades & Drasgow, 2000), teamwork (Pearce & Herbik, 2004) and work-family support (Breugh & Frye, 2008; Hammer, Kossek, Yragui, Bodner & Hanson, 2009). Employees were asked to respond to these items indicating the extent to which their first-line manager implemented the HPWS practices within their work unit. Our measure included nine HPWS dimensions that have been identified in extant literature, including performance management (6 items, e.g., “My direct supervisor bases team members’ performance appraisal on objective information”), extensive training (6 items, e.g., “My direct supervisor identifies the training needs of the members of our team”), promotion from within (5 items, e.g., “My direct supervisor takes time to listen to team members’ career aspirations within the organization”), high rewards and performance-based pay (5 items, e.g., “My direct supervisor places great importance with rewarding team members who perform well”), employee participation (5 items, e.g., “My direct supervisor involves team members in solving problems”), information-sharing (5 items, e.g., “My direct supervisor keeps the members of our team informed about corporate issues such as corporate strategy, financial results, new initiatives, etc.”), broadly defined jobs (5 items, e.g., “My direct supervisor designs team members’ jobs to be simple and repetitive” (R)), teamwork (6 items, e.g., “My direct supervisor encourages us to work as a team”), and work-family support (5 items, e.g., “My direct supervisor is supportive when team members have family problems”). To ascertain the content validity of our measure, five subject matter experts sorted the items into their respective HPWS dimension and reflected upon the content and wording of the items (Hinkin, 1998). In addition, our scale was reviewed and interpreted for accuracy and relevance by the HR manager as well as one employee, one first-line manager and one middle manager of the participating company. Based on the feedback, we revised the initial scale and made some minor wording adjustments to ensure applicability.

Consistent with previous HRM-performance research (e.g., Batt, 2002; Huselid, 1995; Lepak, Taylor, Tekleab, Marrone & Cohen, 2007; Liao et al., 2009; Sun et al., 2007), we used an additive index to compute a single comprehensive measure of first-line implementation of HPWS. This single additive index approach reflects the basic rationale of strategic HRM research to examine HRM systems as a whole rather than individual HRM practices (Wright & Boswell, 2002). Following Liao et

al. (2009), we first averaged across the items reflecting the same HPWS dimension and then created a single index by averaging across all nine HPWS dimensions. Calculation of the dimension scores was justified by high internal consistency reliabilities of each subscale. Similarly, a high alpha score of .93 across the nine HPWS dimensions justified creating the unitary index. Additional support for the unitary index was found in an exploratory factor analysis with principal components extraction in which all nine HPWS dimensions had factor loadings of .70 or above on a single factor and only one factor had an eigenvalue higher than one (eigenvalue = 5.87, total percentage of variance explained = 65%). Table 1 shows the means, standard deviations, internal consistency reliabilities and factor loadings of the different dimensions of our measure of first-line implementation of HPWS.

Insert Table 1 About Here

Work unit human capital was evaluated by middle managers using 4 items adapted from Youndt, Subramaniam & Snell (2004). Example items are: “This branch is highly skilled” and “This branch is creative and bright”.

Work unit empowerment. Following Kirkman, Rosen, Tesluk & Gibson (2004), we used a shortened version of Kirkman & Rosen’s (1999) 26-item measure of work unit empowerment. Employees completed 12 items indicating the extent to which their work unit felt empowered along the four dimensions of meaning (3 items, e.g., “My team believes that its projects are significant”), competence (3 items, e.g., “My team has confidence in itself”), autonomy (3 items, e.g., “My team can select different ways to do the team’s work”) and impact (3 items, e.g., “My team has a positive impact on this company’s customers”). Based on the results of a confirmatory factor analysis using LISREL 8.80, we dropped one item with a factor loading lower than .40 from the autonomy subscale (i.e., “My team makes its own choices without being told by management”). The four-factor measurement model for the remaining 11 items ($\chi^2(38, N = 135) = 132.72$, comparative fit index (CFI) = .95, root-mean square error of approximation (RMSEA) = .14, and standardized root mean square residual (SRMR) = .065) fit the data significantly better than the four-factor model for the original 12 items ($\Delta\chi^2(10) = 24.26, p < .001$, CFI = .94, RMSEA = .13, and SRMR = .069). In line with prior work (e.g., Chen et al., 2007; Kirkman & Rosen, 1999; Kirkman et al., 2004), we collapsed the four dimensions into an overall work unit empowerment score, which was justified by high intercorrelations and a principal components analysis for the 11 items in which only one factor had an eigenvalue greater than 1.

Work unit performance. Middle managers evaluated two types of work unit performance: work unit productivity and work unit customer service. Each of these performance outcomes was

assessed by 3 items adapted from Kirkman & Rosen (1999). A sample item of work unit productivity is “This branch meets or exceeds its goals”. A sample item of work unit customer service is “This branch provides a satisfactory level of customer service overall”.

Because the ratings for work unit human capital, productivity and customer service were all provided by the same source (middle managers), we conducted exploratory factor analysis using principal components extraction to determine the dimensionality of the 10 items measuring these constructs¹. Following the Kaiser criterion and the scree plot, initial results suggested that three components should be extracted. Rotating the data with varimax rotation indicated that all but two items had high factor loadings with their expected factor, ranging from .70 to .95, and low cross-loadings with the non-expected factors. One item from the work unit human capital scale (i.e., “This branch is highly skilled”) and one item from the work unit productivity scale (i.e., “This branch completes its tasks on time”) had high cross-loadings with their non-expected factors and were dropped from further analyses. We calculated a composite score for each factor by taking the average across its items. Work unit human capital accounted for 28.51% of the total item variance ($\alpha = .83$), work unit productivity accounted for 22.18% of the total item variance ($\alpha = .88$), and work unit customer service accounted for 35.87% of the total item variance ($\alpha = .95$).

Control variables. Consistent with previous work (e.g., Liao & Chuang, 2004; Wright et al., 2003; Wright et al., 2005), we conducted our study within a single firm and industry. This allows us to control for a number of extraneous sources of variability such as corporate strategy, the type of work performed, and the operational procedures and technology employed. In addition, performance differences between work units may be due to differences in work unit size or differences in first-line managers’ or work unit members’ professional experience. Therefore, in our analyses, we controlled for the number of employees per work unit, the first-line manager’s age and tenure with the organization, and the work unit members’ average age and tenure with the organization. Information on these variables was collected from company records.

Data aggregation

Because first-line implementation of HPWS and psychological empowerment were conceptualized at the work unit level, aggregation of individual employee ratings of these variables was required. To justify aggregation, we calculated the within-group agreement coefficient for

¹ It would have been preferable to conduct confirmatory factor analysis instead of exploratory factor analysis to assess the distinctiveness of our measures. However, the small sample size (N=62) and the low ratio of sample size to free parameters prevented us from using this method (Kline, 2005).

multiple-item scales $r_{wg(j)}$ (James, Demaree & Wolf, 1984) and intraclass correlation coefficients ICC(1) and ICC(2) (Bliese, 2000), and we ran a one-way analysis of variance (F-test) to ensure that the variance between groups was significantly higher than the variance within groups. The $r_{wg(j)}$ coefficient assesses the extent of consensus among respondents within a single group; that is, the degree to which ratings from individuals are interchangeable (Bliese, 2000). A traditional cutoff value justifying aggregation is .70 (LeBreton & Senter, 2007). The ICC (1) provides an estimate of the proportion of variance in ratings that is due to group membership (Bliese, 2000). There is no standard for the ICC (1) value, but James's (1982) median value of .12 can be used as a reference. The ICC (2) provides an estimate of the reliability of the group means (Bliese, 2000). A commonly used cut point for ICC (2) is .70 (LeBreton & Senter, 2007).

For first-line implementation of HPWS, results supported aggregation to the work unit level. The mean $r_{wg(j)}$ was .99, with values ranging from .86 to .998. The ICC(1) and ICC(2) values were .28 and .46 respectively. The F-test associated with the ICC values was statistically significant ($F(61, 73) = 1.87, p < .01$). The low ICC(2) value can be explained by the small average work unit size and implies potential difficulty to detect emergent relationships using work unit means (Bliese, 2000). However, consistent with earlier work (e.g., Chen & Bliese, 2002; Liao et al., 2009; Srivastava, Bartol & Locke, 2006), we continued our analyses justifying aggregation by theory and by the other aggregation tests and acknowledging that the relationships between first-line implementation of HPWS and the other variables may be underestimated.

Unlike first-line implementation of HPWS, aggregation of employee ratings of work unit psychological empowerment was not supported: ICC(1) = .04; ICC(2) = .08; $F(61, 73) = 1.08, ns$. The low ICC(1) value and the non-significant F-test indicate that there was substantial within-group (i.e., individual level) variability in employee ratings of work unit empowerment relative to between-group (i.e., work unit level) variability and that work unit psychological empowerment did not significantly differ between work units. Moreover, the extremely low ICC(2) value indicates that we cannot use the group means of employee ratings of work unit empowerment to reliably differentiate between work units. Because our results did not support the aggregation of psychological empowerment to the work unit level, we were not able to proceed with testing hypotheses 5-7.

Analytic strategy

In this study, employees were nested in work units/branches and work units/branches were nested in areas/business units. Because of this nesting, an important assumption of ordinary least

squares (OLS) regression, i.e., independence of the error terms, is violated. As a consequence, OLS regression is not an appropriate technique of analysis in this case. Instead, we conducted multilevel analyses using hierarchical linear modeling (HLM) (Hofmann, 1997; Hox, 2010; Raudenbush & Bryk, 2002), which provides unbiased parameter estimates and correct significance tests for multilevel and non-independent data by using correct standard errors for both within-group and between-group effects (Bliese, 2002; Bliese & Hanges, 2004). Specifically, we tested our work-unit level hypotheses using two-level HLM 6.06 to control for the nesting of the work units in areas/business units.

RESULTS

Table 2 shows the descriptive statistics, bivariate correlations and internal consistency reliabilities for the variables in our study. As can be seen, first-line implementation of HPWS was positively and significantly related with work unit human capital and with the performance indicators of work unit productivity and customer service. Work unit human capital also positively correlated with work unit productivity and customer service.

Insert Table 2 About Here

Null or baseline models. We first calculated baseline or intercept-only models for our mediating and dependent variables to investigate the decomposition of the total variance into its between-group (area/business unit level) and within-group (work unit/branch level) components (Hox, 2010; Mathieu & Taylor, 2007). The baseline model for work unit human capital revealed that 64 percent of the variance resided across work units/branches within areas/business units, whereas 36 percent occurred between areas/business units. A chi-square test of the percentage of between-group variance indicated that work unit human capital varied significantly between areas/business units ($\chi^2(9) = 51.48, p < .001$), confirming the need to account for the lack of independence of work units/branches within areas/business units.

In a similar vein, we calculated baseline models for the performance outcomes of work unit productivity and customer service. 83 percent of the variance in work unit productivity resided within areas/business units and 17 percent occurred between areas/business units. Similarly, 78% of the variance in work unit customer service resided within areas/business units and 22% was between areas/business units. The chi-square tests were significant in both cases (productivity: $\chi^2(9) = 23.11, p < .01$; customer service: $\chi^2(9) = 26.79, p < .01$). In sum, these results indicated that

there existed significant variance between areas/business units, which we controlled for when testing our hypotheses by using two-level HLM.

Hypotheses tests. To test our hypotheses, we followed the mediation procedures of Baron and Kenny (1986), in which four conditions are tested in three steps, and we also drew on more recent work by Mathieu & Taylor (2006, 2007). Table 3, 4 and 5 summarize the HLM results that test hypotheses 1-4. The first condition that needs to be met is that first-line implementation of HPWS is related to work unit performance, as proposed in hypothesis 1. As shown in model 2 of tables 3 and 4, after controlling for work unit size and age and organizational tenure of both first-line managers and work unit members, first-line implementation of HPWS had a significant positive relationship with work unit productivity ($\gamma = .54, p < .05$) and with work unit customer service ($\gamma = .56, p < .01$). Therefore, hypothesis 1 was supported.

Insert table 3 & 4 About Here

Next, first-line implementation of HPWS needs to be related to work unit human capital. As shown in model 2 of table 5, when regressed on work unit human capital, first-line implementation of HPWS was significant after controlling for work unit size, first-line manager age and tenure, and average work unit members' age and tenure ($\gamma = .54, p < .001$), providing support for hypothesis 2.

Insert Table 5 About Here

Further, hypothesis 3 stated that work unit human capital would positively relate to work unit performance. Model 3 of tables 3 and 4 shows that, controlling for work unit size and age and tenure of the manager and the work unit members, work unit human capital was positively related with work unit productivity ($\gamma = .61, p < .001$) as well as with work unit customer service ($\gamma = .38, p < .01$), supporting hypothesis 3.

To test the third and fourth condition for mediation, we entered both first-line implementation of HPWS and work unit human capital in analyzing work unit productivity and customer service. Model 4 of tables 3 and 4 shows that, after including first-line implementation of HPWS, the mediator remained significant for work unit productivity ($\gamma = .54, p < .01$) but not for

customer service ($\gamma = .22$, *ns*). Therefore, the mediation hypothesis could not be confirmed for work unit customer service.

Finally, to establish partial mediation for work unit productivity, the strength of the relationship between first-line implementation of HPWS and work unit productivity needs to be reduced when work unit human capital is added as a mediator, but it has to remain statistically significant (Baron & Kenny, 1986; Mathieu & Taylor, 2006, 2007). Model 4 of table 3 shows that, when analyzing work unit productivity, first-line implementation of HPWS was no longer significant after including work unit human capital ($\gamma = .18$, *ns*). Therefore, instead of providing support of our hypothesis of partial mediation, results were consistent with an alternative hypothesis of full mediation. However, these results need to be viewed cautiously, as Mathieu & Taylor (2006) argued that inferences of full rather than partial mediation can be easily made in cases of small sample sizes with low power.

A Sobel (1982) test provided further evidence of the indirect effect of first-line implementation of HPWS on work unit productivity via work unit human capital ($z = 2.49$, $p < .05$). In line with our earlier results, for work unit customer service, the indirect effect was not statistically significant ($z = 1.41$, *ns*).

DISCUSSION

The purpose of this study was to provide a direct assessment of the extent to which first-line managers actually implement HPWS within their work unit and to investigate whether and how this is associated with work unit performance. Although first-line managers have been recognized as critical agents in HPWS implementation (Purcell & Hutchinson, 2007), few empirical investigations of their contributions to HPWS effectiveness have been conducted. To fill this gap, we scaled down the traditional strategic human resource proposition of a positive association between HPWS and firm performance to the local level of work units within the organization. At this local level, we tested whether first-line implementation of HPWS positively relates to work unit performance and does so through work unit human capital.

Theoretical implications

The results of our study have several implications for the strategic HRM literature. First, we found evidence of substantial variance in the actual use of HPWS practices by first-line managers

across the work units within a single firm. These findings provide empirical support for the assumption that HPWS may vary within organizations due to differences in the way that first-line managers enact their HRM responsibilities. Although strategic HRM scholars have speculated that within-firm differences in HPWS are due to differences in line managers' implementation of these practices (Purcell & Hutchinson, 2007; Wright & Nishii, 2006), and although some scholars have found preliminary, qualitative evidence of this assumption in their exploratory fieldwork (Bartel, 2004; McGovern et al., 1997; Purcell et al., 2003), the present study was one of the first to directly and empirically test this expectation.

Second, a key finding of our study was that first-line implementation of HPWS was positively related to work unit productivity and work unit customer service. This suggests that work units led by first-line managers who implement and use HPWS practices more extensively, were reported to be more productive and to provide better customer service than work units with first-line managers who make less use of HPWS practices. Although we need to be careful not to draw causal inferences from this cross-sectional study, establishing a positive relationship between first-line implementation of HPWS and work unit performance is an important first step and provides an initial evidence-base for the claim that first-line managers may play a critical role in the success of HPWS. These findings also imply that we should not only consider well-researched managerial leadership behaviors such as transformational or empowering leadership as ways in which leaders or managers may improve their unit's performance (e.g., Bass, Jung, Avolio & Berson, 2003; Schaubroeck, Lam & Cha, 2007; Srivastava et al., 2006), but also managerial implementation and use of the HPWS processes and practices designed and developed by HR. Furthermore, our results provide support for the arguments of Purcell & Hutchinson (2007) that first-line enactment of HRM practices, just as leadership behavior, is worthy of investigation as a potential influence of employee and firm performance.

Third, our findings further illuminate the relationship between first-line implementation of HPWS and work unit performance by demonstrating the mediating role of work unit human capital. Specifically, we found that first-line implementation of HPWS was positively associated with the knowledge, skills and abilities of the work unit, and through this with the performance of the work unit in terms of productivity. These findings are consistent with the basic strategic HRM principle that HPWS may enhance organizational performance by developing highly skilled employees and extends this argument to the work unit level of analysis within the firm. Since we were not able to aggregate employee ratings of work unit psychological empowerment due to a lack of between-unit variance, we could not test work unit empowerment as a mediator between first-line implementation of HPWS and work unit performance.

Managerial implications

Our study has two main implications for HR and line practitioners. First, our findings further enlighten the debate on how much HRM responsibility and independence should be devolved to the line. Some scholars suggest that providing line managers with autonomy and discretion to undertake their HRM duties is essential for effective HRM implementation (e.g., McConville, 2006; Renwick, 2003). By contrast, our results provide support for the argument that organizations need to be careful of inconsistent implementation of HRM practices when giving line managers greater control (Hall & Torrington, 1998; McGovern et al., 1997). Within a single firm, we found substantial variation in first-line implementation of HPWS across work units, which was associated with variation in work unit performance. This evidence suggests that organizations need to make sure that all first-line managers are equipped with the necessary skills, experience and motivation to handle their people management work in order to preclude unequal access to HPWS practices for employees and potential differences in performance that this inequality may provoke.

Second, the positive associations established in this study provide an important first step towards demonstrating the added value of first-line implementation of HPWS to the work unit. We have shown higher implementation of HPWS by the first-line to be associated with higher work unit human capital, productivity and customer service. This way, we provide initial evidence of the potential benefits for first-line managers from greater use of HPWS practices. Furthermore, these findings offer HR practitioners a firmer ground for convincing first-line managers of the importance of their HRM implementation role and influencing them to exercise this role more effectively.

Limitations and future research

Although we believe this study makes a substantial contribution to the strategic HRM literature, our results must be interpreted in light of a number of study limitations. First, given the cross-sectional nature of our study, we were not able to make causal inferences or to rule out the possibility of reverse causation. It may be that first-line managers of high-performing work units use HPWS practices to reward their highly performing employees, rather than that use of HPWS practices by the first-line promotes superior work unit performance. Future research should employ longitudinal designs measuring both independent and dependent variables at multiple points in time to enhance our understanding of how first-line implementation of HPWS and work unit performance develop over time and to examine the causal direction of the relationship between these variables.

Second, although we gathered data from different sources, we cannot fully eliminate common method bias. Employees rated both their first-line manager's implementation of HPWS and their work unit's psychological empowerment. Similarly, middle managers evaluated both their work units' human capital and performance. Using different measurement approaches, such as consensus ratings of work unit empowerment (Kirkman, Tesluk & Rosen, 2001) and different sources, such as objective measures of work unit performance, may help reduce common method bias in the relationships between our independent, mediating and dependent variables.

Third, because this study was conducted within a single organization in the service industry, the generalizability of our findings should be treated with caution. Whereas the within-firm design allowed us to control for a number of important rival explanations of the relationships established in this study, it raises the question whether our results will generalize to other settings. Therefore, future research is needed to validate our results in other organizations, other industries and other countries.

Fourth, consistent with previous work, this study focused on a single employee job within the organization, i.e., branch consultants. Whereas we carefully selected this job because it represented a core job within the employment agency under study and was highly critical to the performance of the work units, this approach may limit the generalizability of our findings. Future research is needed to examine the application of our results to a broader array of employee jobs. Furthermore, we limited our study to the hierarchical level of first-line managers. Researchers have argued, however, that senior, middle and first-line managers join forces to put HPWS into practice within organizations and that HPWS implementation cascades down through different levels of management to ultimately reach employees (e.g., Stanton, Young, Bartram & Leggat, 2010; Watson et al., 2007). Thus, a fruitful area for future research is to investigate the joint delivery of HPWS practices by different managerial levels and the interactions between these levels in the establishment of an effective HRM system.

Fifth, we conceptualized and operationalized first-line implementation of HPWS in terms of the presence or use of HPWS practices within the work unit. Guest & Conway (2011) clearly distinguished between the 'presence' and the 'effectiveness' of HRM practices and found that the effectiveness of HRM practices had a stronger association with performance outcomes than the mere presence of practices. Furthermore, Gilbert, De Winne & Sels (2011) investigated employees' perceptions of the effectiveness of HRM implementation by line managers and found that these were positively related to employees' affective commitment. Following this line of research, we suggest that future research considers both the quality (i.e., effectiveness) and the quantity (i.e., the use of more practices) of HPWS implementation by line managers and investigates whether these differentially or interactively relate to performance.

Sixth, future research may address the limitation that we were not able to empirically test the mediating role of work unit empowerment in the relationship between first-line implementation of HPWS and work unit performance. Furthermore, future studies including other mediating variables such as work unit climate (e.g., Chuang & Liao, 2010) or work unit social or relational capital (e.g., Gittel et al., 2010) are needed to gain further insight into how this relationship works. In addition, future research that explores mechanisms at the individual level of analysis including employees' idiosyncratic experiences of their managers' HRM actions and employees' subsequent attitudinal and behavioral reactions will prove valuable in providing a more complete picture of how first-line managers contribute to HPWS effectiveness.

Finally, along the same lines of recent research on transformational leadership (Wang & Howell, 2010; Wu, Tsui & Kinicki, 2010) and following recent developments in the conceptualization of HRM configurations (Zhao, Guthrie & Liao, 2009), a last promising avenue for future research is to distinguish between individual-oriented and group-oriented HRM actions by first-line managers and to examine how consistent versus differentiated implementation may affect individual employee and collective work unit performance.

CONCLUSION

Despite the existence of a large body of literature on devolution of HRM responsibilities to line managers, to date, these insights have not yet been fully integrated into the literature on HPWS. HRM-performance research has only scratched the surface of the critical implementation role of first-line managers in establishing effective HPWS. To help filling this research gap, this study presents one of the first attempts to directly assess first-line implementation of HPWS and demonstrates that it is linked with important work unit outcomes, i.e., work unit human capital, productivity, and customer service. These findings highlight the importance of developing first-line managers into excellent people managers in order to maximize the performance effects of high-performance work strategies.

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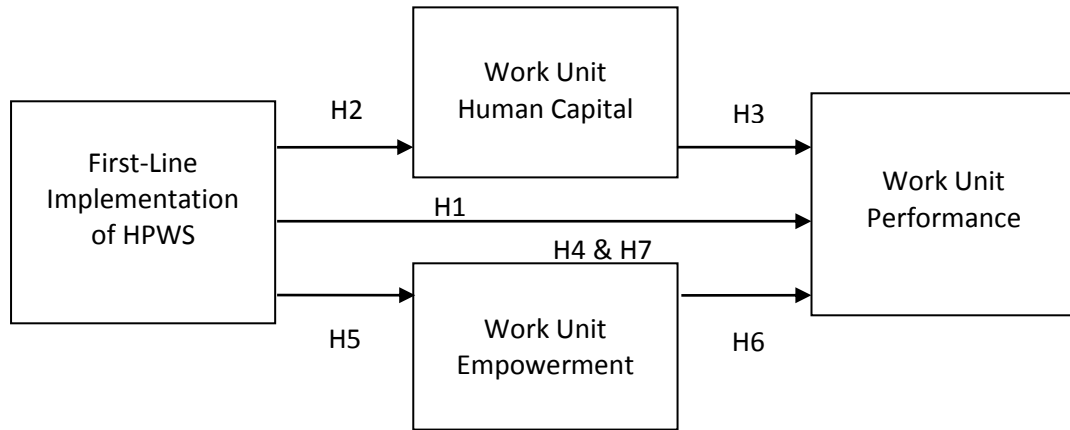
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FIGURE 1:

Conceptual model



Note. HPWS = high-performance work system

TABLE 1:

Subscales of first-line implementation of high-performance work systems (HPWS)

Practice dimension	First-line implementation of HPWS ($\alpha = .93$)			
	M	SD	α	Loading
Performance management	3.88	0.65	0.82	0.83
Training	3.63	0.80	0.92	0.84
Promotion from within	3.48	0.70	0.83	0.80
Pay	3.40	0.74	0.81	0.75
Participation	3.94	0.74	0.89	0.84
Information-sharing	3.89	0.67	0.90	0.70
Broad job design	3.66	0.66	0.84	0.80
Teamwork	3.93	0.68	0.91	0.87
Work-family support	3.78	0.75	0.85	0.81

TABLE 2:

Descriptive statistics, correlations, and internal consistency reliabilities of study variables (N=62)

Variable	M	SD	1	2	3	4	5	6	7	8	9
1.Work unit size	2.95	1.23	-								
2.First-line manager age	38.55	8.42	-.08	-							
3.First-line manager tenure	8.76	4.70	-.20	.73**	-						
4.Average work unit members' age	30.00	4.56	.30*	.36**	.23	-					
5.Average work unit members' tenure	4.46	2.88	.26*	.22	.18	.83**	-				
6.First-line HPWS	3.75	.48	-.19	.16	.18	-.10	-.12	.93			
7.Work unit human capital	3.59	.69	.13	.02	.04	.25	.27*	.40**	.83		
8.Work unit productivity	3.93	.87	.07	.27*	.35**	.37**	.36**	.28*	.50**	.88	
9.Work unit customer service	4.24	.70	-.14	.07	.19	.11	.15	.36**	.27*	.38**	.95

Note. HPWS = high-performance work system. Internal consistency reliabilities (Cronbach's alpha) appear on the diagonal.

* $p < .05$; ** $p < .01$; *** $p < .001$. Two-tailed tests.

TABLE 3:

Hierarchical linear modeling results for work unit productivity (N=62)

Variables	Work Unit Productivity				
	Null Model	Model 1	Model 2	Model 3	Model 4
Intercept	3.91 (.16)***	2.73 (.98)*	2.47 (.92)*	2.83 (.87)*	2.77 (.86)*
Work unit size		.04 (.08)	.06 (.08)	.04 (.07)	.05 (.07)
First-line manager age		-.01 (.02)	-.01 (.02)	-.002 (.01)	-.004 (.01)
First-line manager tenure		.06 (.03)*	.06 (.03) [†]	.06 (.03)*	.06 (.03)*
Average work unit members' age		.02 (.04)	.03 (.04)	.01 (.04)	.01 (.04)
Average work unit members' tenure		.06 (.06)	.06 (.06)	.04 (.06)	.04 (.06)
First-Line implementation of HPWS			.54 (.20)*	–	.18 (.20)
Work unit human capital				.61 (.14)***	.54 (.16)**
σ^{2a}	.13				
τ_{00}^b	.62				

Note. HPWS = high-performance work system. The first value is the parameter estimate. The second value within parentheses is the standard error. All variables except for the control variables were grand-mean centered. Unstandardized coefficients are shown.

^a σ^2 = Variance in Level-2 residual (i.e., area/business unit level)

^b τ_{00} = Variance in Level-1 residual (i.e., work unit/branch level)

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$. Two-tailed tests.

TABLE 4:

Hierarchical linear modeling results for work unit customer service (N=62)

Variables	Work Unit Customer Service				
	Null Model	Model 1	Model 2	Model 3	Model 4
Intercept	4.21 (.13)***	4.37 (.84)***	4.15 (.77)***	4.21 (.80)***	4.08 (.76)***
Work unit size		-.05 (.07)	-.02 (.06)	-.05 (.06)	-.03 (.06)
First-line manager age		-.01 (.01)	-.02 (.01)	-.01 (.01)	-.01 (.01)
First-line manager tenure		.04 (.03)	.03 (.02)	.03 (.02)	.03 (.02)
Average work unit members' age		-.0003 (.04)	.01 (.03)	.002 (.03)	.01 (.03)
Average work unit members' tenure		.05 (.06)	.06 (.05)	.03 (.05)	.05 (.05)
First-line implementation of HPWS			.56 (.16)**	—	.44 (.17)*
Work unit human capital				.38 (.13)**	.22 (.14)
σ^{2a}	.11				
τ_{00}^b	.38				

Note. HPWS = high-performance work system. The first value is the parameter estimate. The second value within parentheses is the standard error. All variables except for the control variables were grand-mean centered. Unstandardized coefficients are shown.

^a σ^2 = Variance in Level-2 residual (i.e., area/business unit level)

^b τ_{00} = Variance in Level-1 residual (i.e., work unit/branch level)

* $p < .05$; ** $p < .01$; *** $p < .001$. Two-tailed tests.

TABLE 5:

Hierarchical linear modeling results for work unit human capital (N=62)

Variables	Work Unit Human Capital		
	Null Model	Model 1	Model 2
Intercept	3.60 (.15)***	4.00 (.76)***	3.78 (.68)***
Work unit size		.01 (.06)	.04 (.05)
First-line manager age		-.01 (.01)	-.02 (.01)
First-line manager tenure		.02 (.02)	.01 (.02)
Average work unit members' age		-.01 (.03)	-.001 (.03)
Average work unit members' tenure		.05 (.05)	.07 (.04)
First-line implementation of HPWS			.54 (.14)***
σ^{2a}	.16		
τ_{00}^b	.28		

Note. HPWS = high-performance work system. The first value is the parameter estimate. The second value within parentheses is the standard error. All variables except for the control variables were grand-mean centered. Unstandardized coefficients are shown.

^a σ^2 = Variance in Level-2 residual (i.e., area/business unit level)

^b τ_{00} = Variance in Level-1 residual (i.e., work unit/branch level)

*** $p < .001$. Two-tailed tests.