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## ABSTRACT

Building upon the Resource Based View of the firm and the managerial rents model, we explore role played by two forms of management capability ('general' and 'HR specific') in the use of High Performance Work Organization (HPWO) practices and their impact on performance. A nationally representative establishment-level survey of organizational practices conducted in 1999 and 2002 in a single industry found that both forms of management capability were associated with the use of HPWO practices in 1999 but this association did not hold for the use of HPWO practices in 2002. There was a strong and positive relationship between the use of HPWO practices in 1999 and subsequent value-added per employee in 2002. HR specific management capability did not moderate the relationship between HPWO practices in 1999 and value-added per employee in 2002. Contrary to expectations we found high levels of value-added per employee where the use of HPWO practices was high but our measure of general management resources was low.

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# MANAGEMENT CAPABILITY AND HIGH PERFORMANCE WORK ORGANIZATION

Marc Thompson <sup>a</sup> and Paul Heron <sup>b</sup>

## 1. INTRODUCTION

The Resource Based View (RBV) of the firm sees management capability as playing a critical role in aligning employee skills, motivation and ability with organisational systems, structures and processes that achieve capabilities at the organisational level (Teece, Pisano, and Shuen, 1997). Indeed, it is argued that managerial resources or capabilities are key contributors to the entire bundle of firm resources that enable firms to generate rents (Castanias and Helfat, 2001). This managerial rents model suggests that firms should build managerial resources and ensure that they are available to the organisation over time.

Furthermore, because managerial skills are largely tacit and involve learning by doing they are by definition difficult to replicate quickly. In the lexicon of the resource-based view these capabilities are imperfectly imitable and subject to time compression diseconomies (Barney, 1991). Building on this perspective, we explore whether managerial resources and capabilities explain variations in the sophistication of the HR system as well as variations in establishment-level performance. Our focus is on High Performance Work Organisation (HPWO) practices which consist of work practices that are investments in the skills and abilities of employees, design work in ways that enables employee collaboration in problem-solving, and provides incentives to motivate workers to use their discretionary effort (Applebaum, Bailey, Berg and Kalleberg, 2000; Delery and Doty, 1996, Colvin, Batt and Katz, 2001). The HPWO is interpreted as another firm asset or capability which managerial resources can shape and leverage to enable firm-specific rents to be created and appropriated (Castanias and Helfat, 1991).

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We draw upon unique panel and cross-sectional establishment-level data gathered in 1999 and 2002 in the UK aerospace industry, which enables us to examine the direct and moderating effect of different dimensions of management capability on the development of other capabilities and resources (i.e. HPWO) and the consequences for performance.

Despite the perceived importance of management capability to organisational effectiveness, there is little research that has systematically studied this capability in the context of HPWO. However, it is potentially one of the most important factors in the 'black box' that links human resource practices to organisational performance and there is a growing recognition that the role of management in workplace innovation needs to be addressed more explicitly in relation to HPWO (Godard, 2002, Colvin, Batt and Katz, 2001).

In detailed case studies of a range of service and manufacturing firms, Purcell, Kinnie and Swart (2003) identified the important role that line managers play in 'bringing high performance work practices alive' by embedding them within the organisational context, and thereby creating non-imitable and imperfectly substitutable, rare and unique human capital (Barney, 1991). More recently, Thompson and Heron (in press) showed how the quality of the relationship between a manager and their subordinate (i.e. social capital) shaped employees levels of organisational commitment and discretionary behaviour, important drivers of the creation of firm-specific resources and capabilities such as innovation and knowledge sharing.

The primary objective of this paper is to explore the extent to which two dimensions of management capability, that we term 'HR specific' and 'general', are important in predicting variations in HPWO practices across establishments and the consequences of using HPWO practices for organizational performance.

## 2. PREVIOUS LITERATURE

There is a growing body of evidence that demonstrates the link between the use of high performance work practices and organizational performance (Applebaum, Bailey, Berg and Kalleberg, 2000; Arthur, 1994; Huselid, 1996; Richardson and Thompson, 1999; Wood, 1999). However, despite the proven benefits of High Performance Work Organisation (HPWO) many of these studies have also noted that such practices are poorly diffused (Becker and Huselid, 1998; Ichniowski, Kochan, Levine, Olson and Strauss, 1996; Pil and MacDuffie, 1996) and as a consequence

there has been increasing interest in understanding the factors associated with the use of these work practices<sup>1</sup>. A number of explanations have been suggested including organizational inability to introduce 'bundles' of high performance work practices (Ichniowski et al, 1996), the need to align production and distribution systems with high performance practices (MacDuffie, 1995), low levels of trust and employee need for job security (Cutcher-Gershenfeld et al, 1998), worker resistance (Batt and Applebaum, 1995), the problems of innovating in brown field sites (Locke et al, 1995), organizational governance and the lack of a mutual gains model to support workplace reforms (Kochan, Katz and McKersie, 1986).

However, there is relatively little research that looks specifically at differences in management resources and capabilities between firms and their use of HPWO, despite a growing view that they may be important in explaining variations in the adoption and implementation of HPWO (e.g. Becker and Huselid, 1998; Pfeffer 1999; Godard 2004).

One potential explanation for the lack of empirical evidence is that these high performance practices are interpreted as an indicator or an embodiment of managerial capability. In other words, where surveys or case studies pick up the deployment of such practices, they are effectively taking account of one dimension of management capability, the ability to implement innovations in work practices. This is what Boxall (1998) termed organisational process advantage, which he sees as distinct from human capital advantage or the stock of human talent in a firm latent with productive potential. From this perspective, the observed level of HPWO practices in any organization may be a de facto measure of managerial capability.

Consequently, we might expect to see a strong correlation between the level of management resources or capability and the deployment of HPWO practices. In a study of establishments in the telecommunications sector, Colvin, Batt and Katz (2001) found that managerial pay (an indicator of the value placed on managerial capability by the firm) tended to be higher in the context of certain types of HR practices in their study. However, this research did not look explicitly at different forms of management capability and also found that managerial pay was not positively associated with high performance practices such as team working which devolve more responsibility to employees.

At a theoretical level, the managerial rents model (Castanias and Helfat, 1991 and 2001) explains how management capability can be important for firm performance.

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<sup>1</sup> Osterman (2000) contrary to many other studies noted a 'rapid diffusion' of certain high performance practices in two surveys conducted in 1992 and 1997.

Managers apply their skills in deploying other firm resources (such as employees) to enable rent generation and appropriation. However, this model is based on the premise that differences between managers in their capabilities (skills, knowledge and abilities) leads them to undertake different strategic actions which produce different outcomes for organisations. The model also differentiates between four types of managerial human capital; firm-specific, industry-specific, related industry and generic.

This classification of managerial resources provides a framework to understand how different levels and categories of manager can generate economic value in firms. While we cannot test the complete model in our research, it does provide a priori support for the need to differentiate between different types of management capability as well as building a bridge between these capabilities and other resources and assets in the firm (such as HPWO) which can enable rent generation. There is a growing body of empirical research arising from this model but this has tended to focus primarily on board level managers or the CEO (Rosenbloom, 2000; Holbrook, Cohen, Hounshell and Klepper, 2000). However, the model also suggests the importance of the training and development of managers lower down in the organisation, to maximise the potential for superior management at all levels (Castanias and Helfat, 2001).

Building on this perspective, the core of our argument is that firms which invest more in the development of management capability are more likely to innovate in the work practice domain and that these practices will in turn drive higher levels of performance. Put simply, HPWO practices are a dependent variable which captures management's ability to introduce processes and practices that create resources which are socially complex, casually ambiguous, path dependent and thereby not easily imitable.

However, this perspective still leaves a number of unanswered questions. In particular, we are unclear about the extent to which different forms of management capability are associated with HPWO. For example, is greater investment in strategic HR management capability more important in predicting the adoption of HPWO and subsequent establishment-level performance outcomes? We might expect this to be the case if we believe that firms need to find fit between their competitive strategy and their HR practices (Schuler and Jackson, 1987). Alternatively, is investment in developing general management capability a route to greater use of HPWO and higher levels of comparative performance? The RBV perspective (Lado and Wilson,

1994, Boxall, 1996, Castanias and Helfat, 2001) suggests that human resource advantage or the superiority of one firm's HRM system over another is rooted in causally ambiguous, socially complex and historically evolved processes. Managers are central to the design of these processes which in turn lead to the creation of unique, rare and non-imitable resources. This leads us to ask whether HPWO practices are more likely to take root in organizational contexts where there has been a sustained investment in developing either or both of these forms of management capability.

### 3. THEORY AND HYPOTHESES

The application of the Resource Based View (RBV) to the SHRM field has raised a number of issues including whether its focus on critical firm-level resources limits the focus to managers rather than the entire workforce. Managers are more likely to contribute directly to the competitive advantage of firms because they 'enable a firm to enact strategies that improve efficiency and effectiveness, exploit market opportunities and neutralise potential threats' (Lepak and Snell, 1999). Managers may also be regarded as core assets because they are vital to competitive advantage and often require internal development (Quinn, 1992).

Furthermore, managers may be seen to have unique human capital qualities. They possess firm-specific knowledge of routines and processes and have high levels of tacit knowledge (Polyani, 1966) developed through idiosyncratic learning processes. As such, firms may recognise that managers possess skills and competencies that are critical to building competitive advantage and as a result invest more in developing the capabilities of their managers. These investments can help prevent the decay of management skills and competencies by attempting to make these more unique and/or valuable, as suggested by the managerial rents model (Castanias and Helfat, 1991, 2001). However, a contrasting, but not necessarily contradictory perspective is that the RBV extends to the entire workforce or human capital pool (Wright et al 1994, Mueller 1996). This is based on the view that employees as a whole can have a major impact on competitive advantage through their product, process and customer knowledge.

Perhaps the most relevant dimension of the RBV for the SHRM field is the importance attributed to non-imitability. Barney (1991) argues that competitor firms may find it difficult to imitate a firm's resources (i.e. they are 'imperfectly imitable') for

three main reasons. Firstly, the path dependent nature of firms development means that the character of any resource is the product of a complex historical interplay of internal and external forces. Secondly, the link between a firm's resources and competitive advantage are casually ambiguous. In other words, managers do not have a shared understanding or theory of how resources drive performance. And lastly, the resources driving competitive advantage are in and of themselves socially complex – managers in competitor firms may not understand how to develop these resources (Dierickx and Cool, 1989).

Human resources can be critical in creating resources that are complex, path dependent and causally ambiguous (Wright, McMahan and Williams, 1994). Indeed, the way in which a firm develops human resources and the way it applies the competencies, skills and knowledge of its employees are part of a specific organisational culture. Pfeffer (2001) describes several organisations with distinctive approaches to their management of people but stresses that many of these firms are happy to allow competitors to study their success because they realise that it is almost impossible for their approach to be copied.

One important implication of the RBV is that firms should invest in developing the management capabilities that can increase the probability that more complex, non-imitable and strategically advantageous firm-specific routines and processes can be formed (Castanias and Helfat, 2001). Boxall (1996) contends that it is 'not only those firms with astute leadership at the top but those that can combine this strength with deep employee involvement in strategic decision-making that appear to be more effective'. This confirms the important role played not only by investments in management capability to leverage internal resources but also in the role of high performance work practices in enabling greater employee involvement which leads to the creation of unique firm-specific capabilities that are non-imitable and imperfectly substitutable.

The RBV perspective suggests that if firms want to create rare, unique and non-imitable resources, they should seek to deploy a wide range of HPWO practices, as these conform closely to the RBV criteria of social complexity, causal ambiguity and path dependency (Barney and Wright, 1998). In this study, we build upon the RBV framework and managerial rents model to explore whether different levels of firm investment in management capability are an important determinant in the variability in the use of HPWO practices between organisations.

The main contribution of this paper is to explore simultaneously the interplay between high performance work practices and management capability and thereby enhance our understanding of the role played by different forms of management capability in the adoption of HPWO. An in-depth single industry study enables a more refined understanding of the extent to which the presence and character of firms' high performance work system is linked to heterogeneity in managerial capabilities.

We now turn to present our research hypotheses and in so doing make an important distinction between two different forms of management capability – general and HR specific.

### 3.1 General Management Capability

There are several dimensions of the HPWO model which have implications for management resources and capability and also how these might be measured. Firstly, HPWO is characterised by the devolution of power, information and knowledge to the employees often through team structures (Lawler 1985). In consequence, establishments moving to HPWO are likely to report much lower levels of staff to management ratios. These flatter management structures are structural consequences as well as prerequisites of self-managing organizations.

Secondly, the shift from a command and control culture to a HPWO generally necessitates new types of leadership attitudes and behaviours (Godard, 1999, Manz and Sims 1987, Stewart and Manz, 1997). Consequently, firms are likely to have higher relative investments in the training and development to support the emergence of these new leadership capabilities, an important implication of the managerial rents model (Castanias and Helfat, 2001). While there is limited prior evidence on investments in management development in the context of HPWO, there is evidence that HPWO is associated with greater expenditure on non-management employee development (Ashtead and Sung, 2002; Thompson, 2002).

Thirdly, the Resource Based View (Grant, 1996; Kogut and Zander, 1996; Nonaka and Takeuchi, 1995, Castanias and Helfat, 2001) suggests that firms will introduce systems and processes to ensure that specialist knowledge is retained and that the firm can more effectively develop and appropriate the results of the learning and knowledge held by its managers and employees. From this perspective, managers are likely to possess valuable tacit knowledge that supports organizational routines underpinning competitive advantage, particularly in much flatter organizational structures where boundary-spanning roles are more common. One important way in which firms can retain knowledge is through internal labour market systems (Leana

and Van Burren, 1999) and in order to develop and retain this firm-specific knowledge, organizations are more likely to design 'make' HR strategies for their management population as a way of locking these skills into the firm through career paths and internal labour market structures.

Lepak and Snell (1999) argued that firms structure employment systems in quite different ways depending on how unique and valuable employees are to the organization, and in their model internal labour market structures that rely on promotion from within can support high commitment HR strategies where knowledge creation and retention is important. Similarly, Pfeffer (2001) provides several examples of companies using internal labour markets for developing and retaining valuable firm-specific skills.

These managerial internal labour markets are more likely to provide a context within which organizational innovations can take root but more importantly be sustained. Managerial ILMs may also help create psychological contracts where managers are prepared to participate in extra-role or organizational citizenship behaviours, which are important in leading change in transforming organizations (Podsakoff, MacKenzie, Paine and Bachrach, 1997). Furthermore, a lack of manager continuity can undermine the development, diffusion and implementation of innovations (Leana and Van Burren, 1999).

Based on the preceding argument we would expect to see a greater use of HPWO practices in those organizations where there have been high levels of investment in 'general' HPWO related management capability. Based on the literature, this capability is linked to employee/management staffing ratios, levels of investment in management development and ILMs for managers. This gives rise to the following hypothesis:

**Hypothesis 1:** *Establishments which score higher on the general management capability index in 1999 will have a more developed HPWO in 1999.*

### 3.2 HR Specific Management Capability

Strategic HR management capability is characterised by the close integration of HR with the organization's business strategy (Fombrun, Tichy and Devanna, 1984; Guest, 1987; Schuler and Jackson, 1987), and the presence of a dedicated HR manager to help support the development and implementation of strategy at workplace level (Becker, Huselid and Ulrich, 2001; Ulrich, 1997). These strategic

priorities are also reflected in the content and focus of HR strategies. For example, we might expect to see an increased emphasis on developing people management skills in order to support transformational leadership styles required in much flatter management structures (Bennis, 2000).

There is also evidence that HR functions tend to have a high level of technical competence but a low level of strategic capability (Huselid, Jackson and Schuler, 1997). Furthermore, this research found that strategic HR management capability was the most important for sustained organizational effectiveness and firms need to ensure that there are processes in place to integrate HR practices with the strategic needs of the business.

**Hypothesis 2:** *Establishments which score high on the HR specific management capability index in 1999 will have a more developed HPWO in 1999.*

The emphasis within the RBV on the non-imitability of organizational routines suggests that path dependency may be an important shaping factor. In other words, the quality of these firm-specific capabilities is time dependent. The implication is that firms may not benefit from the wider use of HPWO immediately because of the potential time-lag between investments in management capability and workplace innovation. Although there is no clear view in the literature on how long such capabilities take to develop, there is research on the time-benefit lag between the implementation of HPWO and performance outcomes that suggests the gap could be as long as 4-5 years (Huselid and Becker, 1996). We tested for the possibility that investments in management capability in 1999 might payback in terms of greater sophistication of HPWO in 2002, a 3-year time span which leads to hypotheses three and four:

**Hypothesis 3:** *Establishments which score high on the general management capability index in 1999 will have a more developed HPWO in 2002.*

**Hypothesis 4:** *Establishments which score high on the HR specific management capability index in 1999 will have a more developed HPWO in 2002.*

Our next set of hypotheses relates to the independent main effects of our three index measures (general management capability, HR specific management capability and HPWO) in 1999 on organisational performance in 2002.

**Hypothesis 5 (a):** *A high score on the general management capability index in 1999 will predict organisational performance in 2002.*

**Hypothesis 5 (b):** *A high score on the HR specific capability index in 1999 will predict organisational performance in 2002.*

**Hypothesis 5 I:** *A high score on the HPWO index in 1999 will predict organisational performance in 2002.*

The managerial rents model argues that rent generation is largely dependent on how effective firms are in mobilising managerial resources and combining them with other assets and resources through processes such as HPWO (Castanias and Helfat, 2001). From within the SHRM literature, a number of writers have argued that the effectiveness of HPWO is largely dependent on the extent to which the organization can integrate work practices with other organizational contingencies such as technology, product market mix or the value customers place on on-time delivery (Applebaum et al, 2000; Milgrom and Roberts, 1995). Furthermore, the RBV (Barney, 1991; Grant, 1996; Prahalad and Hamel, 1990) suggests that the ability of organizations to assemble and integrate resources (for example, through the use of HPWO) is critical in explaining firms' competitive advantage. Studies of HPWO in practice (for reviews, see Becker and Huselid, 1998; Richardson and Thompson, 1999; Wood, 1999) have pointed to management capability as a potential constraint on diffusion of these work systems.

These studies suggest that management capability can have an important moderating effect on the ability of firms to introduce and sustain workplace innovations as well as overall performance effects.

**Hypothesis 6:** *High scores on the general management and specific HR management capability index will moderate the relationship between HPWO in 1999 and organizational performance in 2002.*

## 4. METHODS

### 4.1 Sample

To test the hypotheses, we draw upon data collected in a study of the development and impact of high performance work organization in the UK aerospace sector. The research was carried out under the auspices of the Society of British Aerospace Companies (SBAC) the key employer body in the sector and funded by the Department of Trade and Industry (DTI). Three establishment-level surveys were conducted between 1997 and 2002 and this research draws upon the results from the 1999 and 2002 surveys where detailed information on management capability was collected.

The aerospace sector provides an excellent context in which to explore the related issues of management capability, HPWO and performance. The second largest aerospace industry in the world (after the USA), it employs directly and indirectly around 500,000 employees many in high skilled high paid jobs (the wage premium for aerospace jobs is 17% compared to other jobs in manufacturing). The sector is strongly export oriented with over 60 per cent international sales. It is a global industry with high levels of cross-ownership and characterised by a few large OEMs but a supply chain of much smaller firms. It is estimated (Thompson, 2002) that there are over 1,500 aerospace firms in the UK and the median establishment size is just over 100 employees. The UK aerospace industry is typical of a sector that has converged on a dominant design. It has grown out of a strong craft base – a few very large firms and a mass of much smaller players in the supply chain. However, there are strong pressures for consolidation in order to compete more effectively with international competitors, particularly the US where the average establishment size is much bigger.

In response to competitive pressures the larger primes and 1<sup>st</sup> tier suppliers in the industry are seeking to improve cost, quality and on-time delivery which is putting pressure on firms further down the supply chain. One aspect of this change has been larger players desire to deal with fewer suppliers who they expect to take on greater responsibility for the development and delivery of sub-systems and thereby share the risk of product development. Lean production is also developing across the sector as a means of trying to reduce cost, improve on-time delivery and improve quality. Against this background, the demand for HPWO is increasing and there are concomitant challenges for management in the design and implementation of new

work systems. In short, management capability is becoming critical for sustained competitive advantage.

Our analysis is based on a panel of 78 establishments which responded to both the 1999 and 2002 surveys. The panel data enable us to address performance related questions taking into account time-lag issues and time compression diseconomies (Becker and Huselid, 1998, Wright et al 2001).

In 2002, the median establishment in our panel had a turnover of £7.5 million, with 90 employees and 85 per cent of their sales were in the aerospace sector of which 20 per cent were in international markets. The establishments in our panel show a domination of single site (82 per cent) small/medium enterprises with 77 per cent having 250 or fewer employees and only four establishments reporting more than 1,500 employees. Three quarters of establishments were wholly UK owned, of which 12 per cent had business units or subsidiaries overseas.

## 4.2 Data Collection

Our sample frame included all establishments within the sector drawn from a range of sources including the SBAC, the DTI, the Office of National Statistics (ONS) and a publisher's database (Findlays), which produces a range of sector specific publications. The establishment data from each source was crosschecked for duplications and accuracy of addresses.

A postal survey design was deployed which was sent to the Managing Director at each establishment. Analysis of returns found that 45 per cent had been completed by MDs in 1999 and 50 per cent in 2002<sup>2</sup>. Fewer than 10 per cent of respondents described themselves as human resource or personnel professionals across both surveys. Given that previous research suggests that non-HR managers are less optimistic in their assessment of HR practices and their effectiveness (Wright, McMahan, McCormick and Sherman, 1998) our results are, if anything, likely to downplay the reporting of HR practices in these firms.

The potential for measurement error in using single source organizational surveys has been widely debated amongst SHRM researchers (Becker and Huselid, 1998; Gerhart, Wright and McMahan, 2000; Huselid and Becker, 1996; Huselid and Becker,

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<sup>2</sup> Respondents were asked to give their job title when completing the questionnaire.

2000). A particular concern has been the potential error when a corporate-level respondent of a multi-establishment firm tries to estimate the total proportion of employees affected by a specific HR practice. Given the wide range of product and labour market conditions facing establishments in different business units within such firms, the reliability of such estimates has been found to be low (Gerhart, Wright, McMahan and Snell, 2000).

In contrast to previous studies where the average size of firm has been large (Huselid, 1995, reported an average of 4,413 employees), the mean size of establishments in our panel was 396 employees (median 90) and 82 per cent were single site firms<sup>3</sup>. Analysis by Gerhart, Wright and McMahan (2000) of responses collected at company and plant level in a study of oil refineries, found that reliability was much higher at plant level. These factors increase our confidence in the accuracy of the data. Furthermore, we used several other techniques in order to minimise measurement problems. The survey instrument was developed on the basis of prior research in the industry, including detailed interviews with managers in 12 different firms from across the industry value chain. Furthermore, the questionnaire was piloted extensively amongst 30 firms and discussed with a group of senior managers who formed the steering group for the study. Together, these processes ensured that the survey instrument contained questions that were context specific and understood by respondents (Becker and Gerhart, 1996).

## 4.3 Measures

### 4.3.1 High Performance Work Organization

High Performance Work Organisations comprises of practices that can facilitate employee involvement, skill enhancement and motivation (Applebaum et al, 2000). We followed the procedures used by MacDuffie (1995), Osterman (1994) and Arthur (1994) to combine the HR practices capturing these three dimensions into an aggregate index. The index is based upon nine critical practice areas considered by the literature as being central to a HPWO (Applebaum et al, 2000; Arthur, 1992; Huselid, 1996; MacDuffie, 1995). Respondents were asked to report on the proportion of their their non-management employees covered by each HPWO practice which contributed to a practice area. Consequently our measure captures

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<sup>3</sup> It is important to distinguish between 'firms' and 'establishments'. A firm may comprise of several establishments (or 'facilities' as they are more generally termed in the US) whereas an establishment will always be a single, specific geographical location. Establishments do not generally report profit and loss figures.

both breadth and depth of practices used in the establishments. Where there were multiple practices, a score of one or above meant that the area was included in the additive index count. Therefore, an establishment's score on our HPWO measure ranged from zero (no HPWO areas present) to nine (all HPWO areas present). The nine HPWO areas and their practices are as follows:

**Information sharing:** Briefing/Information cascades while work stops; Included in formal information sharing programmes; provided information about business plans.

**Sophisticated recruitment:** At least three formal interviews; Performance or competency test; Personality or aptitude test.

**Induction:** Formal induction programme; Five or more days off the job training for new recruits.

**Training:** Five or more days off the job training in the last year.

**Teamworking:** Semi or totally autonomous work teams; Continuous improvement team; Problem solving groups.

**Interpersonal development:** Receive training on developing interpersonal skills.

**Performance feedback:** Personal development plans; Formal appraisal at least annually.

**Involvement:** Joint Consultative Committee or Works Council; Staff suggestion scheme; Regular employee opinion survey.

**Group or organizational level rewards:** Team-based rewards; Employee share ownership scheme; Profit sharing scheme.

#### 4.3.2 Management Capability: General

There is little consistent prior work on the measurement of management capability (CEML, 2002). Our measures are based on the extent to which practices influenced or captured management skills, knowledge and attitudes, the three dimensions seen as core to discussions of management capability (Mintzberg, 1989; Stewart, 1979). We also took account of prior discussions in the HPWO literature, which identified

particular aspects as relevant to the diffusion of these work systems, such as management resistance (see Becker and Gerhart 1998, for review).

The general management capability index was measured by a count of a number of variables which capture different dimensions of management capability including attitudes to change and development, levels of investment in management development and indicators of internal labour markets for managers. Each variable was z-scored for standardisation purposes. The variables used were:

*Barriers to change*: scale of three items, 'Resistance from senior management', 'Resistance from middle/line management' and 'poor quality management'. Respondents were asked to indicate how important each of these items was as a barrier to change in their establishment using a five-point Likert scale: not important to vital. Items were reverse coded and alpha reliability was .68.

*Training philosophy*: scale of three items, 'Training our managers is central to our future business success', 'Our managers take the training and development of their staff very seriously' and 'we invest heavily in the skills of our managers'. All items measured on a five-point Likert scale (strongly agree to strongly disagree) and have an alpha reliability of .65.

*Importance of management development*: scale of three items, 'Developing change management skills', 'Developing leadership skills' and 'Improving managers' communication skills'. All items measured on a five-point Likert scale (not important to vital) and have an alpha reliability of .71.

Proportion of management jobs filled internally through promotions in the last 12 months.

Ratio of managers to employees at the establishment (reverse coded).

Total spend on off-the-job training and development programmes per manager in the last year (natural logarithm).

Number of days off the job training and development for the typical manager in the last year.

#### 4.3.3 Management Capability: HR specific

The HR specific management capability index captured three specific dimensions. Firstly, there is an index measuring the strategic integration of HR with business strategy. Secondly, we identified whether there was a dedicated HR manager at the establishment and lastly whether there was an emphasis on developing people management skills in management development training. These measures were standardised by applying z-scores. The variables included were:

The presence of a dedicated HR manager at the establishment.

*Strategic integration of HR:* index of four items, 'Regularly discuss personnel policies at establishment level Board meetings', 'Agree an annual personnel strategy at establishment level', 'Have a process for linking personnel policies to product market strategy' and 'Have a process for ensuring that personnel policies are consistent with one another'.

Proportion of management training related to 'people management' issues.

#### 4.3.4 Organizational Performance

An establishment's performance was measured by value added per employee. Value-added per employee is an appropriate measure to use because it captures the organisation's efficiency in using its human capital (Mayo, 2002). It is a measure considered by the UK Department of Trade and Industry (DTI) to be an 'important measure of wealth creation' and was used in 2002 to create a scoreboard of the top 500 performing UK companies (DTI, 2002b).

The questionnaire gathered data on total sales, the value of bought in goods and total employment at establishment level. We used these three data points to construct a measure of value-added per employee – total sales minus bought-in-goods divided by the total number of employees.

#### 4.3.5 Controls

We controlled for a number of factors that the prior literature identified as particularly relevant to the adoption of HPWO: size of establishment, foreign ownership, age of establishment, single or multisite business, level of international sales, trade union

presence and spend on new capital equipment. Due to the limitations of cases in our panel, it was not feasible to include all these controls and still have a substantial case to variable ratio to carry out hierarchical regression analysis. Instead we investigated the zero order correlations between these variables and our dependent variables and included only those which were found to be significant ( $p < .10$ ). For 1999 HPWO these were: Small medium enterprise (SME:  $< 250$  employees, dummy variable), overseas ownership (dummy), trade union presence (dummy) and percentage of sales in international markets (%). For 2002 HPWO all those for 1999 HPWO were included with the exception of trade union presence. For our 2002 performance measure, value added per employee, the following controls were used: SME, overseas ownership and international sales.

## 5. RESULTS

Table 1 presents the means, standard deviations and correlations for the study's variables. In order to test the first two hypotheses, we constructed a hierarchical regression with the 1999 HPWO index as our dependent variable. The control variables were entered in step one of the analyses followed by the two measures of management capability in step 2. The results are displayed in Table 2 and reveal that in 1999 the general and HR specific aspects of management capability together explained a highly significant 33 per cent of HPWO variance beyond that explained by the control variables ( $F = 21.68, p < .000$ ). The general management capability had the stronger association with the HPWO index ( $\beta = .50, p < .000$ , compared to  $\beta = .27, p < .05$  for HR specific) but both were significant and therefore provided support for Hypotheses 1 and 2.

(Table 1 about here)

The same regression was then repeated using the 2002 HPWO index as the dependent variable, these results are also shown in Table 2. Neither of the management capability indices in 1999 predicted the level of HPWO in 2002 ( $\beta = -.10, p = \text{n.s.}$  and  $\beta = .03, p = \text{n.s.}$ , respectively). This regression equation controlled for past HPWO by including the 1999 HPWO index as a control variable. An establishment's performance on the 1999 HPWO index was a strong and positive predictor of the level of HPWO in 2002 ( $\beta = .57, p < .000$ ) revealing a high level of consistency amongst HPWO practices over the three-year period. As shown in Table 1, there are significant bivariate correlations between the management capability

indices and the 2002 HPWO. To test whether the inclusion of the 1999 HPWO variable into the equation is unduly affecting the results, we repeated the regression analysis excluding the 1999 HPWO. The results revealed that there was still no relationship between the 1999 management capability indices and 2002 HPWO, leading us to conclude that any bivariate relationship could therefore be explained by our control variables. Hypotheses 3 and 4 were therefore not supported.

(Table 2 about here)

Hypothesis 5 (a-c) stated that there would be main effects between 1999 HPWO, the management capability indices and our 2002 organizational performance measure, value added per employee. The hierarchical regression results with all three independent variables entered into step 2 are presented in Table 3. Our analysis revealed that only Hypothesis 5c was supported HPWO in 1999 positively predicted higher levels of value added per employee in 2002 ( $\beta = .37, p < .01$ ). There was no relationship between HR specific management capability and value added per employee ( $\beta = .02, p = \text{n.s.}$ ) and for general management capability there was significantly lower levels of value added per employee ( $\beta = -.28, p < .05$ ) – the opposite direction predicted by the hypothesis.

As before, we included 1999 value added per employee into the regression equation in Step 1 in order to control for past performance and thereby testing whether our independent variables were associated with any change in performance over time. To check for any possible suppression by this variable's inclusion, we repeated the regression equation excluding past performance and found that the level of significance and direction of the results for all three of our independent variables remained the same. Thus, support for hypothesis 5 was mixed.

(Table 3 about here)

Our final hypothesis stated that management capability would moderate the relationship between HPWO in 1999 and value added per employee in 2002. These results are found in Step 3 of the hierarchical regression presented in Table 3. The results show that HR specific management capability did not moderate the relationship between HPWO and value added per employee ( $\beta = -.11, p = \text{n.s.}$ ), however there was a significant negative interaction between general management capability ( $\beta = -.23, p < .05$ ) that explained four per cent of the variance in value added per employee.

In order to assess the nature of the two-way interaction we followed the procedure outlined by Aiken and West (1991). We used the unstandardised regression coefficients and constant from the full regression equation to plot the primary relationship between 1999 HPWO and 2002 value added per employee at high levels (one standard deviation above the mean) and low levels (one standard deviation below the mean) of general management capability.

The nature of the interaction is revealed in Figure 1. Simple slope regression analysis revealed the high general management capability slope in Figure 1 to be non-significant ( $\beta = .11, p = \text{n.s.}$ ) and the low general management capability slope to be highly significant ( $\beta = .46, p < .001$ ). Thus the form of the interaction leads us to conclude the following: when low management capability interacts with low HPWO we see the poorest returns in value added per employee, yet when HPWO is high (and our index of general management capability is low) we see significantly higher returns in value added per employee. In contrast, high levels of general management capability result in moderate levels of performance regardless of whether the establishment is high or low on the HPWO index.

(Figure 1 about here)

Hypothesis 6 was therefore partially supported, however the direction of the statistically significant interaction was contrary to our expectations.

## 6. DISCUSSION

Previous research has shown that HPWO is slow and often uneven in diffusion (Godard, 2002; Ichniowski et al, 1996; MacDuffie, 1995), which has sparked interest in the contingency factors that may influence workplace reform, particularly in the face of considerable evidence of the economic benefits to be gained from such innovations. Although the presence of HPWO practices are seen as *prima facie* evidence of the impact of management capability, there has been little research that has critically evaluated which characteristics of management capability may explain the presence, sustainability and performance effects of HPWO.

The purpose of this study was to examine, using a panel establishment data derived from the UK aerospace sector, the extent to which management capability is

associated with HPWO and organizational performance. There are convincing theoretical grounds (Huselid, Schuler and Jackson, 1997; Castanias and Helfat, 2001), to differentiate between different forms of management capability. In our study we distinguished two levels of capability, one at a general management level and the other at HR level.

We found that both types of management capability were positively and significantly related to the presence of HPWO amongst the panel establishments for 1999. However, we were also interested in understanding whether there is a time-benefit lag in the relationship between management capability and HPWO such that investments made in either form of management capability will result in greater use of HPWO in 2002. We did not find a statistically significant relationship between either dimension of management capability measured in 1999 and HPWO practices in 2002.

How do we explain this finding? One explanation may be that the management capability that aided the early adoption of HPWO practices may be deployed at a later date to address other strategic resources that can build competitive advantage such as technology and products (West and DeCastro, 2001). In other words, the focus and attention is being directed away from workplace innovation. However, it is difficult for us to address this issue with the current survey data which does not capture these other dimensions.

Leonard-Barton's (1995) view of organizations as complex ecosystems that integrates learning across four different capabilities might provide another potential explanation. This perspective suggests that performance derives from the ability of firms to create synergies between systems. It is the integration and alignment of systems that creates the opportunities for value-appropriation through learning and knowledge creation. Our time-lag hypothesis, where one system (management capability, 1999) works on another system (HPWO, 2002) implies a potential disconnect between these systems as they co-evolve. So, although it may be appropriate to explore performance in a time-lagged way, it may not be appropriate to do so for management systems where consistency, alignment and integration are important and evolve together over time (Castanias and Helfat, 2001). Unfortunately, we are unable to test for this argument as the measures used to construct the management capability indices were not fully repeated in the 2002 survey.

This co-evolution argument may also explain the results of the test for a moderation effect. Our analysis found that management capability in 1999 interacted with HPWO

in 1999 to predict value-added per employee in 2002 but not in the way that we expected. Performance was higher when the HPWO was more sophisticated but only when general management capability was low. Furthermore, there was no interaction found between HR specific management capability, HPWO and value-added per employee. Given the importance attached to the role of the HR function in strategically integrating the business strategy and HR strategy in order to deliver higher levels of performance this is a potentially counter intuitive finding.

One possible interpretation is that firms which have been effective in implementing HPWO no longer need the same levels of management resources given the devolution of power and responsibility to employees. In other words, the success of HPWO practices compensates for the perceived lower scores on the management capability indices. While firms may need to invest in management capability in the short-term to ensure the HPWO functions effectively, these investments might not be needed in the long run.

The measurement of management capability is also an issue. The low numbers of firms in the panel and problems with statistical power restricted the number of variables we could use for our analysis. Consequently, we used an index measure of management capability, which identified the number of practices deployed by firms. Although this is in line with practice in measuring the presence of HPWO, it would have been preferable to use independent variables to cover each of the main dimensions within the index, as this would have enabled the analysis to be more sensitive to their independent effects. Using an index does not reveal which of the managerial dimensions might be more important than others in explaining either the use of HPWO or the moderating effect of management capability on performance. Future research where larger panel samples are possible should explore the relative importance of different dimensions of management capability for organizational performance.

For example, although theory suggests that practices such as ILMs can retain firm-specific knowledge and capabilities important for innovation, it is also true that such systems can sometimes work against new ideas by preventing the recruitment of managers with different experiences and perspectives into the organization. Similarly, although firms may invest similar amounts in management development we have no idea if it is the emphasis on developing people management skills that is the critical differentiator. As such, the index measure of management capability does not allow us to develop a more granulated view on the relative merits of the different

dimensions of management capability for organizational effectiveness. From this perspective, it could be argued that although firms with higher levels of value-added may be using fewer of the practices in the index, this may not necessarily be a 'bad' thing.

Further research, preferably qualitative as well as quantitative is needed to explore and understand the character of management capability and its impact on HPWO and performance. For example, it may also be the case that different management capabilities are required as firms move through various stages of establishment, decline and renewal as suggested by Boxall (1998) and Castanias and Helfat (2001). Future research should more clearly differentiate between management capabilities to understand which ones may be more important than others in explaining the adoption and performance effects of HPWO. This requires more in-depth qualitative studies that can explore causal ambiguity, path dependence and social complexity in the development of unique and non-imitable HR systems.

The performance measure used in the study, value-added per employee, is rarely deployed in SHRM research despite its relevance to HR strategies (Huselid and Becker, 1996). Because the measure takes account of the value of bought-in goods (an important cost in any manufacturing context), it is much more sensitive to the transformation of raw materials and the true value created by employees. Furthermore, as this is a single-industry study we can be more confident that the variation between establishments on this measure is likely to be a truer reflection of performance. Cross-industry samples are often problematic because it is difficult to arrive at a standardised measure of performance. High level financial measures of performance are also subject to potential manipulation as the Enron and Tyco cases have shown.

The study also provides further evidence on the link between HPWO and organizational performance. It is one of the few which has used longitudinal data to understand the performance consequences of investment in HPWO and the results confirm that there is an implementation-benefit lag in the returns arising from investments in HPWO of at least 3 years (Huselid and Becker, 1996).

The current study is based on a nationally representative sample of establishments in the aerospace industry in the UK, so the findings are not generalisable beyond that industry. However, given that aerospace is high value added industry that produces

low volume, high variety and complex knowledge based products and services the findings have implications for other high-technology manufacturing industries.

In conclusion, this study has contributed to the literature on strategic human resource management by examining an under-researched but important potential determinant of the adoption and effectiveness of HPWO, the role of management capability. The findings, based on longitudinal data, provide further concrete evidence for the relationship between HPWO and organizational performance, value-added per employee. There is evidence that HPWO is more widespread in establishments, which have a more sophisticated management capability. However, the role of management capability in the link between HPWO and performance over time remains unclear and further research is needed to unravel this relationship.

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## TABLES AND FIGURES

**Table 1: Descriptive Statistics and Correlations<sup>a</sup>**

Variables	Mean	s.d.	1	2	3	4	5	6	7	8
1. Value added per employee (£m) <sup>b</sup>	.02	.01								
2. HPWO 1999	5.99	2.19	0.36							
3. HPWO 2002	6.51	2.07	0.41	0.57						
4. MC: General	3.30	1.63	0.01	0.61	0.29					
5. MC: HR specific	1.29	.98	0.26	0.47	0.33	0.42				
6. SME <sup>c</sup>	.73	.45	-0.20	-0.26	-0.30	-0.28	-0.50			
7. Trade union presence <sup>c</sup>	.49	.50	0.10	0.29	0.08	0.30	0.43	-0.45		
8. Overseas owned <sup>c</sup>	.23	.43	0.35	0.25	0.28	0.15	0.39	-0.37	0.19	
9. International sales	29.96	28.69	0.32	0.24	0.19	0.09	0.13	-0.24	0.29	0.19

<sup>a</sup> For correlations greater than .19,  $p < .10$ ; greater than .22,  $p < .05$ ;

<sup>b</sup> Natural log

<sup>c</sup> Dummy variable

**Table 2: Results of Hierarchical Regression Analyses predicting HPWO**

Variables	HPWO (1999)	Change in		HPWO (2002)	Change in	
	$\beta$	$R^2$	$F$	$\beta$	$R^2$	$F$
<b>Step 1</b>		<b>.12</b>	<b>2.60*</b>		<b>.36</b>	<b>10.35***</b>
SME	-.12			-.12		
Trade union presence	.10			-		
Overseas owned	.14			.11		
International sales	.16			.02		
HPWO (1999)	-			.51***		
<b>Step 2</b>		<b>.33</b>	<b>21.68***</b>		<b>.01</b>	<b>.50</b>
MC: General	.50***			-.12		
MC: HR	.27*			-.01		
<b>Overall model</b>						
$R^2$ (adjusted $R^2$ )	.46 (.41)			.37 (.32)		
$F$	9.94***			6.97***		

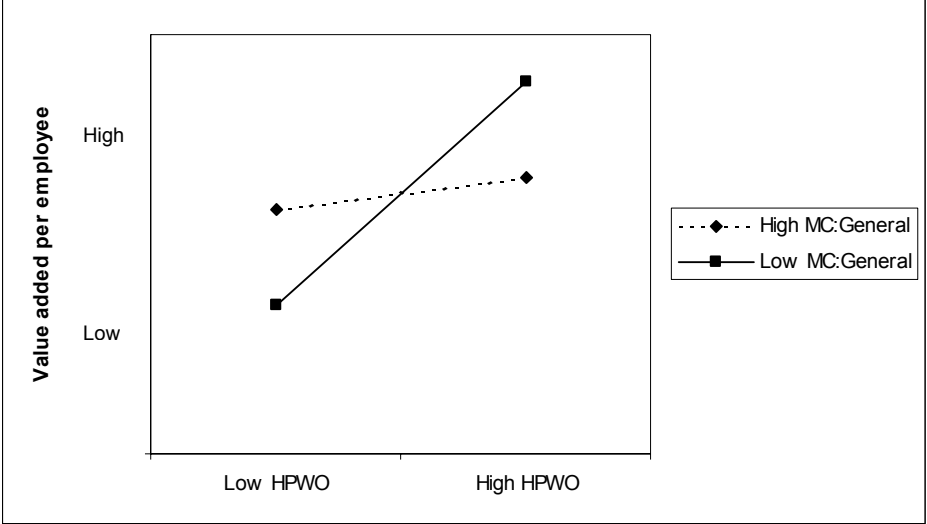
\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 3: Results of Hierarchical Regression Analysis Predicting Organizational Performance**

Variables	Value added per employee (2002)		
	$\beta$	$R^2$	$F$
<b>Step 1</b>		<b>.27</b>	<b>6.71***</b>
SME	.01		
Overseas owned	.14		
International sales	.17		
Value added per employee (1999)	.39***		
<b>Step 2</b>		<b>.09</b>	<b>3.12**</b>
HPWO	.37**		
MC: General	-.28		
MC: HR	.02		
<b>Step 3</b>		<b>.04</b>	<b>2.61*</b>
HPWO * MC: General	-.23*		
HPWO * MC: HR	-.11		
<b>Overall model</b>			
$R^2$ (adjusted $R^2$ )	.39 (.31)		
$F$	4.84***		

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Figure 1: Two-Way Interaction – Moderating Effect of General Management Capability on the Relationship between HPWO and Value Added Per Employee**



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