



Human resource management in the North American automotive industry

North American
automotive
industry

A meta-analytic review

Anthea Zacharatos, M. Sandy Hershcovis, Nick Turner and
Julian Barling

Queen's School of Business, Queen's University, Kingston, Canada

231

Received 23 March 2005
Revised 16 July 2005
Accepted 6 December 2005

Abstract

Purpose – This article aims to provide a quantitative review of the range and effects of human resource management (HRM) practices in the North American automotive industry.

Design/methodology/approach – A total of 14 studies provided data for an employee-level meta-analysis of the relationships comprising high performance work systems in the automotive manufacturing sector. As an extension of research in this context, we hypothesized that three clusters of organizational practices (work systems, HR policies, and leadership) would be associated with two clusters of employee-level psychosocial outcomes (person-focused, organizational-focused) which, in turn, would be related to employee performance.

Findings – It was found that work systems and HR policies related to both person-focused (comprising individual job satisfaction, health, self-esteem, and social support) and organization-focused (comprising organizational commitment and perceptions of organizational justice) outcomes. The leadership cluster had a strong association with the person-focused outcomes. Organizational – but not person-focused outcomes were associated with employee performance comprising employee effectiveness, self-ratings of performance, turnover, and absenteeism.

Research limitations/implications – The results from this study provide support for the role of employee-level psychosocial outcomes as mechanisms between HRM practices and employee performance, supporting an idea that is often discussed but rarely tested in the literature. These results need to be tempered by the fact that this meta-analysis was based on a relatively small number of studies in one industrial sector, thereby limiting the generalizability of the model.

Practical implications – These data suggest that managing with a high-involvement orientation is associated with positive consequences for individuals and organizations within the automotive industry. The paper is not espousing the view that technologically-focused systems are of little value in manufacturing industries, but rather that taking a more humanistic approach to how they are implemented may benefit all parties involved.

Originality/value – This paper provides an empirical review of HRM practices and outcomes in the automotive manufacturing context. The role of leadership in these systems is highlighted. The results offer guidance to researchers and practitioners interested in researching and managing the human side of automobile manufacturing.

Keywords Human resource management, Management information systems, Automotive industry, Job analysis, North America

Paper type Research paper



Financial support from the Centre for Automotive Materials and Manufacturing at Queen's University and the Social Sciences and Humanities Research Council of Canada made this collaboration possible.

Personnel Review
Vol. 36 No. 2, 2007
pp. 231-254
© Emerald Group Publishing Limited
0048-3486
DOI 10.1108/00483480710726127

The automotive industry plays a significant and valuable role in the North American economy. The industry accounts for 12 percent of the USA's manufacturing-related gross domestic product, one in every seven jobs in the USA (US International Trade Commission, 2002), and the manufacture of 12.3 million vehicles in 2002 (Industry Canada, 2003).

Given its substantial economic impact, it is not surprising that a great deal of attention has been and continues to be focused by industry players, governing bodies, and researchers on how to manage automotive manufacturing. There is little doubt that to date a great deal of this focus has been placed on managing the technical side of automobile manufacturing, and this is seen in the extensive literature on the topic. Yet, we know significantly less about how to manage the human side of the industry. The purpose of the current study, therefore, was to take stock of the empirical research describing human resource management in the North American automotive industry. Based on this review, we proposed and tested a model of high performance work systems in the automotive context using existing empirical data on relevant variables.

In this paper, we first present a review of research on work systems and human resource management in the automobile industry. It is on this basis that we then present our model, the criteria and procedure for creating the sample suitable for meta-analysis, and the study results. As with most meta-analyses, the criteria are restrictive, and in this case leads to a dataset consisting of a small number of studies compared to the large body of HRM research available. We acknowledge that this data set reflects only selective organizations in the North American automotive industry that have collaborated with social science researchers; and as a such, the findings should be interpreted with caution as the conclusions derive from a non-representative sample of automobile manufacturing employees representing in, some cases, a small number of statistical relationships.

We hypothesized associations between model variables, and tested these relationships using 14 empirical studies conducted in the North American automotive sector. We conclude with a discussion of the implications of the study results for research on human resource management in the automotive sector.

Theory and background

Automotive work systems

Automobile manufacturing has embraced different models of work management over time. From the Fordist approach of the early twentieth century, which held that the sole contribution of workers was manual labour in the form of repetitive assembly-line tasks (Dohse *et al.*, 1985; Lewchuk and Robertson, 1997), to the adoption of Japanese approaches in the 1970s and 1980s, acknowledged for emphasizing worker involvement and greater intellectual contribution (Dohse *et al.*, 1985; Klein, 1991), the focus on greater productivity and competitiveness is one characteristic the adopters have unequivocally shared. While an extensive review of production trends in automobile manufacturing is beyond the scope of this paper, outlining modern initiatives in relation to their human resource management implications is important.

Using the Just-In-Time (JIT) approach, manufacturing organizations minimize capital outlays by reducing inventories of components and raw materials, material, and product storage as well as the time between initial financial outlays and receipt of

payment for goods (Parker and Wall, 1998). More recently, some organizations implementing JIT have taken the concept further by introducing “direct automatic delivery”, a system whereby suppliers are located within close geographic proximity to the automobile plant and their completed modules and parts are transferred by way of conveyer belts directly to the assembly line (US International Trade Commission, 2002). While these methods are associated with greater efficiency and cost savings, the highly interrelated nature of the JIT manufacturing process suggests a distinct disadvantage: teams or individuals working on the line are forced to operate in a highly synchronized manner. This has the effect of reducing workers’ autonomy over when to conduct team meetings, take breaks, or address safety and quality issues, as examples (Klein, 1991).

Lean production, a term popularized in the 1990s, describes a system originally developed by automaker Toyota, though applied extensively across manufacturing industries (Kochan and Lansbury, 1997; US International Trade Commission, 2002). While there is some disagreement as to what exactly constitutes lean production, a review by Lewchuk and Robertson (1997) suggests four characteristics of the system:

- (1) the “manufacturability” of products is integral to their design;
- (2) machines can be readily adapted to different uses;
- (3) processes strive to eliminate waste, reduce necessary inventories, and improve overall efficiency; and
- (4) labour expertise is summoned to improve the production process and product quality.

While seen by many as the panacea to production issues due to its “humanistic” approach, criticism of the lean production system abounds (e.g. Dohse *et al.*, 1985; Kochan and Landsbury, 1997; Lewchuk and Robertson, 1997; Parker, 2003; Rinehart *et al.*, 1997). The popular view suggests that due to increased worker participation, lean production has a positive impact on the quality of work life. Yet, many critics cite evidence to the contrary, suggesting that through this highly standardized manufacturing process workers are tightly controlled (Babson, 1993; Yates *et al.*, 2001) even when working in teams (Garrahan and Stewart, 1992), that participation in the form of decision-making and greater autonomy is limited (Babson, 1993; Klein, 1991; Parker, 2003), and that work under the lean production system remains repetitive and highly regulated (Dohse *et al.*, 1985).

Flexible manufacturing describes a production approach whereby manufacturers are able to quickly switch vehicle production between models. For instance, at Honda, all 40 models of automobile can be produced within a single factory by using flexible manufacturing. A total of eight vehicle types can be produced at one time with just three minutes required to switch between types (US International Trade Commission, 2002). By definition, this process allows manufacturers to move production between geographic locations depending on factors such as the cost of materials, exchange rates, and resource availability including labour.

With increasing competition, total quality management (TQM) has been extensively adopted as a means of improving product quality and maintaining competitive advantage throughout the supply chain (Bandyopadhyay and Sprague, 2003). The approach involves:

- defining quality in terms of meeting and exceeding customer needs;
- including “internal customers” in the definition of “customer”;
- the extensive use of measurement and quantitative approaches to recognize instances where product quality fails to meet standards;
- including management, production employees and external suppliers in quality management, as opposed to inspectors; and
- constant improvement and reduction in waste and any activities that do not add value (Legge, 1995).

Teamwork, problem-solving, quality circles, and product design are all methods applied within the TQM approach. The apparent success of this approach is evident in its adoption by the Big Three automakers, namely General Motors, Ford, and Chrysler. Critics of the approach, however, argue that TQM, with its goal of eliminating all defects, puts undue stress on employees through intensified work, peer pressure, and surveillance (Delbridge, 1995).

The topic of team working appears frequently in the automotive management literature, whether in discussions of lean production, TQM, or non-assembly line manufacturing. Proponents of teamwork argue that working in groups promotes greater individual autonomy and provides a higher quality of work life for employees (Pfeffer, 1998; Turner *et al.*, 2002). According to Oliver *et al.* (1996), teams come in many forms, however. Within the lean production context, for example, individuals working in groups support one another yet production is carried out on an assembly line at the individual level (Robertson *et al.*, 1993). Reports suggest working in lean teams puts employees under extreme pressure from both their peers and management to work harder and smarter, while simultaneously reducing their control over work (Barker, 1993; Delbridge *et al.*, 2000; Garrahan and Stewart, 1992; Rehder, 1992; Robertson *et al.*, 1993). It has even been argued that the word “teamwork” was applied to the Japanese lean production concept simply to increase its palatability in North America (Prujit, 2003).

At the other end of the spectrum is Volvo’s Uddevalla plant which functions as a team-based, non-assembly line system. Here, employees working in teams assemble entire or significant parts of cars, such as the subassembly or body, in a single location called a “dock”. In some cases, entire cars have been assembled by two women, illustrating the significant choices in team composition and tasks that are at the discretion of employees (Granath, 1998). Despite its more “flexible and democratic production systems” (Rehder, 1992, p. 62), skeptics argue that the Uddevalla system is not as competitive as manufacturing under lean production and, to this point, Volvo’s weak financial situation led to a temporary plant closing in the 1990s.

Other production trends in automobile manufacturing include cellular manufacturing, six sigma quality, build-to-order, modular assembly and platform sharing, and an extensive literature covers each. Worth noting is that all these production systems are interrelated. JIT is an integral part of lean production, while teamworking and TQM often go hand-in-hand, for instance. It is sometimes difficult to distinguish where one system leaves off and another system begins.

Each method has its own advantages and disadvantages and represents a development in the manufacturing process. Significant production and financial gains

have been made in automotive manufacturing due to many of the approaches outlined above. Notwithstanding this, what these approaches have in common, with the exception of some advanced forms of team-working, is a predominant technical focus (e.g. smaller inventories, modular design, measurement systems) and with comparatively less focus on the human dimensions of these types of work practices. While not necessarily a fundamental break from these types of work systems, a high performance work systems orientation attempts to redress this imbalance, by shifting the focus on human determinants of high performance. As Wood and Wall (2002, p. 352) suggest, "[the] competitive advantage stems as much from developing the human as the technical side of business".

Human resource management and high performance work systems

The term "high performance work systems", also called high commitment or high involvement practices or systems by some (e.g. Wood, 1999), describes an approach to managing human resources wherein a fundamental principle is the belief that employees are an organizational asset rather than simply an expense to be incurred (Wood and Wall, 2002). This approach assumes that when treated with fairness and respect, individuals are both capable and willing to work intelligently and to perform at higher levels. More specifically, by involving employees in decision-making, providing them with job security, and opportunities to upgrade their skills or by paying employees comparatively better wages, for example, an organization can increase employee trust and commitment and, in turn, reap the benefits in terms of improved performance (Walton, 1985; Wood and Wall, 2002). More broadly, a number of researchers have variously conducted industry-specific case studies (e.g. Bailey, 1993), cross-industry studies (e.g. Appelbaum *et al.*, 2000), and literature reviews (e.g. Boxall and Purcell, 2003) suggesting that high performance work systems are a special case of HRM focused on creating the determinants of high work performance, namely abilities, motivation, and opportunity to participate (Campbell *et al.*, 1993). The high performance or high commitment approach contrasts directly with the control orientation which assumes organizations should aim to reduce the costs associated with labour, and that exercising tight controls over employees by forcing them to comply with rules and strict procedures is the best way to ensure they perform to desired levels (Arthur, 1994; Barling and Hutchinson, 2000; Walton, 1985).

The issue of what specific human resource management practices constitute a high performance work system continues to be debated in the research literature. Practices studied include, but are not limited to, providing employment security, selectively hiring new personnel, training, team working, reducing status distinctions across the organization, sharing information, involving employees in quality management, conducting employee assessments, paying employees contingent on performance, and applying the principles of job design (Wood and Albanese, 1995; Zacharatos *et al.*, 2005). According to Wood and Wall's (2002) review, all high performance work practices have the following in common, however:

- they foster employee involvement in their work and employee commitment to the organization's goals;
- are in direct contrast to the Taylorist model in which control is favoured, and instead encourage individual and group autonomy and involvement; and

- the practices work together in a synergistic manner such that a “system of HR practices may be more (or less) than the sum of the parts” (Becker and Gerhart, 1996, p. 14).

A number of recent studies support the view that organizing work following a high performance work system approach is associated with positive outcomes for organizations. For instance, Arthur (1994) found, in his study of steel minimills, that operating following a commitment-orientation resulted in greater labour efficiency, lower scrap rates, and an average turnover rate 50 percent lower than in minimills operating under a control-orientation. Similarly, a study of publicly-traded companies found that those adopting high performance work systems experienced lower turnover and higher employee sales. High performance work systems were also associated with increased performance in terms of market and accounting-based measures (Huselid, 1995). Appelbaum *et al.* (2000) conducted a comprehensive study of high performance work systems in three industries, and found that high performance work systems were related to both beneficial organizational outcomes, such as productivity and financial performance, and employee experiences by improving incentives, trust in management, and perceptions of intrinsic rewards. Similarly, Ramsay *et al.* (2000) found that high performance work practices positively related to labour productivity, financial performance, and service quality, and negatively related to turnover.

More recently, a longitudinal study by Patterson *et al.* (2004) found that job quality and training, components in a high performance work system, were associated with productivity and profitability. Examining the mechanisms responsible for such effects, Zacharatos *et al.* (2005) found that high performance work systems were associated with higher levels of safety performance and that this relationship was mediated by employee trust in management. Taken together, this set of evidence illustrates the significant gains that can be made by adopting a high performance approach to managing human resources.

Proposed model

High performance work systems

To manage the “human” dimension within the automotive industry, we proposed a high performance work system based on the model used by MacDuffie (1995) in his study of 62 automotive assembly plants from 16 countries. He conceptualized high performance work practices as falling into two specific bundles. The first, labeled “work systems” comprised those practices related to the organization of work whether in terms of formal work structures, work responsibilities and tasks, or the extent of employee involvement. The second bundle, “human resource (HR) policies”, covered those practices that affect all levels of employment within the organization and have more to do with the “psychological contract” between the employee and the firm, such as hiring practices, recruitment, training, and contingent compensation. We chose to base our conceptualization of a high performance work system on MacDuffie’s model due to its theoretical and ecological validity – being both developed and empirically supported within the automotive industry.

Following MacDuffie (1995), our model of a high performance work system also comprises two factors, work systems and HR policies, the former covering practices that affect the nature of the work itself, while the latter covers human resource

management practices that support the work being done. Unlike MacDuffie (1995), however, we assumed the provision of employee training falls within the work systems, rather than the HR policies component, given its direct relationship with the quality of the work itself. We feel that the extent to which employees have the skills and knowledge necessary to carry out their work autonomously very directly affects the quality and nature of their work (Parker *et al.*, 1997; Patterson *et al.*, 2004), while having less to do with the organization-level practices that characterize the HR policies factor. To summarize our conceptualization, the work systems factor comprises practices that affect the nature of the work itself, namely:

- the opportunity to work in teams;
- the provision of training; and
- job quality, including task variety, participation in decision-making, and job-related autonomy.

We conceptualized the HR policies factor to include:

- employment security;
- compensation; and
- hiring practices.

In addition to the two factors described above, we proposed a third factor in the high performance work system. Increasing evidence supports the role of positive leadership in organizational performance (Howell and Avolio, 1993; Koene *et al.*, 2002), and we argue that a model lacking a distinct leadership factor would be incomplete. Following the transformational theory of leadership (Bass, 1990, 1998), we conceptualized this factor in terms of the following leadership practices: doing what is right, acting as a role model, effectively communicating a vision or mission, intellectually stimulating followers, showing concern for employees with particular attention paid to their individual needs and abilities, communicating satisfaction for a job well done, and demonstrating trust in employees through the sharing of information (Avolio, 1999; Bass, 1998). We feel that the transformational leadership model provides a valid basis for a leadership factor on account of the extensive empirical support the theory has amassed over time (Lowe *et al.*, 1996). In the automotive context more specifically, the changing role of the team leader under technical initiatives such as lean production and just-in-time production (Delbridge *et al.*, 2000; Lowe, 1993) suggests that leadership perceptions at the employee level should be a salient influence in these human resource systems.

As mentioned previously, existing research demonstrates that the practices that comprise a high performance work system tend to work together in a synergistic manner (Wood and Wall, 2002). As such, we hypothesized that the three factors that comprise our model-work systems, HR policies, and leadership – are highly interrelated. This makes sense if one considers the futility of expending resources on training employees that are neither selectively hired nor assured a reasonable amount of employment security. Sharing confidential information with employees who may work for the competition at a later date is of little long-term benefit, if not counterproductive. Similarly, providing employees with the opportunity to improve

their skills and then failing to compensate them for their added value begs the competition to hire them away (Zacharatos *et al.*, 2005). Leadership plays a particularly noteworthy role in this model. Given most organizations do not undertake the challenge of putting in place a high performance work system (Ichniowski *et al.*, 1996), strong leadership is required in envisioning and implementing practices that fall into the work system or HR policies categories.

According to Delery (1998) and Wood and Wall (2002), and as shown in the examples above, the idea of synergies makes a great deal of intuitive sense, and in fact the strong intercorrelations among human resource management practices lend many researchers to treat them as a single factor (e.g. Becker and Huselid, 1998; Guthrie, 2001; Wood and Albanese, 1995; Zacharatos *et al.*, 2005). Meanwhile, others have assumed the practices fall into separate groupings. For instance, MacDuffie (1995) found that his measures of work systems and HR policies were two distinct yet highly correlated ($r = 0.62$) constructs. Similarly, Huselid (1995) found empirical support for dividing human resource management practices into two distinct yet highly correlated factors: those that enhance skills and those that enhance motivation. Following previous research in this area, we hypothesized the three factors (work systems, HR policies, and leadership) would be highly correlated. Following the advice of Wood and Wall (2002), we chose a three-factor model rather than a single-factor model to derive more detailed results and to investigate whether some sets of practices were related to some outcomes more than others.

As described above, various reviews (e.g. Guest *et al.*, 2003) of the structure of human resource management practices have recognized the diversity that exists in: how researchers have conceptualized HR practices (e.g. as systems, as distinct practices, as specific techniques); how, once operationalized, these variables reflect employee experiences of these phenomena (e.g. presence or absence of a particular practice, how broadly a particular practice affects the workforce, or exposure to a particular practice); and the valence toward these practices (e.g. mere exposure to performance-based pay versus satisfaction with performance-based pay). In the current study, one of the conceptual criteria that was important in choosing what data to use was the ability to compare “like with like”: that is, we chose to anchor the meta-analysis in the employee experience (i.e. individual level of analysis) of HR practices that have been clustered in previous research (e.g. MacDuffie, 1995), anchoring the measurement in the intensity of the exposure (e.g. not at all, a little bit, frequently, and all the time) with which these practices affect the experience of work.

Person and organizational mediators and performance outcomes

One of the basic tenets of the high performance work system is that its application will have positive effects on organizational performance, and this has been tested in numerous ways. High performance work systems have been associated with financial performance (Guest *et al.*, 2003; Huselid, 1995; Patterson *et al.*, 2004; turnover (Arthur, 1994; Guthrie, 2001; Huselid, 1995), productivity (Huselid, 1995; Ichniowski *et al.*, 1997; Patterson *et al.*, 2004), staff flexibility (Hoque, 1999), absenteeism (Gardner *et al.*, 2000), workplace safety (Zacharatos *et al.*, 2005), and organizational citizenship behaviours (Tsui *et al.*, 1997), to name but a few of the possible outcomes. The critical question that remains to be answered, however, is how these effects occur.

Although a number of different linkages have been suggested in the literature, little research has addressed the psychosocial mechanisms that account for the relationship between human resource management practices and performance (Godard, 2001; Wright *et al.*, 2003). What little research exists, however, does support the idea of employee-level mediators. For example, Wright *et al.* (2003) found that employees' commitment to their organization mediated the relationship between HR practices (in the form of selection and staffing, training, contingent compensation, and participation) and organizational performance in a study of 50 business units. These results are echoed in the work of Guest *et al.*'s (2003) study using the Workplace Employee Relations Survey database which concluded that the application of key HR practices was linked with organizational commitment and performance.

Similarly, Gardner *et al.* (2000) studied 174 workgroups to find that high performance work practices were negatively related with employee turnover and absenteeism and that this relationship was mediated by job satisfaction and organizational commitment. Likewise, the research of Appelbaum *et al.* (2000) in the US manufacturing industry concluded that implementing high performance work systems was associated with greater employee commitment. Harter *et al.* (2002) found in a meta-analytic study of approximately 8,000 business units that employee satisfaction and employee engagement were associated with increased customer satisfaction, productivity, profitability, lower turnover, and fewer accidents. Last, Zacharatos *et al.* (2005) found that the relationship between high performance work practices and performance measured in terms of occupational safety performance was mediated by employee trust in management.

In an effort to continue research on mediating mechanisms, we used meta-analytic data to examine how high performance work systems might affect performance by way of employee-level mediators. More specifically, we hypothesized that the three factors comprising the current high performance work system model (work systems, HR policies, and leadership) each have positive associations with both person-focused and organization-focused employee-level factors. We conceptualized the person-focused mediator as comprising those factors that have the individual as the referent. These include job satisfaction, which has been shown to be strongly related to personal affect (Cropanzano *et al.*, 1993), co-worker social support, as well as individual health and levels of self-esteem. We conceptualized the organization-focused mediator as comprising those factors that have the organization as the referent and comprises organizational commitment and perceptions of organizational justice.

To complete the model, we proposed that both the person-focused and the organization-focused mediators will be positively related to positive outcomes for the organization. This follows from the previous research described above which found a positive relationship between the employee-level mediators such as commitment and job satisfaction, and organizational performance. Given earlier studies of high performance work systems that have conceptualized performance in a number of different ways extending beyond simple financial performance, we measured performance as a composite of factors such as turnover, withdrawal, employee effectiveness, and employee perceptions of their own performance levels. The proposed model is illustrated in Figure 1.

Study summary

To date, automotive industry management has tended to focus on the technical aspects of work organization, with work systems such as JIT and flexible manufacturing becoming widespread approaches. The purpose of the current study was to evaluate, within the automotive context, a high performance work systems orientation that has gained credibility in other contexts. Using meta-analytic data, we examined the relationship between high performance work practices, conceptualized as three factors (work systems, HR policies, and leadership) and performance in automobile manufacturing/assembly and supply plants. Furthermore, we tested the presence of both person-focused and organization-focused employee-level factors as mediators of this relationship. In conducting this study, we have also reviewed and integrated existing models of human resource management practices in the automotive manufacturing sector.

Methodology

Literature search

To conduct a meta-analysis of the relationships described above, an extensive literature search was conducted. First, comprehensive searches of the ABI/Inform, PAIS International, PsycINFO, EconLit, Humanities Index, Social Sciences Index and Dissertation Abstracts electronic databases were conducted. Approximately 60 keywords were used in the searches, covering all aspects of human resource management (e.g. human resource management, training, compensation, leadership, job satisfaction, labour relations). A complete list of these search terms can be found in the Appendix. Each of these keywords or key phrases was used as part of our widest set of search terms, which we generated as a research team and added to iteratively throughout the search process. Once we had generated a final set of terms, we ran an omnibus search. In the initial search stage, we did not evaluate whether the studies earmarked by these searches examined practices, outcomes, or were variously part of HRM typologies. In some cases (e.g. “Lean production”, “Work environment”), these search terms yielded the same type of construct measures (e.g. employee involvement); in other cases, no studies contained constructs measuring either practices or outcomes fitting these search terms. In all stages of the search, to limit results to those studies involving the automotive (or vehicle manufacturing) industry, each keyword or phrase

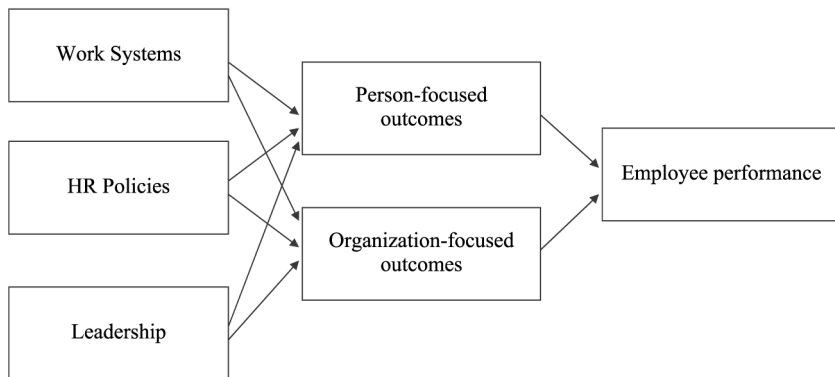


Figure 1.
Proposed relationships
between high performance
work system variables
and employee
performance

was paired with both automo* and vehic* search terms. Using the "*" wild card produces all search results with words beginning "automo" or "vehic" such as automotive, automobile, vehicle, and vehicular.

Second, conference proceedings posted on the Academy of Management, American Psychological Association, Canadian Industrial Relations Association (CIRA), and Industrial Relations Research Association (IRRA) websites were also searched for relevant studies. Third, web pages for government agencies, industry organizations, and research units concentrating on the automotive industry were also searched for research and article leads. In some cases, direct inquiries were made with these organizations. Fourth, requests for unpublished manuscripts examining human resource management in the automotive industry were made by way of electronic messages sent to Academy of Management, CIRA, and IRRA listservs. Last, a manual check of all article references was also conducted to identify any further articles for possible inclusion. The literature search isolated 537 documents in the form of articles, book chapters, dissertations, or unpublished manuscripts examining some aspect of human resource management in the automotive industry.

To be considered for inclusion in this meta-analysis, a study had to satisfy a number of criteria. First, the study had to be published or conducted after 1975. While a somewhat arbitrary cut-off, we found that anything published before this date was less likely to assess the relevant human resource management variables. Second, study samples had to comprise individuals working in the automotive supply or manufacturing industries. We uncovered studies of service garage employees (e.g. Emery and Fredendall, 2002; Fredendall and Emery, 2003) and automobile salespeople (e.g. Honeycutt *et al.*, 1995), for instance, that were not considered to be part of the relevant sample and were consequently excluded from the final analysis.

Third, only studies examining North American automobile employees were included in the final analysis. Including studies from diverse geographic regions would introduce additional variability into the analysis due to plausible cultural differences among samples. Last, studies had to report quantitative data for one or more relationships from the model to be tested at the individual level of analysis. More specifically, to be included in the current study the report had to provide a correlation or a statistic that could be transformed into a correlation (e.g. *t*-statistic, one-way ANOVA with only two levels). In cases where studies were missing such data but where all other inclusion criteria were met, authors were contacted via electronic mail with requests for further information. The vast majority of reports were excluded from the analysis for failing to meet the last criterion, the presence of quantitative data; most articles were thought pieces, reviews, or case studies on the subject.

To determine which of the articles should be included in the meta-analysis, two of the authors independently analyzed each of the articles collected and rated it as either codeable or non-codeable. The two authors generally agreed as to whether or not an article was codeable and therefore should be included in the analysis. Of the 537 documents, the authors' independent analyses coincided on all but one of the articles, for an inter-rater agreement of virtually 100 percent. This high inter-rater agreement was mostly due to the fact that the vast majority of articles were quickly eliminated due to a lack of quantitative data suitable for meta-analysis. In the case where

consensus was not initially met, the two authors came to a final decision by discussing the study in view of the inclusion criteria.

The final dataset comprised 13 articles (including one dissertation) describing 14 studies that were deemed to fit the criteria outlined above. At this stage, a final list of articles was sent via electronic mail to all authors of retrieved studies with a request for information regarding any other known studies that were overlooked. The few author responses received did not yield further articles for possible inclusion. The articles included in the final meta-analysis can be found in the reference section.

At the outset, we acknowledge the severe limitations presented by the size and nature of this dataset. First, the studies in this meta-analysis represent only three percent of the 537 studies found in the initial search. Second, the components making up the three clusters of practices used in this study are often correlated, suggesting that they may not represent three distinct constructs, but instead a more encompassing managerial orientation (e.g. Wood and de Menezes, 1998) to HRM and work systems. This small number of studies from such a large body of research combined with the high correlations between the cluster components suggests that the results should be interpreted with caution.

Meta-analytic methods

Our meta-analytic procedures followed those outlined by Hunter and Schmidt (1990). Given the paucity of data, the most appropriate analytical technique was a simple meta-analytic correlation analysis; more sophisticated analyses such as meta-analytic path analysis (Viswesvaran and Ones, 1995) would require a much larger sample. More generally, meta-analysis allows the aggregation of the results of individual studies after correcting for artifacts that can bias effect sizes. We followed Hunter and Schmidt's (1990) recommendation to correct for attenuation. This method results in larger confidence intervals as it increases the standard error; however, it is favored by many meta-analysts to be more reflective of the population correlation. Both corrected and uncorrected correlations are presented in the Results section. To correct for attenuation, we coded for the reliability of both the independent and the dependent construct in each study. When the reliability coefficient alpha was not provided, we computed a weighted average reliability from the other studies measuring the given construct (see Hunter and Schmidt, 1990). After correcting for attenuation, we weighted the corrected correlation by the population sample size (also corrected for reliability) to compute the weighted average effect size. Finally, we computed a confidence interval using the standard error of the corrected correlation.

To examine the robustness of the confidence interval and to determine whether any moderators were present in the results, we computed credibility intervals. The credibility interval uses the corrected standard error to create an interval around the corrected correlation (Whitener, 1990). If the interval includes zero, then a moderator is present. In the event of a moderator, we intended to examine the study characteristics to determine whether we could identify any moderating variables. To test for a moderator, however, it is necessary to partition the sample on the moderating characteristic. For example, if one expects the geographic location (say, North versus South) of a sample to moderate a relationship, the sample would be partitioned such that part of the sample was from the North; whereas, the other part of the sample is

from the South. The analyses would be then be conducted on these partitioned samples to determine whether the standard error of the new samples decreased from the standard error of the combined sample (indicating that geographic location moderates the relationship). Due to the small size of the current dataset, however, it was not possible to further partition the samples and, therefore, made it impossible to test for moderators.

Results

The relationships among the three factors hypothesized to comprise a high performance work system were first tested. As expected, the corrected correlations between the high performance work system factors (work systems, HR policies, and leadership) were highly correlated. The corrected correlation between leadership and HR policies was 0.62; the corrected correlation between leadership and work systems was 0.66; and the corrected correlation between work systems and HR policies was 0.43.

Several separate meta-analyses were conducted to test the model shown in Figure 1. For the purpose of clarity, we will present the results in three separate sections. First, the results for the relationships between the high performance work system factors (work systems, HR policies, and leadership) and the person-focused outcomes will be presented. Second, the results for the relationships between the high performance work system factors and the organization-focused outcomes will be discussed. Finally, the results between the both the person-focused and organization-focused mediating variables and employee productivity will be discussed.

Person-focused outcomes

Table I presents the results of the three high performance workplace system variables and the person-focused outcome. Results show moderate to strong corrected correlations of 0.44, 0.40, and 0.53 with work systems, HR policies, and leadership, respectively. Leadership shows the strongest relationship with the person-focused mediator variable, with a 95 percent confidence interval of 0.37 to 0.70. In addition, the credibility interval does not include zero, suggesting that no moderators are present in this relationship. The confidence interval for the relationship between work systems and the person-focused outcome is 0.25 to 0.63, and there are no moderators present in this relationship. Finally, the confidence interval between HR policies and the person-focused outcome is 0.32 to 0.49, again with no moderator present.

Organization-focused outcomes

Table II presents the results of the high performance work system variables and the organization-focused outcome. Unfortunately, there were not enough studies to test the

Variables	<i>k</i>	<i>n</i>	<i>r</i>	<i>r_c</i>	<i>CI rc</i>	<i>CredI r_c</i>
Work systems	5	1,119	0.34	0.44	0.25 to 0.63	0.06 to 0.81
HR policies	4	2,116	0.32	0.40	0.32 to 0.49	0.24 to 0.57
Leadership	3	614	0.42	0.53	0.37 to 0.70	0.21 to 0.86

Table I.
Correlations of high performing work system variables and person-focused outcomes

relationship between leadership and the organization-focused outcome. There were moderate relationships between work systems and HR policies and the organization-focused mediator variable, with corrected correlations of 0.37 and 0.30, respectively. The confidence interval for the relationship between work systems and the organization-focused outcome is 0.15 to 0.59, and the credibility interval had zero in the interval suggesting the presence of a moderator. However, in our examination of the study characteristics, we were unable to identify the moderator. The confidence interval for the relationship between HR policies and the organization-focused outcome is 0.25 to 0.34, with no moderator present.

Employee performance

Table III presents the results of the relationship between person- and organization-focused outcomes and employee performance. Results show moderate relationships with corrected correlations of 0.44 and 0.35, respectively. The confidence interval for the relationship between organization-focused outcomes and employee performance is 0.13 to 0.57. The credibility interval for this relationship includes zero, indicating that a moderator is present; however, after an examination of study characteristics, we were unable to identify this moderator. As noted in Table III, the 95 percent confidence interval between person-focused outcomes and employee performance included zero in the relationship, suggesting that this relationship does not differ significantly from zero.

Discussion

The current research had two aims. The first was to conduct a systematic review of the literature examining human resource management practices in the North American automotive industry. The second aim was to examine the relationship between high performance work practices and employee performance in this sector. We conceptualized high performance work practices in three clusters:

- (1) work systems; which include practices that directly pertain to the work design;
- (2) HR policies, which comprise organizational practices that support the work; and
- (3) leadership, which relates to the quality of supervisory practices.

Table II.
Correlations of high performance work systems variables and organization-focused outcomes

Variables	<i>k</i>	<i>n</i>	<i>r</i>	<i>r_c</i>	<i>CI rc</i>	<i>CredI r_c</i>
Work systems	3	740	0.33	0.37	0.15 to 0.59	-0.08 to 0.81
HR policies	2	1,797	0.23	0.30	0.25 to 0.34	0.21 to 0.39

Table III.
Correlations of person- and organization-focused outcomes and employee performance

Variables	<i>k</i>	<i>n</i>	<i>r</i>	<i>r_c</i>	<i>CI rc</i>	<i>CredI r_c</i>
Person-focused outcomes	3	597	0.33	0.44	-0.01 to 0.90	-0.46 to 1.35
Organization-focused outcomes	2	444	0.26	0.35	0.13 to 0.57	-0.10 to 0.79

In developing our model, we had two hypotheses.

First, we hypothesized that the three clusters of organizational practices would be intercorrelated. Second, we predicted that the relationship between these clusters of organizational practices and employee performance would be linked by two clusters of employee-level psychosocial variables: person-focused and organization-focused outcomes.

In general, the results from this study support our hypotheses. As predicted, the three clusters of high performing practices were found to be moderately correlated, indicative of the co-occurrence of these practices in high performing work systems. These factors were also found to be positively related with both person-focused (job satisfaction, health, self-esteem and social support) and organization-focused outcomes (organizational commitment and perceptions of organization justice). The work systems cluster, which included practices that directly affect the nature of the work itself such as job quality, training, and teamwork, was found to be moderately correlated with both person- and organization-focused outcomes. Similarly, HR policies – organizational practices that support work such as the provision of job security and compensation systems – predicted both person- and organization-focused outcomes. The leadership cluster proved to be the strongest predictor of the person-focused outcome cluster, which consisted of job satisfaction, health, self-esteem, and social support. Unfortunately, the relationship between the leadership cluster and the organization-focused cluster of psychosocial outcomes could not be tested as part of this meta-analysis as only a single study testing this relationship was found.

With respect to employee performance (as measured by effectiveness ratings, self-reported performance, turnover, and absenteeism), it was associated with the organization-focused outcome cluster consisting of organizational commitment and perceptions of organizational justice. This was consistent with our predictions. Contrary to our predictions, person-focused outcomes (job satisfaction, health, self-esteem and social support) were not associated with employee performance.

The current results are consistent with earlier work in the area of high performance work systems. To date, numerous studies have supported high performance frameworks and this meta-analytic study contributes further to the growing set of studies in support of a commitment-oriented approach to human resource management. Often debated in the literature is the issue of bundling or the synergy of the practices that comprise a human resource management system. The results of the current meta-analysis support the idea that the practices are highly interrelated, although the present findings do not lend insight into whether the practices applied together rather than in isolation produce optimal effects. The results from this study also provide additional support for the role of employee-level psychosocial outcomes as mechanisms between organizational practices and employee performance, supporting an idea that is often discussed but with only few exceptions tested empirically (see Gardner *et al.*, 2000; Wright *et al.*, 2003; Zacharatos *et al.*, 2005).

Our findings diverge from predictions in one case. We were surprised by the lack of relationship found between person-focused psychosocial outcomes (job satisfaction, health, self-esteem and social support) and employee performance. Perhaps this finding is not altogether surprising given the evidence in the literature for a weak relationship

between job satisfaction (one aspect of this cluster) and employee performance (Iaffaldano and Muchinsky, 1985; Judge *et al.*, 2001).

In conducting this meta-analytic study, we found that while there exists myriad literature focused on the automotive industry, very little focuses on managing workers in a way that emphasizes the human and organizational factors at play. Our results support the argument that managing with a high performance work system orientation is associated with positive consequences for individuals and organizations within the automotive industry. This is particularly relevant in light of findings which suggest that work systems such as lean production, JIT, and TQM can have negative consequences for employees (Parker, 2003; Rinehart *et al.*, 1997), and as a result may not be providing employees and their organizations with maximum well-being and effectiveness. We are not espousing the view that technologically-based systems are of little value in manufacturing industries, but rather that taking a more humanistic approach to how they are applied may benefit all parties involved. Considering some aspects of high performance work systems, such as training or teamworking, are also integral parts of lean production or TQM, it is not farfetched to assume that implementing a high performance work system model in an integrated manufacturing context may provide complementarities or positive synergies among key practices.

Applying a high performance work system approach may also have the added benefit of increasing an organization's ability to compete in the marketplace. While technologically-based systems such as lean production, TQM, and JIT are readily adopted by many organizations, following the resource-based theory of the firm (Guthrie, 2001), high performance work systems are less easily imitated by competitors, and therein lies potential competitive advantage.

Several shortcomings of the current study are worth noting. First, Wood and Wall (2002) point out the limitation of conducting research on high performance work systems with ever differing models. We based our analysis on a model adapted from MacDuffie (1995) in the automotive sector; however this model varies from those examined by other prominent researchers in the area such as Arthur (1994), Huselid (1995), and Ichniowski *et al.* (1997). The limitation inherent in the constant development of new models is that it becomes increasingly difficult to draw comparisons between different research studies.

Second, various researchers (e.g. Delery, 1998; Ichniowski *et al.*, 1996) argue that the practice of grouping high performance management practices into subsets assumes that practices within a factor are positive substitutes for one for the other, while it is certainly possible and extant evidence suggests that the horizontal "fit" of practices can complement or even injure one another. While we decided to investigate the high performance practice in terms of three clusters, the disadvantage of doing so is that we might have overlooked the effects of complementarities between practices that we have assigned to different factors. More broadly, we also acknowledge the possibility of covariance between the higher-order clusters (i.e. work systems, HR policies, and leadership, as well as covariance between the person- and organization-focused clusters). For example, the findings that all three of the clusters are related to person-focused outcomes may merely reflect the high correlation between the three components, or a more general high performance managerial orientation.

With respect to the data analysis, other limitations apply. First, the meta-analysis was based on a relatively small number of studies, thereby limiting the strength of the analyses. In two cases, relationships were tested based on a set of two studies. We chose to test relationships for which we had only two data points as this was the only way to reflect the extant body of empirical research conducted in the automotive industry. Ironically, choosing not to use the relatively small number of studies on high performance work systems and leadership in the automobile industry could have the paradoxical effect of stifling new research questions and practical approaches, thereby reinforcing the status quo focus of research in this context on technology.

Second, due to the limited data available, a number of variables we would have liked to have investigated, such as labour relations, motivation, and trust in management had to be excluded from the analyses. Third, the data included in this meta-analysis were cross-sectional in nature thereby limiting our ability to draw conclusions regarding causation. Fourth, despite our best attempts, we did not uncover any unpublished studies fitting the necessary criteria for inclusion. Consequently, the results of this study may overestimate the strength of the effect given the inherent bias with published research toward significant results.

Fifth, meta-analysis gives priority to quantitative papers, to the exclusion of a large body of qualitative research. Comprehensive qualitative reviews have been conducted on evidence for high performance work systems (e.g. Godard and Delaney, 2000; Wall and Wood, 2005). The current meta-analytic review is intended to contribute to these existing conversations in the field, and to suggest avenues for future research. In doing so, our intention is not to privilege quantitative research over qualitative reviews, which are not constrained by statistical requirements and can provide a much more nuanced discussion of issues in this area of research.

Notwithstanding these limitations, the current study has a number of strengths. First, many studies of high performance work systems (e.g. Zacharatos *et al.*, 2005) combine data from different industries. The current study, however, only considered data from the automotive industry thereby removing from the analysis any variation due to between-industry differences. In a similar vein, our focus was directed at research from within the North American environment, thereby reducing any variability due to potential cultural and regulatory differences. Second, the majority of literature we accumulated on the topic of human resource management in the automotive industry was in the form of reviews, thought pieces, and case studies. While these formats are all valuable, they do not readily lend themselves to systematic comparative research. The strength of the meta-analytic method we used here is that it allows us to take stock of and summarize research in this context, and to draw quantifiable conclusions based on a number of different studies.

A number of avenues for future research arise from this study. In terms of high performance work systems, further research is required to understand how human resource management practices co-exist to produce their effects. It remains to be seen whether some practices have a greater impact than do others or whether certain practices should be grouped together to maximize their benefits. Furthermore, more extensive research needs to focus on the mechanisms that might account for indirect relationships between high performance work systems and employee performance.

This aspect of high performance work systems more generally remains little understood.

Within the automotive industry context, numerous interesting research questions can be identified. We were surprised to discover that despite the importance of the industry to the North American economy, so few empirical articles examined aspects of the model we proposed. This suggests strongly that research lending further understanding to the effect of applying these practices on employee attitudes and behaviors, as well as corporate outcomes, is important. Furthermore, studies directly comparing the effects of high performance work systems with those of more technologically-focused systems such as lean production, JIT, and TQM on employee-level variables and employee performance would be valuable.

To conclude, we review a number of reasons for the importance of research on human resource management in the automotive industry. First, the automotive industry plays a critical role in worldwide economies. Second, it is one of the most highly unionized industries in the world. Third, and finally, automotive assembly plants are “tough, demanding places to work under almost any circumstances” (Shaiken *et al.*, 1997, p. 37). In light of these characteristics, any progress we can make toward understanding how high performance work systems can benefit the automotive industry and its workforce is invaluable. A systematic examination of alternative ways of managing human resources, as this study provides, is central to developing our understanding of work organization issues and provides impetus for future research in this area.

References

- Appelbaum, E., Bailey, T., Berg, P. and Kalleberg, A. (2000), *Manufacturing Advantage: Why High-Performance Work Systems Pay Off*, Cornell University Press, Ithaca, NY.
- Arthur, J.B. (1994), “Effects of human resource systems on manufacturing performance and turnover”, *Academy of Management Journal*, Vol. 37, pp. 670-87.
- Avolio, B.J. (1999), *Full Leadership Development: Building the Vital Forces in Organizations*, Sage, Thousand Oaks, CA.
- Babson, S. (1993), “Lean or mean: the MIT model and lean production at Mazda”, *Labour Studies Journal*, Vol. 18, pp. 3-24.
- Bailey, T. (1993), “Organizational innovation in the apparel industry”, *Industrial Relations*, Vol. 32, pp. 30-48.
- Bandyopadhyay, J.K. and Sprague, D.A. (2003), “Total quality management in an automotive supply chain in the United States”, *International Journal of Management*, Vol. 20, pp. 17-22.
- Barker, J.R. (1993), “Tightening the iron cage: concertive control in self-managing teams”, *Administrative Science Quarterly*, Vol. 38, pp. 408-37.
- Barling, J. and Hutchinson, I. (2000), “Commitment vs. control-oriented safety practices, safety reputation and perceived safety climate”, *Canadian Journal of Administrative Science*, Vol. 17, pp. 76-84.
- Bass, B.M. (1998), *Transformational Leadership: Industry, Military and Educational Impact*, Erlbaum, Mahwah, NJ.
- Bass, B.M. (1990), “From transactional to transformational leadership: learning to share the vision”, *Organizational Dynamics*, Vol. 18, pp. 19-31.

- Becker, B. and Gerhart, B. (1996), "The impact of human resource management on organizational performance: progress and prospects", *Academy of Management Journal*, Vol. 39, pp. 779-801.
- Becker, B.E. and Huselid, M.A. (1998), "High performance work systems and firm performance: a synthesis of research and managerial implications", *Research in Personnel and Human Resource Management*, Vol. 16, pp. 53-101.
- Boxall, P. and Purcell, J. (2003), *Strategy and Human Resource Management*, Palgrave Macmillan, New York, NY.
- Campbell, J.P., McCloy, R.A., Oppler, S.H. and Sager, C.E. (1993), "A theory of performance", in Schmitt, N. and Borman, W.C. (Eds), *Personnel Selection in Organizations*, Jossey-Bass, San Francisco, CA.
- Cropanzano, R., James, K. and Konovsky, M.A. (1993), "Dispositional affectivity as a predictor of work attitudes and job performance", *Journal of Organizational Behavior*, Vol. 14, pp. 595-606.
- Delbridge, R. (1995), "Surviving JIT: control and resistance in a Japanese transplant", *Journal of Management Studies*, Vol. 32, pp. 803-17.
- Delbridge, R., Lowe, J. and Oliver, N. (2000), "Shopfloor responsibilities under lean teamworking", *Human Relations*, Vol. 53, pp. 1459-79.
- Delery, J.E. (1998), "Issues of fit in strategic human resource management: implications for research", *Human Resource Management Review*, Vol. 8, pp. 289-309.
- Dohse, K., Jürgens, U. and Malsch, T. (1985), "From "Fordism" to "Toyotism"? The social organization of the labor process in the Japanese automobile industry", *Politics and Society*, Vol. 14, pp. 115-46.
- Emery, C.R. and Fredendall, L.D. (2002), "The effect of teams on firm profitability and customer satisfaction", *Journal of Service Research*, Vol. 4, pp. 217-9.
- Fredendall, L.D. and Emery, C.R. (2003), "Productivity increases due to the use of teams in service garages", *Journal of Managerial Issues*, Vol. 15, pp. 221-42.
- Gardner, T.M., Moynihan, L.M., Park, H.J. and Wright, P.M. (2000), "Unlocking the Black Box: examining the processes through which human resource practices impact business performance", paper presented at the Academy of Management Annual Meeting, Toronto, August.
- Garrahan, P. and Stewart, P. (1992), "Work organisations in transition: the human resource management implications of the 'Nissan way'", *Human Resource Management Journal*, Vol. 2, pp. 46-62.
- Godard, J. (2001), "High performance and the transformation of work? The implications of alternative work practices for the experience and outcomes of work", *Industrial and Labor Relations Review*, Vol. 54, pp. 776-805.
- Godard, J. and Delaney, J.T. (2000), "Reflections on the 'high performance' paradigms implications for industrial relations as a field", *Industrial and Labour Relations Review*, Vol. 53, pp. 482-503.
- Granath, J.A. (1998), "Torslanda to Uddevalla via Kalmar" ("A journey in production practice in Volvo"), paper presented at the Seminário Internacional Reestruturação Productiva, Rio de Janeiro, August.
- Guest, D.E., Michie, J., Conway, N. and Sheehan, M. (2003), "Human resource management and corporate performance in the UK", *British Journal of Industrial Relations*, Vol. 41, pp. 291-314.

- Guthrie, J.P. (2001), "High involvement work practices, turnover and productivity: evidence from New Zealand", *Academy of Management Journal*, Vol. 44, pp. 180-90.
- Harter, J.K., Schmidt, F.L. and Hayes, T.L. (2002), "Business-unit-level relationship between employee satisfaction, employee engagement and business outcomes: a meta-analysis", *Journal of Applied Psychology*, Vol. 87, pp. 268-79.
- Honeycutt, E.D., Sigauw, J.A. and Hunt, T.G. (1995), "Business ethics and job-related constructs: a cross cultural comparison of automotive salespeople", *Journal of Business Ethics*, Vol. 14, pp. 235-48.
- Hoque, K. (1999), "Human resource management and performance in the UK hotel industry", *British Journal of Industrial Relations*, Vol. 37, pp. 419-43.
- Howell, J.M. and Avolio, B.J. (1993), "Transformational leadership, transactional leadership, locus of control, and support for innovation: key predictors of consolidated-business-unit performance", *Journal of Applied Psychology*, Vol. 78, pp. 891-902.
- Hunter, J.E. and Schmidt, F.L. (1990), *Methods of Meta-Analysis*, Sage, Newbury Park, CA.
- Huselid, M.A. (1995), "The impact of human resource practices on turnover, productivity, and corporate financial performance", *Academy of Management Journal*, Vol. 38, pp. 645-72.
- Iaffaldano, M.T. and Muchinsky, P.M. (1985), "Job satisfaction and job performance: a meta-analysis", *Psychological Bulletin*, Vol. 97, pp. 251-73.
- Ichniowski, C. (2003), *Cars on the Brain*, Catalogue No. IU4-56/2003E, Government of Canada, Ottawa.
- Ichniowski, C., Kochan, T.A., Levine, D., Olson, C. and Strauss, G. (1996), "What works at work: overview and assessment", *Industrial Relations*, Vol. 35, pp. 299-333.
- Ichniowski, C., Shaw, K. and Prennushi, G. (1997), "The effects of human resource management practices on productivity: a study of steel finishing lines", *American Economic Review*, Vol. 87, pp. 291-313.
- Judge, T.A., Thoresen, C.J., Bono, J.E. and Patton, G.K. (2001), "The job satisfaction – job performance relationship: a qualitative and quantitative review", *Psychological Bulletin*, Vol. 127, pp. 376-407.
- Klein, J.A. (1991), "A reexamination of autonomy in light of new manufacturing practices", *Human Relations*, Vol. 44, pp. 21-38.
- Kochan, T.A. and Lansbury, R.D. (1997), "Lean production and changing employment relations in the international auto industry", *Economic and Industrial Democracy*, Vol. 18, pp. 597-620.
- Koene, B.A.S., Vogelaar, A.L.W. and Soeters, J.L. (2002), "Leadership effects on organizational climate and financial performance: local leadership effect in chain organizations", *Leadership Quarterly*, Vol. 13, pp. 193-215.
- Legge, K. (1995), *Human Resource Management: Rhetoric and Realities*, Macmillan, New York, NY.
- Lewchuk, W. and Robertson, D. (1997), "Production without empowerment: work reorganization from the perspective of motor vehicle workers", *Capital and Class*, Vol. 63, pp. 37-64.
- Lowe, J. (1993), "Manufacturing reform and the changing role of the production supervisor: the case of the automobile industry", *Journal of Management Studies*, Vol. 30, pp. 739-58.
- Lowe, K.B., Kroeck, K.G. and Sivasubramanian, N. (1996), "Effectiveness correlates of transformational leadership: a meta-analytic review of the MLQ literature", *Leadership Quarterly*, Vol. 7, pp. 385-425.

- MacDuffie, J.P. (1995), "Human resource bundles and manufacturing performance: organizational logic and flexible production systems in the world automotive industry", *Industrial and Labour Relations Review*, Vol. 48, pp. 197-221.
- Oliver, N., Delbridge, R. and Lowe, J. (1996), "Lean production practices: international comparisons in the auto components industry", *British Journal of Management*, Vol. 7, pp. 29-44.
- Parker, S. and Wall, T. (1998), *Job and Work Design: Organizing Work to Promote Well-Being and Effectiveness*, Sage, Thousand Oaks, CA.
- Parker, S.K. (2003), "Longitudinal effects of lean production on employee outcomes and the mediating role of work characteristics", *Journal of Applied Psychology*, Vol. 88, pp. 620-34.
- Parker, S.K., Wall, T.D. and Jackson, P.R. (1997), "'That's not my job': developing flexible employee work orientations", *Academy of Management Journal*, Vol. 40, pp. 899-929.
- Patterson, M.G., West, M.A. and Wall, T.D. (2004), "Integrated manufacturing, empowerment and company performance", *Journal of Organizational Behavior*, Vol. 25, pp. 641-65.
- Pfeffer, J. (1998), "Seven practices of successful organizations", *California Management Review*, Vol. 40, pp. 96-124.
- Prujit, H. (2003), "Teams between Neo-Taylorism and Anti-Taylorism", *Economic and Industrial Democracy*, Vol. 24, pp. 77-101.
- Ramsey, H., Scholarios, D. and Harley, B. (2000), "Employees and high-performance work systems: testing inside the Black Box", *British Journal of Industrial Relations*, Vol. 38 No. 4, pp. 501-31.
- Rehder, R.R. (1992), "Building cars as if people mattered: the Japanese lean system vs. Volvos Uddevalla system", *Columbia Journal of World Business*, Vol. 27 No. 2, pp. 56-70.
- Rinehart, J., Huxley, C. and Robertson, D. (1997), *Just Another Car Factory? Lean Production and Its Discontents*, Cornell University Press, Ithaca, NY.
- Robertson, D., Rinehart, J., Huxley, C., Wareham, J., Rosenfeld, H., McGough, A. and Benedict, S. (1993), *The CAMI Report: Lean Production in a Unionized Auto Plant*, Canadian Autoworkers (CAW), Willowdale, ON.
- Shaiken, H., Lopez, S. and Mankita, I. (1997), "Two routes to team production: Saturn and Chrysler compared", *Industrial Relations*, Vol. 36, pp. 17-45.
- Tsui, A.S., Pearce, J.L., Porter, L.W. and Tripoli, A.M. (1997), "Alternative approaches to the employee-organization relationship: does investment in employees pay off?", *Academy of Management Journal*, Vol. 40, pp. 1089-121.
- Turner, N., Barling, J. and Zacharatos, A. (2002), "Positive psychology at work", in Snyder, C.R. and Lopez, S.J. (Eds), *Handbook of Positive Psychology*, Oxford University Press, New York, NY, pp. 715-28.
- US International Trade Commission (2002), *Industry and Trade Summary: Motor Vehicles USITC Publication No. 3545*, Author, Washington, DC.
- Viswesvaran, C. and Ones, D.S. (1995), "Theory testing: combining psychometric meta-analysis and structural equations modeling", *Personnel Psychology*, Vol. 48, pp. 865-85.
- Walton, R.E. (1985), "From control to commitment in the work place", *Harvard Business Review*, March-April, pp. 77-84.
- Whitener, E.M. (1990), "Confusion of confidence intervals and credibility intervals in meta-analysis", *Journal of Applied Psychology*, Vol. 75, pp. 315-21.
- Wall, T.D. and Wood, S.J. (2005), "The romance of human resource management and business performance, and the case for big science", *Human Relations*, Vol. 58, pp. 429-62.

-
- Wood, S. (1999), "Human resource management and performance", *International Journal of Management Reviews*, Vol. 1, pp. 367-413.
- Wood, S. and Albanese, M.T. (1995), "Can we speak of a high commitment management on the shop floor", *Journal of Management Studies*, Vol. 32, pp. 215-47.
- Wood, S. and de Menezes, L. (1998), "High commitment management in the UK: evidence from the workplace industrial relations survey, and employers manpower and skills practices survey", *Human Relations*, Vol. 51, pp. 485-515.
- Wood, S. and Wall, T. (2002), "Human resource management and business performance", in Warr, P. (Ed.), *Psychology at Work*, Penguin, London, pp. 351-74.
- Wright, P.M., Gardner, T.M. and Moynihan, L.M. (2003), "The impact of HR practices on the performance of business units", *Human Resource Management Journal*, Vol. 13, pp. 21-36.
- Yates, C., Lewchuk, W. and Stewart, P. (2001), "Empowerment as a Trojan horse: new systems of work organization in the North American automobile industry", *Economic and Industrial Democracy*, Vol. 22, pp. 517-41.
- Zacharatos, A., Barling, J. and Iverson, R. (2005), "High-performance work systems and occupational safety", *Journal of Applied Psychology*, Vol. 90, pp. 77-93.

Further reading

- Chao, G.T. and Kozlowski, S.W.J. (1986), "Employee perceptions on the implementation of robotic manufacturing technology", *Journal of Applied Psychology*, Vol. 71, pp. 70-6.
- Colquitt, J.A. (2001), "On the dimensionality of organizational justice: a construct validation of a measure", *Journal of Applied Psychology*, Vol. 86, pp. 386-400.
- Evans, M.G., Kiggundu, M.N. and House, R.J. (1979), "A partial test and extension of the job characteristics model of motivation", *Organizational Behavior and Human Performance*, Vol. 24, pp. 354-81.
- Fried, Y. and Tieggs, R.B. (1993), "The main effect model versus buffering model of shop steward social support: a study of rank-and-file auto workers in the USA", *Journal of Organizational Behavior*, Vol. 14, pp. 481-93.
- Heaney, C.A., Israel, B.A. and House, J.S. (1994), "Chronic job insecurity among automobile workers: effects on job satisfaction and health", *Social Science and Medicine*, Vol. 28, pp. 1431-7.
- Heaney, C.A., House, J.S., Israel, B.A. and Mero, P. (1995), "The relationship of organizational and social coping resources to employee coping behaviour: a longitudinal analysis", *Work and Stress*, Vol. 9, pp. 416-31.
- Helper, S., Levine, D.I. and Bendoly, E. (2002), "Employee involvement and pay at US and Canadian auto suppliers", *Journal of Economics and Management Strategy*, Vol. 11, pp. 329-77.
- Herold, D.M., Farmer, S.M. and Mobley, M.I. (1995), "Pre-implementation attitudes toward the introduction of robots in a unionized environment", *Journal of Engineering Management*, Vol. 12, pp. 155-73.
- Liverpool, P.A., Gupta, Y.P. and Smith, A.W. (1989), "Analysis of perceptual differences of factors related to participation in decision making: a quality circles based study", *Engineering Management International*, Vol. 5, pp. 151-66.
- MacNeil, M. (1994), "Reactions to job insecurity in a declining organization: a longitudinal study", *Dissertation Abstracts International*, Vol. 55 Nos 3-B, p. 1215.

- Ofori-Dankwa, J., Kanthi, M.S. and Arora, S. (1999), "A comparison of work attitudes of American R and D automotive engineers employed in a US corporation and a Japanese subsidiary", *Multinational Business Review*, Vol. 7, pp. 20-6.
- Spreitzer, G.M. and Quinn, R.E. (1996), "Empowering middle managers to be transformational leaders", *Journal of Applied Behavioral Sciences*, Vol. 32, pp. 237-61.
- Spreitzer, G.M., Gerhart, I. and Scott, K.S. (2003), "Are the 100 best better? An empirical investigation of the relationship between being a 'great place to work' and firm performance", *Personnel Psychology*, Vol. 56, pp. 965-93.
- Tang, L.T., Kim, J.K. and O'Donald, D.A. (2000), "Perceptions of Japanese organizational culture: employees in a non-unionized Japanese-owned and unionized US-owned automobile plants", *Journal of Managerial Psychology*, Vol. 15, pp. 535-59.

Appendix. Keywords used in electronic database search

- Absenteeism
- Accident *
- Attitud *
- Autonomy
- Career development
- Collective bargaining
- Commitment
- Communication
- Compensation
- Contingent reward
- Culture
- Employee development
- Employee involvement
- Employee relations
- Employment practices
- Empower *
- Family *
- Flexib *
- Groupwork
- High performance
- Hiring
- Human resource *
- Human resource * management
- HRM
- Incentive
- Information sharing
- Injur *
- Job enrichment
- Job quality

PR
36,2

254

- Job satisfaction
- Knowledge management
- Labor relations
- Leadership
- Lean production
- Loyalty
- Morale
- Motivation Organizational behavior
- Participative management
- Pay
- Performance management
- Personnel
- Personnel management
- Personnel selection
- Quality of work
- Recruitment
- Reward
- Safety
- Salary
- Selection
- Screening
- Skills
- Team
- Training
- Turnover Union
- Wage
- Work environment
- Workforce planning
- Work conditions
- Work teams

Corresponding author

Julian Barling can be contacted at: jbarling@business.queensu.ca

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints