TEAM, HRM AND INNOVATION: AN ORGANISATION-LEVEL ANALYSIS

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ABSTRACT

For organizations to survive and prosper they have to develop new and improved products, services and ways of working. Innovation is vital for organizational survival. Much research and managerial attention is therefore devoted to understanding the factors that predict innovation in organizations. This paper describes a research study of product innovation in manufacturing organizations and explores the extent to which team based working and team working effectiveness in these organizations predict product innovation. It also considers whether combinations of good HRM systems and practices, extensive team based working and effective team working are associated with product innovation.

INTRODUCTION

Various commentators have noted a significant increase in team working in organizations over the last twenty years (Cohen & Bailey, 1997; Kozlowski & Bell, 2001; West, Tjosvold, & Smith, 2003). Interest is triggered by new demands that make co-operative work more vital and more challenging. To meet the pressures of the global marketplace, organizations are moving away from rigid, hierarchical structures to more organic, flexible forms. Indeed, one of the most striking developments of recent years has been the shift from work organized around individual jobs to team-based work structures. Groups are developing and marketing products, solving production problems, and creating corporate strategy. The team rather than the individual is increasingly considered the basic building block of organizations.

At the same time, there has been a real concern to find ways of encouraging and enabling innovation in organizations (Paton & McCalman, 2000); indeed, it is

often claimed that innovation is one of the main factors underlying a country's economic growth and competitive performance. Researchers have focused efforts on trying to understand the factors that promote innovation in organizations (Mohrman, Cohen & Mohrman, 1995). One factor that has received attention is team working because theoretically, bringing people together to work on shared objectives can be argued to produce divergence of orientation, experiences and knowledge that will promote more comprehensive processing of decisions and a search for a wider variety of options during the decision making process (De Dreu & West, 2001; Jackson, 1996; Guzzo, 1996; Milliken & Martins, 1996; Paulus, 2000). Research in industrial and organizational psychology suggests that the tasks, composition, leadership and team processes of work teams predict levels of team innovation and that teams are more likely to develop innovative solutions than are individuals working alone (Paulus and Nijstad, 2003).

Most of the research on teams and team innovation has taken the team as the level of analysis but much of the rhetoric of team work argues that the greater the extent of team working the higher the level of innovation in organizations (see for example Mohrman, Cohen & Mohrman (1995) ; Mathieu, Marks, & Zaccaro (2001); West & Markiewicz (2004). In this paper we address the untested assumptions that team effectiveness and the extent of team working across organizations predict levels of organizational innovation. Next we define team working effectiveness and team based working and consider how they may be associated with organizational innovation. Finally, we consider the theoretical case for the relationship between effective HRM and innovation, and consider how HRM may enhance team innovative performance.

Team effectiveness

For team working to influence organizational innovation we suggest that team working must be effective. Organizations often report that they incorporate team working but a closer examination reveals that some of the basic elements of team working are not present. For example, the Workplace Employee Relations Survey (Cully, Woodland, O' Reilly & Dix, 1998) reveal that only around 35% of all workplaces which use teams adopt a model enabling teams to be semi-autonomous- for example, having responsibility for a specific product or service and jointly deciding how work is to be done. We draw upon Mohrman, Cohen and Mohrman's (1995) depiction of team work as:-

"*a group of individuals who work together to produce products or deliver services for which they are mutually accountable. Team members share goals and are mutually held accountable for meeting them, they are interdependent in their accomplishment, and they affect the results through their interactions with one another. Because the team is held collectively accountable, the work of integrating with one another is included among the responsibilities of each member*"

This definition emphasises the importance of interdependence in team functioning and also the ability of team members to work effectively in teams. At the organizational level, we propose that the hallmarks of effective team working will be training for employees to work in teams and the extent of reflection on team functioning.

For teams to function effectively and innovate, team members must have the knowledge, skills and attitudes that are necessary for working in a team. Campion, Papper, & Medsker (1996) and Stevens and Campion (1994) have proposed that these

'teamwork KSAs' will predict the potential effectiveness of teams. We therefore argue that one key component of team working potential effectiveness in organizations will be the extent to which employees are given training in how to work in a team. Where team members are skilled at team working they are likely to be able to integrate their diverse perspectives and knowledge to generate creative solutions and directions in their work – to innovate. Teams are also only likely to be effective if they review what it is they are trying to achieve and how they are working as a team because team working is inherently more complex and demanding than working alone (we have to communicate, interact, negotiate decisions, agree goals and sub goals, for example). West (2000) has argued that teams will be more innovative and effective to the extent that they reflect on their objectives, strategies and processes, plan for and initiate changes accordingly. A number of studies support these propositions. For example Schippers, Hartog, Koopman, & Wienk, 2003; Carter and West, 1998; Borrill, West, Shapiro, & Rees, 2000). When teams review their objectives and strategies they are likely to discover discrepancies between the ideal and the current situation and to innovate in order to close this gap (Gollwitzer, 1996). When team processes are aggregated across organizations they are likely to influence the level of organizational innovation. To the extent that teams within and organization take time out to review their objectives and functioning, plan and make changes accordingly therefore we propose that levels of organizational innovation will be high. Putting these arguments together, we propose:

Hypothesis 1: Training for team working and team reflexivity will together predict levels of organizational innovation

The extent of team working

If, as is argued by many theorists, teams generate innovation to an extent that individuals working alone do not, then the ratio of those working in teams should be related to the level of innovation in an organization. All other things being equal, the extent of team membership should predict organizational innovation. This is a widely held assumption that has not, as far as we can discover, been tested. We therefore propose:

Hypothesis 2: The extent of team based working will predict organizational innovation

HRM as a moderator of the team work/ innovation relationship

Since 1990 and the publication of Hackman's *Groups that work and those that don't,* a number of reviews have argued that the organizational context within which teams operate will influence their performance. Guzzo and Shea (1992) and Guzzo (1996) argued that organizational context was neglected and important. Hackman (1987, 1990) proposed a theoretical model of team performance in which organizational reward systems, information flows, training and HRM systems were incorporated. Similarly, Sundstrom, De Meuse, & Futrell (1990) proposed that organizational context was a key influence on work group effectiveness. This has led to the development of a focus on team based working and how organizational systems influence team-based working (West & Markiewicz, 2004).

All of these reviews have emphasised the importance of Human Resource Management systems and mention reward, communication, training, appraisal, induction, selection and recruitment systems as likely to influence the effectiveness of team working. There are also fairly straightforward arguments (although little empirical evidence) to suggest that HRM practices will directly impact upon organizational innovation. We suggest, for example, that recruitment and selection

practices determine whether or not people are employed with the necessary attributes to make a contribution to innovation. Induction and training activities shape the psychological contract (Herriot & Pemberton, 1995), potentially enhancing motivation and developing required questioning, sharing and challenging behaviours. Appraisal and remuneration clarify expectations and reward effective performance, defined in terms of a willingness to learn, to take risks and to communicate well. In addition, HR can play a role in generating the 'internal variety' which researchers argue is critical in shaping the process of organizational knowledge creation (Pedler, Burgoyne & Boydell, 1996, Beer, Eisenstat & Biggadike, 1996, McGrath, 2001, Cohen & Levinthall, 1990). By being exposed to different experiences and points of view, individuals become more willing to examine their own mental models and to make any necessary adjustments. Presenting people with the opportunity to visit customers or suppliers, regardless of their job role, is potentially a valuable exercise. Similarly, developmental opportunities which require people to work in other parts of the company for a period of time, to carry out training not related to their immediate jobs, to interact with others through coaching, mentoring or career development discussions have to potential to enhance both internal variety and the process of knowledge transfer.

The limited research that has been carried out addressing these points shows that it is the synergistic application of HR practices that impacts upon organizational innovation, rather than their piecemeal implementation (cf Laursen & Foss, 2003; Shipton, West, Dawson, Birdi & Patterson, 2003). For example, subscribing to new HRM practices requires extra effort, for which employees may reasonably expect to be compensated. This has implications for the management of remuneration and presents a rationale for the use of performance-based pay. Furthermore, HRM

practices (for example, training) frequently raise skills, and employees with high skills are likely to anticipate that they will be offered some degree of control over work so that they can apply what they have learnt. Thus, HRM practices designed to promote participation may be required. Overall, HRM, where effectively applied, offers opportunities for individuals to participate in organizational decision-making and to experience variety at work. It may also present individuals and teams with the cues necessary to communicate what behaviours are deemed desirable- for example, appraisal schemes may emphasize the importance of development and of sharing knowledge with others.

Where there is simultaneously a commitment to operating in teams, such outcomes may be further augmented. Consistency between team based working and HRM systems is important for team effectiveness – where team based working is supported by good HRM systems, teams will function more effectively and therefore have higher levels of innovation. However, there have been very few tests of these predictions (though Campion, Medsker, & Higgs 1993 showed that managerial support, reflecting organizational systems, was related to group performance). Two themes emerge in these theoretical orientations: the overall sophistication and effectiveness of HRM systems and their orientation towards team work (for example, team based rewards and team based appraisal). In fact, few organizations have well-developed team based HRM systems (Patterson et al, 1997; Cully et.al., 1998) but variation in the overall effectiveness of HRM systems is typical. We therefore propose:

H3: the sophistication and extensiveness of HRM will moderate the relationship between the extent of team working and organizational innovation

H4: the sophistication and extensiveness of HRM will moderate the relationship between the effectiveness of team working and organizational innovation

METHOD

This study draws substantially from a rich and varied data base established as part of a joint undertaking between the Centre for Economic Performance, London School of Economics, and the Work and Organizational Psychology Group based at Aston Business School. This ten-year study (described as the CEP programme) was conducted between 1990- 2000, and involved over 200 manufacturing organizations. The programme was intended to enable researchers to identify the determinants of manufacturing company effectiveness. Data are longitudinal, thus making it possible to account for the impact of variables upon outcomes over time. For full details and the research programme and the way it is operationalized, see West, Patterson, Lawthom & Maitlis (1999). One of the primary purposes of the research programme was to identify which managerial practices are positively associated with performance, measured in terms of economic performance and innovation. Interviews therefore considered questions surrounding work design and team-working, human resource management and product innovation.

There are particular challenges attached to setting up a research programme of this kind. Firstly, gaining access to organizations falling within the remit of the exercise represents a significant difficulty. Organizations were selected using a sectoral database. However, only a very small proportion of organizations approached responded to requests for access (5%). Whilst this low response raise is potentially problematic, it is perhaps is not surprising, given that participation presented significant demands. Managers needed to give up around two days per annum over the course of eight years. Employee attitude surveys were carried out within many of

the organizations within the sample. In addition, companies were asked to divulge sensitive information about performance and profitability over this course of this time.

Given the low response rate, it is possible that the organizations responding were not representative of the sample initially approached. However, an analysis of the ratio of firm labour productivity to industry labour productivity revealed no significant differences. Furthermore, the survey was intended to present an in-depth analysis of the firms that agreed to the research access. Thus, while it may not be strictly representative of UK manufacturing companies, it does provides a unique insight into the operation of the organizations within the sample, in greater depth than is frequently the case in surveys of this kind.

Companies were selected on the basis of their size, their product base and their mode of operating. They were drawn from the engineering, plastics and rubber, food and drink and the electronics sectors. The average number of employees was 260; the smallest company had 70 and the largest 900 employees. Thus, no organizations employed more than 1000 employees, and each organization was single site and involved in the manufacture of a single product. This homogeneity was important when considering the research design for a number of reasons. Most importantly, it is impossible to derive sensible comparative ratings from organizations that differ substantially in any of the ways detailed above. For example, an appraisal scheme within a large multi-national will be qualitatively different from one operating within a medium-sized manufacturing organization. Where this is reported using the same scale for both organizations, it is probable that these substantial differences will remain uncovered. Furthermore, when analysing employee perceptions, it makes sense to incorporate measures of which employees have similar experience. For example, in multi-site operations, it is possible that employees will have very different

experiences of training or participation, so the development of an aggregate score makes very little sense. Finally, when investigating organizational change, it makes sense to remove as far as possible the impact of variables such as size, since large organizations may have at their disposal greater resources and higher levels of expertise than smaller ones. By failing to take account of size, it would be possible to reach erroneous conclusions about the relationship between managerial practices and organizational outcomes.

The research exercise takes account of the need for researcher reliability and consistency in a number of ways. Firstly, training was provided for all the researchers involved in the exercise, training which lasted for a minimum of two weeks. As the research programme commenced, researchers worked in pairs, visiting companies independently and rating them on various aspects of their functioning. This made it possible to reconcile any anomalies in the questionnaire schedule and also to ensure that researchers were rating the various aspects of the schedule consistently and reliably. In order to do this, researchers arrived at individual ratings for each major part of the questionnaire schedule. For each interviewer, a rating was taken for all the main sections of the questionnaire sections and correlated against the rating of a second interviewer. The results are shown below: -

Rater A .79 (n=21)

Rater B .75 (n=17)

Rater C .78 (n=19)

Rater D .87 (n=3)

These results show a high degree of rater reliability across interviews.

It was important that data were derived from the specialist most able to provide this information. Therefore, the survey was designed to ensure that detailed

interviews were conducted with the member of staff perceived to be informed about the subject in question, for example, the Managing Director or Marketing Director of each company answered questions relating to competitive strategy. The Personnel or HR Directors answered questions concerned with HR practices and learning organization issues. This study analyses data drawn from 42 manufacturing companies

The Innovation Survey

Information on organizational level innovation was gathered through a postal survey. The survey was used to measure organizational innovation within the UK manufacturing companies in the sample for product innovation. The questionnaire was labelled a 'change' survey rather than an 'innovation' survey as it was felt that the term ‘innovation’ may have required additional explanation and may have been more subject to social desirability bias. In completing the questionnaire, respondents gave estimates of the number of entirely new and adapted products developed in the last two years. They also detailed the percentage of production workers involved in making the new products; current sales turnover accounted for by the new products; and the extent to which production processes had been changed to accommodate the new products. We also asked whether managers ‘had plans to introduce new products (entirely new or adaptations) in the next two years’. Thus we aimed to capture both the magnitude and the novelty of the innovations being investigated.

The researchers were all I/O psychologists with considerable experience of site visits, and interviews with senior management, in UK manufacturing companies. Each section was given an innovation rating on a seven-point scale from 1 'not at all innovative' to 7 'very innovative'. These were based on the types of change

introduced, their magnitude and novelty and the impact on the workforce and the manufacturing process. Raters gave an overall innovation rating to each company.

The questionnaire was piloted in six companies and, following minor changes to terminology, was sent out to companies. For each company a questionnaire was sent to the Managing Director and the head of production operations. Multiple copies were sent in order to increase the response rate and for the purpose of checking reliability of responses. Eighty-one out of 111 companies returned completed questionnaires. Forty-two of these companies were used as the basis for this study.

To check for differences in innovation ratings by respondents between those companies where the respondent was or was not the Managing Director, analyses of variance were run on all innovation measures, with respondent position as the independent variable, controlling for organization size. There were no significant differences.

To assess the reliability of the ratings of innovation, three researchers rated forty questionnaires from the original 81 organizations. All questionnaires were assessed initially by rater A. For rater A and rater B, Kendall's coefficient of concordance was .86 ($p<.001$). For raters A and C the coefficient was .80 ($p<0.001$). Where more than one manager completed questionnaires in firms (in 27 firms), inter-rater agreement was calculated across the questionnaire items. The average reliability was 0.94.

Independent variables

HRM effectiveness

The person primarily responsible for human resource management was first asked to give information about the personnel function; including who had responsibility for personnel matters, how many levels from the Board was this person.

Interviewees detailed whether there was 'a formal HR strategy endorsed by the top management team', about the extent to which they engaged in human resource planning and whether or not line management took responsibility for HR issues.

The interview schedule then focused upon specific areas of HR, investigating the relative sophistication of practices used for recruitment and selection, induction, training, appraisal, promotion, remuneration and reward and change in HRM. Interviewees described what skills it was believed the company would need in the future and what if anything was being done to ensure that such people were in post. They also indicated whether any form of human resource planning/succession planning was carried out and what was involved in the process. In order to examine other issues to do with succession planning, managers were asked to indicate, whether when filling important posts, recruitment was normally done from within or externally.

Questions on training asked about the average number of hours of formal training for a typical employee per year, again focusing on the four categories of staff detailed above. This part of the schedule also explored the company's commitment to Investors in People. The relevant manager was asked whether there was an overall training strategy and if so, what it was; what were the main objectives over the next three years with regarding to training; and how training needs of the workforce were assessed. Respondents were asked to describe current and recent approaches to training in the organization (on a five point scale ranging from 1 - "very reactive, responding as demands arise", through to 5 - "highly planned and organized"). Information was elicited about the current annual training budget, whether this represented an increase or decrease from the previous year, and how well it met the company training needs. Managers were asked to describe the main sorts of training

taking place for shop floor, supervisory, clerical - administration, management and other staff. Information was also gathered on whether management development programmes included performance appraisal, annual performance reviews, assessment/development centres, planned job rotation and high-flyer schemes. With regard to induction, they were asked whether a formal induction programme existed, whether the scheme involved a system communicating company values to new employees and whether there was any formal means of evaluating whether induction had been carried out as recommended.

Furthermore, interviewees were asked to detail whether or not there was a formal appraisal system and, if so, who was appraised, how long the scheme had been in operation, and how often employees were appraised. They were asked whether appraisers received any formal training, and whether there was a system to monitor whether appraisals had taken place, as they should. Any link between appraisal and remuneration was explored by asking whether such a link existed in relation to four categories of staff: shop-floor, clerical/ administrative, professional/ technical and management. In the section on reward, respondents detailed 'where do you see yourself with regard to local companies or competitors' rates', whether they used skill based pay and whether they offered incentive schemes such as employee share options, merit/ performance related pay or profit-sharing. Finally, interviewees were asked to detail any changes in HRM that had occurred over the last two years and were asked to highlight how extensive these changes had been on a scale 1- 4.

Researchers thus had rich and extensive data – both qualitative and quantitative- on HRM effectiveness for each organization. The questionnaire schedule asked those researchers who had collected this data to rate each organization according to 'how effective overall is the HRM policy?' Responses were detailed on

a scale 1- 5, with 1 indicating that HRM was 'not at all effective' and 5 that HRM policy was 'very effective.' This was the variable used as the measure of HRM effectiveness for this study.

Team-working

Questions surrounding team-working elicited information both on the extent and the potential effectiveness of team working. Production managers or other managers with an in-depth knowledge how work was organized, both on the shop-floor and at management level, responded to these questions. Respondents were first asked to detail 'what percentage of management and administrative staff work in teams' and 'what percentage of production staff work in teams.' It should be noted that respondents were specifically asked to 'refer only to stable teams.' These items were combined to form one scale with reasonably high reliability (Cronbach's alpha = .66). Respondents were then asked in detail about the potential effectiveness of team-working. Four questions were proposed. The first two asked: 'what length of training typically do management and administrative staff receive for working in teams?' and 'what length of training typically do production staff receive for working in teams?' Responses to both these questions were on a scale 1- 5, with 1 representing 'none' and 5 indicating that 'more than one week' of training was provided. The second two questions asked 'How much time do management teams take out to review their team functioning each year (e.g. away days)?' and 'How much time do production teams take out to review their team functioning each year?' These four questions were combined into one scale with good reliability (Cronbach's alpha = .88). This variable is described in the study as 'effective team working'

Analytical strategy

The analytical strategy encompassed three stages. In the first stage, we entered our control variable- organizational size- in order to rule out the possibility that any relationship between independent and dependent variables could be attributed to this factor. Organizational size was measured by taking into account the number of employees working within a company. The second stage of the analysis involved entering the variables ' the extent of team working ' and 'team working effectiveness' into a regression, with product innovation as the dependent variable. We then formed two interaction variables by multiplying 'the extent of team working' by 'HRM effectiveness' and 'team working effectiveness' by 'HRM effectiveness'. The third stage of the analysis was to enter these interaction variables separately into a regression, together with the other relevant dependent variables considered in the study, in order to establish whether or not HRM effectiveness moderated the team work / product innovation relationship.

The research design was longitudinal in that the data on product innovation was collected between six months to one year after the main questionnaire schedule had been administered. There is an argument for proposing that any changes in capability and competence brought about both through working in teams and within an environment where HRM is effective will impact upon organizational innovative propensity over time. Other studies addressing these questions tend, as a rule, to adopt a cross-sectional approach.

RESULTS

Input Tables 1 and 2 & 3 about here

Results are presented in Tables 1- 5. Table 2 presents evidence to suggest that the variable measuring team working effectiveness is marginally significant as a predictor of product innovation ($\beta = .29$, $p < .08$) for the organizations in this sample. This variable accounts for around 7% of the variance for product innovation. Thus we offer some, but not complete, support for Hypothesis 1, which states that 'training for team working and team reflexivity will together predict levels of organizational innovation.'

Table 3 shows that, by contrast, the extent of team working is significantly associated with product innovation at $p < .05$ ($\beta = .31$), and that this variable accounts for around 9% of the variance for this outcome variable. Thus it would appear that there is a direct relationship between the proportion of staff working in teams and organizational innovation. Since this variable represents the proportion of staff both within management and within production departments who work in teams, results suggest that organizations seeking to achieve innovation should give serious consideration to modifying structures so that staff at these levels can work in this way. Our results offer strong support for Hypothesis 2, and provide striking evidence to substantiate claims by protagonists that team working represents an effective way of working where organizations are seeking to augment their propensity to innovate.

INPUT TABLES 4 & 5 ABOUT HERE

Tables 4 and 5 consider the extent to which HRM effectiveness moderates the team work/ innovation relationship. Table 4 focuses upon the extent of team working. Results show that HRM effectiveness does not moderate the relationship between this variable and product innovation; thus we are not able to substantiate Hypothesis 3,

which argued that 'the sophistication and extensiveness of HRM will moderate the relationship between the extent of team working and organizational innovation.' These results are at first glance surprising, given the theoretical rationale in support of such a relationship. However, Table 5 shows that, by contrast, HRM effectiveness does moderate the relationship between the effectiveness of team working and product innovation ($\beta = .57$; $p < .04$). The interaction variable accounts for around 9% of the variance for product innovation.

These results are depicted graphically in Figure 1. As can be seen, results show that where there is high HRM effectiveness there is a much stronger relationship between team working effectiveness and product innovation than where HRM effectiveness is low. Furthermore, high team working effectiveness is associated with lower levels of product innovation where HRM is relatively ineffective and perhaps sporadic in its application. Again, these results are striking, and present substantial support for our final hypothesis, that the sophistication and extensiveness of HRM will moderate the relationship between the team working effectiveness and organizational innovation.

These findings present evidence to address an under-researched theme. They show that the context within which teams are embedded is a vital factor in determining their propensity to innovate. More specifically, effective HRM – encompassing sophisticated selection, induction, appraisal, training and remuneration management- creates the environment within which highly effective teams can excel.

DISCUSSION

This study revealed that the extent of team working significantly predicted product innovation in manufacturing companies. Moreover, the effectiveness of team working also predicted product innovation. The effectiveness of team working in

organizations was operationalised as the extent to which employees were trained to work in teams and the extent to which teams took time out to review their objectives and strategic processes. Of particular theoretical importance is the finding that a *combination* of effective HRM practices and effective team working predicted more of the variation between companies in product innovation than effective team working alone. In other words, there was a significant interaction between effective teamwork and effective HRM in predicting innovation.

There are few studies that look at the extent of team working in organizations and relate this to organizational outcomes. This study incorporated a measure of the extent of team working and revealed a significant association with subsequent levels of product innovation in the companies. Theory suggests a number of reasons for these positive associations. According to De Dreu and West (2001), the divergence of orientation, experiences and knowledge that individuals bring to a team is likely facilitate a more comprehensive processing of decisions. This, in turn, increases the probability that at least some of the ideas explored within the team will result in improvements, either in the product itself or the way it is presented/ marketed. Furthermore, the interaction that takes place within teams is itself an importance source of creativity and innovation (Paulus, 2000). People working on inter-related tasks within a team environment are likely to share ideas, to learn from one another and thus exhibit higher levels of creativity and innovation than individuals working on their own.

The organizations within this study were manufacturing operations, and we propose that product innovation is a key indicator of effective performance for this sector. We measured product innovation not just as new products but as adaptations of existing products also, and as the percentage of sales of new and adapted products.

And it can be argued that all in the company are likely to contribute to product innovation, – sales, marketing, administration, production and R&D. So the more people there are working in teams, the more likely it is that organizations will be able to capture the creativity of people working within them, and thus to promote the implementation of innovations designed to improve upon existing ways of operating. For these reasons, where a high proportion of employees work in teams, one would expect to find relatively high levels of product innovation at organizational level, and our results support such an interpretation.

On the other hand, the extent of reported team working is not a sophisticated measure. For example, it would be difficult to assess the quality of appraisal through measuring whether or not appraisal takes place, or by checking against documentation who has carried out the appraisal interview. Thus we argue that it is important to know instead about the effectiveness of team work. Two key indicators of team working effectiveness are, firstly, that those who work in teams are trained to do so, and, secondly, that individuals who work in teams are encouraged to reflect upon their objectives and group processes in systematic way, by setting aside time expressly for this purpose.

There is research support for the notion that team training is an important pre-requisite for team effectiveness. Campion, et. al.(1996), for example, showed that team work 'knowledge, skills and attitudes' predict the potential effectiveness of teams. The measures that we use in this study for team training take account of the amount of time set aside, both for production and management teams. However, in order to gauge whether or not the team is likely to be effective, we also need some indication of the quality of team working processes. Reflexivity- a process whereby teams take time out to review objectives and to explore alternative ways of working -

is a good indication of healthy team processes. Such processes are known to predict team innovation (West, 2000). And one would expect that, aggregated across the organization, such processes would lead to innovation at organizational level. Overall, we argue that the diversity that exists within teams is unlikely to promote positive outcomes without integrating and effective team processes. Teams that do not exhibit such processes may find that much of the time and attention of team members is directed towards the resolution of unproductive conflict.

Our results further suggest that in order for teams to achieve innovation, they should operate within an environment where there is consistency and support for this way of operating. Of most theoretical significance is the finding that effective team working combined with effective HRM explains more of the variance for product innovation than effective team working alone. There has been little empirical consideration of this point in the literature, although Hackman (1990) argued that organizational context impacts upon team performance in various ways, for example, through offering a framework for the administration of reward and the exchange of knowledge and through promoting learning-oriented beliefs. Our work would support these ideas: furthermore, we propose that effective HRM influences team (and organizational) innovation through offering direction for individuals and teams, through presenting opportunities for employee involvement and through creating mechanisms to enable individuals to experience variety at work.

We suggested in the introduction that it is the synergistic application of HRM practices that impacts upon organizational innovation, rather than their piecemeal implementation. Our measure of effective HRM, whilst not directly taking into account synergistic effects, encompasses many key dimensions of HR activity, such as selection, induction, appraisal, training, involvement and reward management and

considers the extent to which there is strategic commitment to the management of people. And since our measure is based of researchers' perceptions of how well HRM is organized across all the dimensions taken into account, it makes sense to argue that the score captures sophisticated HR practice, where significant efforts have been made to adopt a consistent, integrated approach.

In summary, team working is challenging for organizations, and there is a need for consistent and sophisticated people management practices for team working to lead to innovation. Poor HRM which fails to provide good training, fair rewards, clear objectives, and opportunities for people to experience variety at work and to be involved in decision-making will send mixed messages and undermine team working. The significant interaction detailed in Figure 1 illustrates this point; even effective teams are not likely to perform well where they are not adequately supported by HRM represented in the wider context. However, given the right context, effective teams have the potential to be highly innovative. Effective HRM presents the context to enable effective teams to perform in this way.

We did not find significant results when we considered the relationship between the extent of team working/ effective HRM and organizational innovation. Why was no such association apparent? This measure of team working is less sophisticated, and it is possible that where people are simply assigned to teams, and not given the opportunity to improve upon their team working skills, the external context has little bearing upon team performance. Perhaps in such circumstances, individuals within teams are less open to the opportunities presented for involvement and for variety through effective HRM, or perhaps the sense of direction offered through HRM has less effect on team innovative performance where it fails to

reinforce messages communicated at team level. These points are, however, highly speculative and deserve further detailed empirical study.

Our sample size for the study is relatively small, and whilst we have reported the data in full, one potential limitation of the study is that we are unable to draw upon exactly the same sample size for our main dependent variables (the extent of team working and the effectiveness of team working). Only 37 companies replied to both sets of questions, whilst a total of 42 organizations replied to one or other of the team working questions. We do not believe that this affects the validity of our results, however, because the interaction effects that we report apply either to the extent of team working or to its effectiveness, and do not consider both variables simultaneously. Another potential limitation is that we do not have controls for prior innovation- thus team working may be a consequence rather than a cause of innovation. Furthermore, our results apply specifically to one sector- manufacturing, not to other environments, such as the service or the health-care sector. One of the strengths of our study is that data for dependent and independent variables are drawn from different sources, and that the innovation data were collected some months after the main questionnaire schedule was administered (thereby strengthening the argument for causality).

In practical terms, this study has a number of implications. Our data suggest that there is a relationship between the extent of team working and organizational innovation. In other words, increasing the number of teams in organizations may be an important first step in determining the extent to which organizations can innovate on a sustained basis. Even more importantly, our data suggest that effective teams are likely to respond positively to sophisticated and consistent HRM. Results suggest that it is the combination of team working effectiveness - where efforts have been made to

enhance team skills- and HRM effectiveness- where the wider context presents support for the successful performance of teams- which results in relatively high levels of innovation. Thus organizations should consider not only how to promote team working effectiveness but also what HRM practices will best foster team innovation. For example, organizations should explore to what extent it is helpful to develop team-oriented HR practices such as team-based appraisal, team-based rewards, selection for team-working and better designed training for team working.

Future research should consider the circumstances in which HR practices are most likely to moderate team working/ innovation relationships. To what extent does the wider organizational context exert a stronger influence upon team performance where teams are achieving well, and why might this be the case? What HR practices are most likely to promote the involvement, sense of direction and variety of experience required to facilitate innovation? How can HR practices best be designed to support those who work in teams, and are there any particular approaches to the overall management of people (for example, contingent pay) which are most likely to trigger creativity and innovation at organizational level?

Innovation is vital if organizations are to deal effectively with social and economic change. Our study suggests that good team working will enable organizations to achieve innovation, particularly where they have well developed HR systems. Whilst it is challenging to develop support structures that will enable teams to achieve outstanding performance, our results suggest that such an approach will be well worth the effort involved.

REFERENCES

Amabile, T. M. (1996). Creativity in context. Boulder, CO: Westview Press, Inc.

Beer M., Russell A., Eisenstat and Biggadike, R. (1996). Developing an organization capable of strategy implementation and reformulation: a preliminary test. In Moingeon B. and Edmondson A. *Organizational Learning and Competitive Advantage*. London, Sage.

Borrill, C. S., West, M. A., Shapiro, D. & Rees, A. (2000). Team Working and Effectiveness in Health Care. *British Journal of Health Care Management*, *6*, 364-371.

Campion, M. A., Medsker, G. J. & Higgs, A. C. (1993). Relations between work group characteristics and effectiveness: Implications for designing effective work groups. *Personnel Psychology*, *46*, 823-850.

Campion, M.A., Papper, E.M., & Medsker, G.J. (1996). Relations between work team characteristics and effectiveness: A replication and extension. *Personnel Psychology, 49*, 429-689.

Carter, S. M., & West, M. A. (1998). Reflexivity, effectiveness and mental health in BBC-TV production teams. *Small Group Research, 29*, (5), 583-601.

Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, 23*, (3), 239-290.

Cohen W.M. & Levinthal D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly, 35,* 128- 152.

Cully, M., Woodland, S., O'Reilly, A., & Dix, G. (1998). *Britain at Work; As depicted by the 1998 Workplace Employee Relations Survey*, Routlege, London.

De Dreu, C. K. W., & West, M. A. (2001). Minority dissent and team innovation: The importance of participation in decision making. *Journal of Applied Psychology*, *86*, (6), 1191-1201.

Gollwitzer, P.M. (1996). The volitional benefits of planning. In P.M. Gollwitzer & J.A. Bargh (Eds.), *The psychology of action; Linking cognition and motivation to behaviour* , 287- 312. New York: Guilford Press.

Guzzo, R. A. (1996). Fundamental considerations about work groups. In M.A. West (Ed.), *Handbook of Work Group Psychology*, (pp. 3-24). Chichester: Wiley.

Guzzo, R. A. & Shea, G. P. (1992). Group performance and intergroup relations in organisations. In M. D. Dunnette and L. M. Hough (Eds), *Handbook of Industrial and Organizational Psychology, 3,* 269-313. Palo Alto, CA: Consulting

Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch (Ed.), *Handbook of Organizational Behavior* (pp. 315-342). Englewood Cliffs, NJ: Prentice-Hall.

Hackman, J. R. (1990) Groups that work (and those that don't). San Francisco: Jossey Bass.

Herriot P. & Pemberton C. (1995). *New Deals: the Revolution in Managerial Careers.* Chichester, Wiley.

Jackson, S. E. (1996). The consequences of diversity in multidisciplinary work teams. In M. A. West (Ed.), *Handbook of Work Group Psychology* (pp. 53-76). Chichester: Wiley.

Kozlowski, S. W. J., & Bell, B. S. (2001). Work groups and teams in organizations. In W. C. Borman, D. R. Ilgen & R. J. Klimoski (Eds.), *Comprehensive Handbook of Psychology* (Vol. 12), 4- 57. New York: Wiley.

Laursen K. & Foss N. (2003). New human resource management practices, complementarities and the impact on innovation performance. Cambridge Journal of Economics, 27, 243- 263.

Mathieu, J. E., Marks, M. A., & Zaccaro, S. J. (2001). *Multiteam systems.*

In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (eds.). *Handbook of industrial, work and organizational psychology, 2,* 289-313. London: Sage.

McGrath R.G. (2001). Exploratory learning, innovative capacity and managerial oversight. Academy of Management Journal, 44, 1, 118- 131.

Milliken, F. J. & Martins, L. L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review, 21*, (2), 402-433.

Mohrman, S. A., Cohen, S. G., & Mohrman, A. M. (1995). *Designing team-based organizations: New forms for knowledge work*. San Francisco, CA: Jossey Bass, Inc.

Patterson, M., West, M.A., Lawthorn, R. & Nickell S. (1997). *The impact of people management practices on business performance.* London: CIPD, Issues in people Management, No. 22.

Paton, R.A. & McCalman, J (2000).. A guide to effective implementation. *Change Management* (2nd ed.). Thousand Oaks, CA, London: Sage.

Paulus, P. B. (2000). Groups, teams, and creativity: The creative potential of idea-generating groups. *Applied Psychology: An International Review, 49*, 237-262.

Paulus, P. B. & Nijstad, B. A. (Eds.). (2003). Group creativity: Innovation through collaboration. Oxford: Oxford University Press.

Pedler, M., Burgoyne J. & Boydell P.(1999). *The Learning Company: a Strategy for Sustainable Development*. Maidenhead, McGraw-Hill.

Schippers, M. C., Hartog, D. N., Koopman, P. L., & Wienk, J. A. (2003). Diversity and team outcomes: The moderating effects of outcome interdependence and group longevity and the mediating effect of reflexivity. *Journal of Organizational Behavior, 24,* 779-802.

Shipton, H., West, M., Dawson, J., Birdi, K. & Patterson, M. (2003). Human resource management as a predictor of innovation. Working paper, Aston Business School, Aston University.

Stevens, M.J. & Campion, M. A. (1994). Staffing teams: Development and validation of the Teamwork KSA test. Paper presented at the 9th annual meeting of the Society of Industrial and Organizational Psychology, Nashville, TN.

Sundstrom, E., De Meuse, K. P., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist, 45*, (2), 120-133.

West, M. A. (2000). Reflexivity, revolution, and innovation in work teams. In M. M. Beyerlein, D. A.Johnson and S. T. Beyerlein (Eds.), Advances in interdisciplinary studies of work teams: Product development teams (pp. 1-29). Stamford, Connecticut: JAI Press.

West, M.A., Markiewicz, L. (2004) *Building Team-Based Working: A Practical Guide to Organizational Transformation.* Malden, USA : Blackwell Publishing Inc.

West M., Patterson M., Lawthom R., and Maitlis S, 1999 *The Sheffield Organisational Effectiveness Programme: A Description of Methods*, Institute of Work Psychology, University of Sheffield.

West, M. A., Tjosvold, D., and Smith, K. G. (2003) Teamwork and Co-operation: Fundamentals of Organisational Effectiveness, Ch. 1 in West, M. A., Tjosvold, D. and Smith, K. G. (Eds) *International Handbook of Organisational Teamwork and Cooperative Working*, Chichester, John Wiley & Sons.

Table 1

Means, Standard Deviations and Correlations for all Study Variables

Variable	Mean	SD	1.	2.	3.	4.
Variable						
1. Organizational size	5.03	.65				
2. Effectiveness of HRM	3.14	.89	.24			
3. Team-working effectiveness	4.76	2.57	.45**	.53**		
4. Extent of team-working (n= 37)	68.53	53.20	-.04	.61**	.37*	
5. Product innovation	2.78	1.31	.25	.29*	.35*	.30*

*p< .05; ** p.01; n= between 38 and 42

Table 2

Summary of Hierarchical Regression of Product Innovation onto the Effectiveness of Team work

Dependent variable	Product innovation			
	p	β	ΔR^2	Adjusted ΔR^2
Controls (Organizational size)	.09	.26*	.07	.05
Effectiveness of Teamwork	.08	.29*	.07	.05

*p< .10; ** p.05; *** p<.01; n=42

Table 3

Summary of Hierarchical Regression of Product Innovation onto the Extent of Teamwork

Dependent variable	Product innovation			
	p	β	ΔR^2	Adjusted ΔR^2
Controls (Organizational size)	.14	.22	.05	.03
Extent of Teamwork	. 04	. 31**	.09	.07

*p< .10; ** p.05; *** p<.01; n=42

Table 4

Summary of Hierarchical Regression of Product Innovation onto the Extent of Teamwork X Effectiveness in HRM

Dependent variable	Product innovation			
	p	β	ΔR^2	Adjusted ΔR^2
Controls (Organizational size)	.14	.22	.05	.03
Extent of Teamwork	.04	.31**	.10	.08
Effectiveness in HRM	.50	.13	.01	-.01
Extent of Team work X Effectiveness in HRM	.28	.17	.03	.01

*p< .10; ** p.05; *** p<.01; n = 42

Table 5

Summary of Hierarchical Regression of Product Innovation onto Team Potential X Effectiveness in HRM

Dependent variable	Product innovation			
	p	β	ΔR^2	Adjusted ΔR^2
Controls (Organizational size)	.09	.26*	.07	.05
Effectiveness of Teamwork l	.08	.29*	.07	.05
Effectiveness in HRM	.76	.05	.00	-.02
Teamwork potential X Effectiveness in HRM	.04	.57**	.09	.07

*p< .10; ** p.05; *** p<.01; n=42

Figure 1: Showing the interaction between HRM effectiveness, Team working effectiveness and product innovation