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**Extent, Intensity, and Context: Teamworking and  
Performance in the 1998 UK Workplace Employee  
Relations Survey (WERS98)**

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## ABSTRACT

This paper uses the 1998 UK Workplace Employee Relations Survey to address two main issues: the existence of a relationship between teamworking and performance; and how any relationship might be explained. On the first of these, the WERS98 data allows us to construct a variable that measures the extent of teamworking within an establishment. This is found to be positively and significantly related to two aspects of performance: productivity and financial performance. In order to address our second main issue, we examine three possibilities. The first is that the most important factor in performance is the degree of decision-making autonomy enjoyed by teams. We look at this by constructing a measure of teamworking *intensity*. This is found to be positively and significantly associated with productivity and quality levels. Our second and third possible explanations both focus on the *context* within which teamworking operates. We find that the inclusion of teamworking as part of a broader 'high performance' production regime has little effect on its relationship with performance. On the other hand, there is some support for the idea that an association exists between different forms of teamworking and different strategic objectives. The nature of this association, however, appears to run counter to what existing studies would lead us to expect. Taken as a whole, these results have implications for our understanding of teamworking and its relationship with performance. In particular, they suggest that the focus of attention should be the structural properties of teams rather than the individual team members' experiences of work.

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# EXTENT, INTENSITY, AND CONTEXT: TEAMWORKING AND PERFORMANCE IN THE 1998 UK WORKPLACE EMPLOYEE RELATIONS SURVEY (WERS98)

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## 1. INTRODUCTION

The appeal of teamworking is not difficult to understand. For both managers and academics it appears to offer a way of combining of strong organizational performance with high levels of employee well-being. What is less easy to provide, however, is robust empirical evidence to support the claims made for teamworking. Using data from the 1998 UK Workplace Employee Relations Survey (WERS98), Harley (2001) found that employees who were members of teams reported no better an experience of work than those who were not. Ramsay et al. (2000) used the same dataset to examine the effects of the more general concept, the high-performance work system (HPWS). Their main conclusion was that although such work systems were associated with higher levels of workplace performance, this was not achieved through employees' more positive experiences of work.

This paper seeks to supplement these earlier findings by addressing two broad issues:

- Is there a positive association between teamworking and workplace performance?
- If so, how might the positive association between teamworking and workplace performance be explained?

We address these issues using the same dataset as Harley (2001) and Ramsay et al. (2000). On the question of whether there exists a relationship between

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teamworking and performance, the WERS98 data allows us to construct a variable that gives some indication of the extent of teamworking within an establishment. This is found to be positively and significantly related to two aspects of performance: productivity and financial performance.

In order to address our second main issue--why this relationship might exist—we examine three possibilities. The first possibility is that the most important factor in performance is the degree of decision-making autonomy enjoyed by teams. We look at this by constructing a measure of teamworking intensity. This is found to be positively and significantly associated with productivity and quality levels. Our second and third possible explanations both focus on the context within which teamworking operates. We find that the inclusion of teamworking as part of a broader 'high performance' production regime has little effect on its relationship with performance. On the other hand, there is some support for the idea that an association exists between different forms of teamworking and different strategic objectives. The nature of this association, however, appears to run counter to what existing studies would lead us to expect.

Following this brief introduction, this paper divides into four main sections. In the first of these we examine a number of hypotheses that have been put forward to explain the relationship between teamworking and performance. In the second we show how the WERS98 data set allows us to examine some of these hypotheses in a systematic way. This is followed by the results section and, in turn, by our discussion and conclusions.

## 2. TEAMWORKING AND PERFORMANCE

Teamworking has emerged in recent years as one of the most important ways in which work is being reorganized. In the UK, an Industrial Society (1995) survey found 40 per cent of personnel managers claiming the use of self-managed teams in their organization. The Institute of Work Psychology reported 55 per cent of UK manufacturing companies making at least moderate use of teamworking. The 1998

WERS itself found 65% of workplaces using teamworking for most employees in the workplace's 'largest occupational group'.

These figures do have to be treated with caution. A 1996 study commissioned by the European Foundation for the Improvement of Living and Working Conditions found only 5 per cent of UK organizations to be what they defined as 'group-based', a figure only marginally in excess of the Europe-wide average of 4 per cent (Benders et al., 2001). As we shall see, a great deal hangs on how precisely teamworking is defined. One advantage of using the WERS data is that it allows us to make use of a number of different definitions.

Moves towards teamworking need to be seen as part of the more general trend for organizations to seek competitive advantage through the restructuring of work and production. Both Buchanan (1994) and Jenkins (1994) remark on how this contrasts with the situation which prevailed in the 1950s and 1960s, when the emphasis was very much on improving the quality of employees' working lives. Teamworking in its current manifestation needs to be understood in terms of its much more direct relationship with organizational performance. In Mueller's (1994) terms, management's objectives in introducing teamworking are moving from the social to the economic.

Despite this, there are very few systematic, large-scale studies that have sought to examine the strength and nature of the link between teamworking and performance. In the UK the Workplace Employee Relations Surveys (WERS) have been an invaluable source of data across a wide range of topics since their inception in 1980. Data on workplace performance has formed part of all the surveys in the series, but the fourth WERS, carried out in 1998, was the first to investigate the issue of teamworking. We thus now have data that allows us for the first time to investigate the teamworking-performance link in a direct and systematic manner.

The first thing the data allows us to do is to address the first of the two main issues we identified above: the existence of a positive relationship between teamworking and organizational performance. We will look in greater detail at the WERS data in the next section of this paper. What we can say here is it allows us to do more than

simply look at 'teamworking' as something which a workplace either does or does not have. Our measure of the extent of teamworking in a workplace in fact provides a much more stringent test of the impact that teamworking might have.

The WERS data also allows us to go further than this, in trying to cast light on the question of why there might be a link between teamworking and performance. Our second main research issue in fact breaks down into three more specific research questions. The first of these concerns the role of autonomy. If the idea of autonomy is central to teamworking, then we might expect this to be reflected in performance. Other things being equal, in other words, the greater the degree of autonomy—or the greater the area over which autonomy can be exercised—the stronger the relationship we would expect to see between teamworking and performance.

A number of studies have attempted to test this relationship. Bacon and Blyton's (2000) study of teamworking in the UK steel industry distinguishes between what they call 'high-road' and 'low-road' teamworking, with the 'high road' including teams whose work was characterised by such things as task variety, identification with team tasks, and the power to make decisions. Across a range of outcomes the high-road teams were found to out-perform their low-road counterparts. Cohen and Ledford (1994), however, found that while the introduction of self-managed teams in a US telecommunications company resulted in significant improvements, this was restricted to those aspects of performance to which the intervention was most directly related.

We can understand the theoretical underpinnings of the autonomy-performance relationship from two main perspectives. The first of these is work in the tradition of sociotechnical systems (STS) theory, and, in particular, its concept of the autonomous work group (AWG). As Manz (1992: 1121) argues, the 'joint optimization' of the social and technical aspects of the organization of work usually involves a 'shift in focus from individual to group methods'. Underlying this is 'the view that a group can more effectively apply its resources to address work condition variances within the group than can individual employees working separately' (1992: 1121).

But these structural properties are not the only way in which autonomous teams are hypothesised to contribute to organizational performance. Self managing teams are associated with 'Work high in task variety, autonomy, identity, significance, and feedback [which] foster[s] internal work motivation, which in turn leads to high performance and satisfaction' (Cohen and Ledford, 1994: 14). As Cohen and Ledford (1994) point out, this is the type of work associated also with the Job Characteristics Model (JCM) of Hackman and Oldham (1980). While these similarities have led to calls for the STS and JCM approaches to be integrated with each other (Cohen and Ledford, 1994), the fact that the JCM is applicable to the design of jobs at an individual level means that it can be difficult to identify a single channel through which team autonomy is of influence on performance.

Although these ideas provide us with a theoretical understanding of teamworking, this is not the same thing as saying that teamworking in practice always results from their application. Certainly, we can see cases in which, say, STS theory has played a direct role (Benders & Van Hootegem, 1999), but the rationale for teamworking can arise from a number of sources. The recent re-emergence of autonomous teams has taken place under a variety of labels (Benders and Van Hootegem, 1999). In the UK, for example, cellular manufacturing was one of the most important channels through which teamworking was introduced in the 1980s and 1990s (Benders and Van Hootegem, 1999). More recently we have seen customer- or product-focussed teams emerging as part of such developments as Business Process Reengineering (Hammer and Champy, 1993) and 'strategic segmentation' (Batt, 2000). In the same vein, Mueller et al. (2000) identify a number of discrete 'trajectories' for teamworking, included amongst which are 'humanization of work' and 'employee involvement'.

Even if we treat autonomy as a variable rather than the defining characteristic of teamworking, we still have a situation in which groups with greater degrees of autonomy are seen as being stronger or more pure forms of team than those whose autonomy is more limited. As we shall see, this is the position implicit in the questions on teamworking contained in the 1998 WERS. Koch and Buhl (2001) also distinguish between 'strong' and 'weak' teams, with the latter characterised by 'little development of autonomy and decision latitude' (2001: 165) Likewise, the pan-European EPOC survey (Benders et al., 2001) identifies three basic forms of teamworking on the basis

of a combination of group decision-making with the proportion of employees working in groups.

The second and third parts of our second main research issue both relate to the idea that what is important is not so much teamworking itself as the context in which it is embedded. The first of the two looks at teamworking as part of a set of practices covering the management of work and production. The question of the link between practice and performance has emerged as perhaps the most important issue currently being faced by researchers in the field of Human Resource Management (HRM). We do not have space here to do justice to the full complexities of these debates: useful reviews have been provided by Ichniowski et al. (1996), Guest (1997) and Wood (1999). Concentrating on the most recent work, we can say that even the most basic issues remain unresolved. West et al.'s (2002) study of UK hospitals revealed strong associations between the use of certain HR practices and performance in terms of patient mortality. Guest et al. (2003) are much more circumspect. Their study of UK companies gave rise to 'predominantly negative' results (2003: 307), with the results being more negative the stricter the test being applied.

The relationship between teamworking and HRM is not a straightforward one. Although teamworking is included as part of HRM in both the recent studies just cited, this is not true of all other work in this area. Indeed, the questions of how HRM should be defined and of what practices should be included under the HRM headings are ones that have bedevilled the HRM-performance debate (see eg Becker and Gerhardt, 1996). Even when teamworking is included, it enters only as a relatively unimportant component part, making its nature and significance difficult to isolate.

Teamworking has a more prominent role if we shift our focus from HRM per se to high-performance work systems (HPWS). Although a consideration of the organization of work might or might not be included in a definition of HRM (see Boxall and Purcell, 2003), it would be central to the idea of an HPWS. For Boxall and Purcell (2003: 103), the new systems' attempts to foster employee commitment is 'most usually achieved through the extensive adoption of teamworking as the fundamental building block of the organization'. Similarly, Appelbaum and Batt (1994)

identify 'American Team Production' as one of the two major types of HPWS, its chief distinguishing characteristic being its emphasis on worker participation in decision-making.

Also important in HPWS is the management of production, and for the purposes of this paper it is the relationship between teamworking and this aspect of the HPWS that we want to concentrate on. This follows on from Wood's (1999) wide-ranging review of the literature on the relationship between HRM and performance. His overall conclusions are quite cautious, arguing that research into this relationship is still very much in its 'infancy' (1999: 409) and that the widespread acceptance of the 'universalistic' hypothesis (that certain HR systems will be associated with better performance irrespective of contingent factors) ignores a number of inconsistencies.

Important for us is Wood's argument that the evidence is just as strong for the hypothesis that the key to performance is the link between high involvement work practices and such techniques or philosophies as TQM and lean production. His main support for this is drawn from the two studies of Lawler et al. (1995, 1998)—although he does stress that the evidence is certainly not overwhelming. Much less consideration is given to the possibility that a production environment based on lean production or JIT might actually work against the effectiveness of teamworking. As Klein (1989, 1991) argues, the removal of buffer stocks is likely to have the effect of reducing the team's degree of autonomy over such things as the pace of work. Taking teamworking as an example of what Wood's review describes as a 'high involvement' work practice, the implications of its relationship with TQM or lean production are something that we need to explore.

Our final research question—the second of those looking at the context of teamworking—is another one that runs in parallel to a central concern in the wider HRM-performance debate. A key issue in the wider debate is whether a universalistic or 'best practice' approach (referred to above) might be jettisoned in favour of an approach based on contingency or 'best fit' (Purcell, 1999; Wood, 1999). One important contingency identified in the literature is an organization's strategy. In other words, is the effectiveness of a particular set or 'bundle' of HR practices dependent on the strategic context in which it is operated?

Similar concerns can be identified in the teamworking literature. As we have already noted, Cohen and Ledford (1994) found that while the introduction of self-managed teams in their case study company had proved effective, improvements were restricted to those aspects of performance to which the intervention was most directly related. More pertinently for our purposes, Dunphy and Bryant (1996) identify three forms of team, each of which, it is argued, is most suited to the pursuit of a particular aspect of performance. While simple, multiskilled teams are thus likely to impact most heavily on an organization's costs, self-managed teams will have their main effects on value, and self-led teams on innovation.

It should be noted that the content of the WERS data set does not allow us to examine all possible explanations of the link between teamworking and performance. For example, Cohen et al. (1996) put forward a 'predictive model' of team effectiveness that is structured around four sets of factors: task design, supervisory behaviours, group characteristics, and the employee involvement context. Their study of a US telephone company found support for a link with performance for all but one of the four sets. The exception was supervisory behaviours, a finding which led Cohen et al. to question the emphasis that Manz and Sims (1987) had placed on the role of team leaders in moving team members towards self-management. Also difficult to test for directly would be the idea that teamworking has its effects through Barker's (1993) 'concertive control', whereby team members develop their own normative rules of behaviour, or through Sewell's (1998) 'chimerical control', which combines peer-group scrutiny with information-system surveillance.

## Research Questions

We are left with four basic questions:

1. Can we establish a positive association between teamworking and workplace performance? More specifically, we shall see that we are able to ask whether an association exists between performance and the extent of teamworking within the workplace.
2. Is there a relationship between performance and the type or what we might call the intensity of teamworking? In other words, is better performance associated

with the principles of teamworking—especially group autonomy—being applied to more fundamental levels of decision-making?

3. Is any teamworking-performance link associated with teamworking's role in a broader 'high performance' regime of production? In particular, does the success of teamworking depend upon its residing in the context of systems of TQM or lean production?
4. Is the success of teamworking associated with the broader strategic context in which it is operating? More specifically, is there a relationship between different types of teamworking and different aspects of performance?

### 3. DATA

To investigate the link between teamworking and performance we use the 1998 Workplace Employee Relations Survey (WERS98). The data provided by the whole WERS series has been important in the long-running debates concerning the relationship between employment relations and economic performance. The first three surveys (1980, 1984 and 1990) were used widely in attempts to explore the role of trade unions in organizational performance (see, for example, Machin and Stewart, 1995; Fernie and Metcalf, 1995). Preliminary results from the fourth survey in the series, WERS98, gave broad support to the idea of a positive association between performance and certain HRM practices (Cully et al., 1999: 120-24), and this data has been used to address a range of questions. In addition to the Ramsay et al. (2000) paper already cited, Addison and Belfield (2000), for example, use the data to question some of the conclusions that Fernie and Metcalf (1995) drew from the 1990 WERS.

The WERS98 data set comprises a sample of 2191 UK workplaces employing ten or more individuals (see Cully et al. 1999). From the point of view of the issues under discussion here, a number of points need to be borne in mind. On the one hand, there are very few large scale studies of teamworking, and the WERS survey offers an unrivalled opportunity to say something about its nature and implications in the UK (see Harley, 2001: 727). It might also be argued that in order to understand such things as teamworking, a workplace-based survey is to be preferred to a company-

based one. On the other hand, we must also be aware of the limitations of the WERS data. Teamworking is not the central focus of the survey, and the cross-sectional nature of the data makes it difficult to establish causal rather than associative links.

(a) Performance

The WERS98 data set provides three different measures of workplace performance: financial performance, labour productivity and quality. In each case the respondent is asked to compare their establishment to other establishments in the same industry on a five point scale ranging from 'a lot below average' to 'a lot better than average'. Although the way in which performance is measured in the survey has been subject to some criticism, it is possible to make a strong case in its favour. The use of ordinal measures of performance does not itself pose many problems, since methods exist that allow the data to be used (Machin et al., 1992). Moreover, although respondents might be prone to overstating their relative performance, the responses can be used if the reporting errors are non-systematic and uncorrelated with the explanatory variables (Machin and Stewart, 1990).

Table 1 presents a summary of the performance data, broken down by establishment size.

(Insert Table 1 about here)

The various different measures of performance are positively correlated as one might expect, but the highest correlation (between financial performance and productivity) is only 0.516, suggesting these variables represent distinct measures of workplace performance. Use of analysis of variance suggests there are no significant differences in performance across establishments of differing size. One would also expect there to be no differences across industrial sectors given the sampling methods used in the survey and the comparative nature of the data collected, but whilst this is true when considering the first of these measures it is not true when one focuses upon productivity and quality, where the F statistics of 5.8 and 8.7 respectively are both significant at the 1% level.

### (b) Teamworking

The level of teamworking within each of the workplaces in the survey is identified from the response of the most senior manager responsible for employee relations to the following question: 'What proportion of employees in the largest occupational group at this workplace work in formally designated teams?' Together with information on the number of individuals within each occupational group, we use these responses to construct a variable measuring the extent of teamworking within the organization.

A summary of the variable is provided in Table 2, where the focus is upon differences across particular occupational groups. The mean values show that teamworking is most prevalent for those in professional and sales occupations, with the lowest percentages being recorded for plant & machine operatives and managers & administrators. Analysis of variance suggests these are significant differences across occupational groups. The F statistic of 20.4 is significant at the 1% level.

(Insert Table 2 about here)

It should be noted that this variable is likely to underestimate the true extent of teamworking within the workplace given the lack of information relating to teams in smaller occupational groups. Nevertheless, it is clear from the table that in some establishments all employees work in teams whereas in others there is no teamworking. Similar analysis in relation to industrial classification and establishment size suggests there are also significant differences in the extent of teamworking across industrial sectors (with financial services and public administration exhibiting the highest levels) and that the level of teamworking increases with establishment size.

### (c) Intensity of Teamworking

Our second research question requires that we distinguish between different types of teams on the basis of autonomy. The more autonomous teams were those where teamworking within the organization entailed responsibility for specific products or services and involved members jointly deciding how work was done, as well as members working together. Table 3 shows that overall 40% of establishments made use of this kind of teamworking, with this figure being significantly higher in the

education, financial services and construction sectors. The chi-squared statistic of 203.4 is significant at the 1% level.

(Insert Table 3 about here)

Semi-autonomous teamworking appears to be most pronounced for those in professional occupations and least widespread for plant and machinery operatives.

#### (d) Lean Production and TQM

Our third research question looks at the relationship that teamworking has with lean production and TQM. In this context we take lean production to be represented by a Just-in-Time (JIT) production system. The presence of a JIT system in the workplace was identified from responses relating to a question concerning a policy within the establishment to minimize inventories, supplies and work-in-progress. The presence of quality circles within the establishment was similarly used as a proxy measure to gauge whether a policy of TQM was in operation. Approximately 30% of establishments were identified as exhibiting one of these features, but only 10% appeared to operate both JIT and TQM.

#### (e) Performance Objectives

Our final research question considers the hypothesis of Dunphy and Bryant (1996) that low-intensity teamworking impacts principally on cost whereas semi-autonomous teamworking impacts on value. WERS98 explicitly asks respondents for further details on their definition of financial performance and differentiates between 'profit or value added' and 'costs or expenditure' as well as other possible financial measures. This allows separate analysis of financial performance to be performed for both cost and value focused firms.

## 4. ANALYSIS AND RESULTS

Since the performance data is ordered and categorical but the boundary values are unknown an ordered probit model is used to identify the factors impacting upon establishment performance (Greene, 1993). Initially, three baseline models are estimated. These do not include the teamworking variable, but cover a number of

other variables which impact on performance. Identification of variables was guided by previous theoretical and empirical work drawn from both the economics (Hay and Morris, 1991; Scherer and Ross, 1990) and HRM literature (Becker and Gerhart, 1996; Huselid, 1995) as well as other studies making use of the WERS98 data (Ramsay et al., 2000; Addison and Belfield, 2000). They covered the competitive environment in which the establishment operates; its position within this environment, as well as various organizational influences. A large number of explanatory variables were considered, including degree of competition, capital labour ratio, strategic orientation, quality control and formal training systems. Variables which consistently came out insignificant were dropped from the final baseline specifications.

After extensive experimentation the following variables were included in the baseline specifications: industrial relations, the state of management/employee relations measured on a five point scale ranging from 'very poor' to 'very good'; share ownership, a dummy variable taking on a value of one if the establishment has a share ownership scheme; performance related, a dummy variable to capture the effect of a performance related pay scheme; large organization, a dummy variable to indicate the establishment is part of a larger enterprise; Plc, a dummy variable to indicate the establishment or the enterprise of which it is part is a public limited company; public sector, a dummy variable indicating the establishment is located in the public sector of the economy; growing market, a dummy variable taking on a value of one where the market in which the establishment operates is growing rapidly; workforce reduction, a dummy variable to capture the effect of any reduction in the number of employees during the previous twelve months.

The results from this analysis are shown in the first three columns of Table 4. The state of management/employee relations has a positive effect upon workplace performance in all three baseline models and is statistically significant in every case. Positive coefficients in these models indicate that the probability of performance 'a lot below average' falls and the probability of performance 'a lot better than average' rises as the independent variable increases. The impact on the probability of being in the intermediate categories cannot be determined solely by looking at the sign of the coefficient.

The variables indicating that the establishment is part of a larger organization, or part of a public limited company, are also statistically significant in all cases. In the case of financial performance a number of other variables covering establishment incentive schemes and the competitive environment are also significant. The existence of a performance related pay scheme also has a positive and significant impact on productivity levels within the establishment, as does the variable designed to capture a reduction in the workforce. The final baseline equation looks at quality. This appears to be the weakest of the three specifications with an R-squared of 0.095 and only four statistically significant variables.

(Insert Table 4 about here)

#### (a) Teamworking Extent and Performance

Having established these baseline specifications we now go on to consider the impact of teamworking on the three performance measures considered. The final three columns of Table 4 show the effect on the baseline models of including the teamworking variable discussed in Section 3. In all three cases the coefficient on this variable is positive. In the case of financial performance it is also statically significant at the 5% level and in the case of productivity at the 1% level. The coefficients on this variable are small compared to some others in the equation as a consequence of the way in which teamworking has been measured (ranging from 0% to 100%) rather than implying a small effect.

To gauge the impact of the teamworking variable within the models developed the following simulations are carried out. Firstly, the equations are used to determine the proportion of establishments falling into each of the performance categories in a situation where there is no teamworking. This is achieved by setting the teamworking variable to zero and allowing all other variables to take on their sample values. A comparison is then made to a situation where all individuals in the largest occupation group within an establishment work in teams. This is achieved by setting the teamworking variable to 100%.

Table 5 below shows the implications for performance in both of these situations. An all teamworking environment increases the proportion of establishments performing better than average from approximately 45% to 90% in the case of financial performance and from around 35% to nearly 75% in the case of productivity levels.

(Insert Table 5 about here)

#### (b) Teamworking Intensity and Performance

The equations presented in Table 4 do not allow the impact of teamworking on performance to be influenced in any way by the degree of autonomy afforded to individual teams. To determine whether this constraint is valid a distinction needs to be made between those establishments where teamworking simply involves members working together and those establishments where teamworking also involves responsibility for specific products or services and members jointly deciding how work is done. This is achieved by inclusion of a multiplicative dummy variable in the equations shown in Table 4 (columns 4 to 6) designed to modify the impact on performance of the teamworking variable when semi-autonomous teamworking is present. This allows us to explicitly consider whether semi-autonomous teamworking enhances workplace performance. If semi-autonomous teams (SAT) improve organizational performance compared to other types of teams this modified variable will be positive and significant.

The first three rows of Table 6 present this comparison. In the case of financial performance the initial variable (TW1) capturing the impact of the extent of teamworking on performance remains statistically significant whereas the variable designed to capture the enhancing effects of semi-autonomous teamworking is insignificant. This suggests that the degree of autonomy afforded to individual teams does not influence the financial performance of the workplace.

In contrast, in both the productivity and quality equations the multiplicative dummy variable representing semi-autonomous teamworking (TW2) is positive and statistically significant. This suggests it is the nature of the work undertaken by teams that impacts upon these measures of performance rather than teamworking per se.

(Insert Table 6 about here)

### (c) Teamworking Context and Performance

The relationship between teamworking, lean production and TQM is also explored through the use of multiplicative dummy variables. These variables modify the impact on performance of the teamworking variable when either a JIT or a TQM system is in operation within the establishment. This allows us to identify any synergistic effects which exist between lean production, TQM and teamworking. If either of these systems enhances the effect of teamworking on performance the modified variable will be positive and significant.

Rows 4 to 9 of Table 6 present these results. Only in the case of finance is there is some tentative evidence to suggest that improved performance may result from a combination of teamworking and TQM, with the multiplicative variable (TW2) being significant at the 5% level. In all other equations the modified variable is insignificant suggesting that any teamworking-performance link is not associated with teamworking's role within these particular systems of production. This conclusion remains valid even if the focus is narrowed so that the model allows for performance enhancing effects only when establishments operate both of these systems.

Finally consideration is given to the hypothesis of Dunphy and Bryant (1996) that simple, multiskilled teams are most likely to impact on an establishment's costs, while semi-autonomous teamworking is likely to impact on value. The initial sample is split into two on the basis of whether financial performance is primarily associated with cost or value, and equations are estimated for each of these groups. These equations contain the multiplicative dummy variable described above. If the mapping described by Dunphy and Bryant (1996) holds within the WERS98 data set we would expect the modified variable designed to capture the impact of semi-autonomous teamworking (TW2) to be positive and significant when looking at value generating workplaces, but insignificant when considering those establishments which are cost focused.

(Insert Table 7 about here)

Table 7 presents the results of this analysis. In contrast to the hypotheses proposed, there appears to be some tentative evidence to suggest that cost focussed firms achieve higher levels of financial performance when they adopt semi-autonomous teamworking, but that in the case of value focussed establishments it is teamworking per se that impacts on performance rather than there being benefits associated with alignment. It should be noted that these variables are only significant at the 5% level, however.

## 5. DISCUSSION AND CONCLUSION

We recognise the limitations of this and other WERS-based research. By its nature, all that can be established is associations between HR variables and economic performance; questions of the direction of causality cannot be settled. More than this, it is difficult for survey work and the regression analysis based upon it to capture the dynamics of a situation. We would certainly accept the implications of Wood's (1999) argument, that that there should be a closer relationship between, on the one hand, hypothesis testing, quantitative surveys and, on the other, hypothesis generating, qualitative case studies.

Accepting all this, what does the analysis tell us about our four research questions:

1. We can say first of all that, yes, an association does seem to exist between performance and the extent of teamworking within the workplace.
2. Second, there also appears to be a relationship between performance and the intensity of teamworking. Once teamworking is established there seems to be additional benefit from affording these teams a degree of autonomy.
3. Third, there appears to be no real synergies at work between teamworking and either TQM or lean production. This tends to contradict the emphasis laid upon these relationships by Wood (1999).
4. Finally, we have something of a mixed picture as regards the relationship between teamworking and strategy. Our analysis seems to indicate an association between different forms of teamworking and different financial

performance objectives, but the exact mapping runs counter to that proposed by Dunphy and Bryant (1996).

And what do these conclusions imply more generally? They appear first of all to run counter to the Harley's (2001) findings from the same data set. As we saw in our introduction, he found no evidence that members of 'autonomous' teams experienced greater degrees of discretion than employees who were not team members at all. He argues that this calls into question '[both] the assumption ... that teamwork enhances discretion and the extension of that assumption to the belief that it is via discretion that other positive outcomes arise' (2001: 735).

But we should not automatically expect members of WERS's autonomous teams to experience greater levels of discretion than those who were not team members. In terms of individual discretion it might indeed be the case that we would expect members of autonomous teams to experience less discretion than their non-team counterparts. From the point of view of teamworking the important thing is discretion at the level of the team. It might be argued that in the WERS data the variable that captures this is based on an answer from a management respondent rather than an employee, but as the survey stands this is the best measure that we have.

Moreover, if we make a distinction between individual employees' felt discretion and the autonomy enjoyed at the level of the team, the analysis presented here helps us make sense of Ramsay et al.'s (2000) findings from the WERS data. Their basic conclusion was that the association between HPWS and high performance could not be explained by positive employee experiences of work. Taking teamworking here as an example or a component part of a HPWS, we can see here how this might well be the case.

This in turn might have implications at a conceptual level. We saw in our introduction our difficult it can be to identify the 'transmission mechanism' through which teamworking is of effect on performance. What Harley (2000: 735) calls the 'mainstream' tradition (made most concrete in the JCM) looks at what teamworking implies for individuals' jobs and, in turn, for their motivation to work. Our own study has little to say on this directly, but the findings of both Harley and Ramsay et al. offer

it little support. The rival, sociotechnical tradition, however, relies much more heavily on the structural properties of the teams themselves. Harley lumps both these traditions together under the heading of 'positive accounts' of teamworking (2001: 722-4). We might well be better advised, however, to separate out the sociotechnical interpretation and give it much more serious consideration as a way of understanding teamworking and its impact.

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**Table 1. Average (mean) performance by establishment size**

Size of establishment	Financial performance	Labour productivity	Quality of product or service
10 thru 24 employees	3.61	3.64	4.04
25 to 49 employees	3.62	3.55	3.98
50 to 99 employees	3.70	3.56	3.87
100 to 199 employees	3.63	3.59	4.00
200 to 499 employees	3.65	3.52	3.90
500 or more employees	3.78	3.59	3.88
Total	3.63	3.60	3.99

Notes: Weighted analysis using differential sampling weights.

**Table 2. Percentage of employees in teams**

SOC group	Mean	Minimum	Maximum	Number of workplaces
Managers & administrators	20.1983	5.05	30.77	9
Professional occupations	45.9102	.00	90.91	270
Associate professional & technical occupations	29.9588	.00	82.11	130
Clerical & secretarial occupation	33.4378	.00	100.00	306
Craft & related occupations	25.5044	.00	91.18	169
Personal & protective service occupations	30.5325	.00	100.00	223
Sales occupations	43.2517	.00	100.00	207
Plant & machine operatives	18.7037	.00	83.69	198
Other occupations	23.0175	.00	98.31	165
Total	32.6592	.00	100.00	1677

Notes: Weighted analysis using differential sampling weights.

Number of workplaces is unweighted.

In total 2182 managers responded to the question on teamworking, but only 1677 provided valid information on the largest occupational group.

**Table 3. Percentage of workplaces with semi-autonomous teamworking**

Sector	% of Sector	No. of Workplaces
Manufacturing	23.5%	93
Electricity, gas and water	51.4%	37
Construction	58.8%	48
Wholesale and retail	39.0%	129
Hotels and restaurants	17.7%	41
Transport and communication	22.5%	40
Financial services	58.8%	47
Other business services	31.1%	86
Public administration	47.0%	80
Education	62.2%	151
Health	53.6%	127
Other community services	27.4%	36
Total	40.0%	915

Notes: Weighted analysis using differential sampling weights.  
Number of workplaces is unweighted.

**Table 4 Estimation results**

	Baseline Specification			Teamworking Specification		
	Financial	Prod'y	Quality	Financial	Prod'y	Quality
Industrial relations	0.230***	0.569***	0.313***	0.227***	0.566***	0.312***
Share ownership	0.387***	0.044	0.197*	0.396***	0.054	0.203*
Performance related	0.484***	0.378***	0.146	0.487***	0.386***	0.145
Large organisation	-0.254**	-0.161*	-0.550***	-0.301***	-0.215**	-0.569***
Plc	-1.778***	-1.974***	-2.304***	-1.651***	-1.815***	-2.249***
Public sector	0.515***	0.382*	0.159	0.462***	0.297	0.128
Growing market	0.270***	0.079	-0.097	0.259***	0.061	-0.102
Workforce reduction	0.245**	0.362***	0.109	0.253**	0.375***	0.112
Teamworking				0.003**	0.005***	0.001
F Statistic	40.8	47.3	63.2	35.3	41.7	54.9
Scaled R-squared	0.098	0.148	0.086	0.105	0.161	0.087
N (unweighted)	1461	1382	1550	1461	1382	1550

Notes: Weighted analysis using differential sampling weights.

Number of observations (N) is unweighted.

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\* Significant at the 1% level.

The importance of sectoral influences on performance was tested using a series of industry dummy variables. These were expected to be statistically insignificant given the comparative nature of the performance data. This proved to be case for all sectors except public.

**Table 5. Impact of teamworking on performance**

	A lot below average	Below average	About average for industry	Better than average	A lot better than average
<b>Financial Performance</b>					
No teamworking	0.0	0.1	53.1	46.7	0.1
All teamworking	0.0	0.1	10.1	89.0	0.8
<b>Productivity Levels</b>					
No teamworking	0.0	0.2	64.2	35.6	0.0
All teamworking	0.0	0.1	26.6	73.2	0.1
<b>Quality Levels</b>					
No teamworking	0.0	0.1	1.4	98.3	0.3
All teamworking	0.0	0.1	0.6	97.9	1.4

Notes: The quality variable is included for completeness, but these figures should be treated with caution given the insignificance of the coefficient estimate.

**Table 6. The Impact of Intensity and Context on Workplace Performance**

		TW1 Coef	TW2 Coef	F Statistic	Scaled R <sup>2</sup>	N
SAT	Financial	0.002**	0.002	32.67	0.107	1461
	Productivity	0.001	0.006***	38.12	0.173	1382
	Quality	-0.002	0.006***	52.10	0.100	1550
TQM	Financial	-0.001	0.005**	45.48	0.113	1458
	Productivity	0.006***	-0.002	38.86	0.163	1379
	Quality	0.004	-0.001	49.27	0.088	1547
JIT	Financial	0.002**	0.001	32.66	0.106	1446
	Productivity	0.003**	0.001	37.01	0.162	1371
	Quality	0.006	-0.002	48.98	0.089	1535

Notes: TW1 indicates extent of teamworking. TW2 indicates a multiplicative dummy variable which modifies the teamworking variable when the particular feature is present.

These results are based upon an analysis of the complete sample. Similar results are obtained if the analysis focuses exclusively upon manufacturing.

\*Significant at the 10% level.

\*\*Significant at the 5% level.

\*\*\* Significant at the 1% level.

**Table 7. The Benefits of Strategic Alignment**

	Value focussed	Cost focussed
TW1 Coef	0.005**	-0.001
TW2 Coef	0.002	0.004**
F Statistic	30.05	3.44
Scaled R2	0.141	0.089
N	737	614

Notes: TW1 indicates extent of teamworking. TW2 indicates a multiplicative dummy variable which modifies the teamworking variable when semi-autonomous teamworking is present.

\*Significant a the 10% level.

\*\*Significant at the 5% level.

\*\*\* Significant at the 1% level.

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