

DIMENSIONS OF PERFORMANCE EFFECTIVENESS IN HIGH-INVOLVEMENT WORK ORGANISATIONS

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INTRODUCTION

Superior performance is ultimately based on the people in an organisation. The right management principles, systems, and procedures play an essential role, but the capabilities that create a competitive advantage come from people - their skill, discipline, motivation, ability to solve problems, and capacity for learning. Developing their potential is at the heart of high-performance manufacturing. (Hayes, Wheelwright and Clark, 1988: p 242)

As illustrated in this quote, it is being increasingly recognised that the competitiveness of manufacturing organisations can be enhanced by - and is perhaps dependent upon - a higher level of performance from shopfloor employees. Yet despite the growing interest in shopfloor performance, there have been few systematic investigations carried out to define the characteristics of effective behaviour within modern manufacturing. This article describes such a study; its aim being to specify dimensions of effective shopfloor performance within a 'high-involvement' organisation.

Within the last decade, an increasing number of manufacturing organisations have realised that their models of manufacturing have failed to keep up with major shifts in world-wide economic and market conditions. This view has led several commentators to propose that we are witnessing the growth of a new 'techno-economic paradigm' in manufacturing (for example, Bessant, 1991; Freeman and Perez, 1989; Piore and Sabel, 1984), characterised by greater diversification of product markets and increased customer requirements for variety, quality, reliability and delivery integrity. These elements have combined to create high levels of unpredictability and turbulence in both internal and external environments.

The severity of these demands on the adaptive capacity of companies has been so great that many have been forced to make radical revisions to their business strategies; and the most popular focus for change efforts has been the adoption of advanced manufacturing technology (AMT), (Gerwin and Kolodny, 1992), just-in-time manufacturing techniques (JIT), (Schonberger, 1986) and total quality management practices (TQM) (Deming, 1986; Crosby, 1979; Juran, 1989). These endeavours constitute an attempt to increase efficiency and responsiveness by more closely integrating different stages in the production process. Although such practices have often been regarded by managers as panaceas, the evidence for their effectiveness is mixed; for example, Majchrzak (1988:xi) has reported a fifty to seventy percent failure rate when implementing advanced manufacturing technology. Moreover, most commentators agree that the major reason for these shortcomings lies not with the technology itself but with the choices made about the associated work organisation (Wall, Jackson and Davids, 1992). In other words, the key to the success of initiatives in AMT, JIT and TQM is likely to lie in an organisation's orientation toward its human resources.

Although the nature of work organisation at the shopfloor level is often 'taken for granted', there are usually choices which management can make. The dominant form of work design within western organisations has been variously described as 'specialist control' (Wall et al., 1990), 'command and control' (Hayes, Wheelwright and Clark, 1988) and the 'control-oriented approach' (Lawler, 1992). Under this form of work design, the jobs of shopfloor workers are precisely defined, and variances in the production process are controlled by management or by technical experts. While such an approach can be very effective, evidence is increasing that many production environments require control to be devolved to as low a level as possible, so that shopfloor workers themselves are given both the authority and the capability to manage production variances (Jackson and Wall, 1991; Susman and Chase, 1986; Wall, Jackson and Davids, 1992). This latter form of work design is often described as 'operator control' (Wall et al., 1990), 'continual improvement' (Hayes, Wheelwright and Clark, 1988) and the 'high-involvement approach' (Lawler, 1992). It is becoming apparent that organisations' adaptability depends critically on the development of a highly flexible and multi-skilled workforce within what has become known as the high-involvement organisation (Lawler, 1992; Ledford and Mohrman, 1993).

The high-involvement approach relies on employee self-management and participative management styles (McGregor, 1960) where employees at all levels are given the authority to influence decisions and the knowledge, skill and understanding of the production process that they need to carry out their work. Such high-involvement practices not only help to build employee commitment, but they also foster their development. It is this emphasis on cultivating learning throughout all levels of the organisation which shows promise of becoming 'the critical skill that will determine competitiveness in the future' (Bessant, 1991:11). The popularity of high-involvement organisational management is undoubtedly increasing: the number of US sites adopting this approach is given as two hundred by Lawler (1986) and over a thousand by Walton (1985); and these are likely to be underestimates of the current position.

Within command-and-control organisations shopfloor workers' roles are limited to the day-to-day operation of equipment, and system performance depends primarily on intrinsic characteristics of the technology itself or on the effectiveness of technical support (Kaus, 1990). By contrast, the contribution of employee behaviour to overall system performance is much greater in high-involvement work organisations implementing AMT, JIT and TQM (Jaikumar, 1986; Snell and Dean, 1992; Spenner, 1983). The production strategies of just-in-time and total quality management are designed to make production problems more highly visible, so that efforts can be exerted in problem prevention rather than rectification. Similarly, many kinds of computer-based technology are so complex that they are intrinsically uncertain in their operation; and the effectiveness of employees in managing the resulting variances plays a major role in determining work system performance.

The effectiveness of high-involvement organisations thus depends largely on gaining the maximum contribution possible from employees on the shopfloor. This contribution will be facilitated by clarifying the behavioural requirements for effective performance. There are at least three reasons for this. First, the roles that shopfloor employees are required to take on board are more demanding, requiring higher-level skills and broader knowledge; second, clarity is needed in these role requirements to reduce role confusion and ambiguity; and

third, the human resource management practices must align with the new requirements. We now discuss each of these in more detail.

New work roles

Operator roles within the high-involvement organisation have been expanded greatly to include rectifying operational problems, as well as additional maintenance, inspection, and work scheduling duties. Employees are expected to put in mental effort as well as physical effort; that is, 'to add value to a product using their minds as well as their hands' (Lawler, 1992:29). They are also expected to add value to the process (eg making continuous process improvements) and not just to the product (Hayes et al. 1988). Further, new forms of work organisation result in greater interdependency between individuals and work-units, thus requiring more frequent interaction across both functional and hierarchical boundaries (Cummings and Blumberg, 1987; Susman and Chase, 1986). The creation of self-regulating work groups means problem-solving may take on a much more distributed form and require greater co-operation and co-ordination between individuals (Larson and Christensen, 1993).

On the whole, the new work roles require new portfolios of skills and knowledge associated with problem-solving, team-working and strategic thinking. Whilst commentators have frequently discussed the types of requirements for shopfloor personnel (eg Helfgott, 1988; Snell and Dean) to our knowledge there has been no investigation which systematically examines what these requirements are. Snell and Dean (1992:495), for example, commented that within integrated manufacturing environments, 'we still know little about the particular skills and behaviours that are selected, trained, appraised and rewarded'. Without investigation of the skills and attributes that are relevant and useful to support high-involvement, one is left with only speculation as to their precise nature.

Clarity in role requirements

A likely consequence of the transition to a high-involvement organisation is an increase in uncertainty amongst shopfloor personnel concerning the nature of their new roles. In rapidly changing organisational environments, existing norms and expectations regarding behaviour and performance quickly become redundant, as new forms emerge from the demands and requirements of altered work arrangements. As a result, it would not be surprising if employees were unclear about what was expected of them, and about the criteria being used to evaluate their performance. Role ambiguity has long been recognised as a potent job stressor (Kahn et al., 1964; Rizzo et al., 1970); and clarity of performance requirements is one of three pre-conditions for 'operator self-control' (Gryna, 1988). By defining in precise behavioural terms what are the performance criteria for employees within high-involvement environments, we may help to reduce role uncertainty.

Consistency in HRM practices.

Whilst the major vehicle for high-involvement management is change in work design (usually the implementation of self-managing work groups), the success of high-involvement strategies depends crucially on whether line management practices and HR functions are altered to be consistent with the new work designs: 'work organisation

strategies cannot be developed in isolation from changes to payment system, training, job evaluation, and working times. Integrated approaches to organisational design, employment and rewards policies, and management style are now required' (Buchanan and McCalman, 1989: 33). The same argument for aligning all organisational practices with the underlying philosophies of the company has been made elsewhere (eg the principle of 'support-congruence' in socio-technical systems theory: Cherns, 1976). A key task in achieving such an integrated approach is the definition of those work behaviours which constitute effective performance: since they are central to the selection, training, development, reward and appraisal systems which support the high-involvement approach.

In particular, performance appraisals are important in directing and rewarding behaviour, and thus it is vital that the criteria used for evaluating past performance reflect those behaviours which actually do contribute to the organisations' strategic objectives. Often, however, appraisal systems have been developed with little contact with the real jobs on the factory floor and are imposed upon line managers and supervisors without training. It is small wonder, then, that the process itself has come under much criticism for lack of objectivity, and that shopfloor workers themselves often regard appraisals as either threatening or irrelevant to their day-to-day work. Within the context of systems of performance appraisals that 'have promised so much and delivered so little' (Grint, 1993: 64), it is clearly important that the primary formal means of evaluating individual performance should reflect both the strategic goals of the organisation and the models of effective performance in day-to-day use by supervisors and managers.

In this paper we will be concerned with an examination of the nature of effective employee performance within an organisation based in the East Midlands. The company had for two years been implementing a 'people-oriented' philosophy of manufacturing in line with high-involvement principles. However, their staff appraisal system had not kept pace with the evolution of work designs at shopfloor level, to the point that over half of the staff had stated that they were not clear about the criteria being used to assess their performance. It was generally agreed that the performance appraisal system had become out-dated and ill-equipped to cope with the changes that had occurred in the production area. The major source of staff uncertainty was the mismatch between the performance criteria on which the system was based and the behaviours being encouraged as part of the high-involvement strategy. We saw the company's request to help them revise their appraisal system as an opportunity to explore the dimensions of effective performance, and we set out to investigate the behavioural expectations which had developed in line management staff within the production department. These would then provide a set of core dimensions of performance to be used in future performance appraisals, as well as to inform other HRM practices such as selection. The method compared and collated constructs from individual grids to achieve a core set of dimensions and then clarified and finalised this set through a series of group discussions between participants and researchers. A subsequent study by the authors (in preparation) examined the performance constructs of shopfloor employees within the same company.

MODELS OF PERFORMANCE EFFECTIVENESS

Current performance appraisal research places much emphasis on the nature of cognitive categorisations and schema structures which managers and supervisors build up in their interactions with subordinates (DeNisi, Cafferty and Meglino, 1984; Feldman, 1981; Ilgen and Feldman, 1983). Indeed, Dunn, Pavlak and Roberts (1987) have argued persuasively that the key to improving appraisal is a better understanding of these cognitive categorisations. They argued that one way to achieve this understanding is by the application of the repertory grid technique within the general framework of personal construct theory (Kelly, 1955). This technique has been successfully applied to the analysis of performance dimensions of supervisory tasks (Smith, 1986), and has been recommended for appraisal research in organisational settings (Borman, 1983; Easterby-Smith, 1980a; Pearn and Kandola, 1988).

Derived from Kelly's personal construct theory, the technique was designed to explore systematically the cognitive expectation systems which individuals use to anticipate and predict the behaviour of others. According to Kelly (1955), much of people's interaction with others is based on the need to reduce uncertainty concerning their behaviour; and they do this by constructing conceptual frameworks within which events can be assimilated. The building blocks of this cognitive framework are 'mini-theories' of others, known within Kelly's theory as 'personal constructs'. In their interactions, people will act in accordance with their system of constructs. When circumstances change faster than individuals' ability to alter their construct systems, people will tend to evaluate their own behaviour and that of others inappropriately. Furthermore, some parts of a construct system may change to fit new requirements while other parts remain constant; thus creating inconsistencies within an individual's thinking, so that mixed messages are conveyed to others.

The construct system of interest in this study relates to the models of effective performance in high-involvement work teams by managers and supervisors. Given the changing nature of the company's underlying philosophy toward work behaviours, we expected that the new culture of continuous improvement and high involvement work teams would lead to the development of new evaluative constructs by line managers. A key advantage of using the repertory grid technique to ascertain these models of performance is that grids are difficult to fake 'even by people who understand how they work' (Easterby-Smith, 1980b:9). Where constructs are generated which do not validly relate to an individual's construct system, these are likely to be revealed following further mathematical analyses of the grids. In contrast to grids, semi-structured interviews are likely to be susceptible to social desirability, and supervisors may generate dimensions more reflective of management training materials than of their own experience.

METHOD

The company

The study was conducted within the assembly department of an electronics company (Company F) in the East Midlands which designs, manufactures and installs equipment to measure, regulate, and control operations in such process industries as chemicals, nuclear power, and oil. It is a subsidiary of an American-owned international company with sites

throughout America, Europe and Asia. Company F employs 412 people, 70 of whom are based in product assembly which is responsible for the production of printed circuit boards (PCBs) and standard sub-assemblies. Production is characterised by relatively small batch and high variety: about 100,000 boards are made per year for 230 different products, although 25-to-30 boards make up 80 per cent of the volume. Once combined in sub-assemblies, these products are supplied world-wide to operations staff who install the equipment on customer sites.

The company's high-involvement approach

In 1988, in response to the need for cost reduction and customers' demands for a quicker response to orders and better quality products, five management strategies were established: loss prevention, total quality, supplier partnering, product-lines and just-in-time (JIT), and people involvement. The strategies of people involvement and product lines were designed to gain employee commitment as the key to high performance within the product assembly department. Consequently, broader and more flexible jobs were designed with a view toward 'ambitious performance expectations to replace work standards' and a 'strong employee voice'. Through this high-involvement approach, the company aimed to decrease cycle time, reduce inventory, improve on-time production, and develop a climate for continuous improvement.

The introduction of a product-based system of organisation in production began early in 1989 to replace a process-oriented assembly organisation. The department had experienced many of the problems which are commonly experienced with a functional organisation: an unbalanced work-flow, extensive re-working, many simple operator errors, and low operator ownership of the product (see, for example, Oliver and Davies, 1990). Semi-autonomous work groups were formed around product families, and each product-line group was responsible for achieving production targets as well as employee development goals. To facilitate this, team members developed publicly-displayed charts of their production schedules and primary performance indicators (eg per cent on-time delivery and quality yield). Teams also kept their own attendance, absenteeism, and sickness records. Skill matrices were developed by each line to allow the monitoring of individual and team skill levels and training requirements. Team members had weekly meetings to discuss the performance indicators, any problems in achieving the targets, and ideas for further improvements. The changes which were implemented from 1989 onwards were summarised by one line manager as follows: 'the culture in the production area is one of high involvement of all employees in various activities apart from direct manual work. The work-force and the individual teams are consulted on every major change in process or work design.' (Lodhia, 1993: 41).

On the whole, the implementation of the manufacturing strategies was a success. Performance was substantially improved (for example, the build cycle time -the length of time from kitting to shipping - was reduced from 14 weeks in 1989 to 2 days in 1992). Quality also improved; and the number of component suppliers was considerably reduced.

Performance appraisal at Company F

With the introduction of product-line teams, much higher levels of performance were expected from shopfloor employees, and the grading system was rationalised in order to

represented the non-preferred pole and a rating of 5 indicated the preferred pole. In addition to rating the elements, supervisors were also required to indicate on a five-point scale the importance of each construct for effective performance within the company's product line environment.

Analysis of grids and generation of performance dimensions

Our analysis of participants' grids and generation of performance dimensions proceeded in three stages. The first stage involved analysing the grids with a view to separating out those constructs relevant to performance evaluation within the participants' construct spaces. The most widely used procedure for analysing sets of grids (PREFAN, Slater, 1977; see, for example, Smith, 1986) is inappropriate for the present purpose since it assumes that the same elements are used in each grid. Consequently, each grid was analysed separately by principal components analysis (INGRID, Slater, 1977). INGRID gives a representation of both elements and constructs in the space defined by the principal components of the grid. Since we were interested in those constructs which were most closely associated with elements of performance effectiveness, we initially concentrated on those which loaded highly on the first two principal components. This, of course, leaves the possibility that we have in this way ignored potentially important constructs associated with other components. We therefore performed a secondary examination of the minor components of each grid to determine whether this information was valuable.

The second stage of analysis involved generating categories for high loading constructs which were related in content. One method for categorising qualitative data such as this has been suggested by proponents of 'grounded theory' (Glaser and Straus, 1967; Henwood and Pidgeon, 1992; Rennie, Phillips and Quartero, 1988). Advocates of this theory have proposed that the categorisation of qualitative data should not proceed with a view to assessing the data's fit with a-priori theoretical categories (as is the case in content analysis), but should proceed with a concern that categories will emerge 'in the course of the close inspection and analysis of qualitative data' (Henwood and Pidgeon, 1992:103). Thus, categories which emerge are 'grounded' in the data, rather than imposed on the data from a-priori theories. This approach complements that of personal construct theory in that it attempts to minimise the impact of researchers' theoretical preconceptions and biases.

Adopting the general principles of grounded theory, we started our analysis by generating categories from the content of each participant's high loading constructs. Constructs were examined in turn, and initial categories were generated. Further constructs were allocated either to existing categories or used to form a new category. Where patterns in the content of constructs suggested a revision of our category system, constructs were regrouped and categories renamed. It was sometimes difficult to resolve ambiguity from the wording of constructs alone and, in these cases, the constructs were initially allocated to more than one category, resolution of their ambiguity being left to the final stage of analysis.

The final stage of analysis involved validation of our initial categorisation of constructs through setting up a series of group discussion sessions between the researchers and members of the production management group. These meetings involved discussing differences and similarities in constructs, meaning, language/terminology, and even philosophies about high-involvement with the purpose of achieving a set of shared performance dimensions. Consistent with the personal nature of construct systems within

Kelly's theory, different numbers and types of constructs were generated by different participants. However, the meetings involved discussions which enabled maximising commonality of constructs and their meaning across people and made possible the development of a category system that could be used across the entire shopfloor. The discussions were also useful in highlighting issues with the technique and the process of feedback, and enhanced participants' sense of involvement and ownership in improving the appraisal system.

RESULTS

From the initial grid interviews, a total of 129 constructs were generated by the seven people interviewed; and the numbers of constructs generated per individual ranged from 8 to 35. As is common in most INGRID analyses, the first two components in all seven grids accounted for the majority of the variance in each respective grid; the average variance accounted for by both components being 72 per cent, with a range from 53 to 93 per cent. From a total of 129 constructs, 80 were selected on the basis of their loadings on the first two components in each participant's construct space. Secondary examination of constructs loading on minor components in participants' construct spaces did not increase the size of this set.

Our grounded analysis of these 80 constructs led to the generation of a set of 12 performance-related categories which encompassed 74 of the original 80 high loading constructs. Some miscellaneous constructs could not be allocated at this stage (e.g. 'having a bad record versus not having a bad record') and these were left unassigned. Table 1 shows our initial set of performance-related categories.

In discussing this category system with the production management group, attention firstly focused upon the deeper meaning of our categories and the accuracy of our assignment of constructs. There was broad agreement amongst the production management group members that we had captured the basic dimensions of performance effectiveness which underpinned the company's high-involvement philosophy. There was also discussion around the specific language and meaning of constructs generated from the different participants. Sometimes people labelled similar constructs with different terminology, and some people used the same words (eg 'good team member') to portray very different types of work behaviours.

Attention then focused on two further aspects of the category system: the extent to which a number of the categories were related (and could therefore be combined), and the observation that some categories represented behaviours which could be considered as 'baseline competencies' that were taken for granted for product-line members at the company. First, two categories were merged, 'speaking out' and 'confidence', to form a new category 'social confidence' to represent general social and self confidence and effectiveness in interpersonal interactions at work. Second, the categories of 'seeks personal development' and 'technical ability/competence' were deleted from the list as they were considered baseline competencies. This left a total of nine categories in the final category system listed in Table 2.

Although several of these revised categories appeared related in content, it was decided that the distinctions between them were important enough to keep them separate. Instead of combining categories, a set of four higher order categories was put forward. The first of these contains 'ownership of the production process', 'goal/task orientation, and 'multi-

TABLE 1. *Initial Performance-Related Categories.*

1. Ownership of the production process
 2. Goal / task oriented.
 3. Flexibility / adaptability
 4. Speaking out
 5. Confidence
 6. Effectiveness of communication within and across group boundaries
 7. Team-working and co-operation
 8. Multi-skilled / broad knowledge of the process
 9. Technical ability / competence
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skilled/broad knowledge of the process'. This category was labelled *Process Ownership*, and represents a sense of ownership of work problems and goals with a commitment to acquire the necessary skills to carry out the work effectively. The second group of categories, *Social Skills*, consists of 'social confidence', 'team-working and co-operation' and 'effectiveness of communication within and across group boundaries'. The categories of 'flexibility/adaptability' and 'systematic/planful' were seen as reflecting characteristic approaches to working which could be subsumed under the heading *Personal Style*. The final category, 'task performance', was felt to be important although unrelated to the others and thus placed in its own higher-order category. Constructs in this category, re-named *Loss Prevention*, related to aspects of the company's policy of loss prevention aimed at reducing accidents at work, minimising waste, and minimising the environmental impact of the factory. Table 2 lists the finalised set of performance categories and shows the classification of these into higher order dimensions.

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TABLE 2. *Final Performance-Related Category system showing Higher-Order Dimensions with subsumed categories and construct examples.*

PROCESS OWNERSHIP

1. **Ownership of the production process.** Indicates behaviours such as: being pro-active in changing things; actively pursues improvements; is inner directed and self-motivated; willing to go beyond minimum requirements; takes responsibility where has the experience; and is willing to take the driving seat on problems.
2. **Goal/Task Oriented.** Shows determination to meet schedules and deadlines; persevering in resolving problems to get the job out on time; is not easily distracted and concentrates on what needs to be done; hard-working and keeps to the task when busy.
3. **Multi-Skilled/Broad Knowledge of the Process.** Characterised by individuals who: are able to carry out competently many areas of the lines work; possess good cross-functional awareness of production processes; are familiar with a range of company products; who have a broad technical skill base; who are adaptable and can cover for others.

SOCIAL SKILLS

1. **Social Confidence.** Characterises an individual who is forward in opening up constructive discussion; makes positive verbal contribution of ideas; who takes action through verbal means; is not afraid to ask questions even if it means being controversial; is outgoing; is confident in communication; who shows a strong desire to learn through open, verbal enquiry; who is willing to question rather than just accept; and who doesn't need continual encouragement.
2. **Effectiveness of Communication within and across Group Boundaries.** Characterised by: an ability to communicate clearly; creates good inter-departmental relations; an ability to communicate technical ideas to others; acceptability from support groups;
3. **Team-Working and Co-operation.** Shows: strong willingness to help out in the group without hesitation; a 'Team-Help' spirit of communication; pro-social behaviour within the group.

PERSONAL STYLE

1. **Flexibility/Adaptability.** Characterised by: willingness to accommodate new ideas and change; can maintain multiple goals; is willing to move to other areas in the line without making a fuss; and is able to pull off of a task to deal with another without having problems returning to the original one.
2. **Systematic/Planful.** Characterised by: anticipatory, evaluative, and planful behaviour; systematic approach to achieving results; follows logical and consistent plan or sequence of activities; assesses information available before starting a task.

LOSS PREVENTION

1. **Loss Prevention.** Characterises an individual who: organised; keeps a tidy work area and knows where everything is; shows good attention to detail; is consistent in quality and output; and exhibits good housekeeping skills.

DISCUSSION

The aim of the study was to discover and describe the performance dimensions used by a production management group to evaluate shopfloor employees within a high-involvement organisation. We argued in the introduction that such organisations need descriptions of performance constructs to facilitate employees taking on broader roles, to reduce role confusion, and to enable consistency of HRM practices. The repertory grid technique was used to elicit the managers' performance constructs, which were then categorised into nine dimensions and four higher-order dimensions. Clearly, these dimensions are the primary outcome of the study and we discuss them first. This is followed by a description of some outcomes that can be seen as arising from the process of determining the dimensions. Finally, the implications of this study and some methodological cautions are put forward.

Performance dimensions

The content of the four higher order performance dimensions support the general argument that modern manufacturing strategies require a 'higher quality' workforce than that required in traditional environments. Consistent with other writers, the importance of the flexible application of multiple technical, cognitive and social skills is clear (eg Dean and Snell, 1991; Helfgott, 1988; Zuboff, 1988), as well as the need for a broad knowledge and understanding of the production process (eg Eurotynet, 1991; Lawler, 1992). The absence of work behaviours characteristic of traditional production systems is also noteworthy. For example, there was little mention of technical skills or knowledge (which were considered here as baseline competencies), and the types of traditional behaviours contained within the loss prevention category (eg tidiness, good housekeeping) were mentioned relatively infrequently. On the whole, the performance dimensions that were elicited support the view that high-involvement organisations require a knowledge worker rather than a shopfloor operator (Buchanan and McCalman, 1989), in a semi-professional rather than a specialised job (Zuboff, 1988).

This study builds on predictions of performance requirements in high-involvement organisations summarised elsewhere (eg Dean and Snell, 1991; Lawler, 1992; Snell and Dean, 1992) by providing specific dimensions with behavioural indicators. This is in contrast to the more common approach of identifying important competencies with vague terminology that is open to different interpretations by readers. Moreover, this study presented performance constructs which are not simply the authors' speculation but reflect constructs that are 'grounded' in the mental models of managers who were actively engaged in pursuing a high-involvement approach. As a consequence, our study has highlighted some important performance dimensions which have been relatively under-emphasised in the literature to date. Perhaps the most noticeable difference is the relative dominance of attitudinal/orientation variables such as ownership and social confidence. Of course, this may result from the types of tasks and technology specific to this organisation, although it seems likely that these factors are generally more important than other commentators have realised.

We look first at the category of *Process Ownership* which was a particularly salient aspect of performance in this study. Although there has been some limited reference to this construct elsewhere (eg Lawler, 1992; Buchanan and McCalman, 1989), it has rarely been defined precisely and tends to be used as a global description representing many facets of

behaviour. It has almost never been operationalised and studied systematically (but see Parker, et al., 1993, for an exception to this), perhaps because of the abstractness of the concept. Certainly, in this study we found that 'ownership' was the hardest concept to articulate, and one of the hardest to gain agreement on. Supervisors varied in the extent to which they saw ownership being taken by their subordinates. One degree of ownership is represented by workers who will own, take responsibility for, and be committed to the solution of a problem, but only when it has been allocated to them. A further level of ownership is shown by workers who will seek out and take on board problems and tasks for themselves without needing to be directed. Employees with this level of ownership are often described as those who 'break new ground' and who 'stretch the boundaries'. We concluded that these behaviours reflect different points along a single continuum rather than qualitatively different types of performance, and therefore need to be included as part of the dimension of process ownership. A similar dimension was described by Manz (1992) in discussing the distinction between self-managing and self-leading teams. This author suggested that self-leading teams are more extreme on a continuum of work team empowerment; and, in contrast to self-managing teams, 'the team itself would be directly involved in establishing the direction for its work efforts, not just determining how to carry out the directions' (Manz, 1992:1129).

Based on the findings of this study, we propose that the concept of ownership has three elements: ownership of the production process, goal/task orientation, and multi-skilling/broad knowledge. It can be summarised as involving pro-active behaviours and attitudes which reflect a sense of personal responsibility for the production process and the goals, as well as having the skills and knowledge necessary to act on this sense of responsibility. There is a strong emphasis here on being active and self-directed beyond the boundary of a narrow job. In a recent Eurotecnet report (Eurotecnet, 1991:28), a related construct was defined as 'self-learning competence', or 'an active power within people, making them engage continuously with all of their experiences (in an open and inquiring way) to understand and master them'. The authors of this report argue that this is particularly important because the type of knowledge required in manufacturing today can only be learnt through an active self-learning process where people know both why they are learning and how to learn. Ownership thus comes not simply from training, education or policy statements but from an active exploration and exposure to a broader range and depth of tasks (see Parker, 1993).

The second class of work behaviours we defined was *Social Skills*, including social confidence, effective communication within and across group boundaries, and team-working and co-operation. The particular importance of team-working has been noted elsewhere. For example, Hayes et al. (1988:258) suggest that high-performance organisations need to encourage joint efforts: 'Since most of the important problems in a factory involve more than a single worker, effective problem-solving also depends on the organisation's ability to stimulate and co-ordinate the ingenuity of many people, working together.' As stated in the Eurotecnet report, skills for this joint effort need to be developed: 'Constructive co-operation at the round table cannot be taken for granted, particularly for older workers, who have lived, thought and worked along Tayloristic lines for many years... so team-work has to be learnt' (Eurotecnet, 1991:27). Interestingly, although we included team-working in

the final category system, team-working behaviours were mentioned relatively less often by the supervisors and managers than by the shopfloor employees themselves. For those on the shopfloor, group-working skills and behaviours (eg helping, sharing) were the most salient behaviours they noted in co-workers, and the supervisors recognised that their distant role restricted their insight into the importance of such behaviours. This finding reinforces the value of including operators' constructs in a full analysis of models of effective performance.

Within the category of *Social Skills*, social confidence was also identified as a critical skill at Digital in Ayr where a high-involvement approach was adopted (Buchanan and McCalman, 1989:106). These authors cited a manager as stating:

Production people start out being very timid and quiet and they come on like gangbusters very quickly... They very quickly start to take responsibility and show skills the managers never thought they had. I mean, the ability to do a stand up formal presentation to a group of senior managers and do a terrific job.

On the whole, however, despite its evident importance for effective performance, the construct of social confidence has received little attention in manufacturing literature and has rarely been investigated empirically.

Taking the category system as a whole, managers' and supervisors' views of the requirements for effective shopfloor performance suggest that a qualitatively different type of performance is needed for high-involvement roles. Table 3 summarises the performance requirements of the high-involvement role by contrast with that within traditional shopfloor work designs where employees are expected to consistently perform a prescribed set of (mostly physical) tasks with a limited set of skills and knowledge. The content of this table is partly based on the performance dimensions elicited in the study, and partly on more general descriptions of high-involvement roles and requirements put forward elsewhere (Hayes, et al., 1988; Lawler, 1992). It involves a broader classification into basic ability requirements (i.e. skills and knowledge) and general orientations to work.

Workers in traditional jobs typically have a narrow orientation to their work, being primarily concerned with their own set of tasks, and focusing on short-term performance to obtain extrinsic rewards for themselves. Problems which occur outside of their job may be considered as belonging to 'somebody else' (such as the supervisor) and even problems within their job are dealt with in a reactive way (eg by patching up the problem rather than trying to prevent it). By contrast, high-involvement employees are required to be pro-active in pursuing collective goals utilising many different types of skills (social, technical, cognitive) and a broad range of process knowledge. The role of such employees is not static but open-ended (Susman and Chase, 1986). As such, employees with an orientation to take on board new tasks can stretch the boundaries of this role, and extend their skills and knowledge. This more flexible role fosters personal growth and development, and allows people to be active, independent, long-term oriented, deal in abstractions, and develop multiple abilities see Argyris's (1957) dimensions of personal development within organisations.

DIMENSIONS OF PERFORMANCE EFFECTIVENESS IN HIGH-INVOLVEMENT WORK ORGANISATIONS

TABLE 3: *Characterisation of the types of performance required in high-involvement organisations.*

Traditional shopfloor employee <i>Static job with defined boundary</i>	High-involvement employee <i>Flexible role with 'open-ended boundary'</i>
<hr/>	
General performance requirement	
Reliably and consistently conforming to a narrow set of prescribed tasks, procedures, and competencies	Pro-actively pursuing goals with evolving tasks, procedures, and competencies
<hr/>	
Skills and knowledge base	
<u>Narrow and shallow</u>	<u>Broad and deep</u>
single-skilled	multi-skilled
horizontally skilled (primarily technical/ physical/ man-machine skills)	vertically skilled (inc. technical, managerial, interpersonal, group-working, conceptual, cognitive, problem-solving skills)
individual and task-based knowledge	process knowledge (parts and whole) as well as business and strategic knowledge (eg of other departments, of JIT philosophies)
surface knowledge of process and systems (declarative: knowing 'what')	in-depth knowledge of process and systems (procedural: knowing 'why' and 'how')
Static skills and knowledge base with little development	Developing skills and knowledge base
<hr/>	
General orientation to work	
<u>Narrow</u>	<u>Broad</u>
task focus	goal and customer focus
focus on product	focus on process as well as product
individual focus	collective focus
short-term perspective (tactical)	long-term perspective (strategic)
<u>Passive</u>	<u>Active</u>
reactive approach	proactive, planning approach
doing as directed	thinking for self, using initiative
Focus on extrinsic rewards	Focus on learning and development

Process issues and outcomes

The process involved in obtaining constructions of performance using repertory grids was valuable in several ways. In general, it provided an open and structured forum for discussion of shopfloor performance within the company. This was important as members of the production management group often had differing attitudes about performance which seemed to reflect differences in broader views about strategies and management style. The repertory grid technique highlights and legitimises these differences. Rather than someone being 'wrong', the grids aid an understanding that individuals construct their world in different ways. This is not to say these differences were magically resolved; rather, the technique was useful in expanding people's understanding of other ways of viewing performance. The process also facilitated the development of a common language about performance. For example, articulating in behavioural terms what was meant by vague but commonly used terms such as 'ownership' often revealed that supervisors used the same term in very different ways. At a broader level, the existence of a common language facilitates the growth of a clearer and more consistent culture about performance. Hayes, et al. (1988:242) argue that the consistency required in decisions and actions across the organisation depends

much more on shared values - a common philosophy of management - than on superb analytic techniques. Although most companies create systems and policies to help structure specific kinds of decisions and action, they often fail to put in place the philosophy and principles that provide a clear sense of direction to the people who operate those systems.

The involvement of many different parties in the study was an important feature of the process. First, line management's participation in the project meant that they had a strong sense of ownership for, and understanding of, the performance dimensions which emerged. This is in contrast to the common situation where such issues are seen as 'personnel' concerns which bear little relation to production. We hoped that this would mean the appraisal system is considered meaningful by line management, and that supervisors would have more consistent views of the dimensions and thus appraise people more fairly. This involvement is also likely to be important in facilitating the development of the line manager's own role within high-involvement organisations. It has recently been argued that line management need to move away from viewing their responsibilities as purely technical and expanding (or redefining) their role to incorporate the management of human resources (Lowe, 1992:165). Second, the involvement of the personnel manager in all discussion meetings meant that the dimensions were readily transferred into a new appraisal system. Third, the involvement of shopfloor employees in the process is consistent with the philosophies of a high-involvement organisation, and alerts to possible biases in the 'blinkered' perspective of management. Finally, the feeling that the dimensions were 'valid' was enhanced by the involvement of independent researchers and the detailed process of data analysis.

A further advantage of the process adopted in this study is that detailed examination of individual grids allowed an investigation of possible halo effects or biases. For example, if the 'overall high-performing' construct aligned with a seemingly irrelevant performance dimension (eg 'sociable outside of work'), it is possible that this reflects a personal preference

on the part of the supervisor which introduces bias into everyday judgments about subordinates' performance. Such associations, however, need to be treated very carefully because they may in fact be misleading and - correct or not - are likely to be threatening to the supervisor or manager. Thus, providing such discussions are treated as exploring possibilities in a non-judging way (and preferably conducted on an individual basis prior to group meetings), the individual cognitive maps can be valuable in raising awareness to potential biases.

Implications of this study

There are practical and research implications of the performance dimensions elicited by managers. First, it is clear that the types of behaviours required in high-involvement jobs differ substantially from those in traditional shopfloor jobs, and HR practices should be aligned to reflect this. The selection of people who are trainable, self-confident and interpersonally-skilled individuals will be more important than selecting people purely on the basis of threshold technical skills. For existing employees in an organisation which is moving towards high involvement, the required changes to motivation levels, orientations, skills and knowledge will, in some instances, amount to a change in personality (see Frese, 1982 for his description of how jobs affect personality). Certainly extensive training and supervisory support is necessary to facilitate the development and growth required. Training usually considered appropriate for management groups is likely also to be valuable for shopfloor employees; for example, assertiveness training to facilitate speaking out, and basic business training to enhance strategic understanding. As Hayes et al. (1988:257) stated: 'A manager cannot get the people in a factory to work together to solve problems simply by announcing a new policy, however. They have to be trained in problem-solving techniques and given the necessary tools and equipment.' Even with training, high-involvement practices will not be suited to everyone, most obviously people with strong individualistic orientation; and options need to be generated for dealing with such people. For example, Buchana and McCalman (1989) describe how employees who did not take on board the changes were redeployed to other aspects of the plant where traditional forms of work organisation were still in operation.

From a research perspective, more studies are clearly needed in other contexts to establish the generalisability of these performance dimensions. A further important question to be addressed is the predictive validity of these performance dimensions. The process we adopted means we have captured supervisors' and managers' views of the important differentiating characteristics of work behaviour; however, the extent to which these relate to actual performance is yet to be determined. Further, we have argued that the feedback and negotiation meetings were likely to enhance supervisors' use of similar constructs and behavioural indices in performance appraisals. For those people present at the meetings, converging understanding of performance seemed to be an outcome. However, this could be tested empirically with follow-up repertory grid interviews with the same supervisors to see if greater commonality exists. Similarly, the clarity of employees' understanding of performance criteria could be assessed in a follow-up to the earlier opinion survey referred to above.

From a broader research perspective, the types of behaviours elicited here have implications for evaluation research. Typically, the outcome variables used to evaluate work design include variables such as job satisfaction and mental health; and this study suggests a broader range of outcome measures such as ownership, understanding of production processes, and social confidence. These outcomes need to be evaluated, and the process and conditions under which enhancements occur need further elicitation. For example, Parker, et al (1993) demonstrated that employees whose jobs were re-designed into semi-autonomous work groups developed greater ownership of production problems, enlarged their understanding of the factors which affect their performance, and increased their understanding of and support for the wider manufacturing strategies.

A final implication of this study is that, whilst it might be tempting to simply lift performance dimensions from other organisations, much value comes from the process of arriving at context-appropriate constructs. For example, the procedure that we used facilitates the development of a common language and shared understanding of performance, and therefore allows discussion of 'deep' differences in a non-threatening manner and opens people's eyes to new ways of seeing performance. This is not meant to imply that the process is easy: the repertory grid interviews and the feedback/discussion meetings required significant line management time. If such a process is taken up, we would recommend that the repertory grid procedure is carried out by experienced interviewers. As Easterby-Smith (1980b:3) notes, the technique is 'seductive' in appearing to provide accurate measurement of subtle perceptions, but it is also 'a delicate matter requiring considerable skill and sensitivity'. For example, interviewers need to take care not to impose their own construct system on interviewees' responses, whilst nevertheless gaining sufficient precision from respondents to generate behavioural and measurable constructs. In addition, we suggest that the feedback and discussion process is facilitated by an independent person, particularly since explicit examination of individual differences in performance views can be potentially threatening to people. We would also recommend involvement of as many relevant people in the process as is practical (eg line managers, trainers, human resource personnel, operators). This increases the extent to which a shared language is developed, ensures individual groups' biases are accounted for, and enhances the ownership of outcomes. Finally, we would recommend careful monitoring of the effects of the changes in performance criteria (eg operators' clarity of, and satisfaction with, the new criteria). However, although the process is involved, we would certainly recommend it for the strategic value of establishing a common philosophy of performance. It has been recognised elsewhere (Hayes et al., 1988; Buchanan and McCalman, 1989) that establishing and changing philosophies and values requires consistent and painstaking effort; but effort that is worthwhile in creating a sustained competitive advantage for the organisation.

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