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An Investigation of Attitudes amongst Production Employees

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ABSTRACT

This article is an in-depth investigation of attitudes held by production employees. In the first part, I characterize the types of attitudes that have been widely suggested to facilitate high performance within modern manufacturing. I then investigate the attitudes held by employees within a company endeavoring to enhance its competitiveness. Results suggest that many employees have a narrow and passive role orientation; beliefs that conflict with modern production strategies; and beliefs that are not conducive to a continuous improvement philosophy. In the final part, I suggest that such attitudes are not surprising in light of the organizational context. Strategies to promote the development of new attitudes are put forward. © 1996 John Wiley & Sons, Inc.

1. INTRODUCTION

The prevalence of buzz phrases such as "high performance," "high involvement," "the learning organization," and "empowerment" are indicative of a renewed interest in the contribution of human resources to competitiveness. Much is being written about the need to develop people and make full use of their mental as well as physical capabilities (e.g., Storey, 1994; Susman and Chase, 1986; Zuboff, 1988). This trend is typically not attributed to organizations becoming more concerned with employee well-being, but to an economic imperative. Many commentators go as far as to suggest it is impossible to meet simultaneously the goals of low-cost, high-quality, responsiveness to customers and innovative product ranges with a traditional control-oriented approach. Instead, it is suggested that maximum competitiveness within Western industries can only be achieved by developing a more skilled, flexible, and highly committed work force (Hayes, Wheelright, and Clark, 1988; Womack, Jones, and Roos, 1990; Zammuto and O'Connor, 1992). For example, Lawler (1992, p. 34) describes how, where labor costs are high and competition is global, the enskilling approach is the only way to compete: "If employees do not think, solve problems, and control themselves, they simply cannot add enough value to the product to compete with low wage employees elsewhere in the world."

Such arguments are consistent with research stemming from broader theory about the relationship between environmental uncertainty and organizational structure (e.g., Gailbraith, 1977). That is, most modern manufacturing contexts are characterized by greater uncertainty arising from, for example, rapidly changing customer demands, dynamic links between the organization and its customers or suppliers, and constantly changing technologies. In such uncertain and unpredictable environments, studies suggest that effec-

tiveness will be enhanced by devolving tactical decision making to the lowest level possible and developing a "professional" work force (Slocum and Sims, 1980). Within modern manufacturing settings, there is indeed a move away from the traditional production employee who is expected to perform a fixed set of prescribed and simplified tasks in a consistent manner. Instead, it is argued that a new type of "high performing" operator is needed—one who is willing and able to: operate sophisticated technology, use multiple skills and be flexible, work in teams, contribute to the business direction, and be proactive in preventing problems and improving the process (e.g., Buchanan and McCalman, 1989; Lawler, 1986, 1992; Wood, 1989).

If such an employee is necessary within uncertain and complex manufacturing contexts as is widely argued, then it is critical that research attention be given to the detailed specification of the required competencies. A particularly important aspect, and the focus of this article, is the need for operators to develop new attitudes towards their work. Storey (1994) states, "the need for 'a change in attitudes' is noted by virtually all commentators on the various new manufacturing methods" (p. 14), and Turnbull (1986, p. 203) claims that British managers are starting to recognize that "the organization and management of employees, together with their attitudes, are perhaps the most important (and certainly the most idiosyncratic) resource on which productivity and competitive performance ultimately depend."

The importance of attitudes in facilitating higher levels of performance lies in the type of behavior expected within modern manufacturing contexts. In traditional manufacturing jobs, employee behavior is typically either constrained by the technology (such as the pace of machines) or coerced through mechanisms such as clocking-on and clocking-off (ensuring good time-keeping) and individual bonus schemes (ensuring a high quantity of products). However, employees in modern manufacturing are required to carry out a broad and flexible role in which many of the behaviors required (e.g., making suggestions, using initiative, preventing problems) cannot readily be coerced. This makes attitudes particularly important in guiding behavior. Effectively, the development of appropriate attitudes can be seen as a form of "cultural control," where norms and expectations, rather than rules and regulations, guide behavior (Child, 1984). Consistent with these arguments, cultural control is suggested to be most appropriate within uncertain environments where information processing requirements are high (Clegg, 1984), as is the case in many modern manufacturing settings.

However, although a need for new attitudes amongst production employees is widely acknowledged, there have been very few studies that have examined the issue in any depth. This is the aim of the current article, which is in three parts. The first part is a characterization and synthesis of the types of attitudes and understanding that have been suggested to be necessary for shopfloor high performance. The second part moves on to examine the attitudes and understanding present amongst production employees within a company that was attempting to introduce new systems and technologies. This highlights the discrepancy between attitudes that are argued to be necessary and attitudes that can exist in actuality. The third part examines the origin of employee attitudes and levels of understanding present amongst employees in the case study, and outlines organizational strategies that can promote change. The argument is made that the attitudes reflect long-term exposure to the Taylorized work practices, culture, and structure that exist within the organization, and hence that employee development cannot be expected until there are changes to these aspects.

2. CHARACTERIZATION OF ATTITUDES REQUIRED FOR HIGH PERFORMANCE

A starting point for this discussion is the need for a clear understanding of attitudes. Allport (1935) defined an attitude as: "a mental or neural state of readiness, organized through experience, exerting a direct or dynamic influence on the individual's response to all objects and situations to which it is related." This highlights two key points. First, that attitudes are a reflection of experiences rather than something people are born with, and thus are open to change through altering experiences. Second, that attitudes influence intentions to behave and therefore can affect performance.

Attitudes are typically considered to be composed of an affective (or feeling) component and a cognitive (or belief) component. The affective component involves concepts such as liking/disliking, happiness, and boredom, whereas the cognitive/belief component involves terms and concepts such as causes, prevents, results in, and leads to (Rajecki, 1982). Within the psychological literature on job-related attitudes, the focus has primarily been on the affective component, tapped by a wide range of constructs such as job satisfaction, organizational commitment, and well-being. Many studies of the predictors and consequences of these attitudes exist (e.g., see Wall and Martin, 1987). In this article, however, I take a more cognitive focus and examine employees' beliefs about their job and wider production strategies, rather than their affective reactions to that job or the strategies. In order to reflect this more cognitive emphasis, I use the term orientation. Two broad types of orientation can be distinguished: (1) role orientation (i.e., people's beliefs about what their job involves), and (2) strategic orientation (i.e., people's beliefs about production methods, principles, and philosophies).

There is an extensive literature which suggests (but is rarely explicit about) the types of role and strategic orientation required for effective performance within modern manufacturing. I summarize this literature, and because orientations are underpinned by knowledge, I also describe the importance of operators developing a broader understanding.

2.1. Role Orientation

One of the dominant themes in the literature on modern manufacturing is a requirement for production employees to carry out a broad, emerging role that encompasses a wide and flexible set of tasks (e.g., Susman and Chase, 1986; Zuboff, 1988). Clearly, employees need to develop a role orientation that aligns with these requirements. This involves at least two aspects. The first is the need for a role orientation in which employees *feel ownership for a broad range of production problems and issues*. This includes feeling ownership of, or shared responsibility for, production goals (such as customer satisfaction, high quality) as well factors that might affect the achievement of these goals (such as machine breakdowns or a lack of group cohesion). Broad ownership of problems contrasts to a narrow role orientation that has been variously described as the "job myopia," "its not my job" syndrome, or a "sod it" mentality (e.g., Karasek and Theorell, 1990; Wood, 1990). Davis and Wacker (1987) suggest that such narrow role views are inappropriate for high performance because "important needs go unmet because those who are first aware of problems shrug it off as not part of their job." Consistent with this, Parker, Mullarkey, and Jackson (1994) reported that ownership of the production process was a critical performance dimension for employees within a company which had successfully introduced new manufacturing initiatives.

The literature suggests the importance of a second and related dimension of role orientation. This is the need for employees to have a role orientation with a *proactive view of performance*. It is widely cited that high-performing production employees are expected—not just to own and react to a broader range of problems—but to prevent the occurrence of problems in the first place as well as to continuously improve products and processes. For example, Hayes et al. (1988, p. 250) claim that "employees need great flexibility to respond to situations as they arise, to develop better approaches to their jobs, and to seek out and remove the root causes of recurring problems." Thus, rather than seeing the responsibility for proactive tasks and problem solving as exclusively the job of the supervisor, operators need to accept the need for such behavior as part of their own role. In a case study of the implementation of new initiatives, a manager noted the benefits of a proactive role orientation: "They (operators) will come and tell us when they foresee a problem coming, whereas before they wouldn't. If they saw a problem coming, they'd put their feet up" (Buchanan and Preston, 1992, p. 66).

2.2. Strategic Orientation

One of the most significant aspects of the new technologies and practices prevalent in modern manufacturing is that they are based on very different assumptions than those inherent within traditional manufacturing (Webster, 1993). This has led to the suggestion that operators need to develop fundamentally different beliefs that are often the reverse of those appropriate to more traditional methods.

First, operators need to develop a strategic orientation in which they have *beliefs that are consistent with modern production methods and strategies*, such as those involving production control (e.g., Just-in-Time, JIT) and quality (e.g., Total Quality Management, TQM). JIT production control involves the assumption that production should be "pulled" according to demand rather than "pushed" according to capacity, with inventory levels minimized to facilitate a smooth flow of products. This requires operators to develop new beliefs, and move from "just-in-case thinking to just-in-time thinking" (Oliver and Davies, 1990, p. 564). The latter authors described case studies where problems occurred because the JIT strategy did not align with people's assumptions. Employees saw a lack of inventory on the shopfloor as suggesting a low work load, and as noted by a team leader: "people get very jumpy when there's no work and they try to create work" (p. 564). TQM similarly encompasses new principles that employees need to accept if they are to work effectively, such as the idea that prevention rather than detection of faults is the way to proceed (i.e., the principle of "right first time" advocated by Crosby, 1979), and the view that quality is largely the responsibility of management (Deming, 1986).

It is widely recognized that to survive organizations need to constantly strive to improve and adjust to changing markets (Hayes et al., 1988). Thus, in addition to developing new beliefs about production methods, operators need a strategic orientation in which their *beliefs align with the need for continuous improvement and innovation*. In other words, there needs to be a "a norm of continuous improvement" on the shopfloor (Oliver and Davies, 1990, p. 569). As suggested above, this requires operators to have a role orientation where they take on board the need for proactive behaviors, such as making suggestions for improvements. However, in addition, operators need to develop new beliefs about the ways in which competitiveness is sustained, for example, recognizing that new technology on its own will never be a complete solution. They have to understand

and accept the need for continuous improvement of both products and processes, and develop a questioning attitude that challenges the status quo.

2.3. Underpinning Knowledge of Manufacturing

Although the focus of this article is on attitudes, it is clear that these are shaped by people's knowledge and understanding. That is, a broader knowledge base underpins the development of orientations and appropriate beliefs. Commentators have argued that, with the introduction of new flexible techniques and technologies, operators will need to know about: production processes and their interrelationships; how they as an individual and as a team contribute to the business; the functions performed by nonproduction departments; and many other aspects, such as who are the customers and competitors and what are the company goals (e.g., Buchanan and McCalman, 1989; Lawler, 1986, 1992). Lawler suggests that without such a broad knowledge base, employees will put forward solutions to problems that look great from their perspective but that contain "roadblocks" elsewhere because they do not take into account what goes on outside their limited area.

2.4. Summary

In summary, evidence exists to suggest that the following types of orientation will facilitate high performance amongst production employees within modern manufacturing contexts:

- A broad and proactive role orientation, indicated by:
  —ownership of a broad range of production problems and issues, and
  —a proactive view of performance.
- An appropriate strategic orientation, indicated by:
  —beliefs consistent with modern methods and strategies (e.g., JIT, TQM), and
  —beliefs that align with the philosophy of continuous improvement and innovation.

In addition, underlying such an orientation, employees also need:

- a wide understanding of manufacturing beyond their immediate area.

3. AN INVESTIGATION OF EMPLOYEE ORIENTATIONS AND UNDERSTANDING

Few studies have systematically investigated the extent to which the attitudes described above exist in actuality. In the following case study, I outline a method of assessing orientations, and describe the orientation and level of understanding amongst employees within a company that was attempting to enhance its competitiveness through various new initiatives. The emphasis of the study is on production employees, although by way of comparison, results are also reported for support staff (i.e., production control staff, production engineers) and for supervisors.

3.1. Background

The study was carried out in the Production Department of a small American-owned engineering company in the North of England. The company manufactures drill-bits for the mining and construction industry.

In order to compete with two larger competitors, the company needed to improve product quality and respond more quickly to demands with increasingly small batches, while maintaining a low cost per product. Several changes were taking place in Production to facilitate adjustment to these market demands, including the gradual replacement of older machinery with CNC machines and the introduction of: customer audits of quality, British quality standards, a computer-controlled scheduling system (MRPII), and single-operator machining cells. However, although senior management were trying to achieve a smoother work flow, many problems inhibited the introduction of a complete JIT system, such as unreliable steel supplies, unbalanced work flows, and a lack of preventative maintenance. On the whole, the changes were limited to those that did not require major work reorganization or management restructuring.

Within Production, the organization of work was based on job simplification principles. Direct operators carried out the steel turning and shaping, while indirect operators were responsible for quality inspection, setting up machines, and maintenance. With the exception of some of those working in cells, operators had limited control over the scheduling of work, product designs, or the programming of CNC machines. Supervisors performed a traditional controlling and directing role, production controllers were responsible for planning the work flow, and production engineers designed products and programmed machines. The traditional control structure was reinforced by personnel practices such as clocking-on and clocking-off, and an individual bonus system. Management's main contact with employees was through Trade Union representatives, and all of the workforce was unionized. Only production controllers and production engineers (collectively referred to as "support staff") had been involved in discussions about, and had received training in, MRPII and JIT.

3.2. Method

The research was conducted over a 2-year period, and involved a site-wide survey, interviews with a sample of people, and extensive observation (based on over 50 visits to the company). An action-research style was adopted whereby the researcher worked in collaboration with employees and managers. A steering group, including representatives from the shopfloor and management, was set up to oversee the research.

3.2.1. Survey Design and Administration. With the assistance of the steering group, a questionnaire was designed to be appropriate to the context. Employees were asked to complete the questionnaire at home and return it to the researcher (management reneged on an earlier agreement to allow work time for questionnaire completion). The instructions stressed the confidentiality of the responses.

Seventy-one people completed the questionnaire, approximately 50% of those within Production. This included 51 direct and indirect operators (approximately 50% of all operators); seven supervisors (100% of supervisors); nine support staff (about 75% of support staff); and five others. As these figures indicate, a higher proportion of staff than operators completed the survey. Members of the steering committee believed that only the more motivated operators filled in the questionnaires, and that very traditional em-

ployees (referred to by members of the steering group as "the dinosaurs") refused to participate. This means that the results described in this article probably represent the views of a certain type of employee and need to be interpreted with this in mind.

3.2.2. Measures. The survey contained a range of measures (e.g., job content, mental health, perceptions of the company). However, the measures of primary interest here were those assessing people's role and strategic orientation.

Role orientation was assessed in two ways. First, a measure was designed to assess people's ownership of production problems. Respondents were asked to indicate the extent to which a series of production problems would be "of concern" to them. This included three main types: goal-related problems (such as "customer dissatisfaction"); efficiency-related problems that inhibit goal achievement (such as "excessive handling of products"); and group coordination problems that inhibit goal achievement (such as "a lack of skills in the group"). It is assumed that ownership of these three types of problems indicates a broad and proactive role orientation. As a response check, employees were also asked to rate their concern about individual-level problems that traditionally would be expected to concern shopfloor operators (such as "not reaching the maximum bonus rate for the week"). Table 1 shows the complete set of items.

Role orientation was also assessed with items from a second measure, which included items to assess strategic orientation. Respondents were asked to rate on a five-point scale their agreement or disagreement with a series of statements about roles and operator performance (tapping role orientation); and about relevant production principles such as inflexibility, reactive versus preventative problem solving, inventory control, and continuous improvement (tapping strategic orientation). A sample item assessing strategic orientation is: "It is important to keep making products, even if they go to stock rather than directly to customers." A person who has some understanding of, and support for, JIT principles is likely to disagree with this statement. However, to a person without much awareness of the JIT philosophy, this statement is likely to sound highly plausible. Because the items deliberately tapped a level of awareness and understanding of the principles, most items were worded as the antithesis of the target belief. This meant that the "wrong" answer would seem legitimate and plausible to people who did not have clear views or understanding. The set of items is shown in Table 2.

The scaling properties of these measures are not relevant here as this study focuses on responses to individual items (see Parker, Wall, and Jackson, in preparation, for a complete description of scale measures).

3.2.3. Interviews. Semistructured interviews lasting about 1 h were conducted with a sample of operators (specifically, six direct operators, one quality inspector, one setter, and one union representative) and with one supervisor. Interviews were focused around attitudes towards roles, strategies, and philosophies, as well as understanding of general manufacturing issues such as customers, goals, and suppliers. Responses were recorded on a portable tape recorder and transcribed in full. Content analysis was used to identify key themes.

3.3. Results

Based on integrating results from the questionnaire and the interviews, descriptive accounts are given for each of the categories identified in the first part of this article. Note that results for indirect operators, such as machine setters and quality inspectors, and

TABLE 1. Responses to Items Assessing Ownership of Production Problems

Items	Production Employees ($N = 51$)	Supervisors ($N = 7$)	Support Staff ($N = 9$)
Individual-level problems (response-checks)			
1. You cannot produce at the maximum bonus rate (e.g., due to machine breakdowns, lack of training)	21 (directs only)	n/a[a]	n/a
2. The materials/products you receive to work on are of poor quality	25	n/a	n/a
3. You cannot produce high-quality work (e.g., due to machine breakdowns, lack training, etc.)	29	n/a	n/a
Goal-related problems			
4. Customers of the products you deal with are dissatisfied with what they receive	22	14	11
5. The quality of the products made in your work area is not as good as it could be	22	14	11
6. Orders for the products you deal with are repeatedly not being met on time	34	0	11
Efficiency-related problems			
7. There is much unfinished work sitting in your area	33	0	0
8. Other departments respond slowly after you have requested their assistance	31	29	0
9. There is a pile of completed work in your area	40	14	11
10. The way some things are done in your work area means a lot of rework is needed	41	29	11
Group coordination problems			
11. Others in your work area are not pulling their weight	46	43	0
12. People in your work area are not coordinating their efforts	42	14	
13. There is a lack of well-trained people in your work area	38	33	0

Responses indicate the percentage who report "little concern" or "no concern" for the problem.
[a]n/a means that the question was not asked of, or not applicable to, this group.

TABLE 2. Responses to Belief Statements

Items	Production Employees ($N = 51$)	Supervisors ($N = 7$)	Support Staff ($N = 9$)
1. Specialists (e.g., engineers) and managers should be the people that make suggestions to improve production efficiency	37	43	56
2. Efficient workers get on with what they have been told rather than questioning things	37	14	11
3. In the long run, production is more efficient if people stick to what they know already, rather than learning new things	33	29	0
4. A supervisors job is to tell people what to do and keep watch over them to ensure they do it	41	14	67
5. If all workers are on flat-rates of pay, supervisors will be more important than ever to keep them working	43	86	78
6. It is important to keep making products, even if they go into stock rather than directly to customers	33	14	22
7. In a well-run Production Department, an expensive machine must never be idle	84	57	56
8. In a production department, time spent not producing is time wasted	73	43	56
9. The most important goal of a production department is to keep producing no matter what	14	0	11
10. It is reassuring if there is always a large pile of work waiting for me to work on	84	n/a[a]	n/a
11. When I see lots of work on the shop-floor waiting to be finished, I feel confident of this companies future	55	14	0
12. Inspectors will always be needed to check the quality of operators work	74	57	0
13. The best way to solve problems is to find out who is to blame	50	43	0
14. Fixing problems as they arise is more important than trying to prevent them	20	14	0
15. When an organization is running smoothly, there is no need to think about changing things	36	17	0
16. For a manufacturing company to be successful these days, it must invest heavily in the latest technology	80	57	67

Figures represent the percentage who "agree" or "strongly agree" with the statement.
[a]n/a means that the question was not asked of, or not applicable to, this group.

direct operators are merged for most items as responses were very similar. These are collectively referred to as operators.

3.3.1. Operators' Role Orientation. Most operators appeared to have a narrow and passive role orientation. First, they had *ownership for only a limited range of production problems and issues*, reflected in their clear but narrow focus on a small part of the production process. For example, one operator felt responsible for the quality of what he produced only until "it's put on the floor," and another described how he was "responsible for turning my work out and making sure it's turned out properly, and that's about it really." Similarly, when asked about production goals, one operator stated: "All I know is what I'm trying to achieve, and once I've done my job then it's on to the next person and I lose contact with it, you know."

A more in-depth analysis comes from the questionnaire results. Table 1 shows responses to the items assessing ownership of production problems for operators, supervisors, and support staff. For each item, the percentage of people indicating they were unconcerned about the problem (i.e., reported "little" or "no" concern) is shown. In general, I highlight those items where one-third or more of the respondents gave an answer indicating a narrow orientation. This is considered a significant percentage of the population, especially given the bias of the sample towards more "modern" employees (see Method) and the possibility that some respondents who choose an "appropriate response" might do so on the basis what they perceive they should feel (e.g., as a result of seeing company documents) rather than what they actually believe.

As would be expected, most operators had ownership for problems with immediate implications for them (items 1–3). For example, over three quarters of direct operators (excluding indirect operators who are paid on an hourly rate) reported they would be concerned to some degree if they could not "produce at the maximum bonus rate." Similarly, most operators reported feeling concern for goal-related problems concerning customer dissatisfaction and quality (items 4–5).

However, while messages about the importance of quality and customer satisfaction were taken on board by operators, they had less ownership for the goal of fast lead times. More than one third of operators reported they would not see it as "their problem" if lead times were slow (item 6). Similarly, there was less widespread ownership of the mechanisms by which production goals are achieved. First, operators lacked ownership of efficiency-related problems. Over one third did not see it as their concern if: "There is much unfinished work sitting in your area" (item 7); "There is a pile of completed work in you area" (item 9); and "The way things are done in your work area means a lot of reworking is needed" (item 10). Yet, accumulated inventory and extensive reworking can affect the goal of achieving fast lead times. Second, many operators did not own group coordination problems (items 11–13). For example, 42% felt it was not their concern if "People in your work area are not coordinating their efforts." Yet, within an interdependent production environment, it is important to coordinate activities to meet shared goals.

In addition to having limited ownership of production problems, employees appeared to have *passive views of performance*. This can be seen from the results of select items in Table 2. For each item, the extent to which people "agreed" or "strongly agreed" with the statement is shown (note that, in terms of the requirements of modern manufacturing, the more "ideal" response would have been to disagree with each of the statements). The results show that operators do not appear to have taken on board the espoused view that they should use their local expertise to provide innovative solutions to production prob-

lems. Over one third (37%) agreed with the statement that "Specialists (e.g., engineers) and managers should be the people that make suggestions to improve production efficiency" (item 1), and over one third agreed with (and another 10% were unsure about) the principle that "Efficient workers get on with what they've been told rather than questioning things" (item 2). Also suggesting a passive view of performance, about one third of operators agreed that "In the long run, production is more efficient if people stick to what they know already, rather than learning new things" (item 3).

Operators' view of their role is also indicated by the traditional way they construed the supervisory role. Planning-based aspects of production (such as organizing work and ensuring a smooth work flow) were seen as the supervisor's responsibility. This is well illustrated in this operator's comment: "The supervisor should make sure that you have got work at the side of the machines, and when I've finished that job I should just go to supervisor and say, 'look, I've finished this, what's next?' and that's as far as I should go." This perspective was held more widely. As shown in Table 2, 41% of operators agreed with (and another 10% were unsure about) the statement "A supervisors' job is to tell people what to do and keep watch over them to ensure they do it" (item 4).

3.3.2. Staff Members' Role Orientation. As would be expected, a greater percentage of supervisors and support staff than employees reported ownership of production goals and the mechanisms by which they are met (Table 1). Nevertheless, ownership of group coordination problems was not as widespread as might be anticipated for the supervisors. For example, at least one third this group reported they would not feel it of concern to them if "There is a lack of well-trained people in your work area" (Table 1, item 13). This suggests some supervisors hold a relatively narrow view about their responsibilities; a point further illustrated in this supervisor's description of his job: "My job is to see that we get a fast through-put on the job, to see that times are adhered to and the back of cards are not fiddled, and to keep costs down. Cleanliness of shop, health and safety things come into it too." Nearly half of the supervisors (43%) agreed with the assertion that they should be the people to make suggestions to improve production efficiency (Table 2, item 1). Similarly, suggesting a controlling view of their role, nearly all supervisors (86%) agreed with the item: "If all workers are on flat rates of pay, supervisors will be more important than ever to keep them working" (item 5).

This role orientation contrasts to the "supervisor as first-line manager" concept recommended by Child and Partridge (1982) in complex production situations. Here, minor disturbance handling and progress chasing are devolved to the work group, and the supervisor is responsible for strategic and planning activities (such as selecting and coaching employees, setting objectives, working on improvements, managing boundaries, and providing resources). As shown in a study by Buchanan and Preston (1992), failing to develop a supervisory orientation that aligns with new requirements can be a major obstacle to change. With the introduction of self-managing work teams, supervisors continued to see their job as organizing work and dictating operations, causing conflict with operators who became increasingly dissatisfied with what they saw as "interference" in their daily work.

3.3.3. Strategic Orientation. Operators in this company had a strategic orientation that was strongly aligned to traditional manufacturing. First, they had *beliefs that were inconsistent with the principles of modern production methods and strategies*. For example, despite the fact that this organization was attempting to introduce products just-in-

time for the customer, there was no widespread understanding of the principle to produce goods on demand. One third of the operators agreed with the statement that "It is important to keep making products, even if they go into stock rather than directly to customers" (item 6). More subtle items revealed the presence of traditional beliefs even further; 84% of operators agreed that "In a well run Production Department, an expensive machine should never be idle" (item 7), and 73% of operators agreed that "In a production department, time spent not producing is time wasted" (item 8).

Traditional beliefs about work flow are likely to foster behaviors that would be inappropriate within a JIT environment, such as producing high quantities at the expense of quality, and not taking time to prevent problems. In addition, holding traditional beliefs might also affect well-being. For example, views about the security of the firm were based on an inappropriate criteria. Over 80% of operators agreed that they feel reassured when there is a large amount of work waiting for them to work on (item 10); and over half agreed that seeing lots of work waiting to be finished on the shopfloor made them feel confident about the company's future (item 11). This suggests that, until people develop a better understanding about JIT principles, attempts to remove inventory are going to be perceived as threatening to job security and might cause stress amongst employees.

Operators also held views about quality and its management that were not compatible with a program of TQM. In interviews, high quality was typically described as an end-product that conforms to drawing standards. This contrasts to the usual TQM view that high quality should be seen in terms of meeting customer requirements. Further, when asked for the key contributors to good quality, many responses concerned the need for good inspection (e.g., "you need to have good inspectors to keep you on your toes") as well as the need for individual operators "taking a lot of care." There was little awareness of preventative approaches to improving quality or of the importance of effective management and systems. In the survey, 74% of operators (and 57% of supervisors) agreed with the statement that "Inspectors will always be needed to check the quality of operators' work" (item 12). As shown in the following comment by a supervisor, even this group held beliefs that suggested a narrow understanding of quality improvement:

> I mean we can talk to the men and try and get them thinking conscientiously. But at end of the day, only thing we can do (to improve quality) is make them do the work on lesser rate of pay than what they get for producing. Its a penalty so they don't do it again.

Related to these views, there was a "blaming" mentality amongst the shopfloor, which goes against the TQM principle of systematically attacking problems to prevent their reoccurrence. Half of the operators, and nearly half of the supervisors, agreed that "The best way to solve problems is to find out who is to blame" (item 13) Nevertheless, most operators accepted the need to try and prevent problems (item 14).

Many employees had a strategic orientation that was *not conducive to innovation and continuous improvement*. First, although most of the people interviewed felt that the Production department was doing "quite well," this tended to be defined in terms of a lack of problems rather than in terms of areas for improvement. For example, when asked about the lead-time (at a period when slow delivery dates were seen as problematic by senior management), a typical response is illustrated by this employees' comment: "I don't know how long it takes to get from start to finish. . . . I don't think they really get far behind with them."

Second, related to this narrow understanding of competitiveness, many comments made by employees revealed an implicit assumption that problems could not be prevented, such

as "you're bound to scrap an odd one occasionally, its inevitable," and "well, they (machine breakdowns) are common in every engineering company, you know." Such acceptance of the "status quo" is in direct contrast with the ethos of continuous improvement. Indeed, over one third of the operators (36%) agreed that "When an organization is running smoothly, there is no need to think about changing things."

Third, when asked for ideas about improving aspects of production, a typical response was: "Well, I've never really thought about it actually, until you really asked me about it." Even when ideas were put forward, the proposed solutions to problems often involved a technocratic approach with an explicit focus on improving machines or tools. For example, when asked to think of any ways to enhance quality given an unlimited budget, several people thought new machinery was the only answer (e.g. "with the machinery we've got, I don't think you could get better quality than what we're getting, as we stand"). Similarly, as shown in Table 2, the item that people agreed with more consistently than any other concerns technology and success: over two thirds of all groups agreed that "For a manufacturing company to be successful these days, it must invest heavily in the latest technology" (item 16). In fact, as stated in the introduction of this article, heavy investment in new technology is not necessarily the way forward and attention to organizational issues and working practices may be more important.

3.3.4. Underpinning Knowledge of Manufacturing. In the current company, shopfloor employees appeared to have a *narrow understanding of manufacturing beyond their immediate work area*. Only one of the six operators interviewed had any idea about customers. One person described them as "just names on a sheet," and another stated: "the only thing I know about customers is when I look on the job chart." Similarly, although people speculated when prompted, they lacked an understanding of production goals or targets ("they just give me a list. The list is the target"). A quality inspector remarked "You can only look around you and guess what they are trying to do. Are they building a stockpile in the warehouse or are they trying to run it order to order? I don't know."

Consistent with the findings described earlier, there seemed to be a better understanding of the need for quality than of the need for fast lead times. This is probably because the importance of quality is relatively obvious and intuitive. In contrast, appreciation of the need for fast lead times requires an understanding of issues such as market demands, the cost of inventory, and the need for flexible responses. One person who understood the importance of short lead times nevertheless lacked insight into the ways in which this could be achieved. He saw it purely in terms of "making us do the work faster and working harder." He showed no understanding of concepts such as bottlenecks in production, large batch sizes, or other systemic factors that affect the throughput time of products.

3.4. Summary

The detailed analysis presented here suggests that the attitudes described in the first part of the article were not evident amongst shopfloor employees in this company. Operators had a narrow and passive role orientation, traditional beliefs about production strategies, beliefs that were not conducive to innovation, and a limited understanding of wider manufacturing issues. This contrast between the orientation and understanding of case study employees and the "high-performing" employees described in the literature is summarized in Table 3.

As will be argued in greater depth in the next section, the attitudes held by employees in this company most likely represent an appropriate, adaptive response to the Taylorized

TABLE 3. Summary of the Orientation and Understanding of Case Study Employees Compared to "High-Performing" Employees

	Case Study Employees	High-Performing Employees
Role orientation		
a. ownership of production problems	Narrow/individual ownership • Ownership of those production problems which have direct impact for individual • Ownership of short-term, task-oriented problems	Broad ownership • Ownership of a range of production problems, including goal-related, efficiency-related and group coordination problems • Ownership of product and process
b. view of performance	Passive view of performance • Seeing role as doing what told (i.e., reactive) • Seeing supervisory role as directing and controlling	Proactive view of performance • Seeing role as doing whatever is necessary to meet goals • Accepting the need for self-direction • Seeing supervisors and experts in terms of support
Strategic orientation		
a. beliefs about production methods and strategies	Traditional beliefs about production control, for example, • producing a lot is best •excess inventory means company is doing well	JIT-related beliefs about production control, for example, • producing on demand is often best • excess inventory costs money

	Traditional beliefs about quality, for example,	TQM-related beliefs about quality, for example,
	• inspection by staff is the way to control quality	• it's better to prevent problems ("right first time") and find their root cause
	• the way to solve problems is to find someone to blame	• value should be added, and waste avoided
b. beliefs conducive to continuous improvement and innovation	Reactive and passive beliefs not conducive to continuous improvement and innovation, such as	Proactive beliefs conducive to continuous improvement and innovation, such as
	• status quo is "ok" if no problems	• need to strive for continuous improvement
	• new technology is the answer	• answer might involve changing work practices, systems, etc.
	• only a problem if it "goes wrong"	• problems include "not performing at highest level"
	• mistakes are inevitable	• zero defects are possible
Underpinning knowledge of manufacturing	Limited and narrow knowledge base	Broad and strategic understanding
	• Aware of immediate work area only, and knowledge limited to specific tasks	• Understanding of wider manufacturing, including goals, customer requirements, etc.

forms of work organization and culture. Indeed, the narrow attitudes can be seen as exactly what Taylor intended. Looking back to his early writing, Taylor explicitly stated that adopting a new narrow orientation based around acceptance of simplified roles is a central feature of scientific management: "in its essence, scientific management involves a *complete mental revolution* on the part of the working man" (Taylor, 1912, in Davis and Taylor, 1972, pp. 26–27; italics added). This suggests that any change in attitudes amongst employees in traditional settings will require substantial change in organizational practices and structure. This is discussed further in the next section.

4. TRANSFORMING EMPLOYEE ORIENTATIONS AND UNDERSTANDING

Attitude change is seen as a learning process (or "unlearning process") based on the prior modification of a person's beliefs and understanding (Fishbein and Azjen, 1975). It has been noted that change can occur as a result of two major strategies, both with implications for organizational practice: communication and active participation (Fishbein and Azjen, 1975) These strategies, along with the complementary strategy of training, are key aspects of most models of organizational change (e.g., Dalton, 1970; Lewin, 1951; Schein, 1968).

4.1. Communication

Effective communication has long been seen as a critical way to change attitudes (e.g., Schein, 1968), and is frequently suggested to be paramount in the successful implementation of new manufacturing initiatives (Proctor, Hassard, and Rowlinson, 1995). Buchanan and McCalman (1989) described the importance of constant formal and informal communication by senior managers throughout the introduction of high performance work teams at Digital. A critical aspect was seen as the frequent and consistent use of language such as "flexible working," "product ownership," and "front-to-back responsibility." In Lengel and Daft's (1988) terms, the communication was "rich" in that it had a personal focus, was timely, and involved multiple information cues. Such communication is suggested to be necessary when the messages to deliver are complex, emotional, or difficult to express, as might be expected to be the case when introducing major initiatives. Other important aspects include allowing an opportunity for two-way information flow, and the need to keep communication chains as short as possible to prevent distorted messages (Handy, 1993).

Employees in the current company had little exposure to new concepts and why they were being introduced. For example, operators were told nothing about changes in the market that required the production of smaller batches. Not surprisingly, they believed that, because of the higher set-up times incurred, small batches acted against company interests. Even more telling, the company's decision to attain British quality standards (BS 5750) was posted on a notice board. This was the only communication some employees received about this initiative! Clearly having an understanding of the market, how this affects the organization, and why changes are needed will facilitate the acceptance of new initiatives. More broadly, a process of communicating the need to change, or "discrepancy messages" (i.e., a discrepancy between the desired end-state and the present state), is advocated as a way to facilitate readiness to change (Katz and Kahn, 1987). This relates to the process of "unfreezing," the first of Lewin's (1951) three-phase model of

change (see also Schein, 1968), in which a person's equilibrium is sufficiently disturbed that they are motivated to change. Discrepancy messages are most likely to be successful if external factors are drawn on to justify the new initiatives (such as the competitive market or changes in technology), and if the messages are backed up by sources outside the company (e.g., from consultants, media reports) (Pettigrew, 1987),

It is essential that communication about the need to change is followed up with clear messages about how employees can contribute. If employees lack a sense of efficacy and confidence in their potential contribution to the new initiatives, then alternative reactions to the discrepancy might occur, such as a feeling of helplessness, withdrawal, or denial (Nadler and Tushman, 1989). Lawler (1992) suggested two types of information are important: (1) information about an organization's mission, and (2) information about performance. In the case study company, management communicated with unions only on a "need to know" basis, and there was no company newsletter, no regular team meetings, and no site-wide briefings to facilitate the passing of information up, down or across the organization.

The process of communication is also important at a different level. It can give an important symbolic message that employees are valued and trusted, and thus facilitate the development of proactive attitudes. The lack of communication in the case study company appeared to cause alienation and, as illustrated in the following comment, reinforced a passive and extrinsic role orientation:

> Well, I think the shopfloor should get to know more what is going off in the factory . . . because you get to know nothing. . . . They don't give the bloke on shopfloor the incentive. As far as I can see he's just a number. . . . So me, I just come in, clock-in, clock-out, that's it.

Training is clearly a form of communication, and thus plays a role in increasing people's understanding and shaping their attitudes. In the current company, the support staff demonstrated much greater understanding of JIT and TQM principles than the operators or supervisors; probably a consequence of attending training courses for MRPII. As suggested by the results of this study, training is likely to be particularly important for initiatives aimed at reducing lead times. This goal involves more new concepts and is less intuitive than those focused on improving quality or reducing cost.

Perhaps most importantly, communication and training help employees to become ready for change and prepare them for "active participation" initiatives (Armenakis, Harris, and Mossholder, 1993). The narrow and passive attitudes that exist in traditional companies might represent a state of "learned helplessness" based on many years of simplified jobs and a lack of influence over decisions (Argyris, 1964; Karasek and Theorell, 1990). McGrath (1994) argues that communication and training plays a critical role in overcoming such a passive state, prior to any initiative that involves devolving autonomy.

4.2. Active Participation

It is not enough just to communicate the need to change, or even the message that people can contribute to the change. Employees must also be given an opportunity to contribute to the success of the company through active participation. Two such strategies can be identified in relation to attitude change within modern manufacturing: employee participation in decision making, and enriched work design.

4.2.1. Employee Participation in Decision Making. It is widely recognized in organizational literature that employees value being involved in making decisions that affect them, and that such participation enhances their job satisfaction (Bate and Mangham, 1981). Although there has been little empirical investigation of the issue, participation is also likely to facilitate new attitudes and a broader orientation. Participation can directly increase employees' understanding of the problem to be solved and expose them to new ways of seeing things. For example, in quality circles, or continuous improvement teams, employees are made aware of the importance of quality as well as the many ways in which this goal can be achieved. As a result of being involved in the discussions, employees are more likely to feel ownership for the success of the initiative (Handy, 1993).

Quality circles also typically involve direct contact with people from other departments, and this exposure to other viewpoints can act as a form of vicarious learning. As Schein (1968, p. 62) argued, identification is one of the key mechansims of change: "the person learns new attitudes by identifying with and emulating some other person who holds those attitudes." Similarly, involvement in strategic discussions (such as decision-making meetings or contact with customers and suppliers) can lead to employees discovering for themselves the discrepancies facing the company. Messages discovered in this way are likely to be trusted more than messages coming from outside the person (Armenakis et al., 1993). Such learning is an example of what Schein (1968, p. 62) refers to as internalisation: "the person learns new attitudes by being placed in a situation where new attitudes are demanded of him as a way of solving problems which confront him and which he cannot avoid."

Participation can have an indirect effect on employees' attitudes by enhancing their motivation which, in turn, promotes the development of a more proactive and strategic orientation. This process is highlighted in a study by Proctor et al. (1995), who concluded that a combination of open and honest communication with participative decision making was responsible for facilitating employees' acceptance of product-based cells. In contrast, many shopfloor employees in the current company felt that management did not listen to or involve them in decisions that directly affected them. One person commented: "This management will listen to your ideas, then tell you your ideas are no good, and do exactly what they want to do."

There are many variations in participation strategies, ranging from forced to voluntary; direct (i.e., individual) to indirect (i.e., employee representation on committees); and some degree of consultation to full decision-making authority. The appropriateness of these choices needs to be carefully considered for the organization and the type of decisions being made. For example, indirect participation will have a less widespread effect on shopfloor attitudes if the representative does not fully communicate to, and involve, those people that he or she is representing. Moreover, the type of participation needs to be clear at the outset, and employees must know up front whether they are being asked for advice or whether they have ultimate responsibility for making the decision. Whatever form it takes, participation should be genuine and involve "real" decisions (Geary, 1994), and those involved in the decision-making process need to have the appropriate skills and information to contribute effectively (Handy, 1993).

4.2.2. Enriched Job Design. In the current company, a critical factor in sustaining traditional views and narrow perspectives—and certainly a key causal factor—was the simplified design of jobs. Operators typically carried out a single operation with minimal

autonomy over work methods or scheduling. The narrowness of these jobs meant employees did not have the opportunity to learn about aspects of production beyond their area, and thus had a "tunnel vision" focused on their small contribution to their process.

More generally, simplified jobs can restrict an employee's opportunity and willingness to learn and develop. Argyris (1964) claims that rigid job roles with little autonomy or variety can result in a "child-like" state of passivity, dependency, shallow interests, a limited set of behaviors, and a short-term perspective. Similarly, Karasek and Theorell (1990, p. 174) observed that comments reflecting a narrow orientation, such as "that's not my department" and "its not good to rock the boat around here" probably reflect "learned responses to early job experiences in which taking initiative and using extra skills and judgement were severely penalised as overstepping the bounds of one's (unnecessarily restricted) authority." The process then becomes circular. If people do not exercise their discretion and judgement, then these skills and attitudes associated with them may be lost. Introducing enriched jobs can break this negative spiral and promote employee development. Wall and colleagues, for example, describe several studies which show how greater job autonomy led to operators' learning to prevent production problems (e.g., Wall, Jackson, and Davids, 1992).

Further opportunities for learning and attitude change arise if jobs are enriched at the group level, as with the introduction of self-managing work teams. Cummings and Blumberg (1987, p. 49) argue that such restructuring allows employees to gain "greater insight of the overall manufacturing process." If self-managing teams coexist with a product-based structure, they can also foster a sense of product ownership and customer orientation (Buchanan and Preston, 1992; Oliver, 1991). This was demonstrated empirically by Parker, Jackson, and Wall (1993) in a study of the introduction of product-based cells operated by self-managing work teams. Prior to the change, employees felt little responsibility for problems that occurred in the work area. With the introduction of the new forms of work organization, however, employees developed a clear sense of ownership for problems involving their products and ultimately for the satisfaction of their end-customers.

Whether jobs are enriched at the individual or group level, introducing such a program is likely to be significantly harder than introducing a system for employee participation. As described above, a long-term lack of autonomy might have restricted employee development, and hence attempts to enrich jobs might be blocked by passive attitudes or resistance. Successful job enrichment will require supporting changes, such as the provision of technical and interpersonal skills training, as well as consideration of broader organizational systems (e.g., methods of payment) and cultural factors (e.g., trust in management) (Oldham and Hackman, 1980). Job redesign can be hard to bring about because of its effect on the existing power distribution in the organization. Delegating control to operators can upset vertical power relations such as the role of supervisors (Cummings, 1978), relations with groups such as engineers (Clegg, 1984), and can be seen by unions as a way to reduce their strength. Essentially, job simplification principles are often part of a "taken-for-granted organizational recipe" (Buchanan and McCalman, 1989, p. 13), and are thus deeply entrenched within the systems and culture of the organization.

Taking the step of job enrichment is nevertheless likely to be worth it. Rather than having continuous improvement and learning as a peripheral activity (as in quality circles or off-the-job training), development becomes an integral part of the role. In addition, it is has consistently been shown that autonomy promotes greater job satisfaction and can

reduce work-related stress (see Wall and Martin, 1987, for a review). Further, within production environments where there are high levels of uncertainty, it is suggested that autonomy facilitates more effective performance (Clegg, 1984).

4.3. Other Factors

In addition to the above strategies to facilitate attitude change, it is important to ensure there are not "mixed messages." In particular, the management structure, human resource policies, and management styles need to align with the design of jobs. For example, in the current company, there was a lack of integration across manufacturing management and functions. A supervisor described most of the production problems as belonging to other functions (e.g., he blamed the Planning department for steel availability problems, the Quality department for problems with inspection). If such functions are managed separately, it is not surprising that operators do not have an integrated view of manufacturing.

A further factor in creating and sustaining people's narrow orientation in the current company was the individual bonus payment system for direct operators. Not only did this mean that it was not in people's interest to get involved beyond "churning out" products, but the system reinforced a management-employee division (Fox, 1974). Operators felt the piecework system reflected a lack of trust. Indeed, a comment by a supervisor suggests that employees were not imagining this lack of trust: "When a person comes to me about down-time, if I've not been watching him in that shop, how do I know whether he's had two hours or four?". This mentality—that people cannot be trusted and must be controlled—is not conducive to employees developing new attitudes. This highlights both the importance of supervisors developing a new role orientation in the transition to high performance (Buchanan and Preston, 1992), and the need to design appropriate payment and reward systems (Bratton, 1993).

4.4. Summary

To facilitate the development of more appropriate attitudes within a brownfield site, major transformation to traditional practices and structure are required. Communication, training, and participation in decision making represent key components in a change program. They also act as an important precursor to more fundamental changes that are necessary to sustain long-term development, including introducing more autonomous forms of work organization, integrating traditionally separate aspects of manufacturing, and aligning human resource systems with these changes (e.g., payment methods, supervisory and management styles). These recommendations are consistent with Lawler's (1992) argument that power, information, knowledge, and rewards need to be devolved to shopfloor workers for them to develop the necessary attitudes and abilities to perform well. They are also consistent with arguments that success in the current competitive environment will require organization-wide transformations (e.g., Lawler, 1992) rather than merely "tinkering" with the design of a few jobs.

5. SUMMARY AND CONCLUSIONS

In the first part of this article I summarized literature suggesting that, for production employees to work effectively within uncertain manufacturing environments, they need to develop a fundamentally different view of their role and production strategies. As shown

in the second part, however, the requisite attitudes and orientation do not always exist. Employees within a company attempting to introduce new production methods had narrow and passive views of their roles, and beliefs that did not align with the underlying principles of the modern initiatives. Nevertheless, such attitudes were shown to be entirely consistent with the Taylorized forms of work organization and management practices. Thus, in the third part of the article, I argued that changes to organizational aspects such as communication systems and job design are necessary to bring about attitude change.

This article has clear implications for managers within manufacturing settings. Most importantly, to facilitate change within modern manufacturing contexts, managers must resist the temptation to attribute employees' existing attitudes to the individual (e.g., their intelligence, interest in the job, or age) and should look instead to the broader context. Changes to attitudes cannot be seen as a series of simple steps to be ticked off but require "fundamental changes to the pre-existing organizational structure and procedures" (Storey, 1994, p. 13). Moreover, the attitudes and beliefs of shopfloor employees cannot be "undone" in a day, as is often implied by management gurus and promotion material for training courses. An enormous amount of learning is required to bring about sustainable change; not just in terms of people understanding new "facts," but in terms of them developing new ways to think about work roles and production methods. Essentially, a change in *organizational culture*, or the system of widespread beliefs and taken-for-granted-assumptions, is needed. As many commentators have argued, changing the culture can be a painful process that elicits strong resistance (Denison, 1990; Schein, 1992). Implicit in this process is that many managers will need to undergo their own attitude change, in which they move from a focus on new technologies and techniques to an acceptance of the need for changes in authority structures and management systems. This will clearly require commitment and drive from top management within the organization.

A useful starting point for organizations wanting to further develop their employees would be an assessment of employees' attitudes, both affective components (e.g., job satisfaction, levels of strain) and cognitive aspects (such as the orientations described in this article), with a simultaneous evaluation of organizational and cultural factors which might be causing or sustaining inhibiting attitudes (e.g., assessment of communication systems, degree of autonomy in jobs, extent of participation, supervisory attitudes). There then needs to be commitment to change the relevant aspects, with a systematic follow-up of the outcomes.

From a research perspective, this article represents an important impetus to the study of attitudes within modern manufacturing. There are at least four priorities for further investigation. First, there needs to be continued investigation and conceptualization of the attitudes and understanding required for high performance within modern manufacturing. For example, the generalizability of the dimensions of orientation put forward in this article need to be established. Second, greater attention need to be given to the development of measures to assess change in attitudes, particularly those tapping more cognitive aspects such as role and strategic orientation. Third, there is a need to investigate the processes by which change can be facilitated. For example, the added value in promoting new attitudes of job design strategies above and beyond those involving employee participation and communication have yet to be empirically established. Finally, there should be systematic assessment of the outcomes of change efforts using both qualitative and quantitative data. In general, there is much to gain by applying psychological understanding (such as attitude change, learning, and human development) to the domain of modern manufacturing.

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