

QUALITY MEASUREMENTS: WHO IS USING THE SUMS AND FOR WHAT PURPOSE?

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INTRODUCTION

Quality measurements are regarded as a fundamental element of quality management programmes, yet little research has been conducted to date on the social and organisational contexts of the use of such measurements. The focus of research and analysis has been on the techniques of measurement and how they should be incorporated into such programmes. There have been relatively few attempts to examine the appropriateness of the techniques to actual organisational settings (exceptions include Bushe, 1988; Wood and Preece, 1992).

The problem is that the techniques are abstracted from the social, economic and political contexts in which they are to be used. This makes it difficult to design an appropriate and effective programme of implementation; indeed, the onus is put on the actors involved to decide what is appropriate and what will be done in the name of quality measurements. The opportunity, therefore, for certain actors to imprint their personal objectives on the programme is clear.

This article is an attempt to begin to redress this lack of information and understanding. It has a particular focus around the role taken by managers with respect to quality measurement. As in recent years this has often occurred within the context of the introduction of total quality management (TQM); we also address some wider issues relating to managers and TQM. Their role can, as Hill (1991a) has observed, be pivotal, yet it is by no means as straightforward or uncontroversial as many commentators would have us believe.

The article draws on case study-based research from a variety of organisations (details are provided below). With respect to the literature, we have made use of those studies which utilise primary data, reporting the purposes for which and the ways in which the techniques are used – how they are used, why they are used in a certain way, who uses them, and what use is made of the results.

Three main perspectives on quality management may be identified:

(i) The operations management/operations research/statistics literature. This has tended to focus on a description of the techniques themselves, their derivation and worked examples of their use (see, for example, Dixon *et al*, 1990; Kaplan, 1990; White and Schroder, 1989).

(ii) The total quality management literature, which has burgeoned in recent years. This is of a very varied nature, but much of it combines a discussion of the so-called 'hard' aspects of TQM, such as systems, costs and measurements (statistical process control [SPC], Pareto charts etc.) with a consideration of so-called 'soft' issues, such as the people implications. A strong human relations/socio-technical/paternalistic/normative orientation is to be found here. There is also a certain amount of overlap with (i) above. There are occasional reports on practice, but often from a perspective which is not fundamentally critical of managers' practices *per se*, other than arguing that they are not sufficiently enlightened about the need for a 'participative' approach when introducing quality management (see, for example, Oakland, 1993; Dale and Cooper, 1992; Garvin, 1988).

(iii) **The sociology of work and organisations literature** on quality management. Until recently there has been little primary and theoretical research on quality management *per se*, and, in so far as it has been addressed, it has tended to be conflated with just-in-time (JIT) and Japanisation. This work does, however, usually focus on practice and adopt a critical orientation lacking in much of the literature referred to above. Thus, for example, what managers say they are doing or trying to do is by no means always accepted unreservedly. There is a certain amount of overlap with the literature at (ii) above (see, for example, Bushe, 1988; Delbridge *et al* 1992; Wilkinson *et al* 1991).

This article (which is located in the main at (iii) above) draws on data collected from case studies conducted in four organisations. The research has been focused around social, political and technical issues associated with the adoption and introduction of quality measurements in a context of attempts to move in the direction of total quality management (see Preece, 1995 on the distinction between adoption and introduction). The case studies were based on semi-formal interviews as the major source of data collection. The interviews were conducted by two members of the research team: one operations research specialist and one organisation analysis specialist. This facilitated an exploration of the interrelationship between the technical, managerial and social issues. It soon became clear that it was difficult to separate out these aspects of the quality measurement process – the interviewee, for example, commonly talking about the social and technical issues in the same sentence. The interview notes were written up separately and then discussed and compared at a subsequent meeting, where we attempted to come to an overall view about the sense of the data. We also gathered some more impressionistic information through observation based on tours of manufacturing areas, and front and back offices in the case of the bank, and were given access to relevant company documents.

The organisations were a company designing and manufacturing specialist equipment for medical, transportation and industrial usages (MT Co); a branch office of a UK clearing bank (the bank); a company manufacturing small plastic components by means of an injection moulding process (AR Co); and a press-work company whose main business involves supplying body panels to a UK motor manufacturer (VP Co). The interviewees were quality specialists, the manufacturing director and the training manager at MT Co; the branch manager and a regional manager at the bank; quality specialists and a shop floor supervisor at AR Co; and the engineering manager, quality manager and human resource manager at VP Co.

The following section provides a brief overview of the main arguments put forward by quality management writers for measuring quality. This is followed by a description of, and commentary upon, the motives informing and the organisational circumstances surrounding the introduction of quality measurements in the case study companies. The subsequent discussion relates this material to findings from other empirically-based studies in this area. The key conclusions are presented in the final section.

WHY MEASURE QUALITY?

The measurement of process and product/service quality is taken to be a keystone of any quality management programme by the quality gurus. Hill, for example, in reviewing what he refers to as the 'principles' of quality management, observes that 'there are rigorous and systematic techniques of issue identification and problem-solving which every employee should be

trained to use...These in turn rely on the availability of accurate and relevant information and on the precise measurement and quantification of problems' (1991b: 555). A recent text on total quality management (Munro-Faure and Munro-Faure, 1992) states that quality should be measured for the following reasons:

- Accurate measurement of the quality of all processes is the cornerstone to improvement – until we know where we are today, we cannot improve.
- Objective measurements enable management and employees to focus attention on areas of weakness and to monitor progress.

The authors then go on to argue that the measurements must meet two main criteria: first they should measure things whose improvement will lead to enhanced business performance and, secondly, the measurements should be owned by individuals or work groups (1992: 129).

The measurements may be of processes or outputs. The former may be a production, service, or design process, while the latter could be an object, the provision of information, conduct of a transaction, satisfaction of a desire, etc. Dale *et al* have stated that 'Measurement needs to be made continually against a series of key results indicators, both internal and external... (which) should be developed from external and internal benchmarking, as well as customer surveys and other means of external input, (in Dale [ed], 1994: 13). Oakland (1993: 165) puts forward eight reasons why measures are needed:

1. To ensure customer requirements have been met
2. To be able to set realistic objectives and to comply with them
3. To generate standards for establishing comparisons
4. To provide visibility for employees to monitor their own performance levels
5. To highlight quality problems and determine which areas need priority attention
6. To give an indication of the costs of poor quality
7. To justify the use of resources
8. To provide feedback for driving the improvement effort.

The range of specific applications, as we have observed elsewhere, is extensive (Wood and Preece, 1993; Wood, 1994). It is necessary to recognise, however, that managers may decide to take measurements for purposes other than, or in addition to, these quality objectives, and indeed that these 'higher order' objectives may be given precedence over or may actually conflict with the quality objectives. What is more, some of management's measurement purposes may deliberately not be made explicit, for concern about how they would be received by the affected parties.

Some examples are in order. Management's real objective may be to measure the performance of individuals or teams against some standard as the basis for payment, reward, or punishment; in other words, as an element of management control. The stated objective, however, might be to take regular measurements in order to continuously improve quality (see, for example, Sewell and Wilkinson, 1992). Of course, it may be that these two objectives are closely intertwined, in that both people and processes/outputs are to be measured in order to achieve continuous improvement. There is an inherent conflict here, however, in the sense that controlling people in this way contravenes a key principle of quality management, namely that people should be given discretion and autonomy in order to allow their creative potential to flower. A second example is the use of a measurement scheme as a means of defence against

those above one in the hierarchy, that is, to 'prove' that the existing level of performance is satisfactory. In an earlier article (Wood and Preece, 1992), we provided examples of situations where employees were attempting to display that a process was in control, when, from a statistical point of view it was not. What is more, as Wilkinson has shown (in Dale [ed], 1994), middle managers sometimes go beyond defence onto attack – using their own survey data of internal customer satisfaction to challenge the ratings of senior managers (see also Snape *et al*, 1993). The above illustrates the malleable and hence controversial and contestable nature of measurements, which do not necessarily 'speak for themselves' in a rational-linear way.

Let us now draw upon our case study data in order to explore these issues in more depth.

USING QUALITY MEASUREMENTS – CASE STUDY FINDINGS

MT Co

MT Co is the main UK plant of an American-owned multinational company which designs, manufactures, markets and sells a specialised, high technology product for medical, transportation and industrial applications. The genesis of its total quality management programme in the UK (the three UK plants had already achieved BS 5750 certification and the company itself had ISO 9000 certification worldwide) is to be found in the pressure which customers such as Motorola (an early winner of the award) were putting upon its sister companies in the US to achieve the prestigious Malcolm Baldrige Award. The clear implication was that if these companies wanted to continue to do business with Motorola they would, as a minimum, have to be able to show that they had made significant moves in the TQM direction. This prompted the US parent company to introduce a TQM programme throughout its global operations. A TQM consultancy company was commissioned to provide training in quality for senior managers at all its worldwide sites. This particular consultancy was chosen because it also operated in a variety of different countries; it was anticipated that it would be able to provide a common, integrative approach across the total organisation. The US companies began the senior management awareness training programme in October 1990 and the UK plants a year later.

The approach to quality of this consultancy company incorporates the basic premise that there are four 'absolutes' of quality: definition, systems, performance standards and measurement. With respect to the latter, it is stated that the measure of quality achievement is 'the price of non-conformance', which consists of such things as wasted time, effort and raw materials. Following the senior managers' TQM-awareness training sessions, 17 staff received training to be the in-company trainers for the TQM implementation programme; this includes, of course, a consideration of the measurement element. Subsequent to this, the consultant's 'quality education system' package of training materials was used as the basis for disseminating quality training throughout the organisation to all employees via quality improvement teams. Within the 10 main sessions of this package, measurement aspects are referred to on a number of occasions and two sessions are devoted specifically to 'calculating the price of non-conformance' and 'measuring to improve'.

Non-managerial employees were the first to receive in-company training in quality improvement, and the first to be encouraged to form quality improvement work groups, where the identification of the appropriate local quality measurements was seen as a key

priority. Senior managers, however, also perceived a need to have some common measures which could be used for intra and inter-organisational comparisons across the company, for example, in the UK, across the three manufacturing plants. Costs of non-conformance were already beginning to be produced by 1992, and a sub-committee was looking at the issue of what measures of quality would be appropriate for comparison purposes.

In the meantime, pressure had been building up from the quality improvement groups for changes to be made to working practices, many of the proposals having implications for the style and nature of the management of the relevant department or section. Some senior managers commented to us that they were already looking at the functionally-based organisation structure and its appropriateness, in a situation where the quality improvement programme structure and its cross-organisational linkages were beginning to appear to be more suited to the new quality philosophy and way of working. An example of pressure being put on management through the implementation of quality management was provided by the manufacturing director. He described how he had used Ishikawa diagrams with quality improvement workgroups to show why an order had been lost, making it clear in the process that it was primarily due to management failure; he commented that the workgroups 'loved it'. Generally speaking, shopfloor workers appear to have welcomed quality measurements to date whereas middle managers have not, and there has been some reluctance on their behalf to feed the information generated upwards to senior management.

In the same way that MT Co was influenced by a customer, so it too has tried to influence its suppliers to move in the quality direction. For example, a 'supplier's quality council' was set up in the UK organisation in November 1991 with the objectives of moving from an adversarial to a more cooperative relationship with suppliers, and developing strategic alliances. In order to help its suppliers launch quality initiatives, the company has paid for staff from some of these organisations to go on the same external quality course it is using for its own employees.

The Bank

This refers to a branch office of one of the main UK clearing banks, located in a southern England town. The quality management programme was a direct result of an initiative of the branch manager shortly after he joined the branch in 1991. While he was aware (not least through his previous position within the company of training supervisor) of quality management in general, and the interest being shown at the time in this matter by the main clearing banks, the specifics of the programme were very much of his own choosing. He described to us how, in the pursuit of quality improvements (in this instance, quality being defined in terms of the nature of the service provided to customers) he had set up a 'complaints logging system' in the front office of the bank. This involved cashiers going to their supervisor after a 'complaint' had been made (it should be noted that it was not always clear to us what a complaint was – for example, when does a comment from a customer become a complaint?) and asking the supervisor to enter it into a book. The supervisors collated the day's 'complaints' and passed them on to the manager, who then responded to the customer within a maximum of two working days.

The branch manager was quite clear about the main objective of this system – it was, as he put it, to 'get control of branch operations'. He showed us charts of improvements which had been made in service provision over the last two years, *ie* reductions in the number of complaints. These charts were displayed prominently for everyone to see on walls in the corridors between rooms and on walls at the side of stairs in the back office. Five teams had been set up, each under

the direction of a supervisor picked by the manager. The teams were told that it was their responsibility to monitor and control their work but, at the same time, they had to report back to him on a daily basis. He observed that 'There is not a lot they can do without me knowing about it'.

Why did the branch manager take this particular approach to measuring quality? The reasons become clearer when we look at the contexts of retail banking operations. Strict controls are placed on branch office operations, on the one hand by legislation and the various regulatory bodies (such as the Financial Services Acts and Ombudsman, and visits from an independent auditor once every two years) and, on the other, by the senior management of the bank through its regional staff visits to branch offices on a six-monthly basis, as well as area office audits on a three-monthly basis. A very detailed and lengthy manual is held in every branch office, covering detailed aspects of systems and procedural requirements. This is used as a point of reference by managers and staff, and as a basis for the audits referred to earlier.

Given the above, it is not, perhaps, too surprising that in a climate of intense competition the branch manager should be concerned to display that he is monitoring and controlling the work of his staff in a systematic, 'rational' way. Whether this activity is facilitating the pursuit of TQM in the sense of helping to better serve external customers, and whether it is the most effective way to obtain the active commitment of the cashiers is another matter.

AR Co

This company manufactures small plastic components by injection moulding. It is a division of a large, diversified organisation, which manages through tight financial controls and strong decentralisation to its operating divisions and plants on day-to-day matters.

The normal production run on a machine is several thousand components per hour. Each component has a hole in it and the size and shape of the hole is crucial to the performance of the final product. The main quality problem is that the hole may be the wrong size and this is checked by measuring the rate at which air flows through the hole.

Until 1992 AR Co operated a manual inspection system, whereby production department inspectors took a sample on an hourly basis, the entire hour's output being scrapped if any component in the sample did not meet the specification. This approach had four main deficiencies: (1) it was inefficient in terms of spotting and fixing problems because the method of checking was unreliable and the samples checked were small; (2) it was not proactive in the sense of spotting trouble before defective output was produced; (3) it was expensive in terms of labour – there were almost as many inspectors as there were operators; and (4) it led to conflicts between the operators and the inspectors.

Two changes were introduced:

- The inspectors were replaced by a smaller number of 'auditors', whose role was to assist and train the operators so that they could carry out the inspections themselves (fortuitously, this change occurred when orders were increasing and more staff were being taken on; thus there were no redundancies). This resolved problem (4) above.
- New software and hardware, designed by the engineering department, was introduced to measure flow rates automatically. This equipment took a large sample of components (typically several hundred instead of around the 20 of the manual system), measured the flow rates of each, and then analysed and displayed the data on a VDU. This resolved problems (1) and (3) above.

These changes, therefore, addressed three out of the four problems referred to above, but did not move the company to the preventative mode implied by (2). In addition, new technical problems arose, associated with the statistical analysis of the resulting measurements (see Wood and Preece, 1992).

The initiative for change in this company came from the quality manager and his recognition that the existing situation was unsatisfactory, on the basis of his experience of the use of similar techniques in an earlier job in another company. AR Co experienced little, if any, pressure from customers or suppliers to use specified approaches: only very general enquiries were made about the quality system, and these were not sufficiently explicit to drive the company in one direction rather than another.

VP Co

VP Co was set up in 1988, on a greenfield site in Shropshire, as a 50/50 joint venture, in order to produce body panels for a motor manufacturer (the latter company forming one half of the joint venture, the other being another UK manufacturing organisation). Shortly after VP's formation, the motor manufacturer was taken over by the Ford Motor Company; examples of Ford's subsequent influence over quality matters were provided in our interviews with VP's engineers. The key strategic objectives laid down for the organisation were to provide a reliable supply of panels of a consistently high level of quality (fuller details about the company, including its technology and HR policies and practices can be found in Preece, 1993).

Whilst the objective of a consistently high level of outgoing quality of body panels was undoubtedly treated as an important issue by management and, indeed, was built into the mission statement, the implementation of the quality strategy was somewhat more problematic. According to the quality manager, there were two main reasons for this: the manufacturing process had not had the benefit of appropriate and effective statistical controls and 'the customer is not quite sure what he wants; we have to tell them.' When this person was questioned about the motivation behind the quality strategy, cost savings were mentioned. Our impression was that a, if not *the*, major concern was that the approach should be acceptable to the Ford Motor Company: for example the software package came from the 'Ford approved' list, and the overall orientation to quality followed the Ford approach as defined in that company's quality procedure manual.

The engineers had invested much time and effort in capability studies of the press lines and in generating several capability indices. The quality manager asked one of the researchers 'How can we demonstrate the improvements in these capability indices?' There did not appear to be any link – or perceived need for such a link – between these indices and criteria such as cost or customer satisfaction; rather the concern was essentially to be seen to be doing 'well'. At the time of our interviews, very little use was being made of the capability indices on the press lines (or, indeed, any other measurements) save that they were 'passed back to engineering'.

DISCUSSION: MANAGERIAL OBJECTIVES, SOCIAL CONTROL AND QUALITY MEASUREMENTS

The discussion is organised into two main sections: the first one considers the key points arising out of our case studies outlined above and the second builds on this by relating our findings to the empirically-based literature on quality management.

The case studies

Two particular issues stand out: the external pressure put on organisations to implement some form of quality measurement and the purposes which were being served by the actual usage of quality measurements.

In three of the four organisations, the major influence over the respective measurement systems came from outside the organisation. VP Co and MT Co were under pressure from key customers to adopt, or at least display, certain quality management methodologies within their internal processes. From the very early days of its existence, VP Co had come to be subject to significant influence from Ford through this company's takeover of its sole customer (it has since widened its customer base, but Ford is still by far and away the major one) and as that customer owned 50 per cent of VP Co, on the basis of partial ownership. In the case of MT Co, quite apart from supplier influence, it had no choice about introducing quality management – it was told to do so (like all its sister companies) by its US corporate head office; in turn, MT Co took initiatives to encourage its own suppliers in the quality management direction. In the case of the bank, the main direct pressure came from the higher echelons of the organisation, although, once again, the impact of the actual or anticipated behaviour of competitors was never far away or difficult to identify. In each case this external pressure to adopt internal procedures for monitoring quality was backed up with the implied or actual threat of sanctions for non-compliance. In the case of the bank, whilst the branch manager took the initiative in designing and introducing his own particular version of quality management, this was very much in the context of an awareness of what was being considered or implemented elsewhere within his own organisation and competitor banks.

The exception here was AR Co, where the prescribed methods emanated from within the organisation, that is, the quality manager, who appeared to be doing what he thought was appropriate at that point in time. Whilst satisfying (external) customer requirements was an issue, customers in this instance had not been specifying how this should be achieved. Methodologies for monitoring quality levels were developed internally, initially through the inspection system and later the automated SPC system. Interestingly, quality measurements here did not form part of a wider TQM initiative.

To summarise, these organisations were experiencing the following four main forms of pressure towards the adoption of quality measurements: (1) product markets, that is, the actions and intentions of competitors (all the companies); (2) suppliers, with respect to insistence or 'encouragement' of the adoption of measures by their customers (MT Co, VP Co); (3) regulatory bodies and legislation, imposing absolute requirements upon companies in the conduct of their business (the bank); (4) the wider organisation itself, in the form of higher-level groupings such as the corporate centre or area/regional office (the bank, MT Co). In the case of all four organisations, the measures were effectively imposed by senior managers (or, more accurately, technical managers in the case of AR Co) on the staff who were to take them.

What about the objectives which were pursued through quality measurements? A partial answer to this question would, of course, be to observe that they were helping the organisation to meet one or more of the external pressures discussed above. However, a fuller answer involves a recapitulation of the major reasons for measuring quality, as discussed at an earlier section: to gain knowledge of where the organisation is currently, as a basis for continuous improvement, and to aid the organisation in focusing upon areas of weakness and to monitor

progress (it was noted earlier that this is taken to imply that measurements will facilitate improved business performance and that they will be 'owned' by the people who take the measures).

AR Co appeared to be meeting these main objectives, at least in an internal sense, but it is perhaps a little too early to say whether the other organisations will be able to achieve them through their particular approaches to quality measurements (although the bank's overriding focus on customer complaints does not bode well). Additional considerations included a wish to be seen to be doing something for the benefit of customers and part-owners (VP Co); an understanding that measures had reduced the number of complaints from external customers (the bank); and a wish to display conformance to quality standards (MT Co and VP Co). These organisations then, have developed their own quality objectives and measured accordingly; in some cases these appear to be close to what is advocated in the normative literature, whereas in others there is not too much correspondence. They certainly, however, wanted to display to us the rationality of what they were doing.

Finally, it should be noted that issues to do with inter- and intra-organisational control figured strongly as an element of the objectives which were being pursued in three of the cases: the bank branch manager was undoubtedly using quality measurements as a means of exercising control over his staff; the corporate office of the bank was monitoring its branches through a variety of measurements (albeit the articulation with quality was not altogether clear); quality measures were increasingly being used by VP Co's main customer – Ford – to monitor its conformance to its quality standard; MT Co was under pressure from its US head office to have quality measures in place which provided information on the (changing) nature of its business performance.

Linkages with the wider literature

Let us begin by looking at the matter of customer influence on the use and deployment of quality measurements. Ford has played a significant part in the take-up of SPC and other quality measurements in the motor-parts manufacturing sector. An element of this company's strategy has been an insistence on the use of SPC and the introduction of an award for suppliers for the achievement of high quality standards (the standard is termed Q101 and the award itself Q1). Ford staff audit supplier companies through such means as plant inspections and examination of documentation. We have already noted their influence upon VP Co. Others have made similar findings. Oliver and Wilkinson, for example, report that Ketlon, a components supplier to Ford, first learnt of SPC during a presentation by Ford to their major suppliers (1992: 149-50). Ketlon managers commented:

We were told quite clearly that to survive... we had to meet these requirements [SPC] head on. We were pushed into it, we certainly didn't discover it on our own. SPC highlighted a lot more problems than we knew we had... We were all running round in circles and panicking. As the dust settled, we realised that we couldn't put it in overnight.

A further illustration of customer influence on a supplier company, again involving Ford, but this time in the US, is provided in a recent article by Rayner (1992) on Globe Metallurgical's 'transformation' in the US (this was the first small company to win the Baldrige award, in 1988). In the early 1980s Ford, a major customer of Globe's, began to reduce the number of its

suppliers, and indicated that Globe would have to improve its product quality in order to retain its business. Ford audited Globe for their Q1 Award in 1985; this led to recommendations for changes to be made, including to the measurement system. Globe senior management responded by introducing a TQM programme. This began with every employee being given six hours of quality measurement training, including in the use of SPC, control charts, etc. Arden Sims, the CEO, observed: 'We tried to make it clear that they either accept the program or there wasn't a place for them at the company'. Apparently, not everyone did get the message, treating it with scepticism, as 'just another management fad'. Sims pointed out how it was made quite clear that the programme was 'for real':

As soon as we applied the techniques in the plant, though, they realised this was serious. If a manager went out on the shop floor for an inspection and found that a supervisor hadn't filled in his control charts for that shift, we'd call him into the office. I'd tell him if he didn't fill in the chart every time, as we'd asked, he'd lose his job...Fortunately, I didn't have to fire anyone. They all shaped up pretty quick.

Rayner, 1992: 121

This extract nicely points up the ways in which external pressures for quality measurement adoption can be translated into action by the key actor(s) within the affected organisation, drawing upon the latter organisation's predominant culture and mode of control; to put the matter somewhat bluntly, even if Ford's ethos of quality management involved employee 'empowerment', this is hardly what Globe Metallurgical's employees got! The way in which quality measures can be used as a means of employee control can be clearly seen.

Similarly, with respect to the control question, Kerfoot and Knights, on the basis of their study of quality programmes in two financial services organisations, report that in one of the banks

the TQM programme placed a demand on the company for planning information about staff numbers, productivity levels and costs, consistent with the Bank's business plans. This was intended to facilitate greater monitoring, costing and control of the branch workforce...the TQM programme here could be seen to have had the intention of transforming existing work patterns into a set of quantifiable techniques for increasing production and controlling the workforce...Yet the technical and calculative content of this aspect of the TQM programme had the effect of undermining internal staff cooperation, and was inconsistent with the demands of sales and customer service as interpreted by branch managers and staff.

Kerfoot and Knights, 1992: 147-8

Garrahan and Stewart (1992), in their study of work and employment at the Nissan plant in the north east of England, are even more dismissive of talk of any devolvement of autonomy to employees under circumstances of quality, flexibility and teamwork. The analysis is particularly interesting because of the 'received wisdom' offered by such commentators as Wickens (1987 - he also happens to be the former personnel director) about the meaningful nature of shopfloor work to be found in Japanese plants.

These authors argue that the reality at the plant for shop floor workers is control, exploitation and surveillance and that, on the quality issue, management's concern is not so much with the product *per se* (and hence the customer) but rather with gaining and maintaining intensive control over the workforce. Measuring performance is a key means of achieving this through its facilitation of reductions in employees' 'parcels of time'. Nissan pursues this under the guise

of quality standardisation and the 'rhetoric of benevolence, which is supposed to mean easier, standardised jobs for workers' (1992: 73). TQM is about 'total management control', while the reality of this control is obscured via delegating everyday responsibility for this control to the workers themselves. The managerial philosophy is typified by the observation that 'if a worker has nothing to do, it's better that he does nothing, so the "waste" becomes clear to management, and can be quantified and rectified'. Quality 'is the great ideological shibboleth in pursuit of which individual workers collaborate in the process of their own subordination' (1992: 105).

The institution of regimes of self-control and management surveillance allow managers to espouse empowerment and devolution of autonomy to workers. As Delbridge *et al* have observed, information technology can be used to facilitate this process: 'information technology in the JIT/TQM system maintains and extends the reach of managerial control, it shifts back the "frontier of control". Moreover, it is a key element in the JIT/TQM system's facade of decentralising work, in that it provides a framework of centralised surveillance within that deception' (1992: 100). The ways in which managers design work organisation and procedures around JIT and SPC can also be seen as contributing to a loss of worker autonomy. Klein (1989), indeed, seems to believe that managers have no choice here, for 'the reform programme that ushers in JIT and SPC is meant to eliminate all variations within production and therefore requires strict adherence to rigid methods and procedures. With JIT, workers must meet set cycle times; with SPC they must follow prescribed problem-solving methods.'

What is more, shop floor workers and banking/finance clerks are not the only organisational members who are subject to control and constraint. Managers are also subject to the imperatives of profitability, cost control, efficiency and effective resource (including the 'people resource') utilisation. Senior managers in the private sector need to be attuned to the financial value put on their organisation by share prices; in the public sector, to the requirements of their political 'masters'. We have seen the influence which customer companies can exert in the direction of their suppliers implementing quality management. As we noted in an earlier section, a defining feature of TQM is that customers (companies as well as individuals) should influence if not dictate what those organisations do/provide. Given these economic, social and political contexts, it is hardly surprising that managers 'are generally looking for immediate gains, and therefore are likely to adopt a quick-fix approach rather than long-term cultural change. Managers responsible for TQM are themselves likely to be pressurised through short-run performance-related pay assessment and are looking for projects which will deliver immediately' (Wilkinson *et al*: 1992: 15). In this context, the wider ('soft') quality-related activities may well be regarded as a cost unless it can be proved otherwise.

With respect to the purposes served by quality measurements, it may be that longer-term gains are also being targeted; this implies, among other things, a programme of organisational change. Thus senior managers could be pursuing both short and long-run returns from the TQM programme. TQM may merely be a convenient/timely label to put on what is happening, or is about to happen. According to Hill, TQM could be a convenient label to place on a process of organisational 'debureaucratisation' and 'entrepreneurship' (Hill: 1991a). That is to say, respectively, reducing the number of levels in the hierarchy, decentralisation (for example into divisions or profit centres), a broadening of task ranges; an enhanced emphasis on innovation, more flexible responsiveness to product markets, a stronger profit orientation throughout the organisation etc. As Hill observes:

Entrepreneurial behaviour has a close affinity with the emphasis in quality management theory on managerial behaviour that is responsive to markets and innovative in its pursuit of effectiveness and efficiency. Moreover, while short-run profit maximisation is alien to quality management, the purpose of TQM is unambiguously to maximise profit in the longer run
1991a: 403

It is argued that TQM helps to achieve debureaucratisation through such means as its cross-functional/departmental orientation and enhanced intra-organisational communication. Indeed, it may be that TQM as propounded by its advocates can only be achieved in the middle layers of organisations if major changes such as debureaucratisation and entrepreneurship occur simultaneously, for, as Hill notes of middle managers: 'conventional organisational arrangements do not encourage their contributions' (1991b: 560). If it is true that, as Scase and Goffee (1989) have argued, the majority of UK managers find themselves in a 'low-trust' relationship – to borrow Fox's (1974) terminology – then it is hardly surprising if they display compliance rather than commitment to senior managers' initiatives (see also Wilkinson and Witcher, 1991; Wilkinson and Witcher, 1993). Far from debureaucratisation and entrepreneurship being implied by TQM, therefore, they may actually be preconditions to its achievement.

While then, if we accept Hill's argument, middle managers have something to gain through the introduction of TQM (including quality measurements) into their organisations, in terms of increased responsibility and autonomy-within-constraints, it can equally well be argued that they stand to lose. The nature of their jobs will change and they could lose power and control as a result. Indeed, they may not have a job at all if the TQM initiative becomes embedded within the organisation. Even if any fears they have prove in the event to be unfounded, they can be expected to influence their attitude and behaviour towards the TQM programme. This response would appear to be more likely where measurements are to be taken, the outputs of which are to be acted upon within their areas of responsibility. Much clearly depends on senior management's objectives and strategies for the programme. However, especially in the British context, delayering, cost-cutting and a resulting reduction in headcount in the middle tiers of the organisation cannot be ruled out. Indeed, Hill himself (1991a: 414) has observed that middle managers have been 'largely untouched by other structural changes designed to bring market pressures to bear more directly, (but they) stand at the heart of organisations where there is much more scope for quality improvement activity, and account for many of the quality problems wrongly attributed in the past to labour.' Contrary to the drift of Hill's argument in his article, if this is correct, then it seems to us that middle managers, far from embracing TQM, may resist it. But this, of course, is to treat middle managers as a homogeneous group with common cause; it must be recognised that TQM could serve to divide them, or at least exacerbate divisions already in existence. Wilkinson *et al*, for example, found that production managers sometimes see TQM as an opportunity to increase their centrality within the organisation (1992: 15).

While middle managers may have TQM and quality measurements forced upon them by more senior managers and/or by other organisations, it is important to recognise, however, that on occasions, as we have seen above, they have taken the initiative and in any event, it could be they who shape the specific nature of the quality measures to be used (see, for example, our bank case study above). Quite where one draws the line between attributing the initiative to middle managers or to others, is, of course, difficult to decide in practice, and no doubt often

somewhat arbitrary. However, at the departmental level, it is worth repeating that it is commonly middle managers who introduce specific action with respect to quality matters. As Ishikawa (cited in Hill, 1991b: 555; see also Ishikawa, 1985: 130-5) has observed, they 'have a distinct place in quality improvement: they stand at the crossroads of the vertical and horizontal planes, and are responsible for the quality improvement activities that take place among rank-and-file employees'.

CONCLUSION

Evidence has been presented, then, which suggests that managers (and middle managers in particular) do not always introduce quality measures of their own volition. In some cases measurement systems are imposed on them, just as they in turn may impose measurement systems on other staff. It must be questioned, therefore, whether managers necessarily or always welcome quality measurements. If they do not, then the possibility exists that they will oppose them, or at least try to ensure that the outputs of the process are used in a way which does not reflect badly upon themselves. Not only might there be some dissension within management about quality measurements, but there might also be conflict, as certain people take the opportunity to further their interests within the organisation.

To understand what is happening here it is necessary to understand senior management's objectives and strategies, as well as managerial attempts to exercise control over other people's labour; this means both managerial control over other employees and also (senior) managers' control over other managers (the bank case study starkly illustrated this latter point). At the same time, some managers may recognise the benefits to be derived by the organisation from employees using their minds in the service of the organisation. Thus, 'The desired effect of harnessing these dual forces is to minimise negative divergences from expected behaviour and management-defined norms while identifying positive divergences and maximising their creative potential' (Sewell and Wilkinson, 1992: 271). It might be added that much of the research evidence points to a lack of management attention to the latter and an over-reliance on the former.

Quality measurements can thus be internally contradictory to the wider aims of TQM, for, to the extent that they concentrate in practice on organisational activities which can be quantified, they discourage precisely those aspects of people's orientations towards their work which rely on the use of initiative and creativity. There is a real danger, then, that the measurement process will drive the improvement process, rather than the reverse. As we have seen, the practice of quality management can be rather different, not only from what the 'gurus' advocate, but also from what is espoused by managers for employee and wider consumption.² With respect to middle managers, it is perhaps more accurate to talk about their exercise of compliance towards TQM programmes and the measurements they entail, rather than consent. As Edwards (1992: 391) has put it, 'consent can arise not because of fundamental agreement but because of a pragmatic accommodation to the situation'.

Commentators on quality management have not been slow to give advice on how to forestall or overcome any people-related problems, such as resistance, that might occur when a TQM programme is introduced. Hill, for example, argues that the way to get middle managers involved and committed is to show them that TQM is in their interests. But what if it is not in their interests? TQM programmes require that measurements are taken in a timely and

appropriate way, and that problems are reported to supervisors or managers. This implies that users are not wary of drawing the attention of managers to what is happening. And yet, if they do report accurately what is happening, management failings could be illuminated (this possibility, of course, might actually encourage users to provide data in some settings!). It should come as no surprise, therefore, if managers on occasions espouse the importance of quality measurements while, in practice, having major reservations about them.

If, then, the organisational deployment of quality measurements is to be understood – as well as the quality management programmes of which they form a part – it is necessary, not only to have an understanding of the techniques themselves, but also the organisational and inter-organisational regimes within which they are used. An indication of the latter would be the discretion which users have with respect to the deployment of quality measures, along with data on who derived and prescribed the procedures. There are echoes here of Gouldner's punishment-centred, mock and representative bureaucracies (1954). TQM may indeed be a convenient and topical label to give to a major programme of organisational change taking place in the 1990s, a programme which includes a quality initiative, but also much else besides. For certain managers the possibility of organisational restructuring and delayering might well present itself, with consequential reductions in headcount and a redistribution of power.

NOTES

1. We are grateful to Barrie Dale, Patrick Dawson, Keith Sisson, Adrian Wilkinson and the anonymous reviewers for their comments on earlier drafts of this article, and to Michael Kaye for his contribution to the fieldwork.
2. To take another example, Pickard (1992), commenting on BT's 'Project Sovereign', which had a quality/customer focus, noted it also involved delayering, job loss and major job changes, and observed 'There seems to be a conflict between the quality philosophy and the way staff seem to be treated as numbers on budget sheets, being moved around without any consultation'.

REFERENCES

- Bushe, G. R. 1988. 'Cultural contradictions of statistical process control in American manufacturing organisations'. *Journal of Management*, Vol.14, no.1.
- Dale, B. G. (ed). 1994. *Managing Quality*. Hemel Hempstead: Prentice Hall.
- Dale, B. and Cooper, C. 1992. *Total Quality and Human Resources*. Oxford: Blackwell.
- Delbridge, R., Turnbull, P. and Wilkinson, B. 1992. 'Pushing back the frontiers: management and work intensification under JIT/TQM factory regimes'. *New Technology, Work and Employment*, Vol.7, no.2.
- Dixon, J. R., Nanni, A. and Vollmann, T. E. 1990. *The New Performance Challenge-Measuring Operations for World Class Competition*. Homewood, Illinois: Irwin.
- Edwards, P. K. 1992. 'Industrial conflict: themes and issues in recent research'. *British Journal of Industrial Relations*, Vol.30, no.3.
- Fox, A. 1974. *Beyond Contract: Work, Power and Trust Relations*. London: Faber and Faber.
- Garvin, D. A. 1988. *Managing Quality: The Strategic and Competitive Edge*. New York: Free Press.
- Garrahan, P. and Stewart, P. 1992. *The Nissan Enigma*. London: Mansell.
- Gouldner, A. 1954. *Patterns of Industrial Bureaucracy*. New York: Collier Macmillan.
- Hill, S. 1991a. 'How do you manage a flexible firm? The total quality model'. *Work, Employment*

- and Society*, Vol.5, no.3.
- Hill, S. 1991b. 'Why quality circles failed but total quality management might succeed'. *British Journal of Industrial Relations*, Vol.29, no.4.
- Ishikawa, K. 1985. *What is Total Quality Control? The Japanese Way*. Englewood Cliffs: Prentice Hall.
- Kaplan, R. W. (ed). 1990. *Measures for Manufacturing Excellence*. Boston: Harvard Business School Press.
- Kerfoot, D. and Knights, D. 1992. 'Managerial evangelism? Planning for quality in financial services'. Paper presented at the EIASM conference on quality management in services 11, Maastricht, May.
- Klein, J. 1989. 'The human cost of manufacturing reform'. *Harvard Business Review*, Vol.67, no.1.
- Munro-Faure, L. and Munro-Faure, M. 1992. *Implementing Total Quality Management*. London: Pitman.
- Oakland, J. 1993. *Total Quality Management*. London: Heinemann.
- Oliver, N. and Wilkinson, B. 1992. *The Japanisation of British Industry: New Developments in the 1990s*. Oxford: Blackwell.
- Pickard, J. 1992. 'A long-distance call for quality'. *Personnel Management Plus*, October.
- Preece, D. A. 1993. 'Human resource specialists and technical change at greenfield sites' in Clark, J. *Human Resource Management and Technical Change*. London: Sage.
- Preece, D. A. 1995. *Organisations and Technical Change: Strategy, Objectives and Involvement*. London: Routledge.
- Rayner, B. 1992. 'Trial-by-fire transformation: an interview with Globe Metallurgical's Arden C. Sims'. *Harvard Business Review*, Vol.70, no.3.
- Scase, R. and Goffee, R. 1989. *Reluctant Managers*. London: Unwin Hyman.
- Sewell, G. and Wilkinson, B. 1992. ' "Someone to watch over me": surveillance, discipline and the just-in-time labour process'. *Sociology*, Vol.26, no.2.
- Snape, E., Redman, T. and Bamber, G. 1993. *Managing Managers*. Oxford: Blackwell.
- White, E and Schroeder, R. 1989. 'A simultaneous control chart'. *Journal of Quality Technology*, Vol.19, no.1.
- Wickens, P. 1987. *The Road to Nissan*. London: Macmillan.
- Wilkinson, A. 1994. 'Managing human resources for quality', in Dale, B. (ed). *Managing Quality*. Hemel Hempstead: Prentice Hall.
- Wilkinson, A., Allen, P. and Snape, E. 1991. 'TQM and the management of labour'. *Employee Relations*, Vol.13, no.1.
- Wilkinson, A., Marchington, M., Goodman, J. and Ackers, P. 1991. 'Total quality management and employee involvement'. *Human Resource Management Journal*, Vol.2, no.4.
- Wilkinson, A. and Witcher, B. 1991. 'Fitness for use? Barriers to full TQM in the UK'. *Management Decision*, Vol.29, no.8.
- Wilkinson, A. and Witcher, B. 1993. 'Holistic total quality management must take account of political processes'. *Total Quality Management*, Vol.4, no.1.
- Wood, M. 1994. 'Statistical methods for monitoring service processes'. *International Journal of Service Industry Management*, Vol.5, no.4.
- Wood, M. and Preece, D. 1992. 'Using quality measurements: practice, problems and possibilities'. *International Journal of Quality and Reliability Management*, Vol.9, no.7.
- Wood, M. and Preece, D. 1993. 'The use of statistical process control for service processes'. Paper presented to the EIASM workshop on quality management in services 111, Helsinki, May.