Partnering, lean production and the high performance workplace

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Abstract

Undoubtedly, more attention is being paid in the British construction industry to the lessons that can be learnt from manufacturing for improving its production processes. These include such lean production concerns as teamwork, customer focus, quality control, JIT production and continuous improvement. Arguably, though, it is the 'softer', 'cultural' areas relating to inter-organisational collaboration that have become a particular focus of attention in the 1990s.

The paper, based on research being carried out for the ESRC Innovation Programme, argues that 'partnering' has to be seen in a context of the search for new organisational practices covering a range of related issues. These include human resource management, information management and collaborative working practices. Underlying many of these are notions of 'high-performance' work systems emphasising the management of employees as away of improving performance. High-performance systems involve the devolution of responsibility for decision making to smaller business units, and teams within those units, in order to create a more flexible, customer-focused organisation.

Using case studies of five partnering relationships, involving some 40 companies, the research explores the way the organisational changes arising from partnering are related to wider concerns, some of which draw on notions of lean and other high performance production systems.

Keywords

Partnering Construction High-performance production systems Managerial practices

Introduction

The purpose of this paper is to explore the relationship between 'partnering' - an attempt to create closer collaboration in the construction industry - and contemporary trends in production theory such as lean production, agile manufacturing and high-performance production systems. These all involve developments in organisational design and associated work systems, elements of which can be found in managerial changes associated with partnering. Particularly important is the emphasis on customer focus, teamwork,

empowerment and improved information flows between different elements of the production process.

The question we address is whether the developments stemming from new approaches to production have begun to penetrate the British construction industry and whether partnering has itself helped to promote interest in these trends.

In the next section we examine the recent trends in production systems, the work practices associated with these systems, and their implications for the construction industry. We then consider whether high-performance systems hold lessons for organisations involved in partnering, before discussing some preliminary findings from case studies of firms engaged in partnering. We focus especially on the extent to which these firms have changed their managerial practices to emphasise teamworking, empowerment, improved inter- and intra-organisational communications and greater customer focus. Finally, we draw some conclusions on the barriers to the adoption of new practices and whether partnering has itself acted as a catalyst for their introduction.

Lean production, agile manufacturing and high-performance systems

Concepts of lean production have been popularised since the early 1980s as a way of improving manufacturing quality, minimising stocks and ensuring continuous improvement (Schonberger 1982, 1986; Hall 1983; Ohno 1988; Ohno and Mito 1988; Womack et al 1990). The original objective of lean production was to combine advantages of craft work with those of mass production, but at the same time avoid the rigidities of factory systems and the high costs of craft production. Its success in motor vehicle manufacturing is associated with three important factors - the simplification of manufacturing dies, the development of long-term supply relations to allow just-in-time delivery of parts, and changes in work practices, notably the introduction of teamworking and quality circles.

As Zipkin (1991) points out, lean production has been viewed by some simply as a toolbox providing practical solutions for problems in manufacturing industry, while others have seen it as a radically new philosophy embracing all areas of corporate activity. Lean production is not, however, suitable in all industries (Karmarkar 1989; Zipkin 1991; Pine et al 1993). In particular, the concept was originally developed for industries serving steadily growing export markets for consumer durables; it is probably less suited to situations where markets are turbulent, customer requirements change rapidly, competition is increasing and there are high rates of market saturation. Lean production allows only limited variation in the volume and mix of products and tends to be most effective for relatively standardised products (Baker 1996).

There has therefore been growing interest in recent years in new forms of high-performance production system, including agile manufacturing (Cappelli and Rogovsky 1994; Cappelli and Crocker-Hefter 1996; Useem 1990, 1996; Baker 1996). These systems borrow concepts from lean production, such as notions of continuous improvement and teamworking, but also challenge some of the concepts at the heart of lean production - in particular, limited variation in product types and the need for long-term supply relationships. The emphasis is on flexibility in production processes, ‘mass customisation’ such that highly customised products can be made at costs comparable with mass production, and adding value by including a greater element of customer service within the product (Baker 1996).

Several principles are associated with newer forms of high-performance production (Useem 1996). As well as streamlined management with tighter financial control and increased benchmarking of production decisions, customer requirements are channelled directly to managers of operating units at key decision points. This is achieved by increasing management contact with customers and inserting customer criteria into production decisions. As a result there is a stress on breaking down traditional corporate functional divisions based on development, manufacturing and marketing, and replacing them with strategic business units focused on specific products or services and incorporating as many business functions as possible. This in turn leads to more devolved decision making, with business units receiving fewer policy directives from the corporate centre.

Two central work practices associated with high-performance production systems are employee empowerment and teamwork (Cappelli and Rogovsky 1994, 1995; Peiperi 1996). While notions of team-based work, multi-skilling, participatory and self-management are important features of lean production, comparatively rigid hierarchies have remained prevalent in many 'lean organisations' (Baker 1996). More fluid and empowered team structures are therefore required to increase flexibility. This helps to promote better quality decision making and improve problem solving. An empowered workforce is also felt to be freer to make the horizontal connections appropriate to their activities, with cross-functional teams able form and regroup in response to changing customer requirements. The underlying assumption is that markets are now characterised by consumer demands that are too local, too fleeting or too many in number to permit centralised decision-making processes - hence the need to transfer decision making from centralised administrations directly to those closest to the customer.

Contemporary ideas of 'empowerment' differ from older versions in their underlying principles (Mumford 1996; Cappelli and Rogovsky 1994, 1995). The 'behavioural' or 'socio-technical' models which were refined in the Swedish car industry focused on raising productivity by improving workers' satisfaction. Recent models of empowerment are less concerned with raising productivity through increased employee satisfaction than with meeting the need for a rapid and flexible response to changing customer requirements (Peiperi 1996).

A number of major firms have begun to adopt the organisational designs and work practices of high-performance systems, including AT&T, Du Pont, Ford, Hewlett-Packard, IBM, Kodak and Xerox (Useem 1996). There are, however, as yet few operational examples of agile manufacturing (Baker 1996).

High-performance production has several potential drawbacks. While its work systems may offer more variety and require more skills than systems associated with scientific management, they generally involve less variety and skills than behavioural models (Cappelli 1993; Cappelli and Rogovsky 1994, 1995). *Individual* autonomy is restricted, with decision making occurring in an aggregated inter-team setting. There is less commitment between employees and firms as temporary contracting is greater. Furthermore, level of stress, effort and pace in the workplace may rise. In this environment companies need to find ways of ensuring they maintain the support of their employees, through the introduction of mechanisms for linking their business goals to individual and team objectives, and measuring and rewarding performance. This paradoxically may require greater central control.

Another problem of high-performance production systems is that information requirements arising from distributed decision making tend to rise. The costs of coordinating teams and cross-functional business units, which would once have been borne by the corporate bureaucracy, now have to be borne by individual units and teams. There is therefore a need to increase the quality and speed of information flows, and streamline information processing throughout the organisation.

To what extent do the high-performance systems described above, including lean production, hold lessons for the construction industry?

There is clearly a relationship between the degree of flexibility required in the production process and the most appropriate type of work system to carry out that process. Industries which demand reliability and consistency, such as transport or distribution, or involve the continuous processing of a uniform product, have less use for highly flexible work practices (Cappelli and Rogovsky 1995). Many of the construction industry's activities do not involve a continuous production process resulting in uniform products - construction activities tend to involve fewer regimented, routine tasks than many manufacturing or service industries and its assembly processes are often based around single projects effectively involving a customised product.

Production management in the construction industry has traditionally focused on the need to schedule discrete activities in the building process, rather than seeing it as a manufacturing process involving the management of resources across a network of firms. This perspective has been increasingly criticised (e.g. Halpin 1993) and there is a growing body of research on supply-chain management techniques in construction (O'Brien 1995), design for buildability, and just-in-time and other 'lean construction' practices (Akintoye 1995; Koskela 1992). Arguably, though, lean production techniques may only be of limited applicability to construction, given that much of the industry's output involves project-based, bespoke buildings. Furthermore, lean production appears to achieve the greatest improvements in efficiency, quality and flexibility when all activities from design to assembly occur in close proximity, with a high degree of face-to-face contact, unlike many forms of construction where production processes are physically dispersed (Gann 1996).

Nevertheless, the work systems associated with high-performance production, may still hold lessons for the construction industry. In particular, construction activities which involve more bespoke projects essentially involve the coordination of inputs from a variety of sources to produce customised products, often under conditions of uncertainty over design requirements in the initial stages. Work systems which emphasise the devolution of decision making to smaller business units or teams and greater customer focus may help create an organisational form which is better able to respond flexibly to changing customer requirements during the conceptualisation phases of the project and accelerate decisions as fast as possible during the realisation phases.

To what extent, though, does the current interest in partnering draw on these theories?

Partnering and production theory

In Britain there has been particular concern in the 1990s that many of the performance problems of the construction industry are related to its organisational and cultural environment. The industry's adversarial culture, and its lack of coordination and planning

during the building process, are regarded as a major hindrance to efficiency improvements. There is an underlying assumption that greater collaboration between clients, contractors and suppliers would help to overcome these problems (e.g. NEDC 1991; Latham 1994). In response to these concerns, partnering has been widely encouraged. Partnering essentially involves clients, contractors and suppliers committing themselves to closer working relationships to improve buildability and increase performance. It has been highlighted as a way of overcoming the problems associated with highly competitive relationships between different parties engaged in construction projects.

There is little agreement on the definition of partnering in construction (Barlow et al 1996). Some see it as an example of synergy, such that the sum of the activities of clients and constructors exceeds the product of their independent actions (CII 1991; Provost and Lipscomb 1989; Bennett and Jayes 1995). Partnering has also been seen as a management process. For example, Mosley et al. (1993) feel partnering is simply a form of strategic planning and Wanner (1994) sees it as a variant of TQM. Others have argued that partnering is simply a new word for being reasonable, conscientious or professional in business (Larson 1995) - it has been described as 'putting the handshake back into doing business', restoring trust in business agreements and opening lines of communications (Donald 1991). The presence of a 'moral contract' and an emphasis on collaboration, rather than confrontation, is held to be a key feature of partnering (Uher 1994).

A number of factors tend to be seen in the literature as essential for successful partnering (Barlow et al. 1996). These include the presence of mutual objectives, trust, a partnering 'charter' which all parties 'buy into', an agreed problem resolution mechanism and an understanding of each others' commitments.

However, while these necessary conditions may well be a key to the successful implementation of partnering, they do not develop independently of the structural and cultural circumstances within which an organisation is situated. Partnering - a shift towards greater collaboration and open exchange of information - implies a potentially radical change in the management practices and organisational structures of those involved. It seems unlikely that partnering could emerge in the absence of new organisational designs and managerial practices covering such inter-related issues as human resource management, information management, new communications systems, collaborative working practices and business strategy development. In this way, one would expect partnering to be facilitated by the introduction of new managerial and work practices in the construction industry, particularly those relating to high-performance production systems. Indeed, partnering may itself have acted as a catalyst for the spread of new work systems in the construction industry.

Partnering and new managerial practices: some preliminary findings from the case studies

Our research for the ESRC Innovation Programme is investigating the managerial processes involved in partnering, through a series of case studies of existing partnering arrangements in the construction industry. The case studies were selected because they represent a range of different types of partnering relationship and different construction sectors:

- British Petroleum: the 'Andrew Alliance', construction of a North Sea oil platform.
- Safeway: development of new supermarkets.

- National Westminster Bank: refurbishment programme for high street banks.
- McDonald's: development of new outlets.
- Selfridges: refurbishment of Oxford Street store.

In total, over 40 companies are involved in these partnering arrangements. So far, some 60 in-depth interviews have been conducted with personnel in these companies. These are examining such areas as: the direction of, and motives for, the particular strategies that have been adopted; the ways in which personnel adjust to change by making trade-offs or restructuring work relationships; and the evolution of partnering in response to unexpected events or crises. Interviews have also been conducted with major contractors (Galliford, Gleeson, Birse, Henry Boot, Willmott Dixon) who are pro-actively seeking partnering relationships, to explore their experiences in the current construction market.

Why were firms partnering?

Occasionally, a key individual had been responsible for driving a general corporate objective to 'become involved in partnering'. This was especially true of the contractors, who tended to be actively selling partnering as a part of their pursuit of clients. In most cases, though, the impetus for partnering was the need to carry out a project with specific requirements which could not be fulfilled using traditional procurement methods. In some cases there was an explicit construction problem which needed to be overcome - BP was seeking to develop an economically marginal oil field; McDonald's, Safeway and NatWest were all rapidly increasing their construction programmes. However, a common thread to all the case studies was the desire on the part of both clients and contractors to reduce construction costs.

'Soft', non price-related issues were also important for clients as reasons for partnering. These generally related to the need to maintain a positive public image in high profile construction projects by working with 'trustworthy' partners who understood their requirements (e.g. Safeway were concerned about minimising environmental protest over greenfield supermarkets; NatWest wanted to avoid disruption to staff and public at bank branches undergoing refurbishment). There was also a general concern to change 'ways of working' by avoiding disputes, although only the BP and Selfridges partnering arrangements included formal dispute resolution mechanisms.

It is not clear to what extent firms were already engaged in the promotion of continuous improvement, before their involvement in partnering. NatWest had established a new purchasing and supplies division with a brief to look at ways of improving the procurement of construction and other services. The possibility of *achieving* continuous improvement was, however, highlighted as a reason for partnering by some firms. This was felt to be facilitated by partnering because teams and individual workers were situated in a collaborative structure in which lessons about mistakes and problems could be more easily transmitted between different parties. However, unlike traditional continuous improvement models - where workers tend not to question the basic design of the product and simply learn by carrying out a task (Pine et al 1993) - partnering had tended to result in a more questioning environment, whereby workers challenged fundamental assumptions about design or assembly processes. In fact, some clients (e.g. NatWest) were specifically recruiting suppliers who they felt would question existing approaches. This process also involved clients posing new challenges for suppliers (e.g. McDonald's challenging suppliers to develop new prefabrication techniques).

Individual personality, teamwork and empowerment

The strategic movement of personnel to ensure an optimum mix in project teams was generally seen as a critical factor behind successful partnering in the case study firms. There were several examples of clients and partners moving personnel to avoid personality clashes or put in place workers with the 'right attitude'. For example, in the NatWest case study, regional bank managers - as construction customers - had requested specific individuals (project managers, quantity surveyors, architects) to work on the refurbishment of their branches, because they were deemed to be especially sympathetic to their requirements. In another example, one of McDonald's partners recognised a key individual was unable to work with the client's informal style of communication. This individual, who was felt by managers to operate more effectively in a more aggressive and conflictual setting, was moved to work with a suitable client. In the Selfridges case study, an architect was moved in the first week of the project and a project manager, who was felt to be unable to cope with the increased responsibility resulting from greater empowerment, was by-passed in the flow of communication between client and partner.

Whether this emphasis on alignment of people with the 'right' personality is new to the construction industry is, however, a moot point. It has long been pointed out that the management and decision making environment of the construction industry is frequently characterised by high *interdependency* in its problems, but high *independence* in its people, methods and organisations (Crichton 1966). Construction projects are essentially carried out by groups of individuals within temporary multi-organisations which are disbanded after completion of the work (Cherns and Bryant 1984; Winch 1989). The temporary nature of projects means that their participants can spend considerable amounts of time adjusting to the working practices of others on the project (Luck 1996), suggesting that optimising the mix of personalities has always been a feature of successful project management. What is perhaps different in partnering is that this factor may be *more* important given the non-confrontational aspirations of partnering and its emphasis on collaboration. It has been argued that personality tends to reveal itself most clearly when people are able to choose how they can act (Pervin 1993; Furnham 1992) - in other words, situations where people work in empowered environments are likely to require closer attention to the balance of personalities.

Team-based decision making systems were the norm for the case study clients, main contractors and some of the larger suppliers. In some instances there had been an explicit attempt to reform a company's organisational structure to produce cross-functional teams (e.g. Simons Construction, contractors to NatWest and Safeway). Team work was, however, not new to these companies and certainly not stimulated by their involvement in partnering.

There was very little effort at team*building*, either internally or across organisations, in the case study organisations. In the Safeway, McDonald's and NatWest cases, where each individual construction project was seen as relatively straightforward, there was no perceived need for teambuilding. Only in the two cases involving complex, non-routine projects - the BP and Selfridges projects - was there any formal teambuilding using external facilitators, and only the BP case involved regular teambuilding sessions at key points in the project.

To what extent was there evidence of increased empowerment because of the partnering process? According to Hackman (1986) a crucial indicator of empowerment is the way employees interact with each other and with customers. Typical behaviours of empowered employees include an increased awareness of their organisation's goals, increased personal

responsibility for the outcomes of their work, self-monitoring of their own performance and helping others to improve their own performance.

There was much discussion about empowerment in the case study companies. It was felt that empowerment of those further down the chain of command was essential, particularly for project managers who formed a key link between the managerial level and on-site staff. There was also a concern (expressed by BP and NatWest) to move away from a situation in which suppliers and contractors were directly 'shadowed' by the client's own staff; for example, a client's quantity surveyor continually checking an external quantity surveyor's work. It was, however, clear that in some cases empowerment had not been matched by any training in how to modify behaviours - this had led to a demoralisation of staff in some cases.

Whether increased empowerment was a new feature, arising from partnering, is not clear at this stage. In most cases, key staff were empowered to make relatively autonomous decisions because they had been working long enough for their employers to be trusted. Nevertheless, in at least one case (NatWest) two key individuals had been given a free reign to develop new procurement methods, leading to the establishment of partnering arrangements and a decision making structure based on greater individual empowerment.

Communications and information management

There are two elements to inter- and intra-organisational communications - the channels for communications and levels of openness and trust. Attempts to simplify information flows and develop new communications structures were a common feature in all the case studies, generally either by cutting out a chain of command or by allowing key people in each organisation to talk directly to each other. This helped to break down formalised, hierarchical systems of communications and create a flatter structure.

Another feature was the compression of the information flow, so that people working on the later assembly stages of a project could talk directly to those involved in the earlier design and planning stages, without communicating through intermediate project managers or quantity surveyor. This was especially evident in the two cases involving complex, non-routine projects. The BP Andrew scheme involved a high level of face-to-face communication by members of different companies sharing the same office, using integrated design and project management systems and video links with the various manufacturing and assembly sites. Selfridges and its partners had attempted to cut down paperwork by standardising requisition forms and increasing face-to-face interaction - sub-contractors were allowed to talk directly to architects.

More common in the 'routine' construction programmes was direct contact between senior personnel. This was made easy because many firms in the partnering relationships were relatively small. For example, the two main McDonald's partners were able to talk directly to staff at McDonald's head office, even though their contracts were with McDonald's regional offices. Safeway head office staff also liaised directly with the managers of key suppliers.

In general, there was a feeling that new communication channels and higher levels of trust had improved the ability of staff to deal with problems when they arose. However, open and flexible communications appeared to have also resulted in some problems:

- There was a feeling that there had been a disproportionate increase in the amount of time spent in communications. The number of points of contact between organisations seemed to be growing. Most interviewees agreed that partnering has meant more meetings involving more senior staff, with contractors and suppliers complaining that partnering is consequently an extremely expensive approach to procurement, with an uncertain pay-off.

- Some partners felt there was an uneven balance of power in terms of time spent on communications - clients were able to demand more of partners than in more traditional types of relationship. For example, McDonald's required its partners to be 'on call' for regular meetings in London at very short notice; NatWest's architects were permanently on call.

- Organisational roles had become more ambiguous by removing traditional, hierarchical forms of communication. For example, in the Selfridges case a quantity surveyor was formally held to be the central node for financial transactions between the main contractor and the client. The lack of formal paperwork - a by-product of the attempt to simplify communications - had made the quantity surveyor's role ambiguous, leading to conflict between contractor, client and quantity surveyor over requests for payments.

Customer focus

To what extent were the contractors and suppliers in the case studies seeking to inject customer concerns more closely into their decision-making process? A primary objective of partnering is, of course, the promotion of greater collaboration between clients, contractors and other suppliers. This can involve closer involvement of clients in early design decisions or in selection of key suppliers of components or services. However, beyond this, clients were especially concerned to reduce their burden of work by identifying key individuals in the partners who already knew about their requirements when starting a new project. In the case studies involving longer term construction programmes some contractors had set up teams dedicated to specific clients. For example, Simons Construction had established a cross-functional team with a board-level manager responsible for Safeway contracts, along with other teams dealing with other clients. Similarly, Bovis had a team of around 19 managers and 40 other employees working on Safeway projects. It had been agreed that the core team would not work simultaneously for their other retailer clients.

In most cases, however, there was no need for a client-focused team since the suppliers and contractors were small and it was easy for a client to liaise directly with the individual who dealt with their projects. Another factor which has mitigated against the establishment of specific client focused business units was the fact that even where there is a longer term, regular programme of construction work from a given client, individual projects tended to be relatively infrequent. Nevertheless, it appeared that even in the absence of specific client-focused individuals or teams, partnering had resulted in a shift in attitude, with contractors and other suppliers placing greater emphasis on the need for close liaison with customers.

Partnering and high performance production systems - some conclusions

It has been suggested that having a model of a particular work system in the same industry is one of the best predictors as to whether it will be adopted (Cappelli and Rogovsky 1995). Although there appear to be few, if any, models of high-performance systems in the

construction industry to guide firms, it seems likely that elements of new work systems have infiltrated the industry. This is consistent with the experience in other industries - in general, organisations tend to adopt individual work practices, such as empowerment or teamworking, rather than an entire production system.

Elements of the work systems described earlier in this paper which are evident in some of the case study companies include an emphasis on cross-functional teamwork, devolved decision-making and increased customer focus. These seem to have been adopted on a relatively piecemeal basis, rather than in a systemic way such different features relate to one another in tandem and to their broader environment.

It is perhaps not surprising that this should be the case. Full implementation of high performance - and other - systems face a number of barriers to their adoption:

- New systems frequently require a redistribution of power within the company (with the human resources function sometimes representing the fiercest source of resistance). A breakdown of hierarchical authority may mean managers with ultimate responsibility for functional units feel a loss of control, which they may reject. In addition, internal sub-cultures can undermine new arrangements. These features were evident to a greater or lesser degree in several of the case study companies. For example, the centralised construction procurement divisions of both McDonald's and NatWest had faced some resistance from other divisions or regional units, which were less keen on partnering.

- Demoralisation can act as a barrier to greater empowerment, with some employees rejecting the increased responsibility involved. Again, this was clear in some of the case study firms, where specific individuals had requested they be moved to positions involving more 'traditional' roles.

- There can be greater potential for chaos arising from a lack of clarity about responsibilities and more points of communication. This can undermine systems of distributed decision making as conflicts have to be resolved by centralised statements of company policy and a return to bureaucracy

- The costs and benefits of change are unclear. Companies do not know which of the areas of strategic advantage the market is most likely to reward. In these circumstances, they may go for all areas simultaneously - trying to be the cheapest, most flexible and best quality producer - leading to the adoption of incompatible production systems. Furthermore, there is no reason to suppose that the capabilities fostered by high-performance production systems are the only goals an organisation might have. Different goals may necessitate different work systems (Hunter 1996).

We have argued that the practices associated with some forms of high-performance production may hold lessons for the construction industry. The emphasis on flexibility and customisation may be especially appropriate. More research is needed, but in the case studies at least it seems that emerging organisational designs and managerial processes seem to have helped promote partnering arrangements, although partnering itself has only had a limited effect as a vehicle for wider changes in the organisations involved.

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