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Strategic planning for competitive advantage in construction: The institutions

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There have been developments in strategic planning techniques that various sectors of the economy have applied in pursuit of competitive advantage. In most sectors strategic planning applications are taking place at the level of parts of an enterprise's operations, at the general corporate level and at the level of the nation. In construction, strategic planning at any level appears to lag behind other sectors: it seems to be applied mainly by large enterprises keen on expansion, diversification and penetration of overseas markets. A previous paper by the authors has shown the implications of the developments in strategic planning concepts for the construction enterprise. This paper shows how strategic planning can be applied by professional institutions and trade associations in the construction sector. After defining a five-level framework to which strategic planning can be applied, the paper outlines the factors underlying change in the construction industry and the nature of that change. It then discusses briefly some of the techniques of strategic planning which can be applied by the institutions and gives detailed examples of strategic planning at the level of professional institutions and trade associations. Through recommendations of further opportunities, the paper then goes on to show how more widespread strategic planning can be followed in the future at the institutional level. It concludes by observing that the new ideas of strategic planning have relevance to and considerable scope for application at the institutional level of the construction sector.

Keywords: Strategic planning, competitive advantage, restructuring, professional institutions, trade associations.

Introduction

In other sectors of the economy, the business planning frameworks and priorities have shifted from the short-term and tactical to the long-term and strategic. Porter (1980, 1985) has shown how this shift is occurring at the corporate level. This shift has been in response to factors including the particular challenges to business environments caused by the increase in global competition in various industries (Levitt, 1983) and the decreasing cost of new competition under deregulation (Ives and Learmonth, 1984). This has led to fundamental changes in business including

1. the adoption of new cost structures;
2. major changes to products;
3. changing product life cycles;
4. the addition of new production capacity.

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Benjamin *et al.* (1984) suggest that these changes should lead all stakeholders within economic activities to reappraise their long-term situation with regard to products and relationships between buyers and suppliers.

Porter (1990) shows that similar changes are occurring at the national level. National strategies for socio-economic development have also progressed beyond the static, planning and central direction phase – about which much scepticism was always expressed and that is largely discredited (UNIDO, 1980) – to the dynamic, long-term, forecast-based, technology-driven, interactive phase. This may be seen in national science and technology policies in the industrialized countries (Fusfeld and Haklisch, 1979; Tisdell, 1981; Rothwell, 1986). There is also, increasingly, greater cooperation among nations in pursuit of competitive advantage for specific sectors of their economies, especially in the area of pre-competitive R&D, as displayed by programmes such as those embracing biotechnology engineering,

Table 1 Five-level framework for strategic planning in construction

Levels of application		Responsibility for Implementation
Level 1	National construction industry	Public-sector agencies
Level 2	Professional institution	Professional bodies and trade associations
Level 3	Construction enterprise	Enterprise
Level 4	Construction project	Enterprise
Level 5	Construction product	Enterprise

space exploration and information technology involving several European countries (Rothwell, 1986).

Levels for strategic planning in construction

Various authors adopt different definitions for strategy in construction. Betts and Ofori (1992) describe the variety of perceptions that exist and the narrow approaches that appear to predominate in construction enterprises. The complexity of the construction sector of many economies is greater than most other sectors. This is due to its structure, the nature of its historical evolution and the nature of its process and product. It is therefore possible and pertinent to consider several levels at which strategic planning and positioning may be applied, as suggested by Table 1.

The globalization of construction, the pressure on resources on one hand as against rising expectations of quality on the other, the need to adopt a long-term perspective to position the economy appropriately and so on, have created a situation where nations and their construction industries need to adopt strategies. At the very least, a national-level strategy would provide the framework or set an example for corporate initiatives. Such a strategy would also ensure that measures which support the activities of the enterprises are planned for and implemented. A forthcoming paper by the authors will examine strategic planning by national construction industries in more detail.

Many construction industries are influenced by their historical development and the professional institutions that have resulted from it. Although major deregulation, as faced by other sectors, appears inevitable, for now there is scope for strategic planning by the existing professional institutions and trade associations. This is because of the power and influence the professional institutions retain in some parts of the world, the expertise they can muster and the scale and scope economies which can be derived from their strategic initiatives. This paper reviews efforts to develop and apply strategies at the institutional level and considers the potential for more systematic use of the new techniques of strategic planning.

The most significant and more common examples of strategic planning in construction occur at the corporate level (Betts and Ofori, 1992). Indeed, most of the strategic planning concepts and techniques which have been derived are meant to be applied by business organizations (Porter, 1980, 1985). However, it is important for us to consider the peculiar nature of the construction process and product. In contrast to business and manufacturing industries, the fundamental operating level of the construction industry is the project. Although some writers suggest otherwise (Ramsay, 1989), it is reasonable to assume that the project is a level at which business strategy can be applied. There are many examples of such applications (Betts and Ofori, 1992). The large Japanese firms, in particular, have been successful in applying business strategies in relation to projects based on the concept of the integrated architecture, engineering and construction (AEC) enterprise.

Finally, the size and nature of the construction industry's product is sufficiently large, distinctive and durable for us to consider strategic planning with the product itself as the basis. The product is also diverse in terms of its nature. This again is an area where construction is distinct from many other industries. Hillebrandt and Cannon (1990) cite the offering of maintenance and management services as a product-differentiation strategy by a construction firm and Tarmac's 'Total Build' package is an example of this (*Chartered Quantity Surveyor,* 1991).

Having outlined five levels by which to examine opportunities for strategic planning in construction, the factors giving impetus to the need for strategic planning are considered and the techniques available for its application at these five levels may be examined. This paper considers the opportunities for strategic planning at the second of these five levels, that of the professional institution. Previous work by Betts (1992) has questioned, more specifically, whether information technology (IT) can be strategically exploited at each of these five levels.

The dynamic nature of construction

The nature of construction activity and the structure of the construction industry and its operating environment

are fluid (Gale and Fellows, 1990). This dynamism is growing at an increasing fast pace and is offering proportionately greater strategic opportunities with time, while posing significant threats. Barnett (1989) describes many of these issues and their implications for construction industries. Lansley (1987) sketches developments in the environment of the UK construction industry from the 1960s to the 1980s and outlines the responses adopted by the large construction firms. Tatum (1990) describes the changes in the AEC professions in the US and the strategic opportunities this phenomenon is offering. The influences on construction activity include the pace of technological change in other sectors of the economy (Economic Commission for Europe, 1986), increasingly stringent regulations (Nam and Tatum, 1988) and changing client desires because of variations in tastes, aspirations and purchasing power (Chow, 1990). Clients are also becoming more aware of the nature of construction (and of their rights) and tending to be more discerning. Owing to increasing statutory control, greater client and user knowledge and, especially, concern about the environment, professional duties and liabilities are being defined more strictly (Paustenbach, 1987).

There is also increasing deregulation and further 'privatization' of issues relating to development and building control. In many countries, mandatory professional fee scales and statutory 'protection' of at least some professions are already things of the past: elsewhere, they are under threat. The challenges and opportunities offered by this situation may be illustrated with those resulting from changes to the statutes relating to construction in Singapore. The Building Act 1989 imposes greater responsibilities on architects and engineers (in the design and supervision of building works) and contractors. It is also spawning the emergence of many companies to undertake newly required statutory periodic structural inspections (not more than 5 years for commercial buildings and not more than 10 years for residential buildings) and, when necessary, the repair of buildings used by the general public. In addition, the statutory changes have led to the Professional Engineers and Architects Act 1991 which allows the formation of limited liability companies by construction professionals and multi-disciplinary enterprises.

The environment of the construction industry is being increasingly influenced by economic, technological and social factors. For example, on the economic front, the forces, within and outside a specific country, include issues such as the increasing trend of privatization and the increasing globalization exemplified by the rising importance of regional economic cooperation (reduction of trade barriers and harmonization of regulations). In general, these are resulting in an increase in competition from firms from outside the country concerned. Another major influence emanates from the progress towards the information age (Betts *et al.*, 1991). A structural reorganization of the industry appears likely. As the way in which we execute construction projects undergoes radical changes, those who position themselves strategically can maximize the benefits to themselves.

Betts and Ofori (1992) review the strategic responses of construction enterprises in various countries to the dynamism of their operating environments. In many cases, following their involvement in design-and-build and turnkey projects or through mergers, acquisition and strategic alliances both within and across national borders, some firms have diversified their activities to become integrated AEC firms and others have ventured outside construction. 'Business development' has become an important part of the operations of the construction enterprise. Competition on the basis of far more than price is increasingly more important. Build-operate-and-transfer arrangements are examples (albeit rare) of the result of this phenomenon. Contractors' tenders now commonly incorporate financial packages; the contractor is joint venturing not only with other contractors but also with the developer and, more recently, some contracting firms have offered such services as the identification and securing of major tenants for proposed developments.

It is clear that many of the developments in the environment of the construction industry have implications for specific professions and trades which go beyond that which the individual practitioner or enterprise can effectively address. Perhaps more than other sectors of the economy, strategic planning is of concern to organizations in the construction industry other than enterprises. The professional institutions and trade associations within construction industries must also respond to strategic opportunities and position themselves advantageously by examining their internal activities and their external relationships with others. Porter (1979) observes that times of great changes offer opportunities for competitive advantage and excessive profit. In line with this and partly as a response to these external influences within the construction industry in many countries, the various professional groups are vying to maintain or expand the role of their members in projects, i.e. increasing their market share. Simultaneously, construction practitioners and enterprises are under threat from persons and organizations in other fields of activity who are offering construction-related services. These include those that construction practitioners have ignored (Graves, 1991), for which they lack the relevant expertise or which, while being part of their traditional activities, construction practitioners do not perform satisfactorily. For example, some investment analysts and accountants are offering consultancy ser-

vices on how building owners can optimize the revenue-earning potential of their property and how they can most beneficially (synergistically) integrate their property holdings into their corporate assets and operations.

The new strategic planning techniques

Business enterprises in other sectors of the economy, as individuals, as loose groups and through their associations, both national and international, have applied the techniques and tools that will be required in construction to exploit competitive advantage through strategic positioning. Many other sectors have realized that it is insufficient and often dangerous to react to events and that we should endeavour to influence the future, at least as it relates to our operations. A variety of new techniques, most of which are based on the work of Porter (1980, 1985), that are available to us in attempting to influence the future, are described by Flaaten *et al.* (1989). These are briefly outlined below. They are considered in greater detail and the relevance of each of them to construction is discussed, by Betts and Ofori (1992).

The five-forces model can be used for positioning an organization in relation to market forces particularly through exploiting industry changes (Porter, 1979). The five forces within the model are buyer power, supplier power, threat of new entrants, product substitution and jockeying for position. This model is particularly useful for analysing the strategic potential of an industry segment and the extent to which this is changing or can be changed by movements in the balance of the forces. Value chains can be used to identify potential for competitive advantage within individual parts of an organization (Porter, 1985). The value chain is a structured way of analysing a business's constituents and its links to outside organizations. Value is what a company creates, measured by the amount buyers are willing to pay for its product or service. The difference between value and cost determines profitabilty.

The three generic competitive strategies come through analysis of markets by a combination of the strategic target (industry-wide or segmented) and the competitive advantage sought (uniqueness or low cost) (Porter, 1985). This analysis gives rise to the three strategies of product differentiation, overall cost leadership and focus. Bench-marking is a strategic planning method based on analysing competitors (*The Economist*, 1991). It involves measuring every step of an organization's production process against those of the best rival. The core competences approach is where an organization concentrates on progressively improving its key abilities and skills (Prahalad and Hamel, 1990). It means identifying a particular aspect of 'what one does best' and striving to remain a leader in that field.

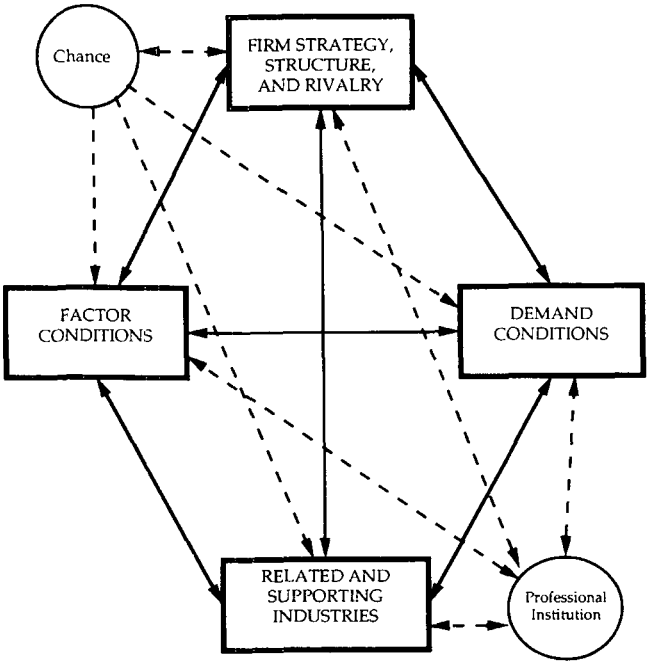

Figure 1 The national diamond (Porter, 1990).

Most of the techniques mentioned above were originally intended for corporate planning (i.e. application at the enterprise level). However, they may be used for all five levels of the construction industry. At the industry and professional institution level an additional form of analysis is appropriate.

The diamond technique

Porter (1990) has, more recently, considered techniques that may be appropriate to the national and institutional level in particular. Porter's (1990) work has become widely accepted within business circles and built upon by others. It is based on a simplistic view of business dynamics and competition. There have been criticisms made of the theories and the way they are presented (Eilon, 1992). However, his work is sufficiently well developed and accepted for us to look to apply it in construction. Porter (1990) offers an analytical framework for strategic economic planning at the national level. He suggests that the economic progress of nations depends mainly on continual increases in productivity realized by groups of companies within certain industry segments that search for competitive advantage. Governments play a key role in helping these firms to upgrade, by creating a conducive environment. Professional institutions also may have the potential to create a conducive environment. The features that distinguish good environments from bad ones are (Figure 1)

1. factor conditions – the traditional factors of production and the ways of making the best use out of them;
2. the strategy, structure and rivalry of domestic competition which provide companies with the experience of competition;
3. demand conditions – the extent to which the nation's shopping habits challenge producers to improve quality and services;
4. clusters – groupings of industries with common interests, the fora in which businessmen can encourage each other.

These four features create pressure on groups of industry segment members in some countries to invest and innovate.

Taking the first of these features, factor conditions can be advantageous by virtue of having human, physical, knowledge, capital or infrastructure resources. The particular hierarchy amongst factors and the facility that exists for factor creation also may be the source of competitive advantage. Porter (1990) does show how, sometimes, competitive advantage can grow out of selective factor disadvantage because of the particular pressure this gives to innovation. He quotes the Italian steel industry and Dutch cut flowers as examples. He also shows how Korean contractors used their relatively low labour costs to exploit competitive advantage in international construction markets. Yet, relative labour costs constantly change and this Korean advantage is now less pronounced.

Demand conditions are the pressures that home buyers bring by virtue of their tastes and expectations. This can be conducive if home buyers' demands anticipate those that are later found in other countries. The size and growth patterns of demand are also important. In construction, where the government is typically a major source of demand, we must take particular note of the different nature of public- and private-sector demands. A particularly rigorous public-sector demand could give rise to a force for competitive innovation in construction.

The feature of related and supporting industries is one by which an industry segment can benefit from a conducive environment. This can be through association indirectly with an advantageous industry segment that is upstream or downstream. The final determinant in an industry-wide segment is the domestic rivalry and the context of its firms or participants. This can embrace the nature of goals, strategies, structure and domestic rivalry. The other two components shown in Figure 1 are chance (taken directly from Porter (1990)) and the professional institutions. The latter comes from Porter's (1990) use of the government as a potential influence of the others. Our hypothesis here is that professional institutions and trade associations in construction can polish their diamond in a similar way.

In successful industry segments within nations, all four features, which form the primary elements of the diamond shown in Figure 1, reinforce each other. On the other hand, in bad environments, each feature can reinforce decline by hindering the efforts of individual companies or participants in the industry segment to upgrade (*The Economist*, 1990). For reasons associated with these four factors, groups of companies or participants within particular industry segments in some countries have developed competitive advantages over other groups of companies from other nations where the environment created is less advantageous. Porter (1990) quotes many examples of this from the ten economies he has studied in various parts of North America, Europe and East Asia. Helping firms to increase their productivity has led to higher rates of economic growth in some countries than others.

Some industries or segments that Porter (1990) identifies as having competitive advantage due to a conducive environment include Italian specialist leather footwear, German printing, Singaporean port services and Korean video-cassette recorders. He then goes on to show clearly how either governments or individual participants can polish the diamond for a particular industry segment. What concerns us here are the professional institutions. These were not major players within Porter's (1990) analysis. Is there scope for them to apply this and other strategic planning techniques in construction?

Overview of current strategic planning by construction institutions

To establish whether the professional institutions and trade associations can use and are using these new concepts and techniques we should take note of the current nature of strategic planning in construction at the institutional level. This forms the analysis within this paper by which we will test our hypothesis. We will examine the general strategies of professional institutions and trade associations and the context in which they operate before detailing major examples from various parts of the world.

Influencing factors

Some of the factors influencing strategic initiatives by professional institutions and trade associations have been outlined above. The need for strategic planning at the institutional level is almost peculiar to construction. It is in construction that the persons and organ-

izations with different specializations have, recently, been in almost constant competition to extend their respective share of total activity. Whereas each profession generally recognizes the technical competence of others, the competition is for the management/coordinating role on the project (Ireland, 1985). As the manager/coordinator is the leader of the project team, the stakes are high. Indeed, since various countries organize their construction industries differently, sometimes without involving professionals who are traditionally important in other countries, the competition is, on occasion, based on technical competence or claims to it. The relevance of the skills of a particular profession is sometimes called into question by members of others in the zero-sum-game competition. The quantity surveying profession in Tanzania faced such a fate in the early 1980s. Arguing that the quantity surveyor made no useful contribution to the project, the other construction professionals launched a concerted effort to demand the banning of the quantity surveying profession (which is accorded official recognition and protection by requiring persons to be duly registered before practising).

With the introduction of new systems for procuring construction projects, the jockeying for position amongst the professions to highlight their suitability for the leadership role has intensified. Another factor giving impetus to this competition among the professions results from the changes being effected in the statutory protection offered in some countries to certain professions in all or certain aspects of their work. It is also unlikely that professions which do not already enjoy such protection and have been calling for it will be accorded such a favour in the future. These are aspects of the five-forces model affecting the construction professions and the strategy, structure and rivalry aspect of the diamond, which give particular potential for competitive advantage from timely strategic positioning.

The single European market was thought likely to have an important effect on the construction professions in the member countries of the European Community. Weatherhead (1990) describes this and poses the question of where this leaves the professional. The strategies of UK professionals in the past must be reoriented to face the new dynamic changes of the future within Europe. This conclusion is based on the different range of construction professions in member countries, the different roles played by professionals in projects in each country and the varieties in the relationships between them. All have architects and engineers although their roles vary. Only the UK and Ireland have surveyors and builders. These differences are determined by historical reasons, but often factor and demand conditions lead to them remaining in place. Both would have to be changed to create the new environment for professional demarcations. Many changes within the single market for construction may start to influence these factor and demand conditions. The professional institutions may be able to influence them further directly. The mutual recognition and harmonization of qualifications will begin to affect factor conditions. The greater dispersion of other economic activities to a European basis will influence demand conditions. Porter (1990) argues that it is during times when the four attributes of the diamond are changing that organizations have the greatest scope to reposition themselves in a way to gain competitive advantage. This is currently the case for all European construction professions with both opportunities and threats present.

Responses

In several countries, many professional bodies and trade associations have endeavoured to equip their members with the necessary skills and facilities to enable them to face the challenging future with confidence: skills, through accreditation of courses, continuing professional development and dissemination of relevant state-of-the-art information and facilities through central data services, computerized libraries and similar. The intention is to help them to enhance their competitiveness. They also run publicity programmes to keep their members in the public limelight (or counter adverse publicity from other quarters). In the UK, there was a prolonged (and acrimonious) debate about the merits of some new forms of project procurement and the professional best suited to play the leading or coordinating role in projects. This was followed by a response from a large client association (British Property Federation (BPF), 1983) which posed threats to many professions and which all were quick to react to. This typified the previous (negative) approach when the institutions tended to delineate their areas of competence and guard them jealously (Ofori, 1990). They resisted new thinking for several years until it was clear that such opposition was futile.

A more forward-looking approach is now evident in some quarters, while the claims to the leadership role remain in others. Introspective studies identifying new roles for particular professions have become common. The stimuli for these have come from

1. perceived threats to the profession from without (Graves, 1991);
2. new, beneficial knowledge that should be applied – such as IT (Brandon *et al.*, 1988);
3. initiatives by client groups dissatisfied with the services they are getting – such as the BPF;

4. issues of wide public concern – for example, the environment;
5. concerns expressed by users about the quality of buildings and works – such as the issue of 'healthy buildings';
6. geopolitical and economic events – such as Europe 1992;
7. great new opportunities – such as the colonization of space (ASCE Aerospace Division, 1988).

Loose 'strategic alliances' among members of associations have, in some cases, been institutionalized. These include 'arranged' tendering systems and guarantees of members' work overseas.

The approach being adopted by professional bodies and trade associations in response to change may be illustrated by the long-term measures they have taken to address developments in IT. As suggested by Betts *et al.* (1991), the technology offers a new opportunity as a strategic weapon to

1. gain competitive advantage;
2. improve productivity and performance;
3. enable new ways of managing and organizing;
4. develop new businesses.

Through a combination of business strategy and application orientation (Lim, 1990), IT can be used strategically to improve internal productivity, external productivity, internal competitiveness and external competitiveness. In construction, IT seems to be considered mainly as a means of improving internal productivity at present. Betts (1992) does show some evidence of strategic IT use but largely at the enterprise level. Governments, professional institutions and groups of enterprises in trade associations may have more opportunities to examine external productivity. The Royal Institution of Chartered Surveyors (RICS) provides an example of how this can be done in the form of the Building Cost Information Service (BCIS), a central database of price information supplied by subscribing members who are then able to use the data to improve their individual external productivity and competitiveness. The Royal Institution of British Architects (RIBA) is offering a similar form of use of IT through the RIBACAD library system (Ray-Jones, 1990) of standard architectural details.

The response to the increasing concern about conserving resources and protecting the environment may also be cited. The pressure has come from widening statutory control, effective action by pressure groups, greater interest by clients and users and mounting awareness on the part of the general public. In the UK, many of the professional bodies have prepared 'Green Papers' (CIOB, 1989; Gibb, 1990). However, there is scope for further action for the benefit of the individual professions as well as for the common good (Burberry, 1991; Ofori, 1992). Specific examples of the application of strategic planning at the institutional level in various countries are discussed in the following sections.

Examples of strategic planning by institutions

Quantity surveying

Some might say that any examples of construction organizations (enterprises, national and international agencies or professional institutions) adopting the new concepts of strategic planning are exceptions. They might say that construction is a stable activity in which not much changes and that the scope for the application of strategic planning simply does not exist or is severely limited. The quantity surveying profession is not normally associated with change: its demise has long been predicted. It can be used to illustrate the ideas expressed in this paper.

Nisbet (1991) demonstrates how the main task of a profession and the approaches and information base required to fulfil it can change over time. He describes quantity surveying as '. . . the study and management of construction costs. It is concerned with obtaining value for money' (p. 13). He observed that 'value for money' is difficult to define and its meaning has fluctuated with time and circumstances. At the genesis of the quantity surveying profession in the 1800s it meant obtaining more reliable prices by restructuring the building industry. In the 1950s it meant getting lower prices; and in the 1980s it meant faster completions. Current priorities appear more concerned with quality. However, the purpose remains the same and the distinctive (core) competence of quantity surveying remains unaltered while its methods change. Male (1990) has shown that the quantity surveyor's knowledge base is the basis for professional power and authority. He highlights the current lack of a broad base for the profession but identifies the potential for power and authority to be gained through the profession concentrating on the 'resource controller' or 'resource gatekeeper' roles. This work is important to our discussion in several ways. First, by showing that the survival and progress of the quantity surveying profession would be supported by strategic, independent academic enquiry into its future and, second, by identifying a potential core competence that the profession could exploit for its competitive advantage. It also shows how important factor conditions are to a profession's success.

Graves (1991) warns the quantity surveying profession against leaving a gap in the market-place and in professional skills that would be filled by others. The

profession should evolve into one providing such additional services as project audits (such as independent views on performance), management consultancy for suppliers and subcontractors and construction management, using established cost planning techniques to control subcontract packages. Other commentators express varying opinions on the best path to a secure future for the quantity surveying profession.

The RICS (1980, 1983, 1984, 1991a,b) has prepared many 'strategic plans' for quantity surveying. These are mainly studies of threats to the profession, investigation of ways and means of improving the quality of members' services and identification of opportunities for members. The first major examination (RICS, 1980) was for all surveying divisions. It charted the social, economic and technological changes which made the surveyor's environment dynamic. In response to these, it suggested that quantity surveying needed to develop a sound academic foundation to its strong and widening practical basis. It saw energy conservation and land-use planning as the dominant issues of the time. The first report on the future role of the chartered quantity surveyor (RICS, 1983) was an early attempt to find new services and roles for members of the profession. It identified some specialized functions in response to the dynamic environment perceived then. It also addressed education, training and recruitment, technological change, fee scales, public relations and marketing and research. The first study of quantity surveying practice and client demand (RICS, 1984) set out to consider the scope of quantity surveying work in relation to both RICS policy and objectives and changes in client demand. It identified many areas of unsatisfied demands and highlighted what constituted a successful professional service. From this, it drew conclusions regarding what actions were necessary to develop and promote the profession. This report was prepared during an important time of change for the profession: there was a merger between consultant- and contractor-based surveyors which broadened the profession's base, thus influencing the structure and rivalry of members in a way that these reports had seen to be beneficial with the coming changes in procurement methods. The reports show that the profession has been thinking very seriously about its current position and its future in a strategic way, for some time. Many of the detailed recommendations constituted attempts to influence factor conditions (through research, education and recruitment) and to clarify demand conditions.

The recent past has seen a further spate of strategic planning activities by the profession which in many ways have re-examined the same issues described above. The first (RICS, 1991a) concerned the maturing nature of the profession and the need for flexible services and fee scales. It also made a case for the profession's core competence to be broadened to embrace decision-making and communication skills to support project management. The second of the more recent 'strategic plans' (1991b) took a new tack in considering a consolidation of the different surveying divisions into a single point of responsibility as a response to an updated analysis of surveyors' markets and their requirements. This greater recent activity illustrates the increasing strategic pressure. We can expect this to continue given the current dynamic climate.

There have been other attempts by the RICS to influence factor conditions through research and development and the offering of information services. These include the development of the BCIS on-line data sharing service referred to earlier and the involvement of the profession in fifth-generation computing research (Brandon *et al.*, 1988). The latter case also shows an attempt by the RICS (one of very few professional bodies to do so) to redefine its cluster to gain advantage from a leading supporting industry segment (artificial intelligence research). The quantity surveying profession has always sought to innovate and invest more in research than the other construction professions in the UK appear to have done. This may be partly due to the selective factor disadvantage of an initially small knowledge-based resource. A recent attempt at innovation by the profession shows that this continues to provide the stimulus for such initiatives (RICS, 1990). In 1989, the Quantity Surveying Division of the RICS adopted a structured set of approaches to manage the development of the profession. This took the form of rolling 3–5 year work programmes with 30–40 specific projects of various durations. The programme was based on a projection of trends that would affect the profession and the identification of the issues it faces. Realizing that '. . . the strength of a profession lies in its knowledge base, in its techniques and in its ability to combine these two elements to solving relevant problems' (McDonagh, 1991, p. 11) and following a concept of strategic planning outlined above, the Division launched yet another study to identify its core competence: its '. . . unique knowledge base . . . and unique skills' (McDonagh, 1991, p. 10), to provide a firmer base on which to develop ideas for the future. Again, this is an example of the professional institution attempting to influence factor conditions in order to suitably position itself for competitive advantage.

Efforts to develop the quantity surveying profession further and to adopt forward-looking perspectives and initiatives to ensure its survival are not limited to the UK. At the *perestroika* conference, the quantity surveyors' institutes of Australia and New Zealand suggested that their restructuring should proceed along a new path. It should include undertaking a value-management study of the quantity surveyor's role in

construction, establishing a common forum for standard contracts, expanding continuing professional development, including firms as members, merging with related bodies, improving publicity, organizing regular conferences and seminars, sponsoring research and study tours and involvement in developments in artificial intelligence (Hordern, 1989). Evans (1991) goes as far as to suggest that the development of the profession should be aimed at making the quantity surveyor the lead consultant. This is a reflection of the healthy strategy, structure and rivalry that is developing amongst quantity surveyors with new services being offered, international acquisitions and new forms of marketing increasingly being adopted. This rivalry, as a part of the diamond, is being influenced by the activities of the professional institution.

Building

We can illustrate strategic planning by the construction professions with a further description of initiatives taken by the building profession in the UK, which, like the quantity surveyors, has been active in trying to further its future for some time. This has included early attempts by the erstwhile Institute of Building to improve its image, culminating in it gaining chartered status in 1980. There have been further attempts since then to establish the discipline as a distinct profession. The Institute has also addressed the issue of women in construction and of quality to a greater extent than its counterparts in the UK. Moreover, through a series of occasional papers, practice manuals and codes, the Institute is also trying to enhance the level of technical competence of and provide an information base for its members. Furthermore, it appears to have adopted a more far-sighted approach to the integration of Europe than most of its counterparts and has actively sought to position its members to exploit the opportunities offered.

The Chartered Institute of Building (CIOB) differs from its counterparts by being the only one which prepares, publishes and continuously monitors and reports on strategic plans using the systematic approaches outlined in this paper. Many issues discussed in this paper were addressed by its recent strategic plan for the period 1991–1995 (*Chartered Builder,* 1991). The plan crystallizes and seeks to consolidate and expand the Institute's initiatives in the broad areas outlined above. The plan (*Chartered Builder,* 1992b) directly addresses the issue of the leadership role: 'The professional builder is uniquely qualified to draw together the strands of the building process and, as a team leader, to influence the economics, function and aesthetics of building projects.'

The components of the plan include aiming for wider recognition, developing new specializations within the discipline, increasing environmental awareness, adding a European dimension to the Institute and extending its international influence more generally and developing pan-industry links. The wider recognition component concerns achieving acceptance of members' qualifications in a broader range of public and private sector organizations and in the new international arena. This is an attempt to influence demand conditions. The second and fourth strategic plan components concern professional services. The Institute aims to extend library and technical information services and to initiate new registers of members, advisory services and seminars and publications. These also include developing project and facilities management as specializations and all attempt to influence factor conditions. The same can be said of the third component which concerns a new education and training framework.

The Institute aims to develop an environmental policy largely in response to changing demand conditions. The same applies to the component concerned with the European dimension. Action plans relate to educational requirements, identifying international professional equivalents and creating a pan-European association. These measures show the Institute polishing a number of parts of the diamond including factor conditions, structure and rivalry and the related and supporting industries. The latter are changing with European integration. The strategic plan also looks beyond the European Community in recognizing potential international links with the US, China and Eastern Europe. The public image and administration components of the strategic plan largely concern efficiency and promotion rather than aspects of the diamond. There is specific mention of pan-industry links and this shows the Institute trying to improve upon its relationships with the related and supporting industries to influence its competitive position. The fact that the Institute follows up on the extent to which its plan is being implemented, not by starting a completely new exercise but, by monitoring the achievement of its original plan also shows some continuity (*Chartered Builder,* 1992b).

Webb (1991) elaborates on the European issues facing builders. The Institute has also attempted to promote the commercial benefits to be gained from environmental awareness (*Chartered Builder,* 1992a). These all show the way the CIOB is attempting to influence all four determinants of the diamond for the industry segment of professional building services as part of its strategic planning for competitive advantage. One point of current debate amongst members is whether to change the professional designation from 'chartered builder' to 'chartered building engineer' in view of the European single market. The choice of a more appropriate name could be a means of influencing demand

conditions and the strategy and rivalry of the Institute's members. The international dimension is a key to the Institute's efforts. Their primary goal is 'to develop a more influential role in the building industry in the United Kingdom and overseas'.

Civil engineering

After significant developments over a long period, the American Society of Civil Engineers (ASCE) has emerged as an institution with many specialist divisions embracing aerospace, air transport, energy, mechanics, geotechnical, highway, hydraulics, irrigation and drainage, materials, structural, urban transportation, water resources, urban planning, waterways, cold regions, earthquakes and management. Macnab (1991) argues that this excessive specialization was a bad strategic move by the ASCE and that it has reduced the standing of the profession. Suggesting changes in this regard is an attempt to influence generic strategies and factor conditions. Pennoni (1991) identifies three types of engineer, that the ASCE should aim to develop core competences for, in its future strategies. The Society recognizes a number of issues facing civil engineers in the US, arising from the dynamic context in which they operate. One of the major problems at present is the shortage of qualified engineers and the recruitment into and image of the profession. Walesh (1990) suggests alternative ways that the ASCE can address this and, thus, influence the factor conditions of the profession. Meyninger (1991) focuses on the few women ASCE members and suggests that the shortage could be reduced by targeting more potential female entrants.

Of greater strategic significance may be the feeling amongst the ASCE members that their profession lacks a vision or a wider view of its future. As Michael Hanatunian, President of the STV Group of New York engineers stated at the 1991 ASCE Annual Convention in Orlando 'Engineers have traditionally been technocrats and not people of vision' (*ASCE News*, 1991a, p. 4). Hanatunian (1991) later suggested that the current professional pressures relating to litigation and a lack of fee competition discourage innovation and have prevented ASCE members emerging as leaders. The ASCE Construction Congress in Cambridge, MA in April 1991 also called for innovation and suggested 'partnering' as a new procurement method that the profession should encourage to enhance its status (ASCE, 1991). In response to these calls the professional institution is starting to question its code of ethics (Groden, 1991) and selection criteria for engineering firms for public projects (Jordan, 1991) which appear to be potential obstacles. They both represent aspects of rivalry, structure and strategy of the ASCE environment which are not conducive to competitive advantage.

The ASCE is responding to the dynamic environment of the civil engineering profession in a number of ways. New initiatives include technical services, continuing education, student and educational services, publications, legislative affairs, public communications, member services, public policy and research (*ASCE News*, 1991b, p. 4). The institution is very active in working on its diamond. It has a number of high-powered committees charged with continuously seeking opportunities for innovation by members in various aspects of civil engineering and construction in general. The Orlando Convention led to some new position papers becoming accepted which affected professional registration and (Paper 384) ASCE support for research and technology programmes for engineering and construction in space (p. 13). The ASCE has an extensive list of publications embracing manuals, standards, newsletters, journals, periodicals, special publications, monographs and committee reports. A recent special publication by 40 ASCE members (ASCE, 1990) concerning quality, reflects the Society's response to changing demand conditions.

A trade association

A final example of institutional strategic planning, that is in direct response to the globalization of construction, comes from Japan. The Overseas Contractors Association of Japan Incorporated (OCAJI) was established in the early 1970s following the initiative of one of the members of the 'Big Six' (Bennett *et al.*, 1987; Hasegawa, 1988). Rather than use the national contractors association to address overseas market issues in what would probably have been a slow and unresponsive way, a new association was created specifically for that purpose. It now provides support and assistance to a variety of large and small construction enterprises in their overseas activities.

The OCAJI is an independent association of contractors but it works very closely with the Ministry of Construction (MOC). Its offices are located within the Ministry's building in Tokyo. Its original strategic goal was to secure new overseas markets in developing countries. Its lobbying and links with the MOC were critical for this as original contracts in the countries concerned were public sector infrastructure works that were typically based on financial aid provided to such countries by the Japanese government. A strategic link with the MOC gave advance notice of these opportunities. The OCAJI's full-time staff are mainly senior and semi-retired public figures from the MOC and the universities. OCAJI representatives abroad host MOC visits to overseas countries and the position of OCAJI country representative is regarded as a prestigious post. The OCAJI's strategy has been to be more than an

Table 2 Enterprise- and institutional-level use of strategic planning techniques

Application Level	Strategic planning technique				
	Five-forces model	Value chains	Three generic strategies	Core competences	The diamond
Enterprise	1	2	1	2	–
Institution	2	–	–	1	1

1, primary significance. 2, secondary significance.

independent trade association. It has been very successful in assisting penetration by Japanese construction enterprises into many overseas construction markets and now has representatives in more than 50 countries.

The relationship between the OCAJI and the contractors that form its membership is interesting. Now that Japanese contractors are very active, they pay a small percentage of their local contract sums into the general pool. In addition to money, each of the major enterprises seconds members of its staff to act as local OCAJI country representatives for 1 year at a time. The choice of enterprise from which the representative is drawn rotates amongst those locally active and this demonstrates an important aspect of the OCAJI's new role. Its original aims have largely been realized. Now, its primary function is a symbolic one. It formalizes the cooperative and non-aggressive competition among the major Japanese construction enterprises overseas. This is a way in which the institution directly influences the strategy, structure and rivalry component of its diamond.

Like other trade associations, the OCAJI does undertake market research and publishes reports and magazines from each of the countries in which it is represented. However, in this respect, it is following the activities of the Big Six rather than leading them. In terms of our strategic planning concepts, this example fits the diamond concept rather than the enterprise-based techniques. The OCAJI has been successful in assisting an overseas market penetration policy by influencing the demand conditions and strategy, structure and rivalry of its members. To illustrate the OCAJI's new role, it is pertinent to consider related and supporting industries. The OCAJI has also been active in maintaining links with the Japanese Economic Trade Research Organisation (JETRO) (a government economic development body that covers all sectors) and the Japanese Chambers of Commerce Association (JCCA). The OCAJI and JETRO are always physically located together, symbolizing the strategic alliance but they also collaborate extensively. The JCCA represents the overseas enterprises in all sectors and has a number of divisions. The OCAJI collaborates extensively with the construction division. These two aspects of cooperation are now assuming more strategic significance for the continued growth and survival of the construction enterprises.

Summary and comparison

From these examples we can clearly see that strategic planning is appropriate at the institutional level. Given that it is responses to threats that constitute a prime motivator for strategic planning, the application of the techniques of strategic planning at this level is likely to continue to be important in response to the pressures of deregulation, clients' insistence on better quality of services, competition from other professions and threats that will come from without the industry.

The approaches adopted by the institutions in the examples discussed above differ. The CIOB appears to be the one which has made the most systematic use of the techniques outlined above to prepare a strategic plan. The numerous studies undertaken by the surveying profession in the UK indicates the lack of strategic vision in the preparation of the earlier ones, necessitating a reconsideration of the issues soon after their publication. Despite differences in national conditions and immediate pressures, the failure of surveying institutions in all countries (despite their small number) to cooperate in studies of threats and opportunities facing the profession in general (which seem generally similar) is remarkable. The OCAJI is an example of an organization which has successfully achieved its strategic objectives. It is worth watching how it will consolidate its achievements in the face of mounting competition from firms and groups of enterprises from other countries, often applying government-backed initiatives.

On the basis of the review and discussion so far in this paper, at the institutional level of the construction sector now, the use of the new strategic planning techniques and the scope for applying them further could be summarized as shown in Table 2. This also shows the differences between the enterprises' and institutions' use of the strategic planning concepts. The techniques that apply at the enterprise level appear to be of some application at the level of the professional institution. We have seen examples of the five-forces model and of core competences being used. The new approaches

developed by Porter (1990) for exploring the competitive advantage of a nation's industry segments seem to apply to professional institutions to a greater extent. What we now need is a means of finding ways to extend our use of the new strategic planning concepts at the professional institution level.

There is often a wide gap between corporate-level strategic planning by professional practitioners and that at the level of the professional body or trade association – what an institution perceives and offers as strategic directions for its members and what the members can apply. For example, despite the attempts by the RICS to highlight new opportunities and portray a modern image of the profession, many of its members still adopt a conservative approach and retain an old perception of themselves. McDonagh (1991) suggests that traditionally, the quantity surveying profession was identified with the construction process but now is more closely associated with the construction product: its development, its procurement and its maintenance and management. Whereas the technologies and techniques it used and the relative importance of the profession had changed (for example, quantity surveyors were providing management-oriented services concerning value and procurement), the self-image of the profession was outdated. Many quantity surveyors considered themselves as '. . . a rather technically based profession providing a . . . backup, back-room service supporting the activities of the far more important skills applied within the design and management of construction' (McDonagh, 1991, p. 11). The institutions need to detect and identify the threats and opportunities in advance. They can then develop appropriate strategies incorporating measures to be implemented at the level of the institute, while offering guidelines for the firms. Each firm of professionals would then have to adapt the broad guidelines to carve niches for itself and benefit from the macro-level information services, hardware and training programmes offered by the institutions.

Further opportunities for strategic application by construction institutions

As our examples show, some institutions within the construction industries of some countries have accepted the need to think strategically. The next task is to convince them to do this in a structured manner. The concepts formulated by Porter (1990) would be very useful in this regard. It is also necessary to persuade other institutions of the need to act. Alternatives may be possible here. Sufficiently large institutions can undertake studies with in-house expertise. Another possibility is that specialist consultants be appointed. Regular conferences and debates on the future of the profession, such as those held by quantity surveyors from Australia and New Zealand and the UK and by the ASCE, enable the issues facing or likely to face the particular profession to be considered from a strategic viewpoint. Institutions then need to identify specific research, development and procedural change programmes that are necessary. These should be set out, systematically, perhaps after further consideration by a study group or an external consultant. The resulting set of missions, objectives and action plans should then be communicated to members. Ideally, the institution's strategic plan should provide the basis for the enterprise-level planning of its members. Guidelines on how members could adopt or implement the contents of the plan should also be prepared and well publicized. Rather than continually preparing 'strategic plans', it would be beneficial for each institution to ensure that what they draw up is actually implemented. A set of procedures for monitoring the extent to which its members have acted upon the stated initiatives and the results achieved, would be useful. Like plans for enterprises, those at the institutional level should be of a rolling nature. The monitoring of their implementation would facilitate any necessary review. Consequences at the institutional level are at their most significant. Failure to act in the current climate may mean that changes occur in a profession's relative position and strength, from which recovery is impossible. Grasping strategic opportunities earlier than other professions could, conversely, result in a leading position in the construction sector of the future. Institutional objectives, therefore, should be survival and interprofessional advantage.

Some professional institutions and trade associations in the construction industries of many countries, like some of those shown in this paper, have applied Porter's (1990) diamond planning concepts. There are many exceptions to this. Despite the current dynamic business climate, there are old, traditional and well-established statutorily protected bodies that are currently well-recognized and regarded. Architects and engineers are good examples of these in some countries. It could be argued that these need to follow strategic planning much more earnestly than those who have responded from the disadvantaged and uncompetitive positions in which they had found themselves. The dangers of complacency in the current dynamic business environments are greater. Experiences of individual, uncompetively positioned enterprises and groups of enterprises in uncompetitively positioned national industry segments demonstrate this. There is no reason to suggest that institutions in construction will escape these influences. Yet, there have been enterprises that have exploited the changing environment positively. Construction professions could do the same.

There is great potential for interprofessional strategic planning and synergistic developments leading to mutual benefit. Professional institutions and trade associations must continue to explore these and other issues in their strategic planning in the future. As the structure of the sector changes, there will be scope, in each country, for strategic alliances among all or groups of professional institutions and trade associations. Such alliances and/or cooperation could be for addressing particular issues or in relation to the wider matters affecting construction. Such multiprofessional and preferably industry-wide cooperation and alliances are most relevant in the developing countries where the ability to influence government to adopt favourable macro-level policies and procedures is vital to the development of the local industry. Before interests become too entrenched, cementing the fragmentation of the construction industries in these countries, it is appropriate that efforts are made to fundamentally restructure the professions to create institutions which are more appropriate to the needs and circumstances of the country. Linkages across national borders are also potentially beneficial, especially in the light of the lowering of national trade barriers. Such linkages may be between or among institutions of the same profession, as well as those of different professions. For example, a strategic restructuring of the professions in the UK undertaken together by all the relevant institutions (rather than the present uniprofessional approach) to bring them more in line with the structure of the industry in Europe would seem a viable option. At the same time, the oportunity could be seized to restructure each profession world-wide to address the problems they are likely to face in the future. Greater cooperation among the professional institutions and trade associations not only on a continental or regional basis, but also on a global one, is necessary.

This paper and that published earlier by the authors (Betts and Ofori, 1992) show that strategic planning, in response to dynamic factors within their industries and their operating environments, will affect the future of individual practitioners in two ways

1. by helping their professional enterprise to explore the opportunities it has for competitive advantage over other enterprises;
2. by enabling their professional institution to explore professional level competitive advantages.

The net result will be a picture of a more competitive environment within the construction industry. It will be necessary for construction practitioners to take due cognisance of efforts by their professional institutions and/or trade associations to ensure their survival and enhance their competitive advantage.

Conclusions

In this paper we have seen that the changing nature of economic activity must be responded to in a different way in the construction sector. This is because of the many operating levels that exist. The new, emerging strategic planning techniques are clearly applicable to enterprises. Through examples we have seen that the new technique developed for analysing national industry segments applies to the professional institutions and trade associations. Most of the components within the diamond have been applied in many of the examples we have described but others could also be applied.

There is a need for all institutions in the construction sector to respond to the opportunities that exist and this paper shows where this might happen and suggests how it can be done. What is clear from this analysis is that the construction sector is about to experience fundamental change. The change will be in response to the new business climates. This dynamism requires that the new planning techniques be used.

References

ASCE (1990) *Quality in the Constructed Project*. New York, American Society of Civil Engineers.

ASCE (1991) *Construction Congress*. Cambridge, MA, April.

ASCE Aerospace Division (1988) Civil engineers in space. *Journal of Professional Issues in Engineering*, **114**, 348–353.

ASCE News (1991a) *ASCE Orlando Annual Convention*, 12–16 December, p. 4.

ASCE News (1991b) What's ASCE done for you lately? 9–16 September, p. 16.

Barnett, A.M. (1989) Future construction industry: implications for industry, *Australian Institute of Building Papers*, **3**, 21–35.

Benjamin, R.I., Rockart, J.F., Scott Morton, M.S. and Wyman, J. (1984) Information technology: a strategic opportunity, *Sloan Management Review*, **Spring**, 3–10.

Bennett, J., Flanagan, R. and Norman, G. (1987) *Capital and Counties Report: Japanese Construction Industry*. Reading, Centre for Strategic Studies in Construction, University of Reading.

Betts, M. (1992) How strategic is our use of information technology in the construction sector?, *International Journal of Information Technology in Construction*, **1**(1), 79–97.

Betts, M. and Ofori, G. (1992) Strategic planning for competitive advantage in construction enterprises, *Construction Management and Economics*, **10**(6), 511–532.

Betts, M., K. Mathur, Ofori, G. and Lim, C. (1991), Strategies for the construction sector in the information technology era, *Construction Management and Economics*, **9**, 509–528.

Brandon, P., Basden, A., Hamilton, I. and Stockley, J. (1988) *Expert System: The Strategic Planning of Construction*

Projects. London, Quantity Surveying Division, Royal Institution of Chartered Surveyors.

British Property Federation (1983) *Manual of the BPF System*. London, The British Property Federation System for Building Design and Construction, BPF.

Burberry, P. (1991) Saving energy: what matters now?, *Architect's Journal*, **13 February**, 55–59.

Chartered Builder (1991) Strategic plan, *Chartered Builder*, **3**, 12–14.

Chartered Builder (1992a) Green profits, *Chartered Builder*, **4**, 11.

Chartered Builder (1992b) Strategic plan, *Chartered Builder*, **4**, 11–14.

Chartered Quantity Surveyor (1991) Tarmac launches Total Build, *Chartered Quantity Surveyor*, **June**, 3.

Chow, K.F. (1990) *The Construction Agenda: Development of the Construction Industry in Singapore*. Singapore, Construction Industry Development Board.

CIOB (1989) *What Are You Doing About the Environment?* Ascot, UK, CIOB.

Economic Commission for Europe (1986) *Long-term Perspectives for Human Settlements Development in the ECE Region*. (A report prepared by S. Staynov and K. Baumgarter.) New York, United Nations.

Eilon, S. (1992) Editorial: on competitiveness, *Omega*, **20**, i–v.

Evans, D. (1991) Widening the scope, *Chartered Quantity Surveyor*, **June**, 13.

Flaaten, P.O., McCubbrey, D.J., O'Riordan, P.D. and Burgess, K. (1989) *Foundations of Business Systems*. Florida, Arthur Andersen & Co. and Dryden Press.

Fusfeld, H.I. and Haklisch, C.S. (1979) *Science and Technology Policy: Perspectives for the 1980s*. New York, Academy of Sciences.

Gale, A.W. and Fellows, R.F. (1990) Challenge and innovation: the challenge to the construction industry, *Construction Management and Economics*, **8**, 431–436.

Gibb, Sir F. (1990) Pollution and its containment. *Overseas Brief* (Newsletter of the Institution of Civil Engineers), **September**, 1–2.

Graves, R. (1991) Skills gap lets in predators. *Chartered Quantity Surveyor*, **June**, 13.

Groden, B.T. (1991) Is the ASCE code of ethics obsolete in today's society?, *Civil Engineering*, **61**, 18.

Hanatunian, M. (1991) Engineers need a wider view, *Civil Engineering*, **61**, 8.

Hasegawa F. (1988) *Built by Japan: Competitive Strategies of the Japanese Construction Industry*. New York, John Wiley & Sons.

Hillebrandt, P. and Cannon, j. (1990) *The Modern Construction Firm*. London, Macmillan.

Hordern, A. (1989) What does the Institute do?, *The Building Economist*, **28**, 3.

Ireland, V. (1985) The role of managerial actions in cost, time and quality performance of a high-rise commercial building, *Construction Management and Economics*, **3**, 59–87.

Ives, B. and Learmonth, g.p. (1984), The information system as a competitive weapon, *Communications of the ACM*, 1193–1201.

Jordan, F.E. (1991) Selecting the most qualified, *Civil Engineering*, **61**, 6.

Lansley, P. (1987), Corporate strategy and survival in the UK construction industry, *Construction Management and Economics*, **5**, 141–155.

Levitt, T. (1983) The globalization of markets, *Harvard Business Review*, **May–June**, 92–102.

Lim, S.S. (1990), Singapore's opportunities for competitive advantage. *Keynote Address to Opening Session of the National IT Application Conference*, 1–7 March 1990, Singapore.

Macnab, A. (1991) Are speciality registrations necessary?, *Civil Engineering*, **61**, 18.

McDonagh, N. (1991) Future shock or future shocked, *Chartered Quantity Surveyor*, **June**, 10–12.

Male, S. (1990) Professional authority, power and emerging forms of 'profession' in quantity surveying, *Construction Management and Economics*, **8**, 191–204.

Meyninger, R. (1991) Women engineers: a national need, *Civil Engineering*, **61**, 6.

Nam, C.H. and Tatum, C.B. (1988), Major characteristics of constructed products and resulting limitations of construction technology, *Construction Management and Economics*, **6**, 133–148.

Nisbett, J. (1991) Identifying the knowledge base, *Chartered Quantity Surveyor*, 13–14.

Ofori, G. (1990) *The Construction Industry: Aspects of its Economics and Management*. Singapore, Singapore University Press.

Ofori, G. (1992) The environment: the fourth construction project objective?, *Construction Management and Economics*, **10**(5), 369–395.

Paustenbach, D.J. (1987), Should engineering schools address environmental and occupational health issues?, *Journal of Professional Issues in Engineering*, **113**, 93–111.

Pennoni, C.R. (1991) Is this engineering?, *Civil Engineering*, **61**, 6.

Porter, M.E. (1979) How competitive forces shape strategy, *Harvard Business Review*, **March–April**, 137–146.

Porter, M.E. (1980) *Competitive Strategy*. New York, Free Press.

Porter, M.E. (1985) *Competitive Advantage*. New York, Free Press.

Porter, M.E. (1990) *The Competitive Advantage of Nations*. New York, Free Press.

Prahalad, C.K. and Hamel, G. (1990) The core competence of the corporation, *Harvard Business Review*, **May–June**, 79–91.

Ramsay, W. (1989) Business objectives and strategy. In Hillbrandt, P.M. and Cannon, J. (eds) *The management of construction firms: aspects of theory*, London, Macmillan.

Ray-Jones, A. (1990) The why, what and how of a graphics library. In *Proceedings of the National IT Application Conference*, Singapore, Construction Sector Programme, 1–7 March.

RICS (1980) *Surveying in the Eighties*. London, Report by the Policy Review Committee, Royal Institution of Chartered Surveyors.

RICS (1983) *The Future Role of the Chartered Quantity Surveyor*. London, Quantity Surveying Division, Royal Institution of Chartered Surveyors.

RICS (1984) *A study of Quantity Surveying Practice and Client*

Demand. London, Quantity Surveying Division, Royal Institution of Chartered Surveyors.

RICS (1990) In Brandon, P.S. (ed.) *Quantity Surveying Techniques: New Directions*. London, Quantity Surveying Division, Royal Institution of Chartered Surveyors.

RICS (1991a) *QS2000: The Future Role of the Chartered Quantity Surveyor*. London, RICS.

RICS (1991b) *Market Requirements of the Profession*. London, Report by Richard Lay's Committee, RICS.

Rothwell, R. (1986) *Public Innovation Policies: Some International Trends and Comparisons*. Brighton, Papers in Science, Technology and Public Policy, No. 12, Science Policy Research Unit.

Tatum, C.B. (1990) Integration: emerging management challenge, *Journal of Management in Engineering*, **6**, 47–58.

The Economist (1990) Oh, Mr Porter, what shall we do?, *The Economist*, **May**, 107.

The Economist (1991) Competing with tomorrow, *The Economist*, **May**, 67–68.

Tisdell, C.A. (1981) *Science and Technology Policy: Priorities of Governments*, New York, Chapman & Hall.

UNIDO (1980) *Technological Self-reliance of the Developing Countries: Towards Operational Strategies*. Vienna, Development and Transfer of Technology Series No. 15.

Walesh, S.G. (1990) Engineer shortage? Try this, *Civil Engineering*, **60**, 8.

Weatherhead, M. (1990) The construction professions and the European single market: a UK perspective, In *Proceedings CIB 90, Joint Symposium on Building Economics and Construction Management*, Sydney, March, **1**, 317–328.

Webb, M. (1991) A passport to Europe, *Chartered Builder*, **3**, 10–12.