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## *Scenario planning for construction companies*

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# SCENARIO PLANNING FOR CONSTRUCTION COMPANIES

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The ability to understand the future holds the key to sustained competitive advantage. The key question is how to embed this ability into the strategic management skill-sets of companies using appropriate tools, techniques and processes, and involving the appropriate stakeholders. Futures methodology literature suggests that scenario planning is a powerful technique for looking at the future that is rarely used in construction. An implementation framework for company scenario planning is proposed derived from relevant parts of the literature and evolved through a series of interactions with industry. The framework emphasizes that the awareness of external factors and industry scenarios, and the extent of stakeholder engagement throughout the process will determine the overall efficacy of scenario planning. Benefits will accrue from having a common understanding of alternative futures by explicitly capturing perceived future events, drivers and pathways in scenario mapping exercises. This should place companies in a better position to navigate their future and deal with potential threats and opportunities.

Keywords: corporate planning, future studies, negotiation, organizational learning, research methods.

## INTRODUCTION

The impact of the construction industry on the UK economy is substantial. Construction firms work within a tradition of competitive tendering and small profit margins, but have to be able to respond to fluctuating market demand in order to survive. Construction work often has to be performed in inhospitable or 'difficult' environments and the industry has a poor health and safety record (Egan 1998). Construction has been found to be ineffective at planning for the long-term future and lacks forward thinking. A number of reports scrutinizing the performance of the sector (e.g. Egan 1998) have called for the industry to look beyond their next project and prepare themselves better for potential future events and trends.

Strategic planning is a critical management function which could ensure the long-term survival of construction organizations (e.g. Betts and Ofori 1992). Here, 'strategic planning' is taken to mean a management function for developing a longer-term plan (beyond the next project), which will shape company characteristics and determine the market in which it is going to operate. Many reasons have been put forward for construction organizations' lack of effort in strategic planning (Brightman *et al.* 1999), most being inadequate resource capacities, instability of employment and the unpredictability of the construction market. Strategic planning is often the

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responsibility of senior managers; however, the time they can dedicate to the task is limited as they also have day-to-day operational responsibilities (Burt and van der Heijden 2003). This problem is increased by the prevalence of small construction companies in the sector. Fierce competition and the transient nature of construction employment often results in smaller companies struggling to survive, let alone plan for the long term. Hence, their focus is often just on their current project, as well as winning the next one. If they do plan ahead, then this may have to be aborted because of an emerging need to respond to emerging market demands, hence rendering the whole process of long-term planning less beneficial. In most cases, there is little evidence of a formal process in the formulation of long-term strategies (Edum-Fotwe 1995; Brightman *et al.* 1999). There is thus little capacity for strategic planning in companies in the construction sector and little emphasis on the need for long-term planning as its benefits have not been fully and immediately realized.

Rapid social, economic and technological developments have provided many threats and opportunities for construction companies. The existing modus operandi is perhaps no longer sustainable if they wish to sustain their competitiveness at local, national or global levels. Hence, the need to plan more strategically and better foresee future possibilities is more important than ever before. Enhancing their capacity to foresee futures and plan for them is critical if companies are to prepare and adapt to emerging trends and eventualities that may lie ahead. Scenario planning has recently been heralded as a promising tool to generate possible, probable and preferred longer-term futures (i.e. 20–25 years) for organizations (Hiemstra 2006). This paper reports on a review of literature which provides the basis for developing a process framework for enhancing a construction company's capacity for strategic planning using scenario planning. First, recent evidence of strategic planning practice derived from a survey of senior construction professionals is presented. The role of scenarios in strategic planning is subsequently explained. Causal mapping techniques to capture individual and organizational cognition about the future are described also. A proposed scenario planning activity (the framework) within a firm is then presented. The paper concludes with a discussion regarding the barriers of implementing scenario planning, recommendations for approaches to overcome them, future research activities and potential contribution to knowledge in this area.

## **STRATEGIC PLANNING IN CONSTRUCTION COMPANIES**

Understanding current strategic planning practices within companies is a prerequisite to improving it. Several studies have outlined the generic approaches of strategic planning practices in construction organizations (Brightman *et al.* 1999; Price 2003). A questionnaire survey of senior construction managers in the UK was recently undertaken by the authors to provide information regarding strategic planning practices. Here, the aim is not to provide definitive facts based upon a representative sample, but to provoke further thought and discussion and to enhance the knowledge of current practices in strategic planning.

The first two questions asked the respondent's position within their organization and their experience (i.e. number of years) within the construction industry. The respondents were then asked whether they had been involved in long-term strategic planning and decision making, and if so, how far ahead their strategic planning looked (in terms of number of years). They were asked to identify events that had had an adverse effect on their corporate strategic planning and the extent to which they can possibly avoid or minimize these given the right tools/techniques. The subsequent

questions asked about the tools and techniques that the respondents usually use as part of their planning. Here, multiple choices of common tools/techniques were provided, including SWOT (strengths, weaknesses, opportunities and threats) analysis, gap analysis, PESTEL (political, economical, social, technological, environmental and legal) analysis, competitor analysis (i.e. analysing the behaviour and development of similar competitors), as well as no specific technique. Spaces for 'other' answers were also provided.

The final question enquired as to the data and information that the respondents thought most useful for strategic planning, and their effectiveness (in terms of ability to help make the right decisions) in a Likert scale of 1 to 4 where 1 indicates 'poor' and 4 'excellent'. Multiple choices of information were provided, including 'forecasts from internal/external sources', 'statistics (past data)', 'newspapers and magazines', 'personal contacts' and 'intuition and experience'. Again, spaces for 'other' answers were provided. At the end of the questionnaire, the respondents were invited to write additional comments and their contact details, should they wish to get further involved in the research. The questionnaires were distributed during a construction professional institution's annual conference in autumn 2006. Considering the practicality of their distribution, the questionnaires were designed to be fairly simple and took about 15 minutes to complete. Two of the authors attended the conference and personally distributed the questionnaires, as well as leading the delegates through a facilitated process for completing the questionnaires. Forty questionnaires were completed and consequently analysed.

The majority of the respondents were experienced construction professionals who had been in the industry for a significant amount of time (an average of 24 years). Most (85%) declared their involvement in the formulation of long-term strategic planning and decision making. The length of the future plans that they had been involved in varied, but almost half (56%) had a corporate plan for the next five years. Only 18% and 12% indicated that their plans were for 10 and 3 years respectively. Much smaller percentages of them planned for 1, 2 and 20 years. This concurs with Brightman *et al.*'s (1999) assertion that planning horizons are generally limited to between 3 and 5 years. Longer-term plans are often sensitive to changes caused by social, political, economic and technological developments. The majority (70%) indicated that they have personally experienced events that have had an adverse effect on their corporate planning. Most reasons cited were events over which they have no or little control, such as market slumps/recession and change in government policies (political decisions). Current issues such as skills shortage, energy prices and climate change, were also cited, indicating their awareness of the possible impacts that these might have now and in the future.

Most respondents used a combination of several techniques for planning, rather than a single technique. The response showed that 68% used SWOT analysis and 58% used competitor analysis. Gap and PESTEL analyses were used by 32% and 20% respectively. Interestingly, 15% of respondents who were involved in strategic planning activities did not use any techniques at all. A small number of 'other' tools were indicated including 'mind-mapping', 'what-if scenarios' and 'blue-sky thinking/brainstorming'. Anecdotal evidence collected from key construction stakeholders during previous workshops and interviews suggests that 'what-if scenario' techniques and brainstorming sessions are often conducted informally among key decision makers during discussions in company meetings, for example, when they considered alternative options.

Regarding information for developing their strategic planning and its effectiveness, the average responses for ‘forecasts from internal/external sources’, ‘statistics (of past data)’, ‘newspapers and magazines’, ‘personal contacts’, ‘intuition and experience’ were 2.6, 2.5, 2.1, 2.6 and 2.7 respectively. The results highlighted the heavy reliance on intuition and experience in the formulation of strategic plans. It is interesting to note the perceived higher effectiveness of intuition and experience compared with ‘harder’ information such as forecasts and statistics. These findings show a higher degree of subjectivity during the formulation of corporate strategic planning with little participation from lower ranks within the organizational hierarchy. A more formal strategic planning technique which is able to elicit and unify aspirations from staff at various levels might help organizational competitiveness through helping to capture the relatively untapped potential of its workforce.

## **THE ROLE OF SCENARIOS IN STRATEGIC PLANNING**

Thinking about and planning for the future is an integral part of human life. An example of its simplest form is the plans that most people make in the early morning, when they think about their activities for the day, whereas the most complex future planning attempts to look into the long-distance future (e.g. 20–50 years’ time). In everyday life, people naturally construct sequences of future events in their minds when they consider the possible implications of their decisions and actions. In other words, people are unconsciously familiar with building scenarios. So what are scenarios in general, and what do we mean by corporate scenario planning? What are the advantages of using scenarios in comparison to other ‘harder’ futures studies techniques such as forecasting?

A scenario can be simply described as a storyline comprising a range of interconnected and uncertain future events and their possible consequences. Scenarios are often employed for decision-making activities in which some parameters are uncertain or poorly defined, hence scenario-planning techniques’ ability to deal with ‘wicked’ (as opposed to ‘tame’) problems (Rittel and Webber 1973; cf. Rosenhead and Mingers 2001: 5). Earlier futures studies techniques (e.g. based on the extrapolation of current trends) have failed to live up to their expectation as a predictive tool. Instead, scenarios are tools for presenting people perceptions of the alternative environments in which decisions and actions might be played out (Brightman *et al.* 1999). It is not about predicting events or determining the most likely scenario, but is about developing several plausible stories that describe how the environment in which an entity (e.g. an individual or organization) lives or operates, may develop, given certain future events, trends and developments and then exploring possible ‘discontinuities’ and ‘surprises’ (i.e. wild cards) (Hiemstra 2006).

Scenarios provide a framework to develop and evaluate corporate strategies. The utility of scenarios is often analogous to ‘wind-tunnel’ or ‘test-bed’ for corporate strategic decisions. Hiemstra (2006) found that taking a long-range view of about 20 to 25 years is best for corporate planning because this permits people to imagine that things will be different, to make fundamental changes in their organizations, and to seize opportunities that are not given by shorter views (of, for example, three to five years). Some may argue that planning for 20 years is almost impossible, so strategic plans will most likely remain three to five years, which is practical given the speed at which the world is changing today. Thus, scenario planning aims to extend people’s views of the future through thinking of various possibilities, which provides a ‘test-bed’ for strategic plans, allowing them to navigate their future and choose an

appropriate direction. This will enhance the organizational capacity for strategic planning and managers' decision-making capabilities (Schwartz 1991; cf. Chermack 2004). However, little is known regarding the conceptual linkage between the decision-making process and scenario planning, in terms of how scenario planning enhances the process and its outcome.

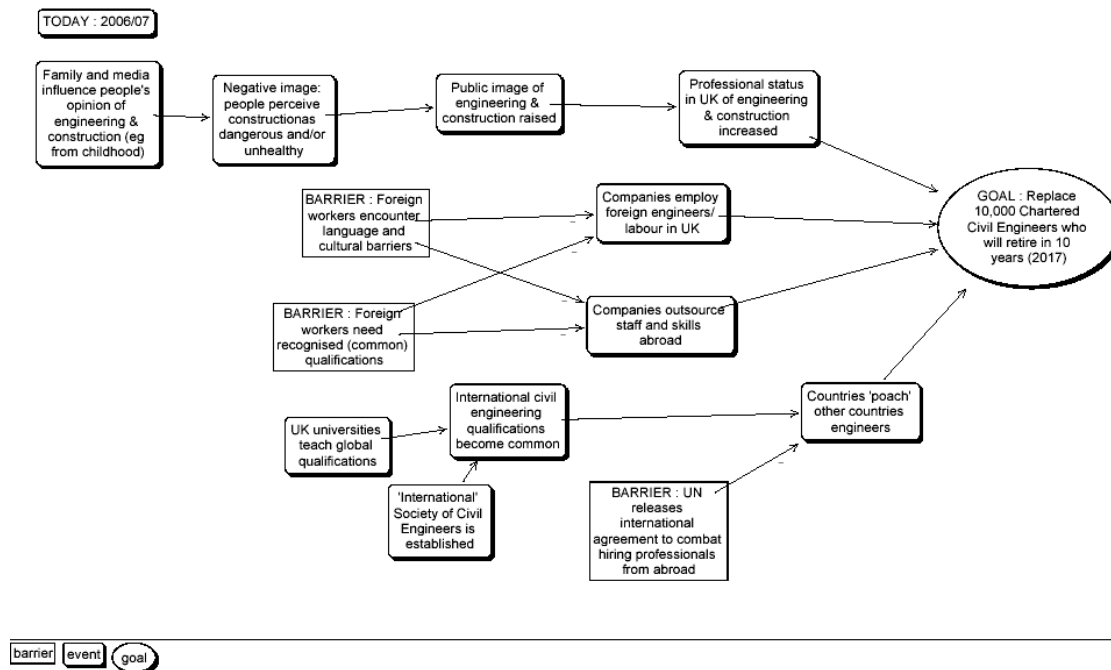
Recently, Chermack (2004) explored the core problems that present themselves in the dynamic decision-making process and outlined the use of scenarios in potentially decreasing the incidence of unexpected decision failure. He identified four main contributors to decision failure, namely: (1) bounded rationality; (2) an emphasis on exogenous variables; (3) 'stickiness' and friction of information and knowledge; and (4) mental models and cognitive maps with their corresponding decision premises or rules. He also explained how the scenario-planning process can reduce the impact of these to improve the effectiveness of the decisions made. Scenario planning makes explicit the mental models of managers for the purposes of analysing, sharing, reconstructing and altering them. Effective decisions should be based upon shared mental models, resulting from the joint decision-making process by key stakeholders (van der Heijden 1996). The main benefit of scenario planning is derived from the process which facilitates organizational learning for the purpose of continuous improvement. The ultimate outcome is not in the scenarios themselves, but within the process as experienced by the participants. Thus, scenario planning is a process of creating an agile, adaptable and prepared organization by 'softening' (and possibly changing) organizational culture to be more receptive towards new thinking (Korte and Chermack 2007). The next step to comprehend this process is understanding what the mental models are and their representations, and how they can be shared, negotiated and altered. This is described in the following section.

## **MAPPING INDIVIDUAL AND ORGANIZATIONAL COGNITION ABOUT THE FUTURE**

Mental models provide a frame of reference for the interpretation of events or phenomena in life (Eden and Ackermann 1998). Mental models govern people's thinking about the future, whether as an individual or as a member of an organization. As noted previously, people are constantly thinking about future events and their interdependencies. Hence, these events and interconnections reside within people's minds and are constructed and interpreted based upon the frame of reference, i.e. mental models. These mental models ultimately govern individuals' behaviours and actions. Changing behaviour requires changing or modifying these mental models.

These mental models become more important when people are working in groups, such as teams, organizations or companies, where coherent and concerted behaviours and actions are essential if a group's objectives are to be achieved. Mental models are the basis for the reasoning of behaviours and actions of individuals within a group. People need to communicate and negotiate intentions and plans, which in turn will be moderated by the other members of the group. This interaction within organizations for developing longer-term plans is called 'strategic conversation' (van der Heijden 1996). To permit this strategic conversation, we need a media of representation, which makes explicit these mental models. Cognitive maps have been advocated by many scholars to objectively exhibit mental models. In general, a cognitive map is simply a graphical representation of a person's thinking, which locates the person in relation to their informational environment (Fiol and Huff 1992; Eden and Ackermann 2001). A number of terms, such as 'mind map', 'brain map' and 'concept map' have sometimes

been confused to mean the same thing. Also, the term ‘cognitive map’ was initially meant rather differently and used to represent mental models of the relative locations and attributes of phenomena in spatial environments (Billinghurst and Weghorst 1995; Kitchin and Freundschuh 2000). In this research, we use the term ‘causal map’ which means a map that exhibits people’s perception of a causal network of relationships in a form of nodes and paths (Eden and Ackermann 1998). Nodes contain future events whereas paths (arrows) describe causal relationships between these events, that is, a relationship to show that the occurrence of Event A will lead to the occurrence of Event B or certain actions will lead to particular outcomes. Eden and Ackermann (1998) proposed a way of structuring the map according to a tear-drop/pyramid shape, with the goal/desired outcome at the top, the strategies/key issues, and assertions, supporting facts and options at a lower level. Figure 1 demonstrates an example of a section of a causal map generated from an interview with the regional manager of a civil engineering professional institution as part of data collection exercise to build industry scenarios in specific areas. In this example, the events are arranged not up and down, but left to right so as to allow a sense of time sequence. It addresses the predicted shortage of chartered civil engineers in 2017 due to retirement and decreasing membership. The map was constructed using Decision Explorer™ software, which has been considered the most advanced computer support for cognitive mapping (Tegarden and Sheetz 2003).



**Figure 1:** An example of a causal map

The functions of a cognitive map in organizational decision making include: issue structuring (which focuses attention and triggers memory); issue closure (which reveals gaps); and creative problem solving (which highlights key factors and supplies missing information) (Fiol and Huff 1992). Fiol and Huff (1992) identified three components of the cognitive map, namely: identity (to identify key actors, events and processes); categorization (to provide information about the interrelationships of the actors, events and processes); and causal and argument (to provide information about potential interconnections among entities of the importance to the organization through time, i.e. the ‘route’). The identity and categorization components provide the

inputs for the causal and argument components. Fiol and Huff (1992) highlighted the significance of managing these interactive components and balancing multiple and often conflicting components and maps of individuals. Individual maps are unlikely to be identical but they may partially overlap.

Corporate strategic decisions are often made through a process of negotiation among stakeholders, in which their idiosyncratic views, interpersonal relationships and politics all come into play. Causal maps can be used for negotiation by reconciliation of goals, the merging of concepts/events and the verification of pathways to the future. Integration of individual maps should maintain a balance between unity and diversity. Lack of unity leads to a dysfunctional map, whereas lack of diversity negates creative production of alternative views of the future, and may also stifle innovation (Fiol and Huff 1992).

Eden and Ackermann (1998, 2001) suggested a way of exposing an individual's causal map to others through a process of 'negotiating' and/or 'merging'. 'Negotiation' occurs when two or more causal maps are going to be integrated by (e.g. organizational or company) stakeholders during a decision-making process. Here, multiple perspectives of an issue facing an organization are invited. 'Negotiation' often involves 'merging', where two concepts are amalgamated into one in the presence of informants and/or interviewers. Theoretically, two or more events can only be merged if they mean exactly the same thing intrinsically. In practice, this is often difficult as even the same word can mean two different things. Merging events would normally involve ascertaining their meanings to the members of a group in a meeting or workshop session. This may lead to three possible outcomes: the events mean exactly the same thing; the events can be merged but need rewording; or the events cannot be merged as the team cannot reach a consensus. The merged maps are referred to as a collective causal map. A number of studies have shown that this process is often problematic mainly because of disagreement on language and its meanings, indicating a lack of shared experiences relevant to a particular domain (Langfield-Smith 1992; Tegarden and Sheetz 2003).

Figure 2 shows how two small parts of two different causal maps can be merged. The maps were produced from two interviews addressing the problem of labour shortage in the construction industry. The goals are slightly different; the first concerns the shortage of engineering professionals, while the second is about labour shortage in general, but focuses more on operatives.

## **SCENARIO-PLANNING ACTIVITIES: A PROPOSED PROCESS FRAMEWORK**

There are as many planning frameworks as there are scenario planners. The process framework presented here is not meant to be prescriptive, but to give generic guidance on how the key principles of scenario planning are implemented in this research. Brightman *et al.* (1999) provided an example of developing scenarios in a construction firm, which is different from this framework, mainly in terms of how employee participation is incorporated in the process and the approach in building the causal maps. The scenario planning is not a 'one-off' but a continuous exercise, linking the development of scenarios and the evaluation of strategic decisions against the scenarios and the implementation of the consequent decisions. This process permits opportunities for reflection and re-perception, as examining possible

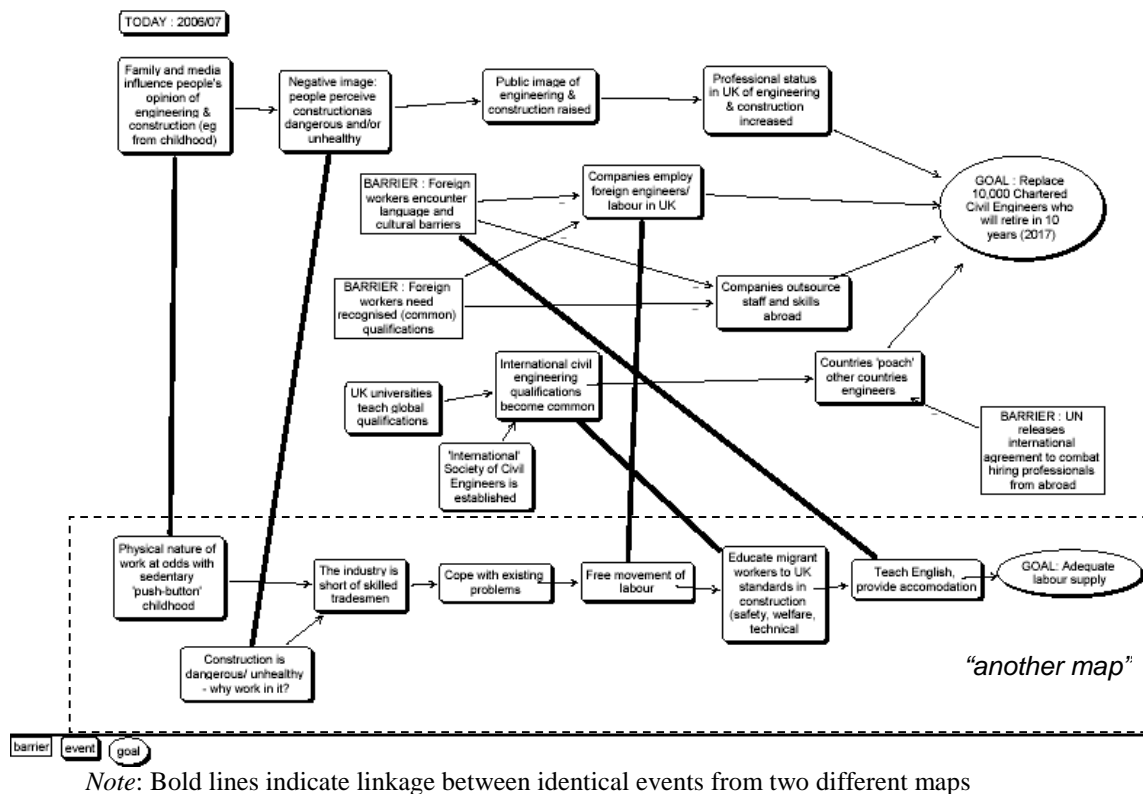


alternative futures from different angles can clarify key issues and help stakeholders to prepare and develop strategies for achieving their preferred futures (List 2006).

**Step 1: Appoint a mapping facilitator and selecting representatives**

The first step is to appoint a mapping facilitator, which could be an external consultant or a member of the internal staff (van der Heijden 1996). The person should be a broad thinker with an ability to understand dissimilar issues of importance to different divisions and levels of organizational hierarchy. He/she should possess excellent interpersonal skills to enable them to interact with people from a range of levels. A reasonable knowledge of the organization, in terms of, for example, both ‘hard’ daily business, operation and organizational structure, and ‘softer’ interpersonal relations and organizational politics would also help the facilitator to appreciate issues and concerns as well as the underlying message and implied reasoning. Nevertheless, he/she should be sufficiently detached to maintain an objective view and impartial judgement. This is the balance required between an external consultant and an internal member of staff. An external consultant would bring a new perspective as a view from an ‘outsider’. Nevertheless, internal staff with the above skills may be more advantageous to the business or organization concerned in the long term.

The process begins with selecting representatives from a range of divisions or levels, ensuring those at lower levels are adequately represented. Such representatives would bring benefits in terms of capturing untapped perspectives from different levels, realizing the potential benefits of employee participation and empowerment in solving organization problems. Apart from exploring different views and identifying problems and potential solutions from an operational level, this approach will develop a sense of ownership and commitment to ensure wholehearted support from employees. These representatives will form a ‘scenario team’.



**Figure 2:** Example of a combined causal map

## **Step 2: Construct individual causal maps using interviews and brainstorming exercises**

A combination of brainstorming and interviews is used to construct individual causal maps via a *Post-it Note* exercise. The aim is to get the most benefit from both techniques while compensating for their different weaknesses. Individual rather than group exercises are preferred in order to capture the individual's pure idiosyncratic views in the first instance – group exercises tend to be influenced by the strong personalities and often result in unproductive disagreements (Scavarda *et al.* 2006). Group exercises can also work against staff at lower levels who feel unable to express their view freely within the presence of their superiors. Facilitator bias in the *Post-it Note* exercise is also much less than that in the interview. Nevertheless, a recorded interview during the session is useful for the benefits of the later analytical stages in the process, particularly for clarifying any issues when merging and negotiating the individual maps.

The individual causal map is constructed on an A1 paper, where a representative can write events on the *Post-it Note* and stick on the paper. *Post-it Notes* ensure flexibility in that they should permit events to be moved freely within the space provided. Cause-and-effect relationships (i.e. arrows) between events can then be drawn – using pencil initially and colour-marker later on. Generally, the map is constructed on a timeline over the next 10–20 years, which does not have to be exact, but is more indicative of the timescale. First, representatives are to identify organizational goal(s), and possibly divisional goal(s), and how both are interlinked (i.e. to build a system of goals (Ackermann *et al.* 2005)). These should be placed on the right-hand side of the A1 paper (i.e. in the future). Then, they write down on the *Post-its* the state of the current situation, together with past events which are relevant predecessors to the present situation, and these are placed on the left-hand side of the paper (i.e. today). The space in between the envisioned 'goal' and the current situation then provides room for external and internal events to take place within that timescale. External events are those related to the changing landscape of political, economical, social, environmental and technological developments, which are outside the influence of the organization. Internal events are possible events happening within the firm, such as changing managing directors or entering new markets, and also possible interventions, such as the recruitment of older workers due to a lack of younger staff (here, to respond to 'ageing population'). The internal events are, to a large extent, controllable by members of the organization. Awareness of industry trends in a broader sense is relevant to this process. Representatives also need to think critically about possible discontinuities and 'wild cards' that may change the 'terrain' on which the firm has to operate. This ensures that the scenarios will embrace as many future uncertainties as possible.

## **Step 3: Analyse the individual causal maps**

This step includes a number of activities, including desk-work, consultation with representatives and other stakeholders, and preparation for the company workshops. The desk-work converts the *Post-it Note* maps into a form suitable for communication, further analysis and manipulation, usually in a computer graphical format with user-friendly software, such as Decision Explorer<sup>TM</sup>. This also involves listing the goals, the current situations, future events, interventions and identifying possible common events to merge. It is also possible at this stage to have a brief

consultation with the representatives and stakeholders, to clarify any issues arising, discrepancies or confusing aspects, and develop an awareness of the political and social interaction within the firm. The facilitator(s) should be aware of any possible problems arising from these ‘intangible but influential’ aspects of the firm. The facilitator should then prepare the outline of activities for the group work (i.e. workshop).

#### **Step 4: Discuss causal maps in a company workshop**

An ‘organization’ is a negotiated and social order, which recognizes that resolution between members to create a new negotiated order requires a social process that explores different perspectives and negotiates an acceptable way forward (Strauss and Schatzman 1963; cf. Eden and Ackermann 2001). Hence, it is imperative that this negotiation process is conducted on an open and cooperative basis, where top level management are receptive towards ideas from those at lower levels in order to obtain social and psychological commitment. Once a sufficient number of individual representatives’ causal maps on the same, or similar, theme(s) have been constructed on a one-to-one basis with the facilitator and the analysis completed, a group company workshop can then be held.

The group discussion opens by the presentation of all the individual causal maps. The collective map(s) developed by the facilitator are then presented. The goals and the current situations are reviewed and the representatives interrogated for possible differences and similarities, and they may then be organized within a hierarchy. The next step is to explore possible pathways to achieve the goals, by scrutinizing external events (including discontinuities and wild cards) and the internal interventions necessary to achieve those goals. The merging of events is used to extend the thinking of the participants to alternative ways to achieve a particular outcome. By this time, possible future scenarios for the firm can be identified. It is recommended to identify between two and four (at most six) scenarios to reflect the uncertainties and to ease communication (Brightman *et al.* 2002). These scenarios should contain an interplay of a range of external events that portray possible future environments in which the firm has to operate. The scenarios are also linked with the final goals and the state of the current situation. Any future decisions for the firms should be trialled using the scenarios. In this sense, the resulting outcome is envisaged to resemble the characteristics of both strategic explorative and normative scenarios, which focus not only on internal and external factors, but also on certain objectives and how these could be realized (Börjesson *et al.* 2006).

The outcome of the workshop should be communicated to all staff within the company, whether they were engaged in the process or not, to allow them to reflect on the scenarios and possibly to raise their concern(s). An event inviting them to air their views would provide useful feedback for the scenario team. It is best to consider the scenarios as ‘life documents’ which are subjected to continual review, update and challenge by organization members. Regular meetings among the scenario team will help this process. The scenario team is analogous to an ‘engine of change’ for the organization. The whole process will create an awareness of decision-making ‘context’ for the firm, and improve organizational agility by continuous learning through an established organizational memory.

## CONCLUSIONS

The literature review and recent survey revealed little awareness of participating in long-term planning techniques in the UK construction industry. Scenario planning has the potential to enhance the capacity and capability of construction companies to deal with the dynamic and uncertain nature of the sector. Scenario planning will facilitate the creation of adaptive and agile organizations which are better prepared for the future by capturing the creative thinking of its members. Scenario planning is beneficial not only for large organizations, but also for small and medium-sized construction companies, which may have the embedded flexibility that can be honed by the use of scenario planning. The formal application of the technique will improve the company's capacity to learn from past experiences through an established organizational memory. Overall benefits should outweigh the investment made as scenario planning can draw on true potential and commitment through the enhanced empowerment and involvement of the company's staff as well as senior members.

Hence, utilizing scenario planning in construction companies could be viewed as the implementation of innovation in organizations. Scenario planning is also about the changing of organizational culture for the purpose of establishing a 'learning' organization. It is reasonable to expect that some may also resist, or disagree with these proposed changes or their outcomes. Convincing people to embrace these techniques would require the communication of the specific benefits for the company and improving (or convincing) the management's thinking regarding engaging with the future (Burt and van der Heijden 2003). Involving a variety of stakeholders in the process would help to alleviate this obstacle. Importantly, trust between those involved (including the facilitator, scenario team and other stakeholders) has to be nurtured throughout the process. Scenario planning exercises are only deemed successful if they change the minds of people engaged in the process (Wack 1985). These approaches will help to improve the success of scenario planning in construction companies.

## FUTURE RESEARCH AND POTENTIAL CONTRIBUTION OF THE WORK

Future work will implement the scenario-planning framework described through a longitudinal study in a number of UK construction companies and consultants. The research will also develop a framework for assessing the efficacy of the approach in terms of the organizational learning experienced and the effectiveness of the process. This will provide a sound basis for the promotion of scenario-planning techniques in the construction industry. Overall, the research endeavours to contribute valuable and much-needed knowledge to this under-developed area in the construction sector.

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