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Integrating uncertainty management in strategic planning practice

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Abstract
Despite competing in highly turbulent and competitive industry, evidence suggests that construction firms have not put sufficient emphasis on strategic planning. Further, the practice of strategic planning in construction is dominated by informal and sporadic approaches/ processes, which rely heavily on the subjective judgement of top management and tacit knowledge of individuals involved. Literature indicates that the identification of possible risks and opportunities is the most critical in this process, but little guidance is available with regards to the most effective approaches in dealing with the inherent characteristics of strategic planning. A review of underlying aspects (including decision theory, cognitive and behavioural psychology) is presented with a view of developing a framework for improving this process in a construction firm. The framework attempts to engage stakeholders and capture both explicit and tacit knowledge in the strategic thinking for organisational learning. The framework is viewed as a better alternative to the top-down approach of strategic decision making in the construction industry. Benefits from adopting such an approach and future direction of research in this area are then discussed.

Keywords: decision making, strategic planning, uncertainty management

Introduction
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. For business, future plan guides current activities/ actions and enables business entities to prepare for the future and achieve the intended objectives. A critical activity of developing a future plan is indeed a complex exercise, largely due to various uncertainties, which inevitably present during the decision making process. There are inherent uncertainties over which environment external to the firms may play out, as well

as internal uncertainties within the firms. As the creator of the plan, the stakeholders of the firm also impose a degree of 'unknown' to the process due to their individual perception of future uncertainty and the manner with which they articulate their perception to others within the group. It is therefore critical that their underlying pre-conception of thinking about the future is well understood for enhancing the process and output of the future plan.

Construction is well known for highly dynamic and competitive sector in which firms have to operate. Greater preoccupation of 'getting the job done' and 'winning the next project' may have denied construction firms for thinking strategically for their future. The lack of strategic thinking is further exacerbated by the prevalence of small construction companies in the sector. Inadequate resource capacities, fierce competition and the transient nature of construction employment often results in smaller companies struggling to survive, let alone plan for the long term. Although there is little capacity for strategic planning and little emphasis on the need for long-term planning, greater emphasis on 'sustainability' has underlined the importance of thinking longer term for survival and competitiveness. Indeed, it is prudent that construction firms equip themselves with appropriate skills and well-developed approaches that are required for thinking about the future.

Thinking longer-term future demands exploration of intuition and creativity within the mind of individuals and organisational stakeholders. The processes of strategic decision making have remained under-explored. Based on review of literature in relevant domains, this paper attempts to enhance understanding of thinking about future uncertainties as experienced by individuals and firms (as a group), in relation to their identification of risks and uncertainties. An activity framework for enhancing the process is then proposed. The aim of the framework is not to present well-defined steps and analytical formulae for developing strategic plan, but to facilitate effective and efficient mobilisation of organisation capitals in a quest to learn about the future. First, a review of strategic planning and its practice in construction is presented. Then, the concept of uncertainty, risk and opportunity is described with particular focus on the human factors involved in the process. A conceptual model of individual and collective perception of the future is developed and explained. Proposed framework is finally presented. The paper is concluded with a presentation of how this framework may be compared with the existing common process, and identification of research areas to harnessed the understanding (or the lack of it) of this subject domain.

Strategic planning: a process perspectives
The lack of emphasis on strategic planning in construction relative to other sectors has been established by many scholars (Chinowsky and Meredith 2000, Price 2003, Dansoh 2005). As a project-based industry, greater focus has traditionally been expended upon shorter-term, operational and tactical planning to execute projects (Chinowsky and Byrd 2001, Dansoh 2005). Often, strategic planning process may be unstructured, non-routine, non-repetitive, and more complex than operational planning (Junnonen 1998). In a survey of strategic management practice of US major contracting and design firms, Chinowsky *et al.* (2000, 2001) concluded that firms generally emphasised on technology and its integration for knowledge transfer, and awareness of the need for market expansion, whilst they

put less attention to long-life education for middle and upper-level employees and lack understanding of securing their competitive advantage and of financial instruments for achieving long-term objectives. This suggests little long-term investment in human capital and organisation learning for developing 'future-proof' organisations.

Recently, Soetanto *et al.* (2007) conducted a questionnaire survey of construction directors and managers to explore current strategic planning practices in construction organisations in the UK. The findings indicate that strategic planning is an informal process relying on personal experience and intuition. For some, planning longer-term seems difficult given the way construction order is made. This confirms the belief that construction is dynamic, highly turbulent, rapidly changing industry and therefore a low level of strategic planning (Price and Newson, 2003). Most respondents used fairly simple tools, such as SWOT and competitor analyses; few exercised 'what-if' analysis within top management circle. The approaches tended to be 'top-down' in orientation, where senior managers determined the company strategic plan and then they communicated this to staff. This policy could potentially negate innovative ideas which may emerge from staff at the lower levels within the management hierarchy. The majority had a fairly shorter-term orientation to the future and admitted to having experienced external events that had changed the course of their plan. In an in-depth case study of medium-size contractor, Green *et al.* (2008) suggested that strategy is a collective endeavour by a loosely defined group of organisation members. The members shape strategy through their actions rather than through any formal plan, within social and physical context of the organisation. Further, they found no evidence to suggest that formal strategic planning have any significant influence on the enacted strategy. Although based on only one historical case study, the work has nevertheless elaborated the idiosyncratic process by which construction firm interacts with its environment and reconfigures resources and capabilities over time.

Strategic process
In construction, a number of scholars have developed formal methodological procedures and processes for helping firms doing strategic planning. Warszawski (1996) adopted a problem-solving approach of system analysis, for developing a strategic planning procedure. Venegas and Alarcon (1997) proposed a framework, which provides a structured procedure and tools to carry out the strategic planning process. Using case studies of large construction organisations, Price (2003) developed a conceptual framework for strategic management process, which serves as a flexible guidance for firms to develop their own bespoke framework. Such a framework provides a checklist while at the same time, emphasises the need to accommodate flexibility and creativity (Price and Newson, 2003). These methodologies have their merit for providing formal guidance for strategic planning process and ensuring appropriate outcome of the process. Here, planning aided by the rationally-derived methodologies may be closely associated with shorter time horizon and within relatively stable environment where many parameters influencing the efficacy of the plan are known. In reality, Minztberg (1994) and Junnonen (1998) argued that formation of strategy in a highly turbulent, uncertain and competitive environment as in the construction sector

often takes place as an emergent (rather than deliberate) and iterative process within the firm, resulting from social interactions involving various activities.

In strategic decision-making process, political behaviour and intuitive synthesis provide alternatives to the rational procedure, to explain the manner in which organisations actually make strategic decisions (Elbanna, 2006). The rationality paradigm attempts to adopt analytical approach to develop strategies which are logical and backed up with evidence in pursuing corporate goals. In practice, this paradigm are often hindered by cognitive limitation of the decision makers (i.e. bounded rationality), complexity of the problem, conflict among decision maker, and non-linearity of the actual strategic process, resulting in lack of consensus on the relationship between rational process and achievement of corporate objectives (Elbanna, 2006). Political paradigm studies how individuals with differing interests attempt to influence the outcome of the strategic decision process to their favour through the use of political tactics such as coalition formation, negotiation or bargaining, the use of power. The role of intuition is recognised when managers have to make quick decisions based on incomplete information, in a highly complex and dynamic environment. Hence, the decisions made are difficult to explain rationally, or the managers are unable to articulate rational reasons for taking a particular decision. Indeed, Henden (2004) found that top managers put more emphasis on intuition (rather than rational analysis) in strategic thinking and foresight. Elbanna (2006) argued that strategic planning is characterised by a combination of rational, political and intuition synthesis. The interplay between these will exert significantly influence upon the perception of strategic issues, uncertainties and risks, and communication of this perception amongst organisation members in the formation of strategy.

In sum, the practice of making strategy has little resemblance to the 'strategic planning' as a formal, purely rational and structured process, but more of a process of 'strategic thinking' within the mind of organisation members. The manner by which organisation members perceive the future (and its associated uncertainties and risks) and mobilise this perceptive thinking (specifically, in terms of cognition and intuition) in the formulation of strategy is indeed little understood. The literature has also suggested that managers rely heavily on intuition in corporate strategic thinking, which is characterised by high degree of uncertainty and ambiguity (Sadler-Smith and Shefy 2004). Further, there seems to be little belief upon the merit of engaging and mobilising human capitals in strategic thinking. Implementing strategy requires a great deal of support and commitment from organisational members who will be affected (either negatively or positively). It is therefore critical that members of the organisation are involved in the strategic process. Review of individual and group perception of uncertainty and risk are described as follows.

Uncertainty, risk and opportunity
Discourse about the future and uncertainty is commonly associated with risk (Tonn *et al*. 2006). Risk can be taken to mean an uncertainty that influence the achievement of objectives (Hillson and Murray-Webster 2005). The term 'risk' is often associated with adversity or threats to an entity. Although there are conflicting views upon the definition of risk and what constitutes risk in risk management literature, some scholar have realised the need to treat opportunities

(the up-side of risk) in an equal footing as threats (the down-side of risk). The reason is simply that threat and opportunity are seldom independent (Ward and Chapman 2003), and an event may be a threat and at the same time opportunity for an entity or different parts of an entity.

Managing risk generally involves activities of identifying, assessing, responding and monitoring the risks (Cooper *et al*. 2005). Early literature suggests heavy reliance on intuition, judgement, experience in managing construction risks (Akintoye and MacLeod 1997) and the need to accommodate this 'softer' aspect for effectiveness (Mak 1995). Nevertheless, the research on the operationalisation of this aspect in practice is scant. Identification of risks and opportunities is the first and most important stage in the process because uncertainties which have not identified, can not be managed (Maytorena *et al*. 2007). Despite many techniques for identifying uncertainties, brainstorming session is seen as the preferred approach if there is little previous experience and information (Cooper *et al*. 2005). In contrast to the other activities, identification session is characterised by high degree subjectivity, heuristic, bias, intuition, utilising tacit knowledge of individuals and groups. In this case, there is little understanding on how individuals imagine uncertainties (over future events) and perceive these as risks or opportunities, and how these perceptions are communicated and mobilised within the group. What is the role of emotion and politics in the process? How are perceptions of uncertainty shaped by the interaction of individual members of a group?

A conceptual model for enhancing understanding of this phenomenon is presented in Figure 1. The model was developed based on an in-depth review of empirical research in perception of risk (e.g. Slovic 2000), decision making under uncertainty (e.g. Tversky and Kahneman 1974, Sadler-Smith and Shefy 2004, Miller and Ireland 2005), risk attitude of individual and group (e.g. Hillson and Murray-Webster 2005). The model postulates two levels of analysis, namely individual and group levels. Perception of uncertainty and identification of risks and opportunities at group level can be considered as the composite of those at individual level, although this does not mean that they are equal to the sum of those at individual level (Hillson and Murray-Webster 2005). The model identifies factors which may influence the way the future is perceived and the identification of risks and opportunities arising from plausible future events. It is understood that perceptions of the future may be influenced by numerous factors, but the model suggests salient factors as identified by previous scholars. In a certain situation, the factors may independently influence the perception, however, a combination of factors is expected in most circumstances to exert their influence on perception, on an equal or non-equal basis (where one factor is more dominant than others). Also the factors may influence each other, e.g. culture and value. As a consequence, it could be difficult to identify influencing factors definitively from an expressed perception and behaviour.

At individual level, the perception of the future is a product of heuristics, intuitions, affective, value, and other socio-political and cultural factors. Some consider heuristics and intuition as a common term, but here they are differentiated as intuitions can include heuristics. Heuristics can be a source of biases for the intuitions. In their seminal work, Tversky and Kahneman (1974)

first coined the operationalisation of heuristics of thinking under uncertainty. Their proposed heuristics are still adopted in recent researches in decision making and risk (e.g. Hillson and Murray-Webster 2005). The heuristics are commonly subsumed under availability, representativeness, anchoring and adjustment, and confirmation trap (see Hillson and Murray-Webster 2005 for description). The form of intuition is subdivided into 'expertise' and 'feeling' (Sadler-Smith and Shefy 2004, Miller and Ireland 2005). Intuition-as-expertise is an accumulation of conscious and unconscious learning over time, and often overlapped with the heuristics, whereas intuition-as-feeling is more dominant in the exploration of future uncertainty. In this case, the reasons behind decisions based on 'feeling' often can not be totally articulated, but the decisions are just felt right (Miller and Ireland 2005). Affective is a form of emotion and defined as positive ('like') and negative ('dislike') evaluative feeling towards a particular issue (Slovic 2000). Individuals hold their value and belief in considering the future course of actions. Value is related to 'worldviews', ideology and belief, which are often overlapped and related to each other. Dake (1991) described 'worldview' as 'orienting dispositions' which guide people response and judgement about complex issues. Individuals may have different orientations towards significant societal issues, such as the use of nuclear energy, stem-cell research, human cloning, sustainability agenda. The other influencing factors may be categorised into sociopolitical and cultural factors, such as religion (Tonn *et al.* 2006).
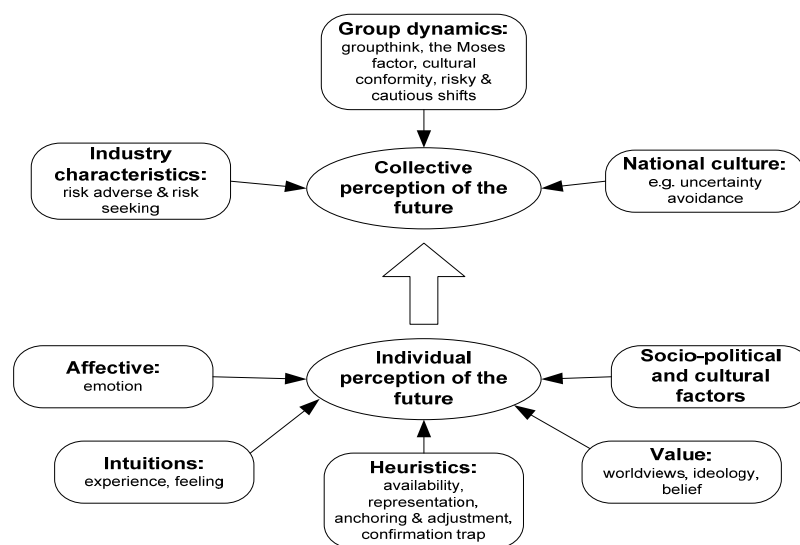

Figure 1 A conceptual model of factors influencing individual and collective perceptions of the future

At collective level, the factors at individual level may exert their same influence. Many factors are thought to influence perception at collective level, but there is little empirical evidence of their significance and manner by which they are related with collective perception and possibly amplified the factors from individual level. In an attempt to understand collective risk attitude, Hillson and Murray-Webster (2005) identified common heuristics related to group dynamics, namely group think, the Moses factor, cultural conformity, risky/cautious shifts. These heuristics may influence the perception of individuals within a group, forming a significantly different collective perception and resulting behaviour. Corporate perception and behaviour is also thought to be associated with the

inherent characteristics of the sector in which it operates. In his ground breaking theory of national culture, Hofstede (1984) proposed dimensions which explain national cultural differences, namely power distance, individualism or collectivism, masculinity or feminity, uncertainty avoidance, and time orientation. Of particular relevance is the uncertainty avoidance, although the other dimensions may also influence upon how organisations perceive the future and uncertainty. Elaboration of how each dimension influences perception of the future is beyond the scope of the paper.

In sum, the model has illuminated a number of factors that may influence individual and collective's perception of the future. Investigation of how these factors work in practice should be conducted in such a manner which appreciates interplay between these factors with other essential aspects of strategic thinking in a real organisational context. The following section presents the proposed framework, which is aimed to enhancing the capacity and capability of construction organisations for thinking about the future.

Towards an activity framework for improving strategic planning process
Figure 2 depicts a visual representation of the proposed activity framework. The framework comprises five independent but closely related activities. The pyramidal form with an activity in each corner is considered an appropriate representation of the framework as it suggests the nature of the interrelationships between activities. The framework embraces a sense of flexibility, in which activities can be undertaken in no particular order, although the first iteration would intuitively commence with establishing business goals.
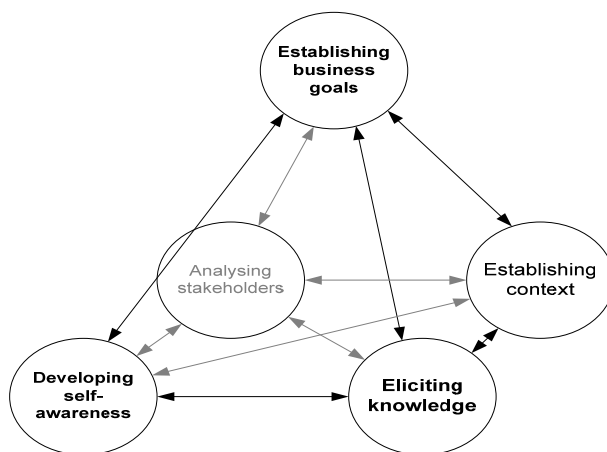

Figure 2 An activity framework for strategic planning

Establishing business goals
Business goals are derived from corporate mission and provide the purpose of a business unit for undertaking a particular action in relation to the strategic plan. Business goals are usually determined by higher level management within organisation, but sometimes, they are deemed as a given. Increased emphasis on the role of public stakeholders in corporate governance has elevated the act of establishing business goals to higher level of complexity. This nevertheless has provided an opportunity to infuse the spirit of social responsibility and sustainability agenda within the firm.

Establishing context

Business does not exist in vacuum, but within an environment which is characterised by dynamic interplay amongst a plethora of interconnected factors. Several tools and techniques have been used to enhancing understanding of organisation context, such as PESTLE (or STEEP) and SWOT analyses, to name a few. PESTLE analysis, a form of horizon scanning activity, explores a range of political, economic, social, technological, legal and environmental issues which might impact the business now and in the future. SWOT analysis systematically identifies internal factors as the strengths and weaknesses of the business, and external factors as opportunities for and threats to the business.

Analysing stakeholders and establishing their roles

Stakeholders hold the key to successful process, but are also a major source of uncertainty (Ward and Chapman 2008). This activity identifies stakeholders and clarifies their roles in the process. Stakeholders may be internal to the firm, but are not closely involved in the process. Nevertheless, they might exert a degree of influence at implementation of the strategy. The analysis of all possible stakeholders will enhance understanding of the context in which strategy is going to be enacted. It is also important to develop a reasonable awareness of those individuals and groups within organisation, who may have different (and may be competing) agendas (Ward and Chapman 2008). Their views will provide richness and diversity, which are essential to the identification of plausible futures.

Developing individual and group self-awareness

The intended aim of this activity is on developing reflective individuals and groups for improving corporate agility. Besides rational thinking, exploration of plausible futures and uncertainties utilises much of innate skills and tacit knowledge of individuals and groups within organisation. Creativity and intuition are encouraged and deemed as a vehicle to devise a breakthrough solution in the decision making. The caveat is that they can possibly lead to biases, if these skills are not appropriately understood and harnessed. For example, Hillson and Murray-Webster (2005) have demonstrated the application of emotional intelligence to enhance individual and group awareness of themselves. This self-reflection should reconsider corporate culture as it may explicitly and implicitly discourage creativity and intuition (Burke and Miller 1999).

Eliciting and communicating tacit knowledge

This activity concerns the articulation of the tacit knowledge by individuals and the interaction of articulated knowledge during strategic thinking. This involves bringing together the identified stakeholders in brainstorming workshops where future uncertainties and ideas are generated and discussed from the lower to higher levels of management. Communication is facilitated through the representation of this tacit knowledge or mental models of individuals involved. Cognitive mapping technique provides a framework to objectively exhibit these mental models in terms of constructs (e.g. events, issues), their interconnections and relations to goal(s) of an entity (e.g. individual, business, corporate). Soetanto *et al*. (2007) proposed an approach to connect the perceived future events in sequential manner, towards goal(s) at the end. 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. What is critical here is the articulation and discussion of creative ideas, generated both consciously and unconsciously, and their relations to the stipulated goal(s). The interaction between stakeholders provides an opportunity to extent the sphere of collective thinking, by merging two (or more) individual cognitive maps. In sum, this activity stimulates individuals to utilise their rationality and intuition for thinking about the future, and amalgamate the other activities for developing strategic plan.

Conclusions

Exploration of plausible futures and identification of risks and opportunities are critical first steps in the strategic planning process. The task is complex and some might consider problematic due to inherent uncertainty of any future thinking. The process is often subjective, unstructured and characterised by both rational and irrational judgements of individuals and groups. A plethora of factors which may impact the formation of individual and group perception of the future, have been identified and discussed. This paper calls for a greater understanding of how these factors work in practice through a framework which appreciates interplay between these factors with other essential aspects of strategic thinking in a real organisational context. The framework encourages the recognition of intuitions and other irrational aspects, which are believed to enhance creativity, imagination and participation for devising possible breakthrough solutions. A comparison between common practice and the proposed framework is presented in Table 1. The framework has the potential to begin to induce a paradigm shift, because of the required fundamental change in process, content and thinking traditionally ingrained in the common practice. Successful implementation would require discipline and perseverance whilst at the same time maintaining flexibility and nurturing continuous organisation learning.

Table 1 Comparison between common practice and proposed framework

Common practice	Proposed framework
Top-down process	Bottom-up process
Responsibility of higher management	Allows participation from all levels
Attempt to simplify complexity with rational judgements	Embrace complexity by extending the sphere of thinking
Irrationality permeates the process, but little understood (in some cases, may be ignored or against for)	Irrationality recognised, understood and substantiated
Singular view about the future	Multiple views, allowing continuous learning about the future
Informal and unstructured process	Informal and flexible process, but requires greater commitment, guided and facilitated by the framework

Further research should concentrate on enhancing understanding of the interplay between rational and irrational factors in the identification of future risks and opportunities during the formulation of strategic plan. Importantly, the research should operationalise the proposed framework in real organisation settings, with a view to obtain a robust evidence of potential implementation, which ultimately will instigate the envisaged 'paradigm shift' in the construction sector. The

benefits from this endeavour are revolved around the creation of sustainable 'future-proof' organisation.

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