Project Managers' Cognitive Style in Decision Making: A Perspective from Construction Industry

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Abstract

A large and growing body of literature focuses on the project manager's technical issues while ignoring the so-called soft project management. This study proposes that there is a need to extend management practices for project management from a human-related factor by incorporating the cognitive styles in the decision-making process towards the accomplishment of a successful project. The study aims to introduce the concept of cognitive styles in decision making by project managers. Furthermore, it takes up a discussion on the definition and types and roles of cognitive styles by linking these styles with project manager's decision making behaviour. A questionnaire-based survey using Cognitive Style Instrument (CoSI), covering 110 project managers in the construction industry, was used to determine the cognitive styles among Malaysian project managers. The paper provides the empirical findings that reveal that Malaysian project managers used Cognitive Style on a daily basis in their project environment. Planning Style was the most preferred style, followed by Knowing Style and Creating Style. This study is significant both for researchers and practitioners to shed light upon the ways in which project managers organise and process information and make judgements from a psychological perspective. Moreover, this study contributes more generally to the evolving understanding of the human intellect process in project management. This paper introduces the concept of Cognitive Styles as an important human-related factor for project managers, contributing to the body of project manager's soft skills.

Keywords: project manager, cognitive styles, project success, construction

1. Introduction

The construction industry is a complex, and unpredictable business. It is a field where different stakeholders involve in a project to meet its objectives in a complex environment. For many countries, the construction industry is a significant contributor to the healthy national economy (Osei, 2013). From the Malaysian construction perspective, the construction industry sector is one of the key economic sectors contributing to the country's development (Al-Tmeemy, Abdul-Rahman, & Harun, 2011). This is because the construction industry stimulates domestic economic activities where the public and private sectors lead to the development of construction projects. Completion of construction projects undoubtedly generates wealth to the nation. In this developing country, there has never been a stop in development of construction projects. For example, 60% from RM230 billion allocated for development plan under the Tenth Malaysia Plan was undertaken by the construction sector (Corporation, 2013). However, the importance of construction industry to nation building is beset with poor project performance. Studies and reports have highlighted below average performance, time delay, cost overrun, and poor quality to the extent that failures in the construction industry seem customary with a low probability of successful implementation (Abdullah, 2010). The construction industry has been urged to improve its competitiveness by implementing good practices and advanced construction techniques and by optimising resources utilisation. In the process of improving its competitiveness, a range of means for continuous improvements have been suggested and a considerable number of researchers have recommended the need for a competent, single-point manager to execute projects successfully (Bandow, 2001; Creasy & Anantatmula, 2013; Powl & Skitmore, 2005). Furthermore, recent studies have shown that the project manager's effectiveness performance is said to be the single most critical factor leading to successful project outcomes (Bandow, 2001;

Hartman, 2000). The ability of a project manager to influence strategic directions towards a successful project should not be underestimated. Decision making effectiveness, which falls on project manager's responsibility, has been identified as one of the most important success factors for construction projects (Gudienė, 2013; Rook, 1986). The way in which a project manager makes a decision is crucial because decision-making processes determine the efficiency and effectiveness of a project (Anantatmula, 2010).

It has been suggested in the cognitive management literature that mental models of managers influence how decisions are made (George, 2002). Therefore, this study aims to draw attention to how decisions are made by Malaysian project managers in a project life cycle from the cognitive perspective. To accomplish this aim, this paper begins with an overview of cognitive styles. Following this overview, this paper discusses the link between cognitive styles and decision-making process. Thereafter, this paper discusses the methodology applied in this study before presenting the results and discussion. This paper ends with discussion on implications and conclusions of the study from the aspect of work and organisational psychology.

1.1 Cognitive Styles

Cognitive style is frequently referred to as the individual way a person perceives, thinks, learns, solves problems, and relates to others (Witkin, 1977). It is also defined as, "Individual differences in how people perceive stimuli and how they use this information to guide their behaviour (i.e., thinking, feeling, actions)" (Cools, 2007b). Furthermore, according to Streufert and Nogami's study (as cited in Kozhevnikov,2007), cognitive style can also be considered one of the variables that determines whether people are able to respond appropriately across a variety of situations (Streufert & Nogami, 1989). Furthermore, according to Cools's study (as cited in Armstrong & Rayner, 2002), when it comes to the underlying constructs of the cognitive style, this field has been recognised with a lack of a coherent or consensual theory. Besides, this field has been criticised for being left fragmented and incomplete, and the construct of coherent theory remains at a low level among researchers in the cognitive sciences (Kozhevnikov, 2007). A large number of literatures have produced many diagnostic tools and questionnaires intended to measure the cognitive styles. In Curry's study (as cited in Kozhevnikov, 2000), the author stated that around 100 researchers have published different versions of cognitive style instrument. The high volumes of published instruments have resulted in conceptual fragmentation and thus incomparable results (Cools, 2007). Despite the criticism on the theories of cognitive styles, it is worth noting that there are evidences from scholars who have addressed the influences of cognitive styles on the perception, learning, problem solving, decision making, communication, interpersonal functioning, and creativity in managerial field (Hayes and Allison, 1994; Sadler-Smith, 1998). Even though the vast number of instruments identified in the literatures may affect the validity and reliability of the methods of assessment, a number of instruments used in business and management research provide systematic and rigorous assessments of individual's cognitive style such as Myers Briggs Type Indicator (MBTI) in Myers's (as cited in Cofield, Moseley, Hall & Ecclestone, 2004), Kirton Adaption-Innovation Inventory (KAI) (Kirton, 1976), Cognitive Style Index (CSI) (Allinson & Hayes, 1996), Rational-Experiential Inventory (REI) (Epstein et al., 1996), Cognitive Style Indicator (CoSI) (Cools & Van den Broeck, 2007), and Linear/Non-linear Thinking Styles Profile (LNTSP) (Vance et al., 2007; Armstrong et al., 2012). Among the six instruments identified, the Cognitive Style Indicator (CoSI) by Cools and Van den Broeck (2007) is still at early stage of use and development, but the instrument demonstrates some promising and supportive findings to be used in both academic setting and practice. In discussing the theory of cognitive style, another critical issue that needs to be considered is the topic of unidimensional and multidimensional models that exist in the field. The unidimensional models are known as bipolar models that distinguish between two cognitive styles situated on a continuum. Scholars identify these unidimensional models as one "analytical-wholist" family (Cools, 2007). On the other hand, multidimensional models explain theories of cognitive style that distinguish different bipolar dimensions (Hodgkinson & Sadler-Smith, 2003). However, recent publications demonstrate that there may be shifting from the unidimensional to the multidimensional concept (Armstrong, 2012).

A large and growing body of literature on cognitive style has been published, and it has been agreed by scholars that cognitive styles are extensively studied in diverse research areas. There are two major streams of research in relation to cognitive styles, which are education and organisational behaviour management (Cools, 2007a). However, in the most recent analysis in the field of cognitive style from 1969 to 2009 by Armstrong et al. (2012), there are eight themes emerged from their findings, which are (a) vocational and occupational issues, (b) national culture, (c) teamwork and interpersonal relationships, (d) learning, (e) decision making, (f) creativity, innovation, and entrepreneurship, (g) sales and marketing, and (h) management information systems, information management and use. These findings indicate that cognitive style is significantly associated with individual's performance under various conditions. However, this study only focuses on the project manager's cognitive style

from decision-making perspective. The following section discusses the role of cognitive style on project manager's decision-making process to provide an important insight to this work and organisational psychology aspect.

1.2 Cognitive Styles and Decision Making

Decision making is an integral part of the management process within each organisation and at every level (Davis, Grove, & Knowles, 1990). A number of researchers have examined the influence of cognitive style on decision making (e.g., Dane, 2007; Gardner & Martinko, 1996; Hensman, 2011; Hunt, 1989). Scholars in the management field are very concerned about cognitive styles because the constructs help in explaining why managers with the same set of skills and level of ability make different decisions (Hough & Ogilvie, 2005). Prior research has suggested that decision tasks should dictate the cognitive styles used by managers and their ability to switch from a style to another depending on situations (Haley & Stumpf, 1989). This finding is supported by Sadler-Smith (1998) who describes that cognitive styles are an important attribute that influences managerial choice, and are closely connected to workplace behaviour. Undoubtedly, this field also always gets attention due to the supremacy of "intuition" and "analysis" approach explored in relation to of the individual decision-making process. Intuition, which is characterised as right-brain orientation, refers to immediate judgement based on feeling and the adoption of a global perspective, while analysis, which is characterised as left-brain orientation, refers to judgement based on mental reasoning and a focus on detail (Allison & Hayes, 1996). Following Mintzberg (1976), Allison and Hayes (1996) link right-brained intuition with the need of managers to make quick decisions based on "soft" information, while left-brained analysis is seen as the kind of rational information processing that makes good planning. Hayes & Allinson (1997) regard "rainedness" as "a useful metaphor" and claim that a left-brain person "tends to be compliant, prefers structure and is most effective when handling problems that require a step-by-step solution," while a right-brain person "tends to be a non-conformist, prefers open-ended tasks and works best on problems favoring a holistic approach" (Allinson and Hayes, 2000). Scholars have also identified that people prefer decision-making processes and strategies that are compatible with their cognitive style (Gardner & Martinko, 1996; Hunt et al., 1989; Davis et al., 1990). There is a consensus among researchers that, a blend of intuitive and rational styles are essential in a decision-making process. Several studies have revealed that decision makers not only rationally analyse the choices they are faced with when it is appropriate to do so, but decision makers also use intuitive judgement to support a risk-taking, entrepreneurial, and visionary style of leadership (de Vries, 2004; Evgeniou & Cartwright, 2005). Therefore, research on cognitive styles may lead to better insight about the characteristics of decision makers and how the cognitive style may affect decision outcomes.

Decision-making skills are required from a project manager in every step to avoid any serious buffering in a project schedule. "What makes it more challenging is the pressure to make the right decision is often very high" (Canterucci, 2003). Thus, the cognitive style comes into play where it arrives to the issue of selecting the right style for the entire execution process, including the decision to allow the project to go forward. Therefore, in such a situation, the application of cognitive styles in executing project tasks by project managers is crucial. Moreover, researchers (e.g., Ritchie et al., 2007; Gallén, 2006; Khatri and Ng, 2000) have demonstrated that the cognitive styles are significantly related to decision-making process in determining project manager's performance. However, in order to educate the project managers about the importance of cognitive style in the decision-making process, it is important to identify the type of cognitive styles used by the project managers to provide initial evidence of the use of cognitive styles in project management practices.

1.3 Purpose of Inquiry and Inquiry Questions

Few empirical studies have attempted to explore construction project manager's decision making style from cognitive style perspective. The aim of this study is to examine the type of cognitive styles practised by construction project managers in performing their respective tasks in a project. This study helps the researcher in predicting project manager's behaviour in which manager's cognitive styles may lead to good decision-making strategies. The specific research questions that this study seeks to answer are as follows: (1) What are the types of cognitive style used by Malaysian construction project managers from a decision-making context? (2) How these cognitive styles assist project managers to meet practical demands of the job? The following section discusses the method applied in this study.

2. Method

2.1 Quantitative Survey Method

This study applied nonrandom judgement sampling or purposive sampling because the researcher focused on a specific group of people (project manager). According to Leedy and Ormrod (2005), purposive sampling, a

nonprobability sampling, is used when a specific group of people is chosen to participate in the research. Thus, in the purposive sampling, the selection of the information providers is based on the judgement of the researcher. Even though purposive sampling is largely applied in qualitative and mixed method studies, this nonprobability sampling can also be used in quantitative research designs.Researchers are required to use nonprobability sampling design when failed to fulfil a number of criteria needs in probability sampling (Laerd Dissertation, 2012). In this study, the researcher identified the representatives who in the researcher's opinion were likely to have knowledge and information about the questions to be asked and was ready to share them. The survey questionnaire was administered to the respondents in person to the potential project managers who attended project management workshops that were undertaken separately in Kuala Lumpur, Malaysia, organised by PROKOM (Complex Project Management Division) and CIDB (Construction Industry Development Board). The advantage to such an approach was to ensure that the participants would respond from a position that reflects actual practitioner recognition and application of the issues (Leybourne, 2006).

2.2 External and Internal Validity

In this study, the internal and external validity of the questionnaire were considered as the measurement items was selected based on a review of the theoretical and empirical literature. According to Leedy and Ormrod (2005), internal validity is defined as "the extent to which its design and the data that it yields allow the researcher to draw accurate conclusions about cause-and-effect and other relationships within the data," whilst external validity is described as "the extent to which its results apply to situations beyond the study itself…" In simple terms, the appropriateness of internal validity is considered from theory to hypothesis testing, research design, instruments, procedures, and data analysis that give impact between two variables (Dyett, 2011). On the other hand, the external validity deals with truth of conclusions that a researcher draws for generalisations (Trochim, 2007). Thus, the research methodology was evaluated to ensure the internal and external validity of this study were taken care of properly. The details have been summarised in a table below.

Table 1. External and internal validity

Internal Validity	External Validity
During the survey, the participants were verified as project managers.	The survey was completed in natural environment.
The internal consistency reliability and construct validity in previous studies were checked to ensure that they were inherently sound (Pallant, 2006).	A purposeful sample was used to select the participants for the current study.

2.3 Study Sample

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3. Results

3.1 Sample Characteristics

The final sample consisted of 110 respondents who had experiences in the management of construction projects and they belonged to upper management level within their organisations. 72.2% of the respondents were male

and the 27.8%. remaining were female. From this group, majority of the respondents (50%) were between 31 and 40 years old, followed by age groups between 21 and 30 (33%) years old and between 41 and 50 (17%) years old. Next, 90% of the respondents were project managers/assistant project managers, while programme manager (9%) and organisational manager (1%) represented the remaining respondents. Respondents represented various segments of project nature that they were currently involved; 77% of the respondents were involved in managing complex projects, 11% of the respondents were involved in infrastructure projects, and 12% of the respondents were involved in different type of projects. These data were gathered to understand the group of respondents and how the age, level of accumulated experience, and type of projects may possibly give impact on their cognitive styles.

3.2 Descriptive Statistics

Table 2. Cognitive styles results

Cognitive Style	N	Mean	SD
Knowing Style	110	4.30	0.678
Planning Style	110	4.06	0.769
Creating Style	110	4.39	0.657

Table 2 shows the results of Cognitive Style Instrument (CoSI) completed by the respondents. Referring to SD value, the table indicates that the respondents on average rated highest on the Planning Style. Individuals in Planning Style are categorised by a need for structure. They prefer to organise and control in a well-structured work environment (Cools, 2007). This type of individuals also make decision in a structured way and focus in the process of preparation and planning to reach targeted objectives (Armstrong et al., 2012). The second highest cognitive style rated by the respondents was Knowing Style. Individuals with Knowing Style are those who have strong analytical skills. They prefer a logical, rational, and impersonal way of information processing, and make informed decisions on the basis of a thorough analysis of facts and figures and rational arguments (Cools & Van den Broeck, 2007; Cools et al., 2009). Finally, Creating Style was found to be least preferred styles by the respondents as the mean scored the lowest among the three styles. Individuals categorised in Creating Style are creative and prefer experimentation. They treat problems as opportunities and challenges (Cools, 2007). They also possess other interesting characters such as making decision based on intuition ("gut-feel") in unconventional ways and creative, like to work in flexible environment, and have a strong imagination (Armstrong et al., 2012).

4. Discussion

In this study, Planning Style was found to be the most preferred cognitive style. This is not a surprising result as project management is the facilitation of the planning, scheduling, and controlling of all activities to meet project objectives (Leban & Zulauf, 2004). Furthermore, a considerable number of literatures have emphasised that planning techniques are required for an effective management of a project, especially if the project is large (Bourne, 2004; Chan, Scott, & Chan, 2004; Turner, 2005). Thus, project managers have to possess an effective Planning Style to facilitate effective coordination throughout the project life cycle for a successful completion of the project. By the same token, Mei et al. (2005) demonstrate that, in order to be a competent good project manager, one must be capable of understanding a situation by breaking it down into small parts or keeping a record of the effect of a situation in a step-by-step, causal way. For an example, in a project planning stage, project manager needs to focus on breaking down projects into work packets (or known as work breakdown structure) in order to assign the resources to the project before the execution process. Furthermore, project managers need to plan carefully and allocate human resources by work packets to avoid the shortages or surpluses of the human resource during the project's execution (Belout, 2004). Therefore, project managers are alerted to emphasise on the Planning Style in the process of making decisions and operational strategies to execute the project to success.

Knowing Style was the next important attribute preferred by the respondents in this study. Individuals with Knowing Style are described as people who have strong analytical skills. They prefer a logical, rational, and impersonal way of information processing, and make informed decisions based on a thorough analysis of facts and figures and rational arguments (Cools & Van den Broeck, 2007; Cools et al., 2009). Project managers who demonstrate a Knowing Style should enable them to perform better in a decision making process. This is because

most of the thinking done by project managers in a project management process is analytical thinking (Mango, 2009). As an example, construction projects that involve high level of mobility and a continuous deadline pressure (Bredin & Söderlund, 2013) need project managers who are able to calculate cost estimate, to set up a baseline, or even to calculate a schedule through procedures and analyse them critically and apply different techniques to generate desired output (Mango, 2009).

Creating Style was the lowest among the three cognitive styles. This result confirms that project managers tend to give the least attention to Creating Style compared to other cognitive styles because individuals with Creating Style are labelled as creative and prefer experimentation, and they treat problems as opportunities and challenges (Cools, 2007). There is not much creativity involved in project managers' routine jobs such as compiling status updates through e-mails and meetings or even breaking down a WBS (work breakdown structure) component (Mango, 2009; William, Dow, & Taylor, 2010). Even though creativity is greatly needed in solving project problems, motivating the team, influencing stakeholders, and decision making for a project manager (Mango, 2009), a big chunk of previously mentioned routines slows down project managers from demonstrating the Creating Style. Therefore, it is not surprising given that the use of creating styles is not much emphasised by project managers in performing their routines in daily basis especially tasks that need decision making.

5. Conclusion and Implication

This study reveals that Planning Style was the most widely utilised cognitive styles by project managers in orchestrating the project's progress, followed by Knowing Style and Creating Style. However, the main recommendation arising from this study is that, project managers should pay a greater attention to Creating Style because they will be able to demonstrate thoughtful strategies and increase the capacity to get things done more effectively and a creative way. This is due to the fact that Creative Style may assists project managers to interpret problems in a new way and avoid being bonded by conventional thinking (Sun & Hui, 2012). This is important as the construction project environment which project managers are involved in is complex and unpredictable. Therefore, there is a need for alternatives to rational and analytical styles of thinking to ensure strategic decision making to solve problems as they occur. It has become apparent from the discussions in the preceding sections that this study is important both for researchers and practitioners to shed light upon the ways in which project managers organise and process information and make judgements. Moreover, this study contributes more generally to the evolving understanding of the human intellect in project management from psychological perspective. This study indicates that Cognitive Style is the cognitive style used mostly by the Malaysian project managers, and it is a point of argument for including Cognitive Style as a topic for discussion in every project manager's training in order to carry forward this human behaviour out of the closet and ultimately so that this so-called soft skill may be better understood and more effectively managed. Furthermore, the question of whether or not projects managers are able to understand and manage their cognitive style as one of the cognitive competencies vital in dynamic, highly complex, and uncertain project environments is an intriguing one for future research from the psychological perspective. However, it may be useful for future researchers to investigate the role of cognitive styles in strategic decisions made by project managers to take forward our understanding of the role that cognitive styles may play in projects.

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