THE INFLUENCE OF PROJECT MANAGER'S COGNITIVE STYLES ON PROJECT SUCCESS IN THE MALAYSIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Considerable attention has been devoted to project success which is at the heart of project management. This interest led to the development of a wide diversity of project success topic. There are many factors that contribute to a successful implementation of a project, hence it's not surprising that there have been many research conducted in this field. Over the years scholars have investigated and analysed what they deem as factors that directly impacts the degree of success of a project. It has been revealed that the effective performance of a project manager is the most critical factor affecting project success. It is also reported that soft skills or human-related factors contribute more to project success than technical skills but these human-related factors received insufficient attention especially with regard to the project manager's abilities and performance. As such, there is an imperative need to investigate the effect of human-related factors on the project success by project managers that seems to have gained little attention in Malaysian construction industry. Many studies have investigated the project manager's leadership style, social skills and the relative importance of critical factors across the project life cycle and their effect on successful project outcomes. However, a very little study has been conducted on the project manager's cognitive styles and their effect on project success in construction industry. The main aim of this research is to explore how the cognitive styles and its attributes influence the achievement of project success by construction project managers. This study adopted single method research design by employing quantitative method of data collection in Malaysian construction industry. This research found out that project managers tend to stimulate their cognitive competence by cooperating Planning Style, Knowing Style and Creating Styles attributes which formed the cognitive styles construct in achieving project success from the aspect of project usability, value of project outcomes to users and the project delivery. This study has provided information and empirical findings on

how the cognitive styles constructs have influences on the achievement of project success by Malaysian construction project managers. This research indicated that by paying greater attention to this human-related factor relationship, project managers will be able to demonstrate a significant role in project completion successfully by applying the proposed CoSProS (Cognitive Styles and Project Success) Framework. Finally, the research argues to include cognitive styles as topics for discussion in every project manager's educational training programme so this subject be better understood and more effectively managed. This study also has highlighted possible ways to foster the cognitive style among project managers through training programmes and ultimately pull this so called human-related issues 'out of the closet'.

ABSTRAK

Perhatian yang menyeluruh telah ditumpukan kepada topik kejayaan projek di mana ia merupakan aspek penting dalam pengurusan projek. Kecenderungan ini telah membawa kepada penyelidikan serta kajian dari pelbagai aspek dalam perbincangan berkaitan dengan kejayaan projek. Terdapat pelbagai faktor yang menyumbang kepada kejayaan pelaksanaan projek. Sejak beberapa tahun lalu, para penyelidik telah mengkaji dan menganalisa faktor-faktor yang dianggap sebagai pemangkin tahap kejayaan sesuatu projek. Melalui kajian-kajian tersebut, telah didedahkan bahawa kecekapan pengurus projek merupakan faktor utama paling kritikal yang mempengaruhi kejayaan sesuatu projek. Dilaporkan juga bahawa kemahiran insaniah atau faktor kemanusiaan menyumbang lebih banyak kepada kejayaan sesuatu projek berbanding dengan kemahiran teknikal. Namun begitu, faktor yang berkaitan dengan kemanusiaan mendapat kurang perhatian dalam mengambil kira kebolehan dan prestasi pengurus projek. Memandangkan topik ini kurang mendapat perhatian yang sewajarnya dalam industri pembinaan Malaysia, maka terdapat keperluan mendesak untuk menjalankan penyelidikan yang lebih terperinci terhadap kesan faktor kemanusiaan oleh pengurus projek atas kejayaan sesuatu projek. Banyak penyelidikan terdahulu menjurus kepada gaya kepimpinan pengurus projek, kemahiran sosial dan faktor-faktor kritikal yang berkepentingan relatif di dalam sebuah kitar hayat projek serta kesan faktor-faktor tersebut pada pencapaian kejayaan projek. Walau bagaimanapun, tiada kajian yang menyelidik gaya kognitif pengurus projek dan kesannya pada kejayaan projek dalam industri pembinaan. Oleh yang demikian, tujuan utama kajian ini adalah untuk meneroka bagaimana gaya kognitif pengurus projek mempengaruhi kejayaan projek di dalam industri pembinaan. Kajian ini telah menggunakan reka bentuk penyelidikan tunggal dengan mengaplikasi kaedah kuantitatif dalam pengumpulan data daripada pengurus-pengurus projek didalam negara ini. Kajian ini telah mendapati bahawa

pengurus projek cenderung untuk menggunakan kecekapan kognitif dengan mengaplikasi dimensi *Planning Style, Knowing Styl*e dan *Creating Style* yang membentuk gaya kognitif dalam proses mencapai kejayaan projek melalui aspek penggunaan projek, nilai sesuatu hasil projek dan penyerahan projek. Malah, hasil kajian ini telah menyediakan maklumat dan penemuan empirikal bagaimana gaya kognitif mempengaruhi terhadap pencapaian kejayaan projek oleh pengurus projek di dalam industri pembinaan Malaysia. Kajian ini menunjukkan bahawa dengan memberi perhatian yang lebih khusus kepada faktor kemanusiaan, pengurus projek dapat memainkan peranan yang lebih signifikan dalam usaha mencapai kejayaan projek. Ini dapat dilaksanakan melalui Rangka Kerja *CoSProS (Cognitive Style and Project Success)* yang dicadangkan melalui hasil penyelidikan ini. Kajian ini juga telah mengutarakan kepentingan untuk menerapkan informasi berkaitan gaya kognitif sebagai topik perbincangan dalam program latihan yang berbentuk akademik kepada pengurus projek supaya topik ini akan difahami dengan baik serta dapat diaplikasikan dengan cara yang lebih berkesan. Penyelidikan ini juga telah menekankan cara-cara untuk memupuk penggunaan gaya kognitif dikalangan pengurus projek melalui program-program latihan di mana akhirnya isu-isu yang berkaitan dengan topik perbincangan gaya kognitif dapat disampaikan dengan lebih jelas.

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
MPC	Malaysian Productivity Corporation
MBAM	Master Builders Association Malaysia
PMBOK	Project Management Body of Knowledge
PM	Project Management
PMI	Project Management Institute
PMIMY	Project Management Institute, Malaysia Chapter
CIDB	Construction Industry Development Board Malaysia

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CHAPTER 1

INTRODUCTION

1.1 General Introduction

In construction industry, project manager has been identified as the most highly cited stakeholder when measuring project success (Davis, 2014). Project managers are being investigated on the most critical issues they face include quality, profitability, cost control, productivity and overall performance. These success factors are considered hard issues. Many studies focus on the hard issues because they are easy to see, recognize, measure and easier to address. Researchers also place importance on hard issues because they seemingly are based on fact and factual matters that can proven and strategized for a successful project delivery. On top of this, researchers find it easier to address concrete, nonhuman issues. However, the underlying cause of hard issues is often found in the soft issues in a project management knowledge base (Eweje *et al*., 2012). The soft issues are the human issue – the fundamental mindset issues of people in the industry. These soft issues consist of less tangible aspects that are much more subjective and less easily measured than the hard issues. When it comes to discussion on the mindset, an individual's performance is directly related to his/her state of mind- a soft issue (Creasy & Anantatmula, 2013). Performance, which can often be measured, is a hard issue. On the other hand, state of mind, is a soft issue. As such, it has been argued that an effective mindset creates good performance and desirable results (*e.g.*, Dutta & Thornhill, 2008). Unfortunately, a more detailed development of the soft issues was limited by the lack of available research in this field (Skulmoski & Hartman, 2010; Hyvari, 2006).

Therefore, this research is an attempt to understand the relationship between project manager's cognitive styles (which stemmed from taxonomy of personality - state of mind to be precise) and project success in the construction management discipline. The definition of cognitive styles and project success are described to provide an initial idea on the subjects. In Rayner and Cools's study (as cited in Cool *et al*., 2013), cognitive styles is defined as: "*consistent individual differences in ways of perceiving, organizing, and processing information*" which represent a fundamental factor in determining individual and organizational behaviour (Armstrong, Cools & Sadler- Smith, 2012). The cognitive styles is believed to be a critical variable that influence the management practise (Hayes & Allison, 1994). Meanwhile project success is generally accepted as achieving project targets within budget, schedule and quality (Elattar, 2009). It has been noted that during the past few decades there has been a broadening of success measures. As such, the project success identified in this study was based on Pinto and Slevin's (1986) project implementation profile (PIP) which covered the common measures of project success: the schedule, on budget and the performance. Further details of the explanation of these terms are provided in chapter three, section 3.3.1.1 and 3.4.1.2.

In order to address above issues, this chapter, which is an overview of the thesis presents the research context in terms of the background of the study and statement of the research problem to be addressed. This chapter is structured into few sections. In the problem statement section, this study provides the background of the problems and the problem statement which guided to the creation of research questions for this study. In the following sections, the research objectives and research methodology are presented in details. In section of significance of the study, the researcher included an overview of the importance of study and the contribution the study may make in the field of project management especially in the construction industry. This chapter also highlighted the

scope of the study. Definition of terms that applied throughout the thesis is discussed briefly in the following section. This chapter is ended by the presentation of the thesis structure layout.

1.2 Statements of Problem

1.2.1 Background of the problems

This section is created to highlight the statements of the problem on the proposed study. However, it would be much appropriate if this section started with a description on the context of the study to provide a clear picture on the background of problem, which summarized in Figure 1.2.1.

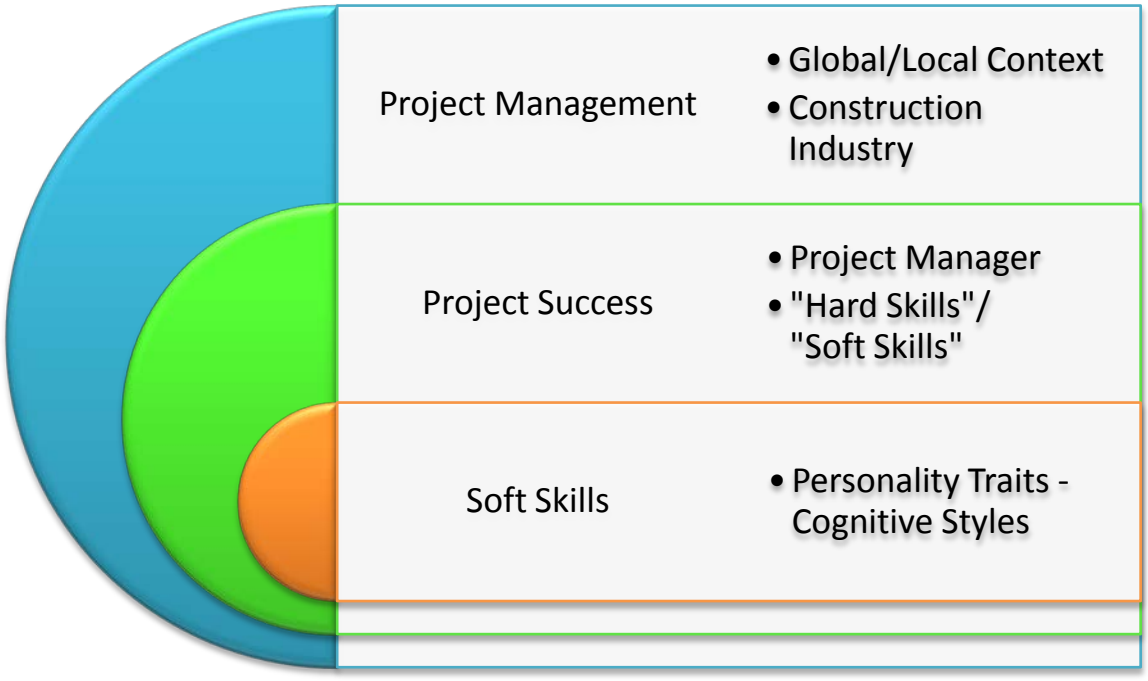


Figure 1.2.1: Context of the Study

Practice of project management rapidly transformed since the beginning of 21st century where the evolution in the field was triggered by the changes in management philosophy and practices in order to maintain competitive advantage and continuous

success in the field. Scholars started to identify that organizations and individuals are holding on a new perception on project management (Brewer, 2005; Crawford, 2005). They are relying upon techniques of project management to gain competitive advantage. When it comes to the definition of project management, Project Management Institute (PMI) described project management as an "*application of knowledge, skills, tools, and techniques to project activities to meet the project requirements which is accomplished through application and integration of project management process*" (Project Management Institute, 2013:4). The field has gone through significant changes in the past decades, which contributed to an amount of project work across different industries (Lundin, 1995; Hanisch, 2011). However, in a slightly deeper context, the field continues to receive criticism for deficiency of its relevant to practise and consequently to enhance the performance of projects across diverse industries (Markoczy, 2006). Furthermore, the project management has been reviewed as a field which struggle with balance from multiple perspective and urged to arrive at the solutions from new angels in order to provide improved effectiveness and efficiency for a successful project management (Söderlund, 2011).

Meanwhile, in the construction field, construction projects are one of the driving forces of the global economy where billions of dollars are being spent, which results in the growing usage of project management significantly (Anantatmula, 2008; Davis, 2011). Consequently, a large volume of project works are being done by organizations resulted in a project-oriented society (Huemann *et al.*, 2004). However, scholars have notified that the modern project management practice demands other general and management knowledge, coupled with skills that extend beyond the technical aspects of traditional engineering areas (Edum-Fotwe & McCaffer, 2000). In addition, it is worth noting that project management literature has agreed that projects in construction industry are

different and known as the largest and most established project–based industry projects, which perhaps requiring different method of management (Crawford, 2005). This is due to the fast changing environment of the construction industry with challenges such as skills shortages, the rapid advancement of information and communication technologies, and the increasing prioritization of issues such as sustainability, environmental protection and climate change (Hwang, 2012).

From the Malaysian construction perspective, the construction field is known as one of the key economic sector that contributes to the country's development agenda. This is due to the fact that the construction industry stimulates domestic economic activities adjoining both the public and private sector provide development of construction projects. Completion of construction projects, generate wealth to the citizen of nation undoubtedly. In Malaysia, there has never been a stop in development of construction projects. In the 10^{th} Malaysia Plan (2011 - 2015), a total of RM 250 billion was allocated for development and facilities. Out of this total, RM230 billion was assigned for development strategies while the remaining RM 20 billion belong to facilitation fund (Corporation, 2011). Both of these allocations are expected to create a momentum in driving demand for the construction sector as 60% from RM230 billion will be expended in physical development which to be undertaken by the construction field (Corporation, 2011). Meanwhile, facilitation fund is expected to attract private sector investments that worth billions of ringgit Malaysia of which a major portion would be investments that involving the participation of construction industry (Aftab Hameed Memon *et al.*, 2012).

Yet despite bourgeoning interest in projects, the performance of Malaysian construction industry to nation building continues to disappoint. Studies and reports have highlighted

critical issues such as time delay, below average performance, cost overrun and poor quality to the extent that failures to the construction industry seems customary with a low probability of successful implementation (Wan Maimun Wan Abdullah, 2010). Even though Malaysian construction productivity was known as one of the best among selected Asian and ASEAN countries, however, construction GDP (Gross Domestic Product) and productivity growth has been generally on the decline since the world economic crisis of 2008 (Corporation, 2011). The construction industry has been urged to improve its competitiveness that can be achieved by using good practices, advanced construction techniques and optimize resources utilization. Construction industry is proposed to adopt new technologies and new methods of construction which believed could achieve a quantum leap in productivity (Corporation, 2011). The importance of the construction industry as vital link to the gross development product and nation building demand the construction industry to improvement of construction projects implementation and enhancement of project success (Wan Maimun Wan Abdullah, 2010).

When it comes to the topic of project success, the concept of project success and failure were originally introduced by Rubin and Seeling (1967). They demonstrated that a project manager's experience and the size of the previously managed projects do affect the manager's performance. Since then, scholars were continuously investigating the factors affecting project success from different aspects which enriched the theories in project management (*e.g.*, Hayfield, 1979 (as cited in De Wit,1988); Might & Fischer, 1985; Belassi, 1996). It has been well documented in the literature on the importance of a project manager for a successful project completion (Parker & Skitmore, 2005; Pheng & Chuan, 2006; Powl & Skitmore, 2005; Prabhakar, 2005). It has been asserted that the competence of a project manager is an important factor in ensuring positive project outcomes and enhanced organizational performance (Prabhakar, 2008). More recently,

Davis (2014) who reviewed the literature on the development of project success since the 1970s claimed that the thematic analysis of the literature evidenced the project manager as the most highly cited stakeholder when measuring project success. Notably, according to Hartman (2000), project manager's effective performance is identified as one of the single most critical factors affecting successful project outcomes (as cited in Powl & Skitmore, 2005; Bandow & Summer, 2001). This is due to the nature of a project manager's responsibility to deliver a project on time, budget and by meeting the quality standards determined by the client (Sommerville, Craig, & Hendry, 2010).

According to Skulmoski & Hartman (2010), the two arenas of project manager study comprises of "soft skills" which are interpersonally related and "hard skills" which are discipline specific and technically oriented. A considerable amount of literature which has been published on project success reported that soft skills contribute more to project success than technical skills. For example, Lechler (1998) commented that soft skills competencies (human-related factors) contribute more to project success than technical skills. Similarly, El-Sabaa (2001) has discovered that the human-related factors of project managers have the greatest impact on project management practices and technical skills the least. The scholars also have criticized that traditional project manager's skills are commonly at entry level and those skills do not frequently facilitate to the successful project accomplishment as much as soft skills (Turner & Muller, 2006). Besides, Pant & Baroundi (2008) also emphasized that, to manage project successfully, the required essential soft skills are interpersonal ability, technical proficiency, cognitive aptitude, capability to identify and take control the situation and people and take a role as leader through effective leadership behaviour.

Turning now to the local context where a very little research contains information specific to the local context on issues pertaining soft skills and project success (Yong & Mustaffa, 2013). In a recent study by Abu Hassan Abu Bakar *et al*., (2012), the researchers have confirmed from their study that the human-related factors are essential for the growth performance of construction companies performance in the industry. Furthermore, Yong & Mustaffa (2013) recognized soft skills as a potentially important factor for project success in Malaysian construction industry. Therefore, this research sought to undertake a critical review of the issues pertaining to soft skills and project success. Subsequently, indentifies potential gaps in current knowledge for this study.

Project manager's competencies have been critical to the project success (Zhang *et al*., 2013). According to Slevin & Pinto (2004), project success is not a result of a particular set of project management techniques but from understanding how people can create an environment conducive to project success. Gaddis (1959) for the very first time proposed a requirement profile for the ideal project manager. Then in 1985, Fryer (as cited in Pheng & Chuan, 2006) listed social skills, decision-making skills, problem-handling skills, ability to recognize opportunities and management of changes as key personal attributes affecting project success. Since then, this field has attracted significance interests from scholars to identify the competencies that project managers require to effectively manage the projects they have been assigned (Crawford & Turner, 2007). Scholars have investigated the project manager's leadership style, social skills, emotional intelligence, specific personality traits and the relative importance of critical factors across the project life cycle and their effect on the project success (*e.g*., Muller & Turner, 2007; Geoghegan & Dulewich, 2008). In 2005, Dulewicz & Higgs developed the Leadership Dimensions Questionnaire (LDQ) to identify the competence profiles of effective leaders. The results of the study demonstrated that LDQ consists of 15

dimensions or competencies which load onto three competences; emotional, managerial and intellectual competence. Using the LDQ framework, the authors were able to differentiate effective leaders from other leaders. However, Muller & Turner (2010) who explored the relative importance of project managers' attitude towards their project and the effect of the leadership competence in the process of achieving targeted project success using the LDQ framework, concluded that more project manager competence is required as complexity increases. A corollary of this is that there appears to be need to identify other aspect of project managers' attributes and how they contribute to the outcomes of projects. Consequently, this study attempts to fill this gap. The aim of this study is to investigate the relationship of cognitive styles and project success where the cognitive styles may contribute itself as a dimension in the scope of personality traits towards project success.

Although the body of project management continues to grow on a range of diverse subjects, however there are still only limited results of the literature on the subject of cognitive. Review of previous literature reveals that there is not enough knowledge on cognitive perspective in project management setting and there is a need to welcome research on the cognitive aspects of project success (Geoghegan & Dulewich, 2008). There are few conceptual and empirical studies discuss cognitive in project management context where researchers include cognitive as a dimension in relation to leadership ability and the behavioural competencies of project manager (*e.g.*, Turner & Muller, 2005; Eweje *et al*., 2012). Much of the discussions in this subject is tied to a general description rather than its internal characteristics in order to support management practise (see for example, Leban & Zulauf, 2004; Clarke, 2010; Davis, 2011). Even though the cognitive aspect, cognitive styles in particular has been identified as an excellent indicator for managerial performance (*e.g.*, Allinson, Chell, & Hayes, 2000;

Sadler-Smith, 2004), however little attention has been paid to this area. There is an evident to investigate how the cognitive styles and its attributes contributes as one of the important personality traits dimensions in achieving project success. Thus, referring to an ancient phrase, 'A journey of a thousand miles begins with a single step' , this study attempts to fill this gap by providing empirical evidence of cognitive styles influences in the context of project success by Malaysian project managers.

1.2.2 Problem Statement

Based on the above discussion (paragraph 1.2.1), the general problems encountered in this study are:

a) A call for more studies on project manager's soft skills (human-related factor) to supplement the hard skills is needed to enrich and extend the project management practise, in particular from personality traits field towards the achievement of project success.

b) In Malaysian construction industry, there has not yet been any widely published research that analysed the soft issues in relation to project success (*e.g.*, Yong & Mustaffa, 2013).

c) The role of cognitive styles (human-related factor) towards the accomplishment of project success in Malaysian construction industry has not been exploited for the study on project managers.

d) A framework, which would eventually form a systematic way of assessing the cognitive styles attributes towards the achievement of project success for project managers, is not available in local context.

Accordingly, the problem statement of this research is as follows,

"Research on the relationship of project manager's soft skills and project success received very little attention in Malaysian construction industry, in particular from personality traits field. Therefore, there is a need for investigation on how the aspect of cognitive styles assists project manager to achieve project success by providing empirical evidence on the influential of project manager's cognitive styles in project success. Furthermore, a framework that links the cognitive styles and project success is needed to help project managers to rapidly assess the possibility of a successful project from an individual's cognitive perspective".

1.3 Research Questions

Referring to the statements of the problems above, four (4) important research questions are raised for this study. The specific research questions that the researcher sought to answer are:

1. In recognition of the unique and challenging construction project environment, what cognitive styles are appropriate for engendering the project manager's performance in achieving the project success?
2. How does the project manager's cognitive styles relate to project success in this sample?
3. Are there any relationships between the variables of cognitive styles and project success constructs?
4. What effect do project manager's cognitive styles and variables have on project success and its elements?

1.4 Research Objectives

The questions posed above (in section 1.3) engendered the key research aim, which was to develop a workable framework by linking cognitive styles directly with the project success for project managers in the Malaysian construction industry. The framework is expected to assist this group of profesional to identify the elements of cognitive styles that can enhance the project success rate in Malaysian construction industry from human-related factor. Consequently, the research sought to undertake these specific objectives:

1. To analyze and evaluate recent developments in bridging management science and practise, in particular, the project manager's human-related factors (soft skills) and project management.
2. To critically assess the subject of cognitive styles and project success towards identifying suitable cognitive styles and project success measures for achieving the key research aim.
3. To identify the relationship between cognitive styles and project success, that can increase the effectiveness of project manager's ability to achieve the ultimate goal of project outcomes.
4. To develop a framework, that comprises the cognitive styles and project success measures that enables project managers to rapidly assess the possibility of a successful project in Malaysian construction environment.

1.5 Research Methodology

In addressing the key research questions identified above, it was important to adopt an appropriate research approach, which would enable appropriate data collection, analysis

and interpretation of the findings for the benefit of practitioners and researchers. Subsequently, as in all researches, the study commenced with an extensive literature review to help provide a thorough understanding of the developments in the methodologies used for measuring the cognitive styles and project success including the construction management discipline. Consequently, positivism as a research paradigm was adopted to carry out this research. To this effect, a quantitative approach was used in eliciting the relevant data project managers in Malaysian construction industry. Subsequently, structured questionnaire (using existing instruments) was used in eliciting the data (including piloting). The research paradigm adopted also enabled statistical tools such as factor analysis and regression analysis to be used in the interpretation of the data and discussions of the findings. The details are as explained in two different phases:

Phase 1: Review of literature and determination of the potential cognitive styles attributes that may enhances the achievement of project success factors by project managers.

To ensure that this study is progressing well and meeting its objectives, a thorough literature study was conducted, including both primary and secondary sources related to soft skills and project management in general. To identify project manager's personality traits with respect to its effect on project success factors, special attention was given to cognitive styles. In this respect, further investigation of cognitive styles topic is a promising variable because the topic is projected to be a critical variable influencing management practice and career management and performance. Research documents and journals from multiple sources were obtained in the execution of phase 1. For example, online libraries, bookstores and journal subscriptions were accessed to collect

the online sources from the University of Malaya, namely EBSCOhost/PsychInfo, Emerald, ScienceDirect, Proquest and Proquest Digital Dissertations. The published articles were used to locate relevant papers. For the cognitive styles topic, the period 1990 - 2013 was chosen as review period. However, the years before 90's also considered to provide a solid theoretical and conceptual groundwork because it is noted that the number of applied studies going up rapidly amongst cognitive scholars during the 1969 - 2012 (Kozhevnikov, 2007). The reviews on this topic were limited to peer-reviewed journal papers because the topic represents a scientifically validated knowledge and have the highest impact on the cognitive field (Podsakoff *et al*., 1986). The keywords searched were 'cognitive styles', 'thinking style', and 'personality style'. Published papers that did not focus on cognitive styles in relation to the field of business and management were excluded (*e.g*., politics, macroeconomics, medicine and sport). Meanwhile, for the project success topic, articles and books published within the last 10 years (2002 - 2012) were crucial to the basis of the study by understanding previous studies carried out on project management and the impact project managers have on project success. The following search terms were used 'project manager', 'human-related factor', 'project success', 'project management', 'success factors' and 'soft skills'. However, during final write up stage, the literature review on the cognitive styles and project success presented a mixture of germinal and latest findings on the proposed study.

Phase 2 : Quantitative Survey Method

This study applied quantitative survey method as the strategies for data collection. Qualitative method is not considered for this study because the qualitative strategy deals

with open-ended questions, emerging approaches and requires data to be collected with interviews and observations (Creswell, 2009; Leedy & Ormrod, 2005) while the most common formats in assessing behaviour patterns such as personality, social attitudes and psychopathology largely relied on self-reported measures where respondents evaluate one question at a time, often depend to a rating scale (*e.g.*, Likert-type items) (Brown & Maydeu-Oliveras, 2013). The instruments consist of forced-choice questions found in the Cognitive Styles Instrument (CoSI) and PSQ (Project Success Questionnaire) measured in this study. After the survey was completed, the statistical analyses were performed using SPSS version 20.0. The methods of data analysis included factor analysis, internal consistency reliability (coefficient *alphas*), Pearson's *r* correlations and linear regression. The statistical analyses were reviewed to ensure the research aims and objectives are achieved. The analysis also critically evaluated to ensure the research questions are answered through testable hypothesis.

1.6 Significance of Research

The significance of the current study was to highlight the extent to which this topic is researchable and feasible. This study is researchable because the concepts of the theoretical framework and research questions can be measured and tested. Additionally, the study is feasible since the approach can be implemented in a targeted sample which is accessible, available; with cost and time spend for field works are manageable. The results of the quantitative research study provide a foundation for the study of the relationship between construction project managers' cognitive styles and project success and are a mean for narrowing a gap noted in the literature. The current study adds to the body of knowledge in the areas of project management by providing insight into the impact of a project manager's cognitive styles on project success. Meanwhile, from the

local context, this study adds to the collective knowledge on the soft issues relating to the success of construction projects. This study helps to enrich the dimensions of the personality traits from human-related perspective in project management by focusing on the attributes of cognitive styles.

1.7 Scope of Study

It is critically important to point out three guiding issues that informed this study. First, the topic of cognitive styles is through the lens of the personality traits where it is one specific aspect of one's cognitive behaviour. This study is not concerned on the other aspects of personality traits such as emotional and motivational dimensions of competencies (*e.g.*, Creasy *et al*., 2013) which were outside the scope of this study. The subject of cognitive has a broad application where it belongs to various discipline. The topic mainly found in the different branches of psychology, but also from sociology, business studies, management and education (Coffield *et al*., 2004). Therefore, in this thesis, the researcher concerned with how the dimension of cognitive has a significant relationship towards the achievement of project success at the individual level. Further to this, the researcher focuses upon cognitive styles as a central characteristic of one's role that may assist for a successful project. Secondly, issues regarding the subject on project success. In the field of project management, the subject of project success is the heart of the field where it varies with project phases. For the purpose of this study, the project success covered the common measures of project success: schedule, budget, performance and client measures. The impact of the project life cycle on the relative importance of the project success was not considered in this study. Finally, the construction industry comprises of multidisciplinary professionals who are employed by different organisations which are diverse in the service they provide (Barlow, 1998).

Therefore, a typical construction project involves many organisations as stakeholders of the project. However, this study only covers project managers from construction organization while excluding other stakeholders from the study. This is due to the fact that project manager has been identified as the most highly cited stakeholder when measuring project success (Davis, 2014).

1.8 Thesis Outline

The thesis is structured into seven (7) chapters. An overview of what is presented in each chapter is summarized below. The framework of the research is shown at the end of this section.

CHAPTER 1: INTRODUCTION

Provides an introduction on the research topic, the research problems are formulated to demonstrate that the problem is real and worth for investigation. The study establishes the research questions, objectives, and highlights the significance of the study. Finally, the thesis outline is presented after the scope of this study.

CHAPTER 2: RESEARCH BACKGROUND

Chapter 2 addresses generic issues relating to soft skills (human-related factors) in project management with particular reference to project manager in construction industry. Firstly, this section provides an overview on the issues of the appropriateness of bridging the management science and practise. Subsequently, a quick review on the importance of linking the concept of cognitive styles and project success from one's cognitive competence approach is discussed. Other relevant issues also discussed over here to identify the sources that provide basic background information about the subject.

In this case, the researcher wanted to look into and study more deeply to understand the topic and identify the angle to approach the proposed area.

CHAPTER 3: MAPPING THE CONCEPT OF COGNTITIVE STYLES AND PROJECT SUCCESS

This chapter provides a literature review concerning the variables involved in this study. A critical review on the subjects of cognitive styles and project success are presented. It addresses issues regarding the development of cognitive styles and project success knowledge in management practise. Thereafter, the chapter also traces how both approaches can be link together towards engendering effective managerial performance by project managers. Thereafter, a commentary on how these backgrounds were combined to develop an appropriate conceptual model is provided. At the end of each section, concluding note is presented to highlight important issues arising from the literature review discussions.

CHAPTER 4: RESEARCH METHODOLOGY

This chapter focuses specifically on the discussion of the research designs and methods that are applied in this research. Thus, it incorporates the research methodology and explains the rationales for using questionnaire survey (quantitative method). The data collection procedures (pilot study, sampling process, and survey measures), formulation of research model and finally the methods of data analysis are also presented.

CHAPTER 5: RESULT AND ANALYSIS

This chapter address the analysis of the data collected. It reports on the main findings from the quantitative analysis. This includes psychometric assessment of the

instruments, descriptive analysis of demographic data and the use of appropriate statistical methods namely, Pearson's correlation and linear regression.

CHAPTER 6: DISCUSSION

This chapter is devoted exclusively to the development of a framework by bridging the cognitive styles and project success, including discussions of the findings, strategies for implementation and the recommended application. An in-depth discussion of the theoretical convergence and significance of the findings is also presented in this chapter.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

Finally, this chapter concludes the research by reviewing the achievements of the objectives, presents the main conclusion, research implications, limitations and recommendations for future research with a suggested framework for Malaysian construction project managers.

Figure 1.8 provides the diagram of the overall structure of this study and the processes involved in this research accomplishment.

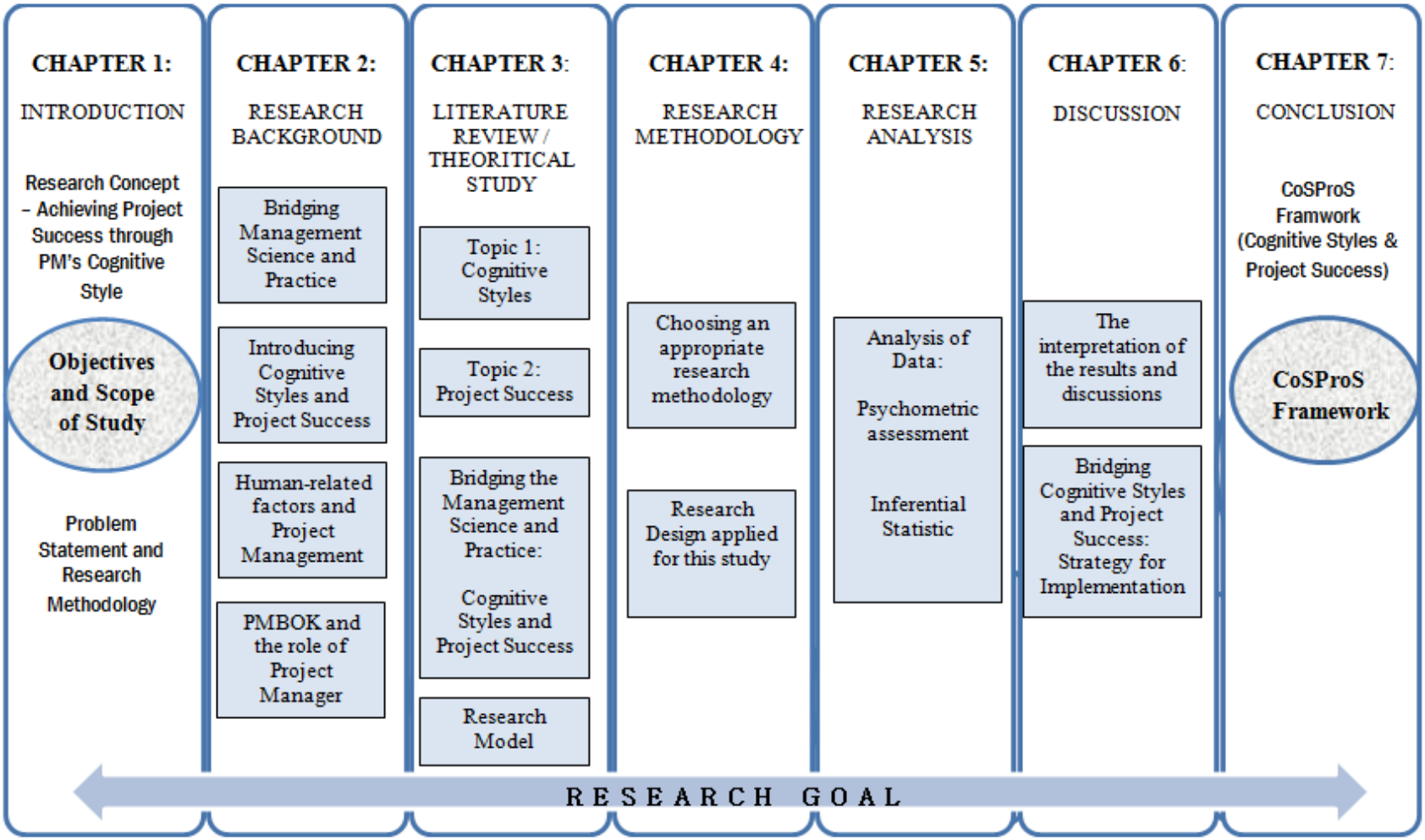


Figure 1.8: Presentation of Research Report

CHAPTER 2

RESEARCH BACKGROUND

2.1 Introduction

Chapter one includes an overview of the study, introducing the research aim and objectives, and presented the organization of the thesis. The purpose of this chapter is, to provide an overview of the research background on the proposed topic because the topic itself is a very specific subject. To understand the background of the topic is crucial because it could go a million different ways and create confusions due to nature of the management studies. Thus, by exploring the human-related factor (soft skill) perspective together with project management area will lead the flows into discovering the potential relationship between cognitive styles and project success in construction industry. Furthermore, this chapter will be able to resist the urge to ramble off into a multiple different directions by focusing only on the niche area.

Firstly, as this study is a collaborative study between science and practise, a quick review on the appropriateness to carry out the proposed study is provided. The information is expected to provide a clear understanding on the subject matter. The following section will briefly review the background of cognitive styles and project success by detaining the remaining facts and details for the literature review chapters. Next, discussion on the human-related factor (soft skills) and project management will be illustrated in detail in which these subjects formed the foundation for the current study. Thereafter, the next section briefly review the role of a project manager with the emphasis on the soft skill approach given the focus of this study.

2.2 Bridging the Management Science and Practise

This research is about examining the role of cognitive styles in improving the project success within construction industry in project managers. The study is an attempt to bridge the management science and practise by exploring the use of cognitive styles (management science - psychological perspective) and project success (practise). Therefore, this section provides an overview on the issues of the appropriateness of bridging the management science and practise, the latter reflecting the continuing desire to establish the link between the two field in producing relevant and rigorous collaborative studies.

Whether the rigour-relevance gap in management research could be bridgeable has been the topic of continuous debate among scholars (*e.g.*, Alle, 2003; Beer, 2001; Hodgkinson *et al*., 2001; Rynes, 2001). More recently, Kieser and Leiner (2009) sustained the debates that rigour–relevance gap in management research is unbridgeable due to the distinction of the social system between the management science and practise. Interestingly, the authors argued that it is not possible to produce a collaborative research that is rigorous and relevant (Kieser & Leiner, 2009) . The authors also provided some key arguments on the rejection which is summarized in the point form below (Kieser & Leiner, 2009) :

a) Science is consumed excessively and inappropriate basis for management education.
b) Science cannot communicate well with practise because it is appeared that science prefer to talks to itself.
c) The studies conducted in collaboration between scientist and practitioners are imposable to produce rigorous and relevant results.

d) It has been criticized that the collaboration only cause both streams to be on much more worse condition.

Given these points, it is worth noting that, the authors somehow highlighted recommendations on how to bridge the two different streams based on Van de Ven (2006). According to the author, in order to produce a remarkable work by bridging the theory and practise, researchers are recommended to undertake the collection and the analysis of research data in a systematic and well planned manner. He has proposed four ways which were: (a) research questions or problem are formed based on concrete perception; (b) to develop a feasible and credible concepts and models that illustrates the subject of studies and that thereby present a comprehensive theoretical framework addressing the central research questions; (c) in order to gain an accurate picture of the subject that being examined, appropriate research methods, approaches and research questions are focused upon; (d) the research findings should be able to be applied and practised from the perspectives of different academic and practitioner users (Van de Ven, 2006).

However, by referring to Van de Ven (2006) assumptions, Kieser & Leiner (2009) continually addressed the difficulties that have to faced by researchers and practitioners during collaboration which is the communication problem due to the stream's differences. One of the most important question arising from this arguments was, "Is there any chance to merge rigour and as well as relevance to the mutual of the science and practise?" Thus, the following statements try to answer the question by highlighting the importance of filling the gap by pointing out some interesting counter-arguments by Hodgkinson & Rousseau (2009) and other scholars in defending the appropriateness in bridging the research and practise.

a) To produce a successful management and executive educational programmes , it is important to ensure the management education is appropriately science-based (Latham, 2007; Loewenstein, 2003). This is true because science-based behavioural principals are obtained through science-focused education which involving the active and mindful learning characteristic (Langer, 1998).

b) Whereas some have criticized that science impossible to work effectively with practise, however, others believe it provides an important knowledge. For example, scholars and practitioners have collaborated to help each other in developing, validate and use of psychometric tests, assessment centres, peer ratings, and interview techniques in selection and promotion successfully (*e.g*., Coles & Hodgkinson, 2008; Hodgkinson, 2003; Pulakos, 2005). It is also documented that profesional managers in this area of interest have demonstrated a strong preferences towards research-based principles and tools (Cohen, 2007).

c) Kieser & Leiner (2009) have made total rejection of the collaboration between science and practise by criticizing that the collaborative researches cannot be both rigorous and significant. However, a number of articles which have published the collaborative works in the scientific top journals (*e.g*., Gill & Hodgkinson, 2007; Bartunek *et al*., 2006) have proved that the collaboration have successfully produced unbiased, reliable and valid fashion where the findings are generalized in a specific context (Hodgkinson & Rousseau, 2009).

d) Despite Kieser and Leiner's rejection's, however, a large number of publications have demonstrated collaborative studies provided findings are both useful and used where the "filled gap" proved how much impact science to date has on management practise (Hodgkinson & Rousseau, 2009). For example, in work and organizational psychology field, it is observed that the propel growth of the collaboration dedicated to professionalizing management practise by bridging

the research-practise gap (Anderson, 2007; Anderson *et al.*, 2001; Gelade, 2006; Hodgkinson, 2006; Symon, 2006; Wall, 2006).

By referring to the above arguments, it is important to note that the bridging between rigorous research and practice is possible. The associations between academic and practitioner will provide valuable insights that add important knowledge development. As a result, both science and practise would be of great benefit in effort to exert successful collaboration in order to narrow the gap between research and practice.

In concluding this note, the primary objective of this study which is to assess the associations between cognitive styles and project success is supported and researchable. Therefore, the proposed study on the collaboration between psychology and project management aspects is expected to provide more diverse kinds of knowledge than the current practises from the construction management perspective.

Having clarified the possibility of bridging the science and practise, in the following sections, the topic of cognitive styles and project success underpinning its definition, are elaborated. It will be discussing the concept of cognitive competence to generate idea how the topic of cognitive styles was identified as a potential area for further investigation in the project management context.

2.3 Cognitive Styles and Project Success

The objective of this study is to investigate the potential influences by the cognitive styles approach on project success. As a point of departure, this section deals with a

quick review on the importance of considering the topic of cognitive in project management.

Over the last 20 years, there has been an increased interest in the study of cognitive competence in the social field and, researchers have continuously stressed the diversification quality of cognitive competence and its development and the role of the socio cultural environment where the competence is applied (Wang *et al*., 2004) . To get a clear picture, cognitive competence is described as the ability to carry out sufficiently the complex tasks cognitively in which it is considered as an important needs for an individual in the society (Willis, 1996). Furthermore, Howkins *et al*., (1992), defined cognitive competence as two overlapping constructs. First form of cognitive competences as the "*ability to develop and apply the cognitive skills of self talk, the reading and interpretation of social cues, using steps for problem solving and decision making, understanding the perspective of others, understand behavioural norms, appositive attitude toward life and self awareness"* (Howkins *et al*., 1992). The author also defined the second aspect is connected to academic and intellectual achievement. The development of core capacities, including the ability to use logic, analytic thinking and abstract reasoning are emphasized. Apart from the ability to manipulate and strategize information, cognitive competence considered as an skill to internalize, self-regulate, and transfer these cognitive skills to construct knowledge and make sense of the surroundings (Vygotsky, 1962, 1978). Similarly, Fry (1991) also pointed out that by using appropriate thinking skills, people will be able to make a change in their cognitive development and capability by controlling their mental preferences and cognitive styles.

Referring to the few examples of definitions above, it can be concluded that there are broad definitions of cognitive competence well as narrow definitions. What can be

summarized is that the through effective management of cognitive competence, people can manipulate their personel experiences as well as organize and adapt their thoughts to guide their behaviour (Sun & Hui, 2012).The application of cognitive competency approach basically is used to facilitate knowledge construction, task completion, problem solving, and decision making (Sun & Hui, 2012). When it comes to the discussion on the relationship between cognitive competence and project managers, it is sufficient here to say that one of the principal characteristics of a manager's work is cognitive (Das, 1995). Thus, it should be agreed that every project manager perform a cognitive function because the nature of the job where the function as been frequently described as goal setting, decision making, execution of decisions, and evaluation of the effects of the previous decisions taken (Das, 1995). Before progressing onto the unique relationship between cognitive styles and project success, the following paragraph presents some findings of cognitive development which may have gone unnoticed in discussions on project management.

Research consistently demonstrates that the aspect of cognitive in project management receive a little attention in the literature. Leban & Zulauf's (2004) work on the project manager's transformational leadership style and project performance reveal that emotional intelligence ability contributes to transformational project manager leader behaviour and project performance. However, the authors concluded that the system thinking (cognitive thinking) is the roots of emotional intelligence that will enable the project manager to utilize his/her emotional intelligence abilities and leadership styles to the greatest advantage. Similarly, Barber & Warn's (2005) conceptual paper demonstrate that transactional and transformational leadership qualities with emotional intelligence abilities and empathy (through cognitive stimulation) offer a means to further explain aspects of individual differences between project managers that can

influence their performance in projects. The research on the leadership and emotional intelligence by linking to the cognition aspect are continuously being carried out in determining project manager's performance (*e.g.,* Turner & Muller, 2005; Geoghegan & Dulewicz, 2008; Clarke, 2010). As the result of a recent study, Davis (2011) in his investigation on the impact of project manager's emotional intelligence on the interpersonal competence, argued that it's time to utilize and continue to explore influencing variables that show applicable relevance related to both cognitive emotional ability and interpersonal competence in the role of project manager. Additionally, Creasy *et al*., (2013) also pointed out how important the project manager's personality dimensions (cognitive ability as a subset) on project success even though they haven't prove that personality characteristics contribute to the project success through any empirical work.

Hence, because project manager's cognition play an important role in the project management field, it is therefore essential to identify the attributes of cognitive aspect that a project manager needs to effectively execute the projects from the construction industry perspective. Therefore, this paragraph would like to highlight the unique relationship that cognitive styles may has on project success. In the construction industry, as a project leader, project manager's primary responsibility is to achieve project objectives. In view of this, leaders need a different attitude regarding the classic management functions of control, coordination, communication, and the setting of performance standards (Muneera Esa *et al*., 2013) . Boal and Whitehead (1992) (as cited in Leban, 2004) have identified that to be successful; leaders need both cognitive and behavioral complexity and flexibility. This means, leaders need a behavioral repertoire and ability to select the right role for the situation. Therefore, the cognitive styles has been identified as an important potential human-related factor to assist project manager

to select the right style for the entire execution process includes the decision to allow the project to go forward and achieved project success. There is a need for research to further explore the relationship between the two constructs. It would be interesting to relate this management science measures towards the project management practise to determine whether they coincide in individuals as an important personality variables from human-related factors aspects.

To understand the conceptual foundation of cognitive styles and project success, the following section return to the description of human-related factor and project management approaches, particularly significant from a project manager's perspective in which these subjects formed the foundation for the current study.

2.4 Human-Related Factor and Project Management

Research on project management (PM) has created an extraordinary development since the mid 1990s and this area has been criticized for being hard to coordinate in traditional management disciplines regardless of the fact that the topic has get to be more far reaching since the turn of the 21st century (Garel, 2013). A great amount of debate has been ranging about the soundness of the PM theoretical foundation and theories (Packendorff, 1995; Söderlund, 2004). Somehow, the power and flexibility that PM brings to organizations could not be denied through the literatures (Ives, 2005) because if the project management is developed in a right way both deliberately and strategically, it could increase the value of an organization (Winter, 2008; Thiry, 2002; Crawford, 2003). It is notable that the discipline of project management has experienced huge changes in the past decades, which contributed to a large amount of project work from diverse industries, which lead to an interesting fact where some scholars even

portray a “projectification” of entire societies (Lundin, 1995; Hanisch, 2011). In spite of these developments, project management continues to receive criticism for its lack of relevance to practice and this field is urged to improve performance of projects across diverse sectors (Markoczy, 2006).

Even though there are so many criticisms have arises, but the main argument of this chapter was not to argue or to investigate in detail the worthiness of its concepts, methodologies and tools. This chapter intended to highlight that in order to connect the project management practice closely to its contemporary challenges, new research system is needed to enrich the field beyond its current intellectual foundations (Winter *et al*., 2006). Before moving into the concept of human-related factors and PM, the following paragraph will discuss briefly the condition of PM in the Malaysian construction industry to generate general idea on the current scenario regarding the research topic.

It is interesting and encouraging to discover the continuous driving efforts by project management practitioners and academics at the global level to ensure project management continues to offer avenues that would be worth exploring. Based on the existing literatures on the Malaysian construction industry, there are not much articles critically reviewed the status of construction project management performance in Malaysia. But somehow, it is worthy to note some interesting points highlighted by one of key players in the Malaysian construction industry, Prof. Tan Sri Dato’ (Dr) Ir. Jamilus Hussein who acknowledge the importance of project management as a discipline that can produce an excellent performance and effectiveness in project development and delivery. However, the author has highlighted few major challenges that needed immediate attention by the practitioners in the construction industry to lead

better performance in project cycle through project management, which summarized as below (Hussein, 2003).

a) To highlight and bring forward current negative perspective on its role and benefits.
b) The state of the industry vĩs -á- vĩs the lack of awareness and understanding of the discipline, the way it should be practised and the diverse applications of project management to many commercial activities.
c) The state of development of the industry vĩs -á- vĩs competency and performance standard of project managers and project management service providers.
d) National regulatory framework to safe guard performance standard and quality services.
e) The levels of training and the quality of training programmes and training providers.

In this respect, this review clearly shows that project management field in Malaysian construction industry need to provide initiative and comprehensive plan to arrest and address the present situation in assuring high quality of performance at each task in a project lifecycle by having a distinctive management process utilising the appropriate methodology, techniques and tools. Before the next paragraph starts to highlight the issues on human-related factors and project management, it is worthwhile to glance through the summary of project management contribution over the decades as illustrated in the Figure 2.4.

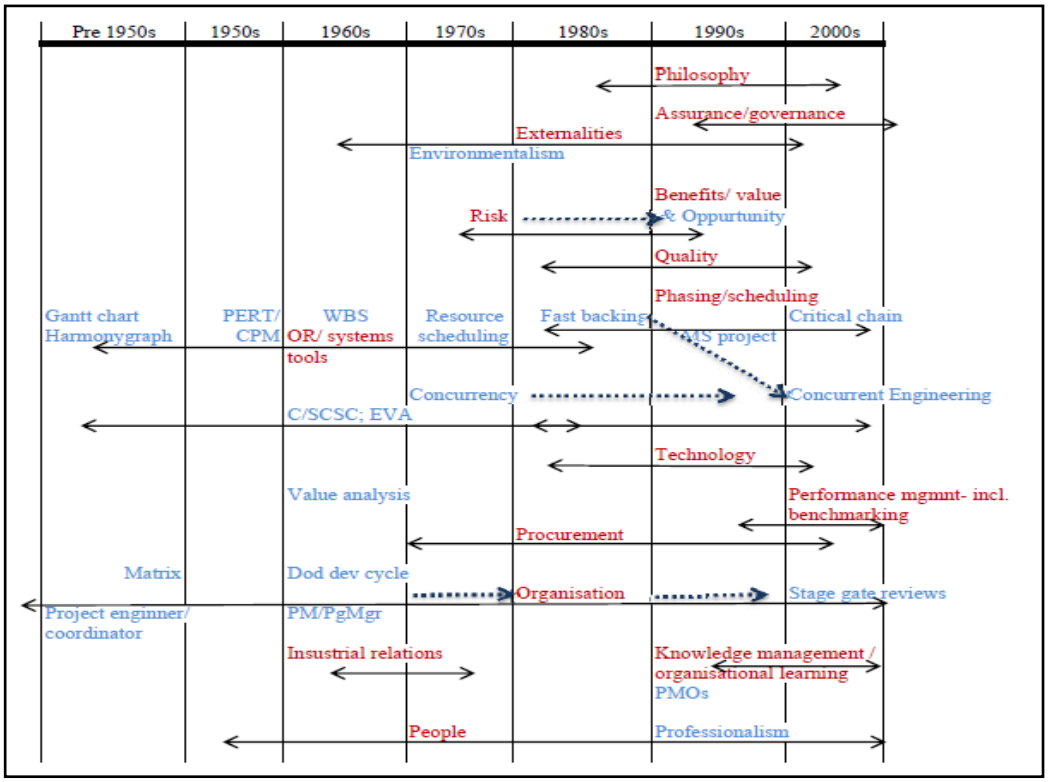


Figure 2.4: PM-related research contribution over the past decades

(Source: Morris, 2010)

Back in year 2000, Crawford argued that there are growing number of studies focusing in people skills of project managers and in standards for development and assessment of project management competence due to the fact that more organizations implement project management as a modus operandi to deliver work while at the same time increasing demand on project managers (Crawford, 2000). It was further supported by recent research findings that construction organizations now focusing on the core competencies of project managers to achieve success in their assignments (Hwang, 2012). The reason why project manager competences have been suggested as important factors is that the project manager who, at the centre of the project network, is responsible for orchestrating the whole construction process even though a successful project delivery requires the concerted effort of the project team to carry out the various project activities (Bayliss, 2002). After all, possessing the core project management competence would help to define the ability of project managers to deliver good

performance towards the attainment of project success (Abu Bakar Abu Hasan *et al*., 2009). Scholars in the project management area also confirmed that competent project managers are vital to project success, and several studies have highlighted critical skills (Avots, 1969; Belassi & Tukel, 1996; Crawford, 2000) which necessary for efficient project performance (Hwang, 2012).

From time to time, scholars suggest further investigation that support the need for new and improved effective people skills which associated with project managers (*e.g*., Blackburn, 2001; Dainty *et al*., 2005; Fisher, 2011; Moore *et al*., 2003). After further exploration in the subject area, it is interesting to discover human skills of project managers have the greatest influence on project management practices and technical skills the least (El-Sabaa, 2001) which directly give impact on the achievement of project success because project manager has direct influence over 34–47% of project success (Frank, 2002). Realising the significance of people management skills, Turner (1999) rephrases his definition of "project" as:

> *[. . .] endeavour in resources are recognised in a novel way to undertake a unique scope of work, of a given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives (Turner, 1999)*

Adding to the literature, communication, organisational effectiveness, leadership, problem solving, teambuilding, flexibility, creativity and trustworthiness have been identified as key soft skills essentially required to manage projects successfully (Belzer, 2001; Baroudi & Pant, 2008). Pant and Baroundi (2008) echoes this further by emphasizing that, to manage project successfully, the required essential soft skills are

including interpersonal ability, technical proficiency, and cognitive aptitude, along with the capability to identify and take control the situation and people and take a role as leader through effective leadership behaviour. Halstead (1999) argued that if a project manager wants to achieve a successful project, managing human issues within a project certainly cannot been considered 'optional'. The author further described that real success comes from knowing how to get things done through soft issues by a project manager.

Meanwhile from Malaysian construction industry perspective, there are not much scholars investigated the impact of the human-related factors or soft skill in project management but in the most recent study, Abu Hassan Abu Bakar *et al*., (2012), have confirmed from their study that the human-related factors are essential for the growth performance of construction companies performance in the industry. Against this background, the questions then arise as to how well our industry equips potential project managers in the area of human-related factors. Thus, next section will briefly discussed the coverage of these skills in the PMBOK due to its widespread use in project management practises in Malaysian construction industry (Abu Hassan Abu Bakar, 2011). This will provide insights into assumptions in respect to the soft skills required for project managers in Malaysian construction industry in general before focusing on the scope of research in the human-related factors perspective in the following chapter.

2.5 Project Management Body Of Knowledge (PMBOK)

Project Management Body of Knowledge Guide is a standard brought out by PMI (Project Management Institute) for management of individual projects for North

Amerika since 1969 but it is also recognised as a major global standard in project management practises nowadays. It has taken a stewardship role in promoting the establishment of project management standards, training, education, and research (Pant, 2008). This manual identifies the collection of knowledge, generally 'recognized as Best practices for managing projects' which has been adopted accreditation purposes by professional bodies in Malaysia, particularly in the construction industry such as Construction Industry Development Board Malaysia (CIDB) and Master Builders Association Malaysia (MBAM). In 2012, Project Management Institute (PMI) released new version of the PMBOK Guide (Project Management Institute, 2013).

The major of the PMBOK Guide 5th Edition compared with previous edition, is on the knowledge area where there are 10 knowledge areas with total 47 processes meanwhile in the 4th edition, there were only 9 knowledge area with 42 processes. Before the next paragraph dwelled into the issues of human-related factor and PMBOK, the contents of PMBOK Guide are summarised in a Figure 2.5 as illustrated below.

Figure 2.5: PMBOK Guide

(Source: Project Management Institute, 2013)

PMBOK has been in existence since 1987 but recently the body of knowledge seems to receive criticisms from the scholars in the project management area due to its structure which hardly changed since its inception and no formal program of research underlay the formation of the PMBOK (2006). Furthermore, it has been criticized for focusing on the delivery of hard concepts such as technical information, scientific management principles, the usage of tools and tangible outputs. In contrast the coverage of soft skills appears to be both slowly and inadequate (Pant, 2008). This statement is supported by earlier findings by Bourne ad Walker (2004) who commented that the PMBOK more concerned with the hard skills required in project management than the soft skills. Further to this, apart from Stakeholder management which is added in the recent PMBOK, the two knowledge areas concerned with human aspects, such as Project Human Resources Management and Project Communications Management are typically seen as secondary to the more technically based areas (Pant, 2008). Similar criticisms are raised by Morris *et al*., (2006) who commented that PMBOK essentially focused on project delivery and largely ignoring the front-end stage of projects. Furthermore, it is interesting to note the arguments that have been made by Gale and Brown (2003 : 417) who stated '*there are some obvious gaps in all the BoKs, particularly in the area of people and culture*.'

However, in the newest edition of PMBOK Guide 2012, there was a significant amount of changes between previous edition and fifth edition. Most notably, the latest edition underlines the importance of project stakeholders by introducing Project Stakeholder Management. Under this section, stakeholder management is divided into four processes. The processes are (a) identify the project stakeholders, (b) plan stakeholder management, (c) manage stakeholder management and finally (d) control stakeholder management. Besides that, the fifth edition also introduce seven new process which are

Plan Scope Management, Plan Schedule Management, Plan Cost Management, Manage Communications, Control Communications, Pelan Stakeholder Management and finally Control Stakeholder Management.

All the studies reviewed so far, however, would be more persuasive if the scholars have considered areas of human-related factors that have great potential in enhancing the performance of project management professionalism, particularly for project managers. This due to the argument that appropriate skills and behaviours would help project managers to become better at managing people in their projects and deliver projects successfully in the increasing challenging and competitive environment (Fisher, 2011). Even though Pant (2008), has proposed human types of issues as previously identified by the likes of Strang (2003); Mantel *et al*., (2004); Loo (2003) and Belzer (2001) can help in achieving successful project outcomes by project management professionals, however, from Malaysian construction industry perspective, there has been little discussion regarding this topic.

In the most recent studies by Affandi *et al*., (2012), the authors have highlighted that, since long time ago, soft skills have been recognized as one of the important elements within the construction management that can assist construction organization, CIDB and universities meet the demand for highly able and skills construction managers. Furthermore, the studies have identified that the needs of industry are constantly changing, whereas in the past, the focus might have been on the technical skills of the graduates, but the current focus seems to be on the human-related factors. For example, the ability to work in a group, to solves problems, capable in adapting to the environment in which they are required to work in and adaption of managerial skills (specifically social skills) (Madter *et al*., 2012; Affandi *et al*., 2012; Le *et al*., 2008). It

is also noticeable in the literature where the lack of non-technical skills and the high dependence on technical skills is the problems that should be overcome by skilled worker in Malaysia (Corporation, 2011). Interestingly, Affandi *et al*., (2012) also argued on the gap between construction industry needs and university product (graduates) arising since there is no specific framework or list of soft skill that can be used as a reference. However, more empirical research on this topic needs to be undertaken before a comprehensive soft skill attributes could be produced in the future.

To achieve this, the effect of cognitive styles towards the achievement of project success by Malaysian project managers will be investigated to provide a platform for future research in the area of soft skills particularly from cognitive competence approach. As such, a the following section going to discuss on the profesion of project manager in overall to grasp the importance of project manager's role in achieving project success in the construction industry especially from the soft skills approach. This is because project manager's effective performance is identified as one of the single most critical factors affecting successful project outcomes (Hartman, 2000; Bandow & Summer, 2001).

2.6 The Project Manager

This section is created to understand the roles and responsibilities of project managers in the construction industry. This is important at the later stage of this research as it means to establish the link between the project manager role and soft skills in improving the project manages' performance in achieving project success.

2.6.1 Construction Project Manager

In the construct industry, project manager's primary responsibility is to achieve project objectives. The project manager also highly expected to be capable in managing both technical and non-technical skills to allow the design or development efforts to move forward on schedule without critical chain buffering in a project cycle. Furthermore, the project manager is also accountable for ensuring that all the parties involved in a project team knows and execute their responsibilities. In addition, a project manager also is the bridging gap between the project team and client by ensuring the key issues like cost, time, and quality and client satisfaction are being met for as successful project delivery. However, it is worth to noting that different skills are demanded for project managers for different types of project and industry. Thus, it is essential to identify an inclusive and internally acceptable definition of construction management because the nature of this research which focuses on the group of project managers in the construction industry. Before the topic of project manager and soft skills being discussed in detail, the project manager's responsibility that falls within the boundaries of construction management area is illustrated in Figure 2.6.1. It should be noted that, the figure only described the definition of Construction Management which was developed from series of 'models' by Chartered Institute of Building (CIOB) (Bale, 2010). This figure may provide some insights on the overall responsibility that the project manager must be capable and function effectively in the construction industry. Meanwhile, Table 2.6.1 summarized the project manager's duties in a project lifecycle in the construction industry in detail breakdown.

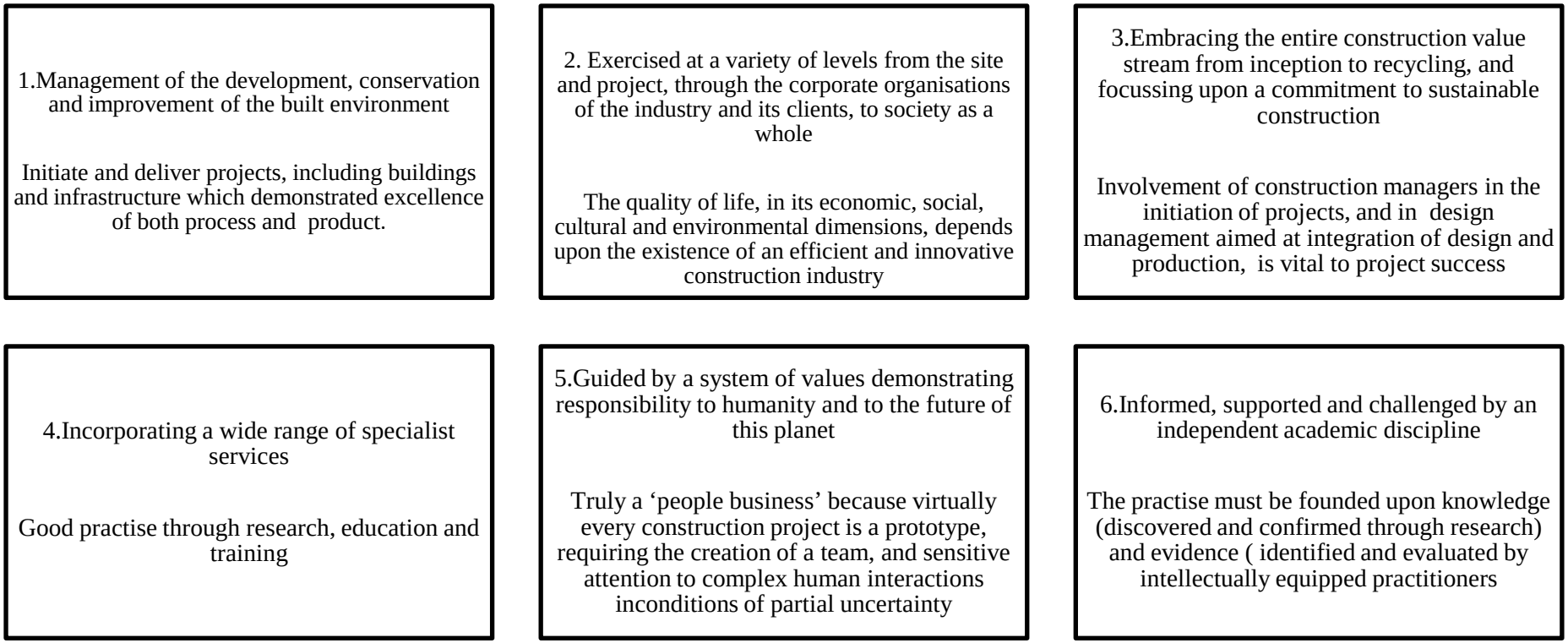


Figure 2.6.1: Definition of Construction Management

(Source: Bale, 2010)

Table 2.6.1: Suggested Project Manager's Duties

Duties*	Client's requirements			
	In-house project management		Independent project management	
	Project management	Project Coordination	Project management	Project Coordination
Be party to the contract	*		x	
Assist in preparing the project brief	*		*	
Develop project manager's brief	*		*	
Advise on budget/funding arrangements	*		x	
Advise on site acquisition, grants and planning	*		x	
Arrange feasibility study and report	*	x	*	x
Develop project strategy	*	x	*	x
Prepare project handbook	*	x	*	x
Develop consultant's briefs	*	x	*	x
Devise project programme	*	x	*	x
Select project team members	*	x	x	x
Establish management structure	*	x	*	x
Co-ordinate design processes	*	x	*	x
Appoint consultants	*		*	x
Arrange insurance and warranties	*	x	*	x
Select procurement system	*	x	*	x
Arrange tender documentation	*	x	*	x
Organise contractor pre-qualification	*	x	*	x
Evaluate tenders	*	x	*	x
Participate in contractor selection	*	x	*	x
Participate in contractor appointment	*	x	*	x
Organize control systems	*	x	*	*
Monitor progress	*	x	*	*
Arrange meetings	*	x	*	*
Authorize payments	*	x	*	x
Organize communication/reporting system	*	x	*	*
Provide total co-ordination	*	x	*	*
Issue safety/health procedures	*	x	*	*
Address environmental aspects	*	x	*	*
Co-ordinate statutory authorities	*	x	*	*
Monitor budget and variation orders	*	x	*	*
Develop final account	*	x	*	*
Arrange pre-commissioning/ commissioning	*	x	*	*
Organize handover/occupation	*	x	*	*
Advise on marketing/disposal	*	x	*	x
Organize maintenance manuals	*	x	*	x
Plan for maintenance period	*	x	*	x
Develop maintenance programme/staff training	*	x	*	x
Plan facilities management	*	x	*	x
Arrange for feedback monitoring	*	x	*	x
Duties vary by project, and relevant responsibility and authority.	*	x	*	x
Symbols: (*) = suggested duties; (x) = possible additional duties.				

(Source: The Charted Institute of Building, 2010)

2.6.2 The role of Project Manager

Nowadays, organizations are operating in a dynamic business environment where the companies continuously using projects to achieve company goals. In search of excellence in business, the only way organization to achieve task success is by keeping eye on the competition and world best practise of the numerous aspects of the business (Bendell, 1998). As in any project environment, proficiency with project management process is essential, but given the human orientation of these settings, it would also appear that competencies with soft skills would be necessary (Radford, 2008). Thus, the selection of the right project manager is a key factor for implementing a successful project (Crawford, 2005) because the ability to lead people to accomplish project objectives dependent upon the aptitude of the project manager (LeBlanc, 2008).

The expansion of project management into non-traditional business settings increases the demand for project managers with additional skill sets beyond the technical knowledge (Radford, 2008). Bourne (2004) also has suggested that a successful project manager need to demonstrate the use of both hard and soft skills. It is interesting to note from the Belling & Mengelaars (2004) who stated that the project manager needs to have the right skills to use the project management tools, but to be a better project manager they must also have the skills to be able to understand their thoughts and emotions and the thoughts and emotions of others (Radford, 2008). Similarly, Leban (2004) agreed that project manager could achieve the project objectives by focusing on both the cognitive and emotional aspects of a project and using an integrated approach. This is because project manager often finds himself like a pilot flying blind, assisted by a relatively unproven set of instruments where his experiment, judgement and faith carry him through the every stage of decision making process (Gaddis, 1959). Meanwhile, Zhang's study on the social competencies and soft skills among

construction project managers concluded that the execution of project manager's project management knowledge and efficient performance are largely dependent on the project managers' personal characteristics (Zhang *et al*., 2013). Nevertheless, Thomas (2008) also justified that project managers need to dwell with emotional and spiritual skills and capabilities to provide orientation even in complex, unknown and uncertain environments.

Exploring further, project manager who is known as the person responsible for working with different stakeholders involved in a project to meet project objectives is expected to possessed skills in addition to the basics of project management to succeed (Brewer, 2005). It is interesting to discover that among the skills a project manager may have embedded in the human spirit, the leading of these skills is the ability to influence others (Brewer, 2005). It has been argued that "*it's hard to find people who can influence others and create win-win situation*" (Melymuka, 2000). However, project manager who is considered as central actor for successful project implementation is needed to have the capability to the sell the value of the project and play an important role in influencing all the stakeholders involved to get their task completed on time (Lovell, 1993). Other example on the description of influencing skill as listed in Table 2.6.2.

Table 2.6.2(a): Description of Influencing Skill

Influencing Skill
Convince, influence or impress others in order to support their agenda, or the desire to have a specific impact or effect on others.
Influence others by selling them the benefit, for example, why they should change so they can see the benefit and make the appropriate changes to their behaviour or attitude.
Share with others what it feels like to work in a highly successful team so they adopt the behaviours that are associated with success.
Influence team members to unblock the values and beliefs people have to help them develop better. Share with others what it feels like to work in a highly valued team.

(Source: Fisher, 2011)

By the same token, Goleman (1995) also emphasized the importance of relationship management skill in managing projects. The relationship management skill is about steering relationship with others as the project moves forward (Muller, 2010b). According to Bourne & Walker (2004), the relationship management role is relevant to be practise in non-traditional, non-construction projects delivering “intangible” results. However, in the most recent research, Zhang *et al*., (2013) has demonstrated that the relationship management is one of the important behavioural competencies that must be possessed by construction project managers. Other characteristics of competencies that falls in the relationship management domain are, inspirational leadership, developing others, change catalyst, conflict management, building bonds, teamwork and collaboration (Turner & Muller, 2005).

When attempting to indentify the project manager’s role from a soft-skill approach, general leadership skill must be not overlooked. A leadership skill is known as one of the most critical skills to be applied for a successful project (*e.g*., Prabhakar, 2005; Yang, Huang & Hsu, 2014; Zimmerer & Yasin, 1998). Research indicates that the leadership style of a project manager is an important factor in being assigned to a project (Turner & Müller, 2005). A large and growing body of literature discusses project manager’s leadership skill and their effect on project success (*e.g.*, Nixon *et al*., 2012; Dyett, 2011). When it comes to the topic of project manager’s leadership skill, the subject focuses but not limited on following areas (Mir & Pinnington, 2013):

a) Development and process of spreading the knowledge of the role of projects as a vehicle for handling any types of changes that may occurred.

b) To make sure that project management system supports the progress of open, two-way partnership with clients and other stakeholders and a shared common project language culture.

Besides, Fisher (2011) has drawn several more specific descriptions of leadership skill by project managers as illustrated in table below.

Table 2.6.2 (b): Descriptions on the Leadership Skill

Leading Others
Show a high level of motivation towards innovation to inspire others to become more creative and innovative.
Adopt a leadership style that is appropriate to the situation, for example, situational, transitional, visionary or charismatic.
Ensure that your team members comply with your wishes.
Apply directive, firm or demanding behaviours according to the attitudes and behaviours of your team members

(Source: Fisher, 2011)

Due to the high level of literatures discusses on this leadership skill, this soft skill continuing impress upon scholars in investigating its necessity for project success. Even though leadership skill has been identified as an important factor in effective management, but the topic still not being addressed properly (Nixon, Harrington, & Parker, 2012) and further research is needed to understand this human behaviour comprehensively.

Moving forward, research within this area has grown considerably in the recent years and the importance of project manager's personality traits and dimensions also has been identified in offering new knowledge on the subject matter. The dimensions that fall in this group are communication, innovativeness, self monitoring, conflict management, change initiation and finally the personality type through Myers-Briggs test (Creasy &

Anantatmula, 2013). The following paragraphs described shortly of each category to provide general idea on the characteristic of personality traits and dimensions and how it contributes for a successful project execution.

A large and growing body of literature has examine the importance and significance of communication skill for project managers (*e.g*., Moore *et al*., 2012; Thomas & Mengel, 2008; Geoghegan, 2008). It is a very well known topic in project management field especially in the construction industry. The importance of project manager's communication skill has been stressed by Blindenbach-Driessen (2006) who stated that, "Project leaders of project-based firms are in the 'main line of communication and can exercise control to coordinate and integrate specialists and functions in creative new ways, focusing on the needs of the projects". Increasing understanding on the importance of communication skill is likely to help project managers to easily form excellent interpersonal relations (Clarke, 2010). This is in line with Prabhakar (2008) who demonstrated that a cultural bond between two parties are formed from an interactive communication which leads to a transferring of values by both participants toward common ground. Prior research has also indicated that an effective communication channels were crucial for project success (Ika, 2009). One of the reasons for this findings could be that in order to achieve cost and time target as well as achieve project objectives, a good communication among those involved is crucial so there is clear understanding of the project flow (Papke-Shields *et al*., 2010). In order to achieve this, a project manager has to performed tasks such as persuasive in personel contact, being confident in managing people on different level and represents the company convincingly internally and externally (Hölzle, 2010).

Meanwhile, conflict management also has been identified as one of the important soft skill dimensions that influence the achievement of project success by project managers (Creasy & Anantatmula, 2013). Conflict management is defined as the ability to resolve conflict (Zhang & Fan, 2013).In a project environment, the management of conflict is an unpredictable event as change (Verma, 1996). In order to resolve any arising conflicts, project managers are urged to adapt their behaviours according to the type and level of conflicts because different levels of conflict required a different approach (Verma, 1996). As another example, conflict management descriptions which have illustrated by Fisher (2011) and Zhang & Zillante (2013) are summarized in Table 2.6.2(c) below:

Table 2.6.2(c): Conflict Management Description

Conflict Management Descriptions	
Fisher, 2011	• Establish the root causes of the conflict by talking to others openly and honestly to find out. • Concentrate on the work issues and do not get personal. • Show loyalty, integrity, trust, help and support when dealing with conflicts. • Be tolerant and prepared to compromise. • Observe behaviours of team members to sense early when conflicts begin to develop, and then take corrective actions to resolve these.
Zhang, 2013	An ability to negotiate and resolve disagreements that occur in projects; such as managing conflict, negotiation skills, and problem solving

One of the reasons for above findings could be due to the diversity of a construction project team where it is predictable that conflicts arise between different stakeholders. It is worth to note that conflicts has often been cited as major factor undermining a team's effectiveness which contributing to project failure (Nordin, 2006; Vaaland & Håkansson, 2003). For this reason, it is essential for project managers to master the competency in order to resolve such conflicts and to ensure the various interests with a shared project objective is properly aligned (Clarke, 2010; Rahim, 2002).

By the same token, innovativeness also has been identified as one of the contributing soft skill dimensions and through innovative methods, project management has continued to benefit from it (Barber & Warn, 2005). The dimension is defined as newness (Garcia & Calantone, 2002). In the literature, innovation has been described in different dimensions and criterion. For example, innovativeness is refers to the degree of innovation developed within organizations, resulting to a differentiation advantage and superior performance (Hansen, 2007). However, in a recent research, Alpay *et al.*, (2012) provided four dimensions of innovativeness : product, process, behavioural, and strategic innovativeness. The authors found that each of these dimensions affects the firm performance through improving effectiveness or efficiency, or both (Alpay *et al*., 2012). However, the topic of innovativeness also related to individual performance where it presents in leaders such project managers (Creasy & Anantatmula, 2013). As Stock & Zacharis states: "*The innovation orientation (or innovativeness) of leadership refers to the degree to which leaders promote subordinates' innovation orientation*" (Stock & Zacharis, 2011, p.874). They demonstrated that leaders with strong preference towards innovativeness encourage others to apply such attitudes while leading a good example.

Continuing studying the soft skill of project manager's personality traits and dimensions, the identification of personality type through Myers-Briggs test has been investigated within the project management domain (*e.g*., Madter, 2012; Sense, 2007). The Myers-Briggs Type Indicator (MBTI) is a self-assessment tool which measures personality on four dimensions: extraversion–introversion, sensing–intuiting, thinking–feeling, and judging–perceiving (Sense, 2007; Cools & Van den Broeck, 2007). This topic will be not addressed in detail in this section because it will be explained specifically in the Chapter 3. However, existing literatures in project management

indicated that this dimension has important implications for project managers. For example, Gehring (2007) has demonstrated that the instrument supported project management leadership competencies. Furthermore, referring to a number of publications on the MBTI tools and project management, it is postulated that project managers with MBTI categorization, will perform better in achieving project success (Creasy & Anantatmula, 2013).

The topic of self monitoring and its effect on the project managers have not received much attention in the project management field. However, the concept of self-monitoring is essential for project managers as their task involving multiple roles such as project leader, facilitator, or communicator (Creasy & Anantatmula, 2013). Sel-monitoring is defined as a personality trait in which the individual "*controls their expressive behaviors and self presentations to cultivate desired public appearances"* (Scott, Barnes, & Wagner, 2012). The concept which is divided into two groups namely "highly self-monitors" and "low self-monitors", is an internal process of evaluating the situation/environment and adjusting one's behaviour through verbal, emotional and so forth (Gangestad, 2000). Several attempts have ben made to indentify the effect of high self monitoring and low self-monitoring acting in individuals (Beal, 2005; Maslach, 2003). The most interesting findings is, high self-monitoring personality trait which is associated with lower levels of stamina, motivation, and task focus can lead to negative project outcomes (Beal, 2005; Creasy & Anantatmula, 2013). It is reported that individual who engaged in high self-monitoring emotional intelligence tends to experience negative outcomes such as negative effect, burnout, emotional exhaustion, job dissatisfaction, and withdrawal (Scott *et al.*, 2012). Meanwhile, the low self-monitoring approach is acting in the opposite way. However, there is need for further investigations in indentifying the effect of low self-monitoring approach and project

success and how this soft skill enhance the project manager's effectiveness in project execution.

This paragraph now turning to its final subject of project manager's personality traits and dimensions which is found in project management literature, change initiation. The concept of change initiation involved an attempt to change the current way of thinking and acting and this topic has received significant attention over the years (Gioia & Kumar, 1991). The importance to develop a detailed plan for implementing change during uncertainty and complex situation is crucial for managers (Ramnarayan & Nilakant, 2006). In the project management field, unexpected events trigger consequential effects that give impact on the manager's roles in keeping the project on the track. Thus, it is essential for managers to anticipate any changes through careful planning in accomplishing project's objectives through integration and coordination among people to work together effectively (Ramnarayan & Nilakant, 2006). Prior research has also indicated that a change agent is needed to overcome any resistance by encouraging others to implement new practises that arises due to the changes (Battilana & Casciaro, 2012). Therefore, project manager who is at the centre of a project team has to play the role of a change agent in order to achieve project's target successfully (Creasy & Anantatmula, 2013). Given these points, it could be concluded that change initiation is a promising variable to be investigated in relation to the project management effectiveness from a project manager's behavioral perspective.

2.7 Concluding Note on Research Background

The purpose for this study was to investigate the role of project manager's cognitive styles on project success. This study is interested in bridging science over practise where the researcher looked into the cognitive styles attributes from the psychological

field and project success from project management practise. To accomplish this goal, this study begins with a background section that provides essential foundation materials. Firstly, the study revealed the appropriateness of bridging the concept of management science and practise. Beginning with a discussion of such potential connection, the information provided a better understanding of relevancy in linking both proposed concepts. In what follows, the following section review the description of cognition as a potential human-related factor that is important in project management. This section is acting as a starting point for fostering a better understanding of the approach in the following section where human-related factor and project management sections discussed the subjects, respectively. In addition, a chapter on the Project Management Body of Knowledge (PMBOK) is written to identify potential issues on the human-related factor and project success because PMBOK is widely used by project managers in practises. The chapter closes by reviewing the literature regarding project manager profession before addressing issues regarding the soft skills of project managers. The reason for this section is to highlight the importance of a project manager in ensuring positive impacts on the project through an effective soft skills management. These previous information leads to discussions upon the so-called soft-side of project management which involved project manager's behavioural skills that are important to project success in construction industry and to identify. Consequently, the research background revealed that the aspect of cognitive in project management receive a little attention in the literature, particularly towards the achievement of a successful project. As such, the proposed study, which is to investigate potential relationship between cognitive styles and project success, is expected to add to the body of knowledge in human-related factor's research stream.

2.8 Summary

On the collection of previously discussed information about research background, it is clearly shows that further examination of the relative contribution of project manager's human-related factor towards the existing project management body of knowledge will offer interesting insights for future reference for the construction project managers. In conclusion, this chapter has discussed in detail the key issues of the research topic within the area of interest. Summary of this chapter is illustrated in the Figure 2.8.

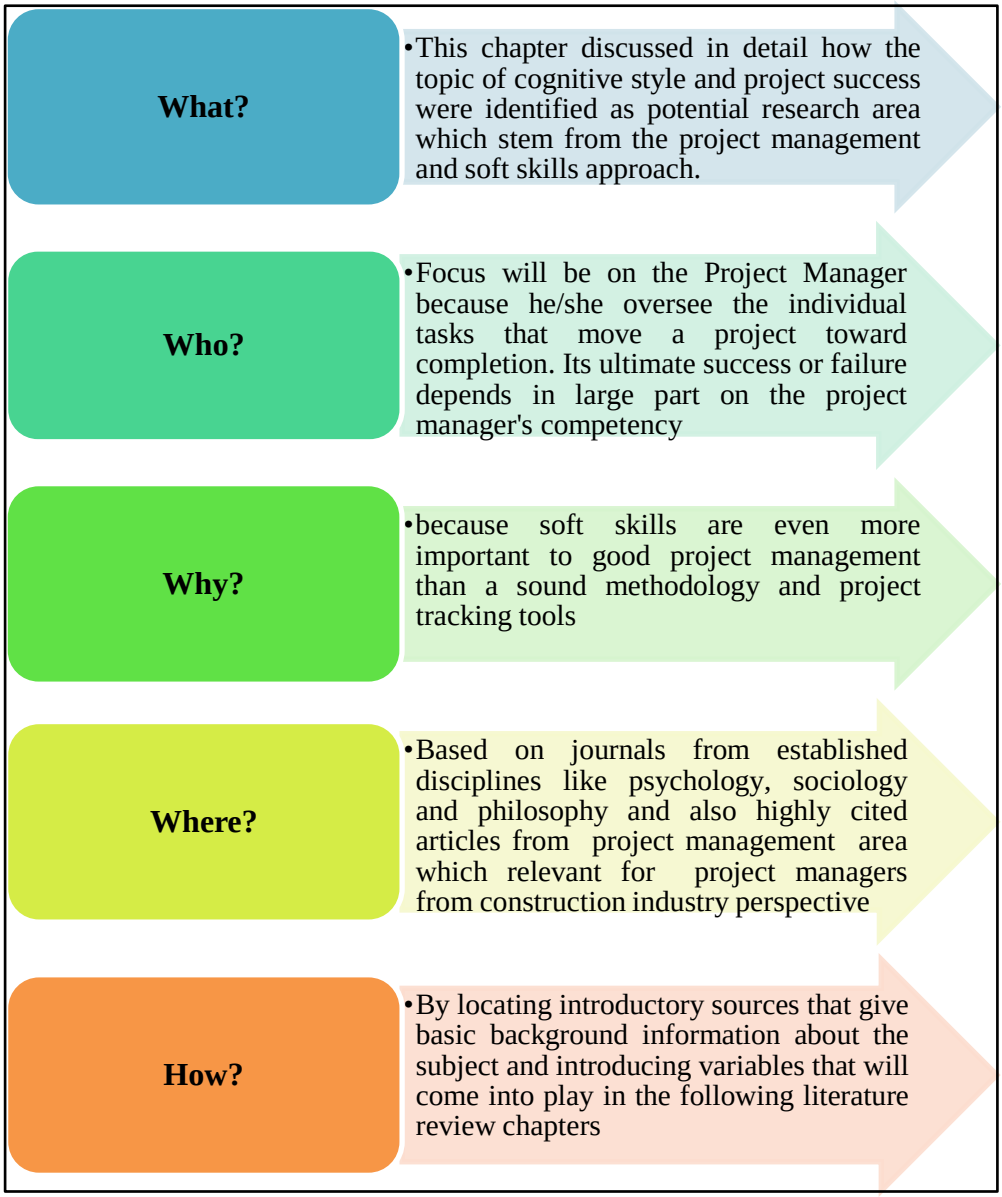


Figure 2.8: Summary of Research Background

CHAPTER 3

MAPPING THE CONCEPT OF COGNITIVE STYLES AND PROJECT SUCCESS

3.1 Introduction

In chapter two, the concepts and background underlying the subjects of cognitive styles and project success were presented. However, moving away from the general introduction chapters, this chapter provides a critical review of the extensive literature supporting and fostering the importance of cognitive styles and project success in management practise. It focuses on theories arising from different areas of interest within the boundaries of research scope. This chapter begins with an engaging description of literature mapping of cognitive styles and project success, portraying a comprehensive view with regard to the topic. Further, this chapter will discuss in depth the variables, covering three main aspects. Firstly, sub-topic one addresses the scholarly literature about the responsive variable, cognitive style; secondly, the topic two which incorporates the literature about the explanatory variable, project success; thirdly, topic three which explore the scholarly literature that relates the cognitive styles to the project success where this sub-section will be relatively short and contains conceptual framework proposed for this study. Finally, the summary of the review will be evaluated by highlighting the needs for further investigation on the proposed topic which will becomes a logical point of departure for the research methodology section.

3.2 Literature Mapping

This section starts with the literature mapping as it provides overall perspective for the study. Figure 3.2(a) reflects on the topics covered throughout this section. Subsequently, Figure 3.2 (b) provides an overview on the research subjects (i.e., cognitive styles and project success) together with prominent authors from each field.

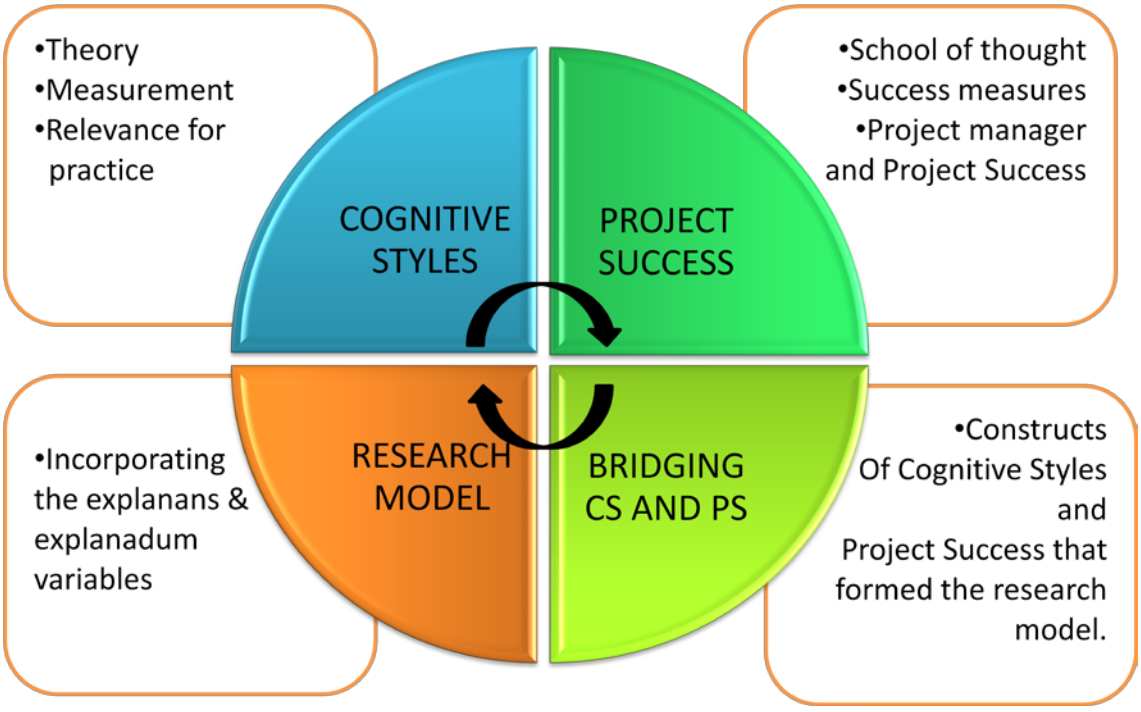


Figure 3.2(a): Topics Covered in Literature Review

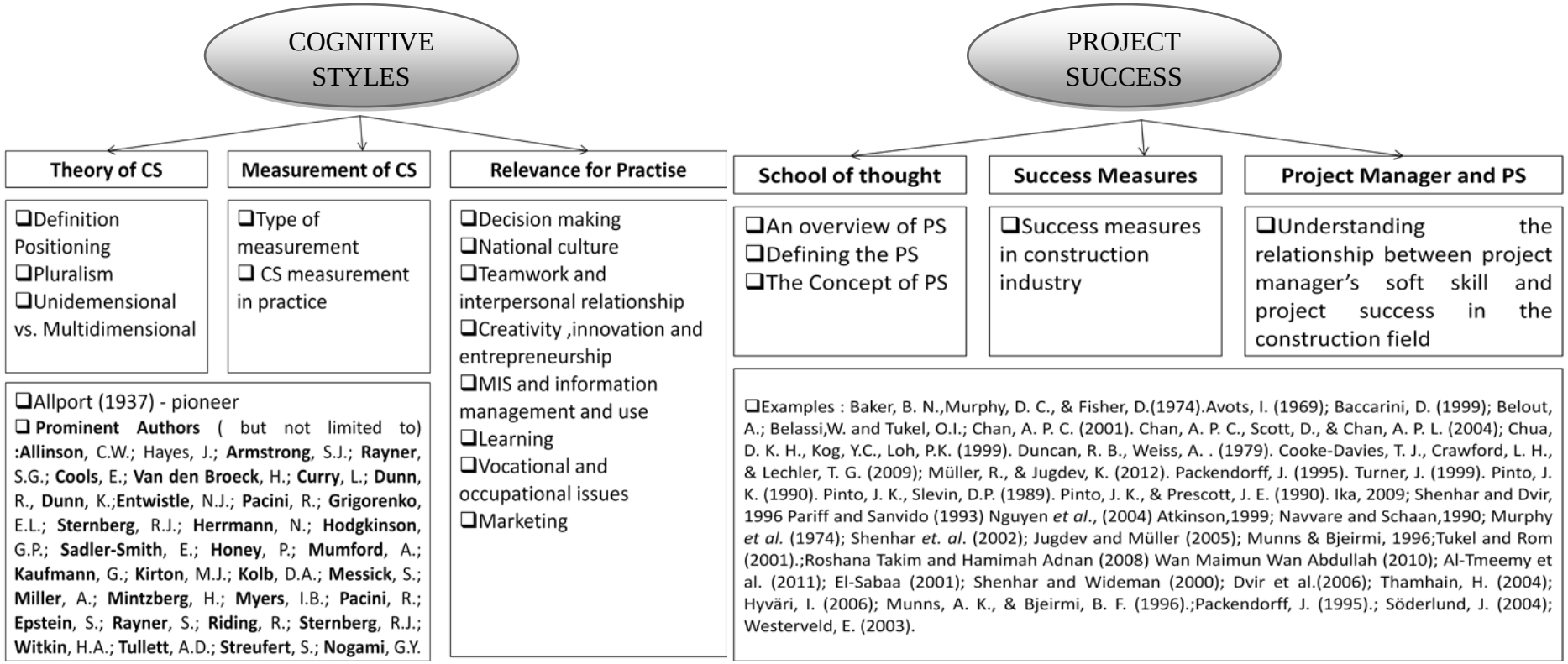


Figure 3.2(b): Overview on the Research Subject

3.3 Cognitive Styles

3.3.1 Theory of Cognitive Styles

Cognitive styles is frequently referred as the individual way a person perceives, thinks, learns, solves problems and relates to others (Witkin *et al.,* 1977). When it comes to the theory of cognitive styles, this field has been recognized by a lack of a coherent or consensual theory (Armstrong & Rayner, 2002; Rayner, 2006). Furthermore, this topic was criticized for being left fragmented, incomplete and the construct of coherent theory remains at a low level among researches in the cognitive sciences (Kozhevnikov, 2007). It is interesting to note from one of the scholars who commented that continuous focus on technical issues regarding validity and reliability of the psychometrics instruments and debates on the theoretical questions regarding relationship with other psychological constructs, hence a barrier that may prevent the practitioners to contribute to the development of style research (Rayner, 2006).

Despite the criticism on the theories of cognitive styles, it is worth noting that there are evidences from the scholars who addressed the influences of cognitive styles on the perception, learning, problem solving, decision-making, communication, interpersonal functioning and creativity in important ways (Hayes & Allison, 1994; Kirton, 2003; Sadler-Smith, 1998(a)). Thus, it is crucial to perceive the background of cognitive styles and its theory through the most appropriate approach so the importance of cognitive styles relating to the project management context can be drawn in the end of the this chapter for further investigation. Therefore, the theoretical background of this topic will be base on a range of related topics and the works that done by Cools (2007) who

produced a comprehensive study of the cognitive styles from the management perspective.

3.3.1.1 Defining Cognitive Styles

Since few decades ago, the topic of cognitive styles has been widely studied and quiet a number of authors have written about the definitions. The attention received by the constructs somehow led to the confusion between cognitive styles and learning style. Thus, it is important to highlight that this study focus on the cognitive styles concept even though some scholars seems to exploit the concepts of cognitive styles and learning style interchangeably without any differentiation (Reynolds, 1997) because style is always referred as a habitual pattern or preferable way of doing things (Gringorenko & Sternberg, 1995). Table 3.3.1.1 summarises some of the common definitions found in the literature.

Table 3.3.1.1: Definition of Cognitive Styles

Author	Definition
Messick (1984)	" an individual's characteristic and consistent approach of organising and processing information"
Shipman & Shipman (1985)	" cognitive styles are generally considered to be information-processing habits: individually characteristic ways of interpreting and responding to the environment"
Tennant (1988)	" an individual's characteristic and consistent approach of organising and processing information"
Hunt *et al.,* (1989)	" the way people process and organise information and arrive at judgments or conclusions on the basis of their observations"
Riding & Cheema (1991)	" a person's typical or habitual mode of thinking, problem solving, perceiving, and remembering"
Hayes *et al.,* (1998)	" a process which influences how people scan their environment for information, how they organize and interpret this information and how they integrate it into the mental model and subjective theories that guide their actions"
Sadler-Smith & Badger (1998)	"are consistent individual differences in ways of organising and processing information and experience"

Table 3.3.1.1: continued

Author	Definition
Saracho (1998)	"individual differences and includes stable attitudes, choices, and habitual strategies related to an individual style of perceiving, remembering, thinking, and solving problems"
Brigham & De Castro (2003)	"consistent approach towards understanding and solving problems"
Hough & Ogilvie (2005)	"cognitive styles reflects 'how', rather than 'how well', on the process of perceiving and judging information. It emphasizes individual traits rather than cognitive ability, focusing on 'preferred styles' as opposed to 'more is better' psychometric measures"

Building further on this stream of definitions, Cools (2007) came up with a comprehensive definition of cognitive styles where it covered the fundamental concept of the cognitive style, which will be used for the purpose of this research. It is defined as, "*Cognitive styles are individual differences in how people perceive stimuli and how they use this information to guide their behaviour (i.e., thinking, feeling, actions)"* (Cools, 2007, p.13).

3.3.1.2 Positioning the Cognitive Styles

Cognitive styles is very well known as a subject that has been extensively studied across diverse research area and from different angles from the theoretical approach (Zhang *et al*., 2012). This diversity had cause overlap and duplication in the psychological constructs (Cools, 2007). Thus, it is crucial to exhibit cognitive styles model in relation to other individual differences theory. Therefore, the remaining paragraph will provide details on the link between cognitive styles and various concepts of individual differences to help improve understanding of the research area.

Hayes and Allison (1994) has described cognition is a way a person acquires, stores and uses knowledge and style which could be defined as a qualitatively different ways of

organizing and processing information, with the ‘best’ style being determined by the demands of each particular task, problem or situation. They provide different level of heuristic application which form a stable basis for behaviour (Messick, 1976). Interestingly, in Keefe’s study (as cited in Kozhevnikov, 2007), cognitive styles has been asserted to be unrelated to intellectual abilities because when the intellectual ability of an individual increases, performance on the tasks will be improved as well (Riding, 1997). Whereas, it has been argued that, the cognitive styles only demonstrate the effect in either positive or negative form on the individual performance, depending on the nature of the task (Riding, 1997).

However, by referring to the Hodgkinson & Sadler-Smith (2003), the main contribution of the cognitive styles construct lies in its ability to bring notions of information processing and personality together. However, through literature findings since decades ago, it shows that researchers have investigated cognitive styles in relationship to four distinct approaches which are, ability, cognitive strategy, and personality and affect (*e.g.*, Armstrong, 2000; Riding & Agrell, 1997; Sadler-Smith, 1998(b); Tullett & Davies, 1997). Relevant details that fall under each concept are explained below.

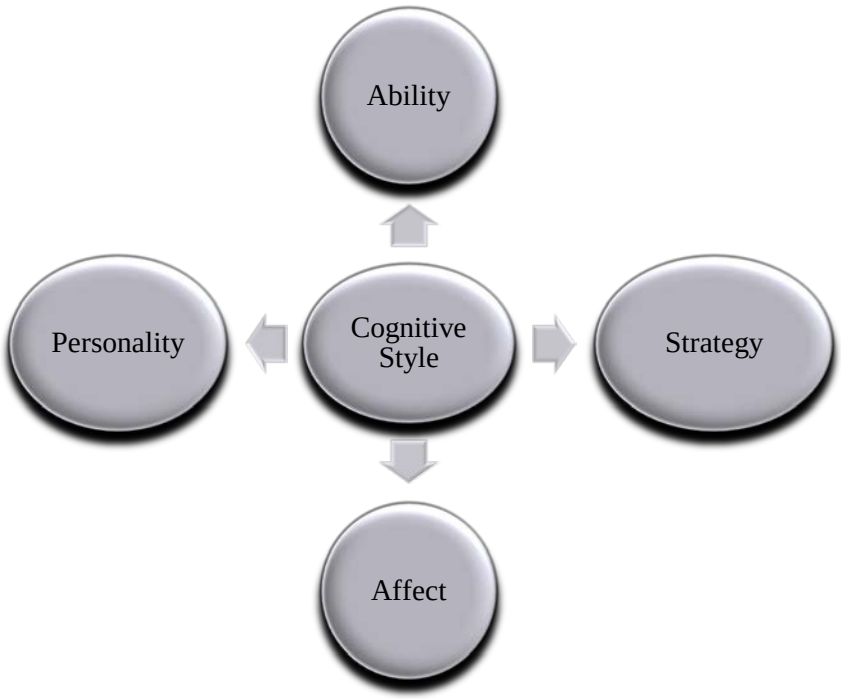


Figure 3.3.1.2: The link between cognitive styles and various concepts

a) Cognitive styles and ability

Abilities is a stable characteristics that are responsible for movement performance such as agility, coordination, strength and flexibility (Haibach, 2011). According to Riding (2000), cognitive styles and ability are the two major characteristic that are studied in the context of individual variation in cognitive processing. Several researchers have identified statistically insignificant relations between cognitive styles and various ability measures (Goldsmith, 1986; Grigorenko & Sternberg, 1997; Riding & Pearson, 1994; Tinajero & Paramo, 1997). Somehow, contradictorily, some researchers found relationships between cognitive styles and ability (*e.g.*, Allison & Hayes, 1996; Tiedemann, 1989). But these studies were criticized by Armstrong (2000) as insignificant studies due to lacking of consideration on the nature of the task that used to measure ability, as some tasks may favour one cognitive styles over another. In a critical and comprehensive review by Cools (2007) in the debate of relationship between cognitive styles and ability by theorists, it has been identified that cognitive styles

considered being unrelated to ability in general. The summaries of findings are summarized as below.

Table 3.3.1.2(a): Cognitive Styles versus Ability

Author	Cognitive Style	Ability
Witkin *et al.*, 1977	Concerned with the form of an activity	Content of an activity
Guilford, 1980	Concerned with the manner of performance	Focuses on the level of performance
Messick, 1984	Unipolar construct	Bipolar construct
	Cutting across domains in their breadth of coverage and pervasiveness of application.	Specific to a particular domain
Messick, 1994	Organizing and controlling variables which contribute to the selection, combination and sequencing of the content and process (organizing) and also help regulating the direction, duration, intensity, range and speed of functioning (controlling).	Perceived as enabling variables which facilitate task performance in particular areas.

From the studies reviewed so far, it can be concluded that cognitive styles and ability categorized in task performance factors but unrelated each other. It can be assumed that cognitive styles relates with the manner of performance whereby, ability concerned on the level of performance (Cools, 2007).

b) Cognitive styles and cognitive strategy

Several attempts have been made to clarify whether cognitive styles is a stable, pervasive, and consistent across different areas of cognitive functioning or can change over situations and time (Sadler-Smith, 1998(a); Cools, 2007). Meanwhile, Riding and Cheema (1991) categorized cognitive styles into three poles, as structure, process or as both. In a structure way, the focus is on its stability over time while the second pole when it is considered as a process; the focus is on how it changes. Finally, when the cognitive style is viewed as both structure and process, it continually adapted as new events influence it directly or indirectly. However, a solution for these contradiction

views as proposed by Hayes and Allison (1994, 1998) and Sadler-Smith and Badger (1998) is through differentiation between cognitive styles and cognitive strategy.

According to Cools (2007), a style is generally considered to as fairly fixed characteristic while strategies are referred as plan that may be applied to deal with certain situations and tasks. Strategies may need changes and be learned and developed, while styles are embedded in an individual (Riding & Cheema, 1991). Meanwhile, according to Sadler-Smith and Badger (1998), a style is basically a function of the individual, while a strategy is a process of the interaction of the individual and the situation. There appeared to be general consensus among scholars who do research on styles and strategy that human being have a preferred or domain cognitive styles but the individual's behaviour and performance usually are impacted by the demands of the situation or task (Armstrong, 2000; Grigorenko & Sternberg, 1997; Riding & Agrell, 1997; Spicer, 2004). Taken together, these review demonstrated that cognitive styles is described as a "*fairly fixed, relatively in-built features of people, while cognitive strategies are specific behaviors people use to cope with particular situations and tasks outside their natural preferences*" (Cools, 2007, p.21).

c) Cognitive styles and personality

When it comes to the topic of personality, it should be noted that the topic is often studied in relative to one's cognitive styles. The definition of personality can be drawn as "*the relatively stable set of psychological attributes that distinguish one person from another*" (Moorhead & Griffin, 2004). Cognitive styles and personality are described to be independent, but related constructs that are conceptualized in a 'personality space' and that together affect behavior (Cools, 2007). Interestingly, researchers in cognitive styles field applied different personality models to indentify the relationship between

cognitive styles and personality in which provided some expected relationships between the cognitive styles construct and personality models. Example of studies as illustrated in the table below.

Table 3.3.1.2(b): Cognitive styles versus Personality

Author	Cognitive Style	Personality Model
Allison & Hayes (1996)	CSI (Cognitive styles Index)	- 16 PF (Personality Factor) Questionnaire - MBTI (Myers- Briggs Type Indicator)
Jacobson (1993)	KAI (*Kirton Adaption-Innovation Inventory)*	MBTI (Myers- Briggs Type Indicator)
Gryskiewicz & Tullar (1995)	KAI (*Kirton Adaption-Innovation Inventory)*	MBTI (Myers- Briggs Type Indicator)
Kirton & de Ciantis (1994)	KAI (*Kirton Adaption-Innovation Inventory)*	16 PF (Personality Factor) Questionnaire

In their detail study of cognitive styles and personel characteristic, Riding and Wright (1995) concluded that both constructs are yielded the same underlying characteristic and physiological condition. This statement supports the justification made by Cools (2007) who said cognitive styles and personality both are would be independent but related construct that area conceptualized in a 'personality space' that collectively impact the behaviour. However, but further research is needed on each of these links to clarify on the assertions that have been made.

d) Cognitive styles and affect

This final topic under the umbrella of cognitive styles and various concepts will cover the link between cognitive styles and affect. Affect can be explained as an umbrella term encompassing quiet a broad range of feelings that people may experience including emotions and moods (Barsade & Gibson, 2007) where it's role has been understudied in many areas of organizational behavior and psychology research (Murphy, 1996).

Even thought Tullett and Davies (1997) have reported an interrelationship between cognition and affect in the understanding of human behavior but several studies have revealed that cognitive styles are considered to be conceptually different from affect (Kirton, 1994; Tullett & Davies, 1997). In addition, other studies which have considered the subject area, found out that cognitive styles are rooted in cognition and not related to affect (Kirton ,1976 ; Kirton & de Ciantis, 1994; Tullet & Davies, 1997; Beyler & Schemeck, 1992). Furthermore, Cools (2007) who traces the development of cognitive styles and affect, found out that the scholars have focused on the cognitive mechanisms rather on the effective ones due to lack of attention on empirical studies in the field. The author also argued that cognitive styles is different than affect. Even though there is an urge to explore the relationship between cognitive and affect in detail but the topic will not be discussed in further because it is not related with the objective of this research.

3.3.1.3 Pluralism in the field of cognitive styles

Drawing on recent research in the field of cognitive style, it has been identified as potential important variable for a better understanding and predicting differences in behaviour in a working environment at individuals and teams levels of analysis. Even though the literature on the subject is extensive, but it was criticized for the increased number of alternative construct and assessment instrument (Hodgkinson & Sadler-Smith, 2003). Messick (1994) who criticized that the major source of this pluralism is due to the reason where researchers use different measures to represent the same style constructs and similar measures to represent different constructs supports this claim.

Findings by Curry (2000) show 100 different investigators with different version of cognitive styles measurement instruments. Furthermore, in a study by Coffield *et al.*,

(2004), 71 cognitive theories and models have been reviewed. This diversity resulted in conceptual fragmentation and incomparable results (Cools, 2007) which called scholars in the field to integrate and categorized different cognitive styles theories (Cassidy, 2004; Grigorenko & Sternberg, 1995; Hayes & Allinson, 1994; Kozhevnikov, 2007; Rayner & Riding, 1997; Sadler-Smith & Badger, 1998). For the purpose of this literature review, four different integration approaches which commonly discussed by scholars in the field are reviewed.

a. Onion Model

This model was established by Curry (1983) who categorised different research approaches of learning style. This highly influential 'union' model was categorized into three main types 'instructional preferences', 'information processing style' and 'cognitive style'. This model more commonly used within research on learning style but, this model referred as an interesting approach to think about the related concepts of learning styles, cognitive styles, learning preferences and learning strategies (Cools, 2007). Furthermore, this model (Figure 3.3.3.1(a)) is one of the most widely cited integrated models within the field (Cofield, 2004). Subsequently, Figure 3.3.3.1 (b) summarized the description on the three level of Onion Model which has been introduced in preceding figure.

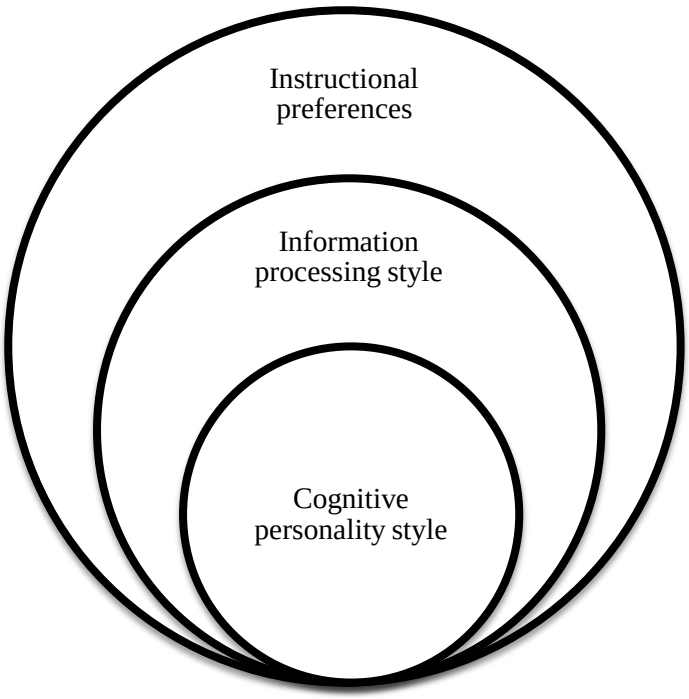


Figure 3.3.1.3(a): Curry's 'Onion' model

(Source: Curry, 1983)

The onion model which was distinguished into three levels is summarized into a diagram as illustrated below.

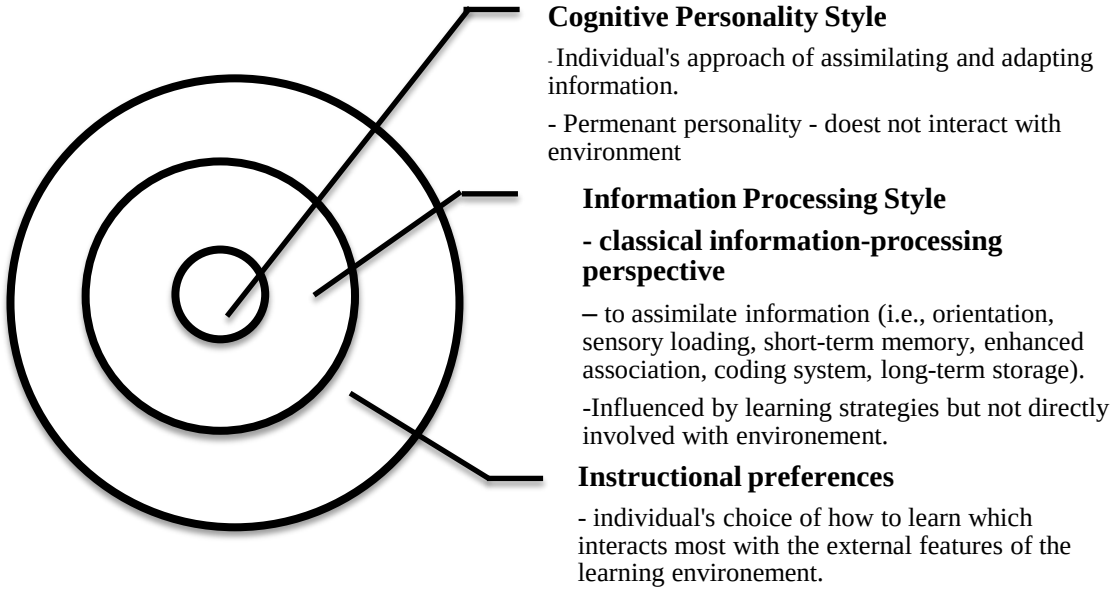


Figure 3.3.1.3(b): Summary of Curry's 'Onion' Model

(Source: Coffield, 2004)

b. Cognition-centered, personality-centered and activity-centered approaches

According to Cools (2007), there are three different groups within the cognitive styles which frequently cited in this field of study which are cognition-centered approach, personality centered approach and activity centered approach. Firstly, on the cognition-centered approach the scholars have particularly focused on cognitive and perceptual functioning, which resulted in the development and definition of several abilities, styles, and dimensions of cognitive processing (Rayner & Riding, 1997). Furthermore, these theories have been distinguished into three subtypes: (1) theories that relate to cognitive organisation (*i.e.*, the wholist–analytic style dimension), (2) theories that relate to mental representation (*i.e.*, the verbal– imagery style dimension), and (3) theories that attempt to integrate the previous two dimensions (Rayner and Riding, 1997). Secondly, the personality centered approach which closer to personality traits (Sternberg and Grigorenko, 1997). Finally, the activity centered approach focuses on style in relation to various activities, settings and environments which actually has been labelled as the 'learning-centered' approach (Riding & Rayner, 1997) where they suggested the approach as a basis for improving pedagogical practise.

c. Vertical classification, horizontal classification and style versus ability

Hayes and Allison (1994) introduced different categorisation of cognitive styles theories integration that can be classified into vertical, horizontal and style versus ability classification. The general views on these categories can be summarized as in the table below.

Table 3.3.1.3(a): Categorization of Cognitive Styles

Vertical classification (Brain functioning)	Horizontal classification (Information processing)	Style vs. ability classification
there is a super ordinate structure which offers an analytical–holistic categorisation of styles	links different cognitive styles dimensions to cognitive processes or models of information processing	focuses on the earlier mentioned distinction between style and ability
Different cognitive styles labels are actually reflecting the same underlying dimension	According to Allison and Hayes (1994) this category, "helps to clarify the nature of the similarities and differences that exist between some of the dimensions of cognitive styles and offers the possibility of developing theory by predicting and testing relationships between the many dimensions that have been proposed and between the various classes of style and managerial Behaviour"	deals with the functional distance of style from the ability domain.
Some theorists connect this dimension with neurological and brain activity and link it to differences in hemispheric functioning.	cognitive styles related to the cognitive processes of perception, memory, and thought.	This category useful to identify possible concepts that undermine the utility of a theory of cognitive styles because the measures used to operationalise it are measures of level (ability) rather than style.

(Source: Allison & Hayes, 1994; Allinson & Hayes, 1996; Cools, 2007; Messick, 1984; Miller, 1987)

d. Combination of Cognitive Styles

In this final part of cognitive styles field, various integration models of cognitive and learning styles which illustrated by Cassidy (2004) will be reviewed. The table (Table 3.3.1.3 (b) shows the diversity of cognitive /learning style models and how different scholars attempted to categories and integrate them based on three integrated models;

1. Onion model of Curry (1983)
2. 'Wholist-analytic' family of Riding and Cheema (1991)
3. Grigorenko and Sternberg (1995) and Riding and Rayner (1998)

Table 3.3.1.3(b): The cognitive styles models

	Curry				Riding and Cheema	Riding and Rayner	
	Instructional preference	**Social interaction**	**Information processing**	**Cognitive personality**	**Wholist– analytic**	**Cognition centered**	**Learning centered**
Field dependence–independence (Witkin, 1962)				*	*	*	
Reflection–impulsivity *(Kagan, 1965)*				*	*	*	
Convergence–divergence *(Hudson, 1966)*				*	*	*	
Leveller–sharpener *(Holzman & Klein, 1954)*				*	*	*	
Holist–serialist *(Pask, 1976)*				*	*	*	
Verbaliser–visualiser *(Pavio, 1971)*				*	*	*	
Style Delineator *(Gregorc, 1985)*				*	*	*	
Assimilator–explorer *(Kaufmann, 1979)*				*	*	*	
Adaption–innovation *(Kirton, 1976)*				*	*	*	
Analysis–intuition *(Allinson & Hayes, 1996)*				*	*	*	
Experiential Learning Model *(Kolb, 1984)*			*				*
Learning Styles Questionnaire *(Honey & Mumford, 1992)*			*				*
Learning Styles Inventory *(Vermunt, 1994)*			*				*
Approaches to Study Inventory *(Entwistle and Tait, 1995)*			*				*
Study Processes Questionnaire *(Biggs, Kember, and Leung, 2001)*			*				*
Inventory of Learning Processes *(Schmeck, Geisler-Brenstein, and Cercey, 1991)*			*				*
Conceptual Level Model *(Hunt, Butler, Noy, and Rosser, 1978)*			*				*

Table 3.3.1.3(b): continued

Learning Styles Inventory *(Dunn, Dunn,and Price, 1989)*	*	*					*
Learning Styles Questionnaire *(Honey & Mumford, 1992)*			*				*
Learning Styles Inventory *(Vermunt, 1994)*			*				*
Approaches to Study Inventory *(Entwistle and Tait, 1995)*			*				*
Study Processes Questionnaire *(Biggs, Kember, and Leung, 2001)*			*				*
Inventory of Learning Processes *(Schmeck, Geisler-Brenstein, and Cercey, 1991)*			*				*
Conceptual Level Model *(Hunt, Butler, Noy, and Rosser, 1978)*			*				*
Learning Styles Inventory *(Dunn, Dunn,and Price, 1989)*	*	*					*
Style of Learning Interaction Model *(Reichmann and Grasha, 1974)*	*	*					*
Child Rating Form *(Ramirez and Castenada, 1974)*	*	*		*			*
Edmunds Learning Style Identification Exercise *(Reinert, 1976)*				*			*
Cognitive stylesInterest Inventory *(Hill, 1976)*				*			*
Learning Types *(Letteri, 1980)*				*			*
Learning Style Profile *(Keefe & Monks, 1986)*	*	*		*			*

(Source: Cassidy, 2004)

3.3.1.4 Cognitive styles conceptualized in unidimensional versus multidimensional models

In approaching this final topic under the subject of cognitive styles theory, another critical issue that that needs to be considered is on the topic of unidimensional and multidimensional models that exist in the field. The unidimensional models known as bipolar models that distinguish between two cognitive styles situated on a continuum (Cools, 2007). Meanwhile, multidimensional models explained cognitive styles theories that distinguish different bipolar dimensions (Hodgkinson & Sadler-Smith, 2003) . However, there seems to be little disagreement among researchers as to how best to conceptualize and measure the constructs. This lack of consensus has significant implications for the comparability of results across studies (Hodgkinson *et al.*, 2009(a)). This statement supports the claim made by Hodgkinson & Sadler-Smith (2003) who criticized that the field of cognitive styles struggling between two rival theoretical construct, one group of professionals arguing that cognitive styles is best applied through multidimensional framework, whilst the other group uphold single dimension construct more strongly.

Thus, a review on the both constructs is summarized in the Table 3.3.1.4 to provide a general idea how this unidimensional and multidimensional issues have been circulated in the cognitive styles field. It should be noted that, for the purpose of this study, multidimensional construct has been adopted since the discussion and information regarding multidimensional is more convincing than unidimensional construct. As supported by Hodgkinson & Sadler-Smith (2003) who commented that the multidimensional construct of cognitive styles made a huge contribution to the field of management and organizational behaviour by enriching understanding the differences in

the information processing in individuals. Details regarding this topic will be explained further in the measurement topic.

Table 3.3.1.4: Unidimensional versus Multidimensional of Cognitive Styles

Unidimensional	Multidimensional
Agreed by scholars as one 'analytical–wholist' family (Cools, 2007)	Cognitive styles investigated in several dimensions.
Example (Cofield, 2004) • Analysis Intuition (Allinson & Hayes, 1996) • Analytic Holistic (Miller, 1987) • Left-brain Right-brain (Entwistle, 1981) • Assimilator Explorer (Kaufmann, 1979) • Adaptor Innovator (Kirton, 1976) • Serialist Holist (Pask, 1976) • Converger Diverger (Hudson, 1966) • Reflection Impulsivity (Kagan, 1965) • Field independence Field dependence (Witkin, 1962) • Sharpener Leveller (Holzman & Klein, 1954)	Example (Cofield, 2004): • Cognitive Styles Analysis (CSA) model (Riding, 1991) • Herrmann's Brain Dominance model (Herrmann, 1994) • Decision Style Inventory (DSI) model (Rowe ad Mason, 1987) • Myers-Briggs Type Indicator (MBTI) model (Myers *et al*., 2003) • Cognitive Styles Instrument (Whetten, Cameron and Woods, 1994) • The Keegan Type Indicator (Keegan, 1982) • Learning Style Inventory (Kolb, 1976)
Various cognitive styles models are different conceptions of the same underlying continuum - analysis: analysis-intuition dimension (Allison & Hayes, 1996).	Multiple of factors consists in measures of cognitive styles such as 'thinking-feeling', 'information-processing domain', 'attentional focus' dimensions (Cofield, 2004).
A single comprehensive dimension decrease the complexity of the basic cognitive styles construct by reducing the number of dimensions to be assessed and their possible combinations (Hodgkinson & Sadler-Smith, 2003).	Relatively complex to administer ,score and interpret (Hodgkinson & Sadler-Smith, 2003).
Less weighty and time consumed to administer in comparison with their relatively complex counterpart (Hodgkinson & Sadler-Smith, 2003).	Imposing additional demands on assessors and candidates (Hodgkinson & Sadler-Smith, 2003).
Scholars link the dimension with neurological and brain activity and connect it to differences in brain's system but it were criticized on the relevancy of findings of brain's function for management theory and practise. But somehow, the discussion has no way eliminated the concept of differences in cognitive styles nor even decreased its importance (Cools, 2007).	According to two modes of processing are necessary in order to perform a variety of activities: a mode that lies largely beyond conscious control and a deeper form. Firstly, the automatic mode, assists individuals to rapidly cut through a huge amount of quantities of information, while the following controlled mode of processing, involving detailed analysis and is consciously controlled (Hodgkinson & Sparrow, 2002).

3.3.2 Measurement of Cognitive Styles

A person's cognitive styles cannot be guessed just by looking at an individual. Measurement tool is required to empirically study and identified the cognitive styles differences in individual. A large number of literatures have produced many diagnostic tools and questionnaires which intended to measure the cognitive styles. Curry (2000) demonstrated around 100 researchers have published different version of cognitive styles instrument. The high volumes of published instruments have resulted in conceptual fragmentation and incomparable results (Cools, 2007). Thus, for the purpose of this study, the focus will be on the most frequent approaches that have been used to measure the cognitive styles concept: self-report inventories, physiological assessments, and computer-based tests.

3.3.2.1 Type of Measurement

a) Questionnaire

The self-report questionnaires is one of most preferred method which needs people to evaluate their own cognitive styles where the potential respondents are asked to indicate how well each item describes themselves or how much they agree with each item. Even though this method is an easy and practical way of collecting information on individual's cognitive styles but this method is frequently being questioned on the issue regarding validity, reliability and scoring (Cools, 2007).

b) Physiological assessments

Physiological assessments is one of the method that being used in the cognitive styles field because previous studies have reported that cognitive styles differences existed due

to differences in a brain's function. There is a consensus among scholars that cognitive styles may have an underlying physiological basis and that cognitive styles differences are due to differences in specialisation of functioning in certain areas of the brain (Cools, 2007). The psychological assessment is a process of identification about a person and their behavior, personality and capabilities through certain process and procedure (Framingham, 2011). Somehow, the complicated process of physiological assessments had cause the scholars points out that further research is needed to use this approach for measuring the cognitive styles differences (Riding & Ryner, 1998).

c) Computer-based tests

A computer-based test is another approach to measure the cognitive styles differences which assess people's performance on simple tasks that are considered to be relevant for information processing (Cools, 2007). In general, it is a process where the assessment is done using the information technology where the computer calculates the participant's cognitive styles based on the criteria that have been programmed in the modul. Even though several scholar have identified the advantages of this computer-based measures (Riding, 1991) , but this approach has been criticized on the issue regarding reliability and also implementation in a large organization (Cools, 2007).

3.3.2.2 Cognitive styles Measurement in Practice

By referring to the valid, reliable and convenient measures that have been identified by Armstrong and Sadler-Smith (2006), the remaining paragraph will discuss the instrument which relevant in the context of management for this study.

a) Allinson and Hayes' Cognitive styles Index (CSI)

Cognitive Styles Index (CSI) of Allison and Hayes has the good psychometric credentials, where items are focused very transparently on decision making and other procedures at work and it is an appropriate instrument for the usage in the educational management study setting as well as other relevant applications such as identifying the characteristics of successful entrepreneurs (Cofield, 2004). The Table 3.3.2.2(a) summarized the characteristic of Allison and Hayes' Cognitive Styles Index (CSI).

Table 3.3.2.2(a): Cognitive Styles Index (CSI)

Criteria	Description
General	38-item of CSI, to measure the degree to which individual predominantly uses analytic or intuitive information processing.
Model	-A single bipolar dimension of intuition-analysis. -Intuition, characteristic of right-brain orientation, refers to immediate judgment based on feeling and the adoption of a global perspective. Meanwhile, analysis is the characteristic of left-brain orientation, refers to judgment based on mental reasoning and a focus on detail
Reliability	Internal consistency and test–retest reliability are high, according to both internal and external evaluations.
Validity	The CSI correlates with scales from other instruments, including four from the Myers-Briggs Type Indicator.
Practical implications	-Specifically for use by managers and professionals. - Example: i. Intuitive managers are generally better liked, irrespective of the style of their subordinates. ii. Analysis is associated with more job satisfaction in junior roles than intuition, while intuition is associated with seniority in business and with success in entrepreneurship.
Summary	The constructs of analysis and intuition are relevant to decision making and work performance in many contexts. Will be suitable for wider context of research if treated as measure of two factors rather than one.
Key Source	Allison & Hayes (1996); Cofield (2004); Kozhevnikov (2007)

b) The Herrmann Brain Dominance Instrument (HBDI)

The Herrmann Brain Dominance Instrument (HBDI) was used to identify each individual's preferred thinking style (Meneely & Portillo, 2005). This is a format of self-assessment by questionnaire which incorporates with the 'whole brain' model. The model has been applied in many contexts, including personel growth, decision making

and management and there is a large volume of mental preferences profiles have been analyzed including international comparisons of management style (Cofield, 2004). The description on the model as illustrated in Table 3.3.2.2 (b).

Table 3.3.2.2(b): The Herrmann Brain Dominance Instrument (HBDI)

Criteria	Description
General	Based on 120 items, a four-category classification of mental preferences or thinking styles: cerebral (analytic thinking), limbic (affective thinking), right (global thinking), and left (local thinking).
Model	- It is based on theory which, although originally brain-based, incorporates growth and development, especially in creativity. - Four categories in Herrmann's model ▪ Theorists (cerebral, left: the rational self) Theorists are described as: difficult to accommodate the feeling self and the humanitarian style. ▪ Organisers (limbic, left: the safe-keeping self) Organisers are described as: difficult to accommodate the experimental self and the innovatory style. ▪ Innovators (cerebral, right: the experimental self) Innovators are described as: difficult to accommodate the safe-keeping self and the organising style. ▪ Humanitarians (limbic, right: the feeling self) Humanitarians are described as: difficult to accommodate the rational self and the theoretical style.
Reliability/ Validity	Internal evidence suggests that the HBDI is psychometrically sound, and new analyses can draw on an enormous international database.
Practical implications	-provides rich accounts of how people think and learn, valuing diversity and arguing for mutual understanding - Managers and workers may be stimulated to examine and refine their ideas about communication and learning.
Summary	This instrument is well known in business world and it is more comprehensive which taking an optimistic, open and non-labelling stance towards the development of people and organisations
Key Source	Cofield (2004); Meneely & Portillo (2005)

c) Kirton Adaption Innovation Inventory

The Kirton Adaption innovation Inventory examined managerial styles in decision making (Kozhevnikov, 2007). The instrument which also known as KAII, was established as a single dimension instrument, measure the tendency of people to adapt or innovate when facing a problematic situation (Cools & Van den Broek, 2007). The

inventory described as a "style of decision making, problem-solving, and by implication, creativity" (Kirton, 1988).

Table 3.3.2.2(c): Kirton Adaption-Innovation Inventory (KAI)

Criteria	Description
General	-The 32-item self report test evaluate people's tendency to 'do things better' versus 'do things differently' when solving problems. Adaptors turn to established procedures, while innovators prefer restructuring problems and approaching them from different angles
Model	The inventory consists of three scales (Originality, Efficiency and Group Rule Conformity) which respondents indicate the difficulty (or ease) involved in maintaining a certain image consistently for a relatively long time (e.g., as manifested in an individual's tendency for continuing to pursue a creative idea). Scores explained whether the respondents tend to be innovators or adaptors
Reliability/ Validity	It has been justified as a stable personality dimension over time and it has been tested and validated in several languages and cultures through cross-validation studies.
Practical implications	Several research trends emerge from the investigations of the inventory such as cross- national validation of the inventory and relationships between problem solving styles and personality traits. As example, in the investigation done by Tullet and Davies (1997), the study demonstrated that, there may be conflicts and different opinions arises if innovative project manager working with a relatively adaptive client manager. However, absence of clients moderating their preferences, the project manager (effectively the supplier in the relationship) may be forced into adopting a coping strategy.
Summary	A continuum of style differ from adaption (preferring to work by improving consensually agreed methods, products and practices) to innovation (preferring to work by reassessing and redefining problems thereby proposing changes which may appear unexpected and difficult to accept) which can help assist management in building effective work teams.
Key Source	Armstrong *et al*., (2012); Babic *et al., (*1999); Leybourne (2006); Tullett & Davies (1997); Zhang & Sternberg (2005).

d) Miller's Model

The Miller's model was designed back in 1987 which incorporate the model of cognitive process and styles. The instrument was established from his views on the cognitive styles as comprising individual differences in the various subcomponents of an information-processing model of three main types of cognitive processes: perception, memory, and thought (Zhang & Sternberg, 2005). In his major study, Miller points out

that all the cognitive styles are subordinate to a broad stylistic dimension: analytic – holistic .

Table 3.3.2.2(d): The Miller's Model

Criteria	Description
General	The construct at the super-ordinate level — as varying between an "analytic" versus a "holistic" style which stress on the mental preferences.
Model	-The founder proposed a hierarchical model of individual differences in cognitive processing; under one stylistic dimension (analytic-holistic), three specific kinds of cognitive processes (perception, memory, and thought) are at the core of investigation. -At analytic pole, there are such styles as field independence, sharpening, converging, and serial information processing; at the holistic pole, there are such styles as field dependence, levelling, diverging, and holistic information processing
Reliability/ Validity	Miller's contemporary model requires more extensive investigation.
Practical implications	A considerable amount of literature has shown that a cognitive conclusion based on a decision maker's previous experiences and emotional inputs. As example, in the study conducted by Burke and Miller (1999), the respondents who are the managers, have identified several areas as appropriate for the use of intuition, specifically personnel decisions (*e.g.*, hiring, training, performance appraisal, and harassment complaints) and first-time restructurings or reorganizations, formulating budgets, estimating prices, and selecting investments.
Summary	It is interesting to note that Miller made several attempts at incorporating a personality typology of cognitive, affective, and cognitive dimensions into his 1987 model. He also demonstrated preliminary empirical evidence for the recent model. However, Miller's contemporary model requires more extensive investigation.
Key Source	Burke & Miller (1999); Dane (2007); Kozhevnikoz (2007); Miller (1987); Sadler-Smith & Burke (2009).

e) Myers–Briggs Type Indicator (MBTI)

The Myers-Briggs Type Indicator which is also known as MBTI is one of the well known instrument in the field of cognitive styles and most popular in the consultancy and training sector. A considerable amount of scholars have used the MBTI as the instrument to measure the relationships between personality and information systems issues (Bowen *et al.*, 2003). The MBTI is strongly linked to personality instruments

using the ‘big five’ personality factors which has a well-established role in locating and understanding interpersonal and community dynamics (Cofield, 2004).

Table 3.3.2.2(e): Myers–Briggs Type Indicator (MBTI)

Criteria	Description
General	Based on Jung’s theory of human personality on four bipolar scales, producing a possible 16 personality ‘types’.
Model	The four bipolar discontinues scales : ▪ Extraversion–introversion Extraversion means operating in the external world of behaviour, action, people and things. Introverts have a focus on the internal world of ideas and reflection ▪ Sensing–intuition Sensing people are more likely to trust information that is in the present, tangible and concrete. Intuitive people tend to trust information that is more abstract or theoretical ▪ Thinking–feeling Thinkers tend to decide things from a more detached standpoint, using logic. Feeling people come to decisions by empathizing with the situation and using consensus ▪ Judgment–perception Judging people prefer planning and organization, while perceivers adhere to a more flexible approach
Reliability/ Validity	There has been considerable controversy regarding the MBTI’s measurement characteristics and its construct validity has been repeatedly questioned, particularly in relation to whether the constructs are best represented as opposing pairs
Practical implications	There is a large volume of published studies describing the practice of MBTI approach in theory and practice. For example, in a comparison of North American and Far Eastern cultures, the researcher found that Taiwanese senior managers exhibited stronger preference for MBTI sensing than their US counterparts. Other studies have also shown an effect of style on job level where senior managers tend to be more intuitive and less analytical than middle/lower level managers.
Summary	Even though MBTI received criticism on its validity but the instrument is offering people excellent information for personel self-knowledge and how they may relate to different learning settings.
Key Source	Armstrong *et al*., (2012); Bowen *et al*., *(*2003); Coffield (2004); Kozhevnikoz (2007); Sense (2007); Allinson & Hayes(1996); Armstrong (1999); Sadler-Smith *et al*., (2000); Yen *et al*., (2000).

f) Riding's Model

The model, Cognitive Styles Analysis by Riding (1991) (stem from the cognitive styles concept) was designed to measure the two style dimensions (Zhang & Sternberg, 2005). The model consists of two orthonogonal style constructs that is termed as verbaliser-imager and wholist-analytical where the dimensions assessed using a computer-administered direct test of cognitive processing (Savvas, 2001).

Table 3.3.2.2(f): Cognitive Styles Analysis (CSA)

Criteria	Description
General	The CSA is a computer-based measure comprising three subtests, one assessing the verbal-imagery dimension, and the other two assessing the wholistic-analytic dimension.
Model	This models not a self-report measure which works on the basis of responses to a series of 48 statements where it is judged true or false and computes a ratio for both dimensions. The instrument presents cognitive tasks in such a way that it is not evident to the participant exactly what is being measured.
Reliability/ Validity	No reliability data were reported by Riding (1991). The construct validity of the inventory was supported by the findings that the two style dimensions are independent of each other and that they are independent of intelligence
Practical implications	The two style dimensions have been tested in many empirical studies by scholars. As Jones (1997) has admitted, Riding and Cheema's (1991) work has been serving as a catalyst for cognitive-styles research.
Summary	The simplicity and potential value of Riding's model are not well served by an unreliable instrument, the CSA. Furthermore, the model has been criticized for not having a theoretical basis for the four-type model. Future research might useful focus upon on the reliability and validity of the instrument to overcome the limitations.
Key Source	Zhang & Sternberg (2005); Kozhevnikoz (2007); Cofield (2004); Jones (1994).

g) Assimilator-explorer styles; Human information processing metaphor; The two hemispheres of the human brain

In this final heading, the remaining three theories that related to the instrument adopted for this study is summarized in a table below (Table 3.3.2.2) to provide insights into the nature of this complex topic.

Table 3.3.2.2(g): Summary of the Styles

Human information processing metaphor (Taggart & Valenzi, 1990)	Assimilator-explorer styles (Kaufmann, 1979)	The two hemispheres of the human brain (Mintzberg,1976)
-human information-processing metaphor that includes six information-processing modes through brain activity. - (1) "left hemisphere" decision style: logical, sequential, analytic, planning, and rationality; (2) "right hemisphere" decision style: non-logical, simultaneous, synthetic, vision, insight, feeling, and intuition.	-Related to individual preferences to seek novelty or familiarity in the process of problem solving and creativity - Created, The A-E Inventory which labelled as Explorer–assimilator	-Claimed that a manager's mental model determines to a great extent the effectiveness of his decisions. -The left hemisphere (left-brained) has an analytic, logical, linear, and sequential approach to problem framing and solving, while the right hemisphere (right-brained) uses an intuitive, value-based, and non-linear approach for strategic decision.

3.3.3 Cognitive styles - Relevance for Practice

In the construction industry, the topic of cognitive styles is relatively a new topic. Even though there are some studies have been conducted to identify the relationship of cognitive styles in project management in general but, there are no previous studies that have specifically examined the role of cognitive styles in the construction industry point of view. Furthermore, the uniqueness of this study relies on the influences of cognitive styles towards the achievement of project success by project managers. Before further discussion on the relevancy of cognitive styles and project success being elaborated in detail, it will be much more appropriate if the discussion initiated by the previous studies which have reported the influences of cognitive styles in the management field. Reviewing the literature regarding the application of cognitive styles from other aspect of management study will allow better understanding in projecting the potential relationship between cognitive styles and project success by project managers. Moreover, the application of the cognitive styles concept towards construction project management could be linked together in the most appropriate way at the end of this chapter.

A considerable amount of literature has been published on cognitive styles and it has been agreed by scholars that cognitive styles are extensively studied in diverse research area. Cools (2007) has identified that there are two major streams of research which consists of education (Grigorenko & Sternberg, 1995; Rayner & Riding, 1997) and organizational behavior management (Hayes and Allison, 1994; Hodgkinson & Sadler-Smith, 2003; Sadler-Smith & Badger, 1998). Somehow, in the most recent analysis in the field of cognitive styles from 1969 to 2009, it shows that there are around eight themes emerged from the findings which consist of (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 (Armstrong *et al.*, 2012). This finding clearly supports the statement made by Messick, earlier in 1976 who said, "*They serve as high level heuristics in complex processes that are applied spontaneously across situations and form enduring basis for behaviour*." Furthermore, cognitive styles can be considered as one of the variables that determine whether people are able to respond appropriately across a variety of situations (Streufert & Nogami, 1989). Remaining paragraph will address all the eight themes as mentioned above in more details.

(a) Decision Making

Decision making is one of topic which closely related with management field because the job of managing is fundamentally one of processing information because 40 per cent of executives' time is almost exclusively devoted to it (Mintzberg, 1994). In addition, decision making is an integral part of the management process within every organization and at every level (Davis, Grove, & Knowles, 1990). There are quite a number of researchers examined the influence of cognitive styles on decision making

(*e.g.*, Hunt *et al.*, 1989; Gardner & Martinko, 1996; Dane, 2007; Hensman, 2011). Undoubtedly, this topic always get attention in the cognitive styles field due to the supremacy of 'intuition' and 'analysis' approach that being explored in the correlation of individual decision making process. Furthermore, scholars identified that people prefer decision-making processes and strategies that are compatible with their cognitive styles (Gardner & Martinko, 1996; Hunt *et al.*, 1989; Davis *et al.*, 1990). There is a consensus among researchers that, a blend of both styles is essential in decision making process. Several studies have revealed that decision makers not only rationally analyze the choices they are faced with when it is appropriate to do so, but also use intuitive judgment to support a risk-taking, entrepreneurial and visionary style of leadership (de Vries, 2004; Evgeniou & Cartwright, 2005). Remaining discussions will be focusing on how strategic decision making, risk, escalation of commitment and framing effects and finally decision styles will be influencing the decision making process from cognitive styles perspective in general.

i. Strategic Decision making

There are some scholars studied the influence of cognitive styles on strategic decision making process and outcomes with the assumptions top managers' strategic choices reflect their style preferences (*e.g.*, Hough & Ogilvie, 2005; Sadler-Smith, 2004). According to Mitchell *et al.*, (2011), strategic decision is a process where those choices made by managers that commit important resources, set important precedents, and/or direct important firm level actions (Mintzberg *et al.*, 1976). They added that the processes are influenced by the manager's prior knowledge and experiences, system in the organization that they worked in and its environment (Mitchell, *et al.*, 2011). Furthermore, previous studies have demonstrated that cognitive styles is one of the

attributes which influences an individual thinking style using established instruments in the process of strategic decision making, which is as summarized in Table 3.3.3(a).

Table 3.3.3(a): Cognitive styles and Strategic Decision Making

Author	Findings	Note
Haley & Stumpf (1989)	Explored relationships between MBTI style and senior and middle managers' cognitive biases which revealed that Sensing–feeling types (SFs) tended to focus on the emotional information whereas Intuition-Feeling (NFs) focusing mainly on personel view and memorable information)	-Used Jung's Theory -Sensing-feeling: prefer precise, specific data while admitting as realists concerned problems. -Intuition-feeling: Usually make decision on the general data.
Stumpf & Dunbar (1991)	- intuiting–thinking types (NTs) were prone to positivity bias (emphasis on opportunities coupled with low attention to threat); - SFs were prone to social desirability bias (conformance to socially acceptable business practices); - NFs were prone to reasoning by- analogy bias (novel actions for target organization based on comparison to situation in some other organization).	This study also used Jungian style as framework in investigating the relationship cognitive styles and strategic decision-making. The summary of the findings discussed individuals with different personality-type preferences take patterns of actions that reflect specific biases.
Ritchie *et al*., (2007)	Intuitive decision making to be a significant and positive predictor of organizations' fiscal performance and public support measures.	This study concluded that executives from nonprofit organization prefer to use gut feeling in decision-making process. They also rely on their experiences which enhance the productivity of the organization.
Gallén (2006)	- analytical types more often described the defender strategy as the most viable option (*i.e.*, offering a stable set of products and competing mainly based on price, quality, service, and delivery) - intuitive type preferred a prospector firm strategy (*i.e.*, having a broad product definition, striving to be first in the market, and focusing on change and innovation)	This study investigates the effect of cognitive styles on the manager's strategic decision making using the MBTI measurement scale.
Khatri & Ng (2000)	-used intuition in strategic decision in the computer industry than in banking or utility - intuition showed a negative association with the financial performance of banks and utilities and a positive association with the financial performance of computer companies	Surveyed senior managers across different field and found that intuitive decision style often used in organization which operates in unstable environment.

Table 3.3.3(a): continued

Author	Findings	Note
Nutt (1990)	cognitive styles differences were a key factor in explaining the likelihood of taking strategic action and the perceived risk among top executives and middle managers who found : -sensation-feeling (SF) top executive was found to be action-oriented and the systematic judicial -sensation-thinking (ST) top executive action-averse, with the speculative and heuristic -intuition-thinking (NT) and intuition feeling (NF) top executives taking nearly identical and neutral positions -top executives with a sensate (S) style were found to be much like top executives with feeling (F) style similar to top executive with a pure judicial style (SF) -top executives with pure ST style were more much conservative than the traditional ST. Pure SFs far more action oriented than the traditional defined SF.	This study adopted the Jungian style measurement that concluded decision style is one of the key factors in strategic actions where top executives are more style dependant rather than those of middle managers.
Berr, Church, and Waclawski (2000)	-Intuitive managers tended to be consistently perceived to be more effective in behaviour related to innovation and strategic thinking than managers with a preference for sensing -perceiving managers were rated better on innovation due to willingness to take risks or to try something new than their judging counterparts.	Used Myer-Briggsinstruments in analysing the personality preferences and behavioural ratings among senior managers in services organization.
Hough & Ogilvie (2005)	-NT (intuiting–thinking)executives used intuition to make cognitive leaps based on objective information and crafted more decisions of higher quality; - SF (sensation-feeling)executives took time to seek socially acceptable decisions, made the lowest number of decisions and made decisions of lowest perceived effectiveness	MBTI styles to be related to decision outcomes as well as subordinates' perceptions of executives' decision performance

ii. Risk

Since the mid-1990s risk management has undergone a dramatic expansion in its reach and significance, being transformed from an aspect of management control to become a benchmark of good governance of different type of organizations (Power, 2008). From the cognitive styles perspective, it discusses on how the cognitive styles influences a person's decision making process by identifying that person as a risk taker or risk avoider. Based on the previous studies that have investigated the relationship between cognitive styles and risks, it seems MBTI has been used frequently in the process of identifying the relationship between the concepts. However, it should be noted that, most of the articles that have been published under this topic were from two decades ago and there is an overall decline on the number of publication in this area of interest. In a study by Filbeck (2005), the author investigated the relationship between personality type dimensions of the Myers-Briggs Type Indicator (MBTI) and the moments approach to individual investor risk tolerance inherent in expected utility theory (EUT). The result indicated that higher levels of risk tolerance are related to the Myers-Briggs preferences for extraversion, intuition, thinking, and perceiving (Filbeck *et al*., 2005).

iii. Escalation of commitment and framing effect

Escalation of commitment (EOC) refers to an individual's tendency to make an increased commitment in a situation "*where losses have been suffered, where there is an opportunity to persist or withdraw, and where the consequences of these actions are uncertain*" (Staw, 1997). To explain further, it is a process where individuals have a strong preference to persist in a failing course of action during a decision making process, especially when the decision makers are responsible for the action's initiation, in order to verify that their prior decision was not wrong (Wong, 2008). Meanwhile in

the field of psychology of judgement and decision making, the framing effect is one of the most important subject and contribute a significant implication in the “Rationality Debate” (Shafir & LeBoeuf, 2002) in which believed to happen when the same descriptions of a decision problem guide to systematically different decisions. A considerable amount of literature has been published on the topic of escalation of commitment and framing effect such as Shiloh *et al*., (2002); Mc Elroy & Seta (2003) and McIntosh (2005). Even though several attempts have been made to demonstrate the influence of cognitive styles in escalation of commitment but, further research is required for this area as Singer (1990) failed to find any relationship between the two attributes.

iv. Decision styles

Decision-making style has been defined as “a habitual pattern individuals use in decision making” (Driver, 1979). Meanwhile, Scott and Bruce (1995) reviewed decision style is a way of individuals makes sense of the data they gather. There is only a small volume of published studies investigated the relationship between cognitive styles and decision style. The limitation is due to the lack of generally available, psychometrically sound instrument for measuring decision style (Scott & Bruce, 1995). However, the limited literatures that have been published between late eighties and early two thousands may provide some insights on the relationship that established between cognitive styles and decision style.

Table 3.3.3(b): Cognitive Styles and Decision Style

Author	Findings	Note
Hunt *et al.,* (1989)	Relationship exist between cognitive styles and preferred decision making strategy	MBTI analytical and intuitive
Leonard *et al.,* (1999)	-Directive style to be more sensing than intuitive -Behavioral style more feeling than thinking -Analytical style more thinking than feeling -Conceptual style more intuitive than thinking	Used cognitive styles and decision styles inventory scores
Nutt (2005)	-Private sector manager : support budget decisions arrived at via analysis, less preferred through bargaining -Public sector managers : support budget decisions arrived at by bargaining, less preferred through analysis	Investigate relationship between decision style and public and private sector in the decision making process
Betsch & Kunz (2008)	-when there is a fit between preferred and applied decisional strategy positive effects were observed (the chosen object is seen as more valuable). -when the outcome of a decision was negative decision fit appeared to protect the decision maker from negative affect (i.e. fewer experiences of regret compared with decisional misfit). (Armstrong *et al*.,2012)	Used Preference for Intuition or Deliberation (PID) scale

(b) National Culture

In the management field, national culture is increasingly getting more attention in the cognitive style. Researchers also agreed that national culture is a determinant of style (Armstrong *et al*., 2012). In the cognitive styles field, national culture has been identified as one of the important indicators to be investigated due the tremendous changes in business environment that result in the need to operate within and across diverse national culture by managers. Thus, understanding individual style in relation to national cultures is of one of the potential and practical relevance in the management field (*e.g.*, Savvas *et al*., 2001; Tullett & Kirton, 1995; Zhang, 1999). Moreover, back in 90's, Sternberg & Grigorenko (1997) commented that culture may influence the development of an individual's style in addition to factors such as the others include gender, age, parenting, schooling and occupation. Supporting those ideas, Allison and

Hayes (2000) argued that cross-cultural differences in cognitive styles are the primary barrier in producing a productive working relationship between managers of different national cultures (Savvas *et al*., 2001). Next, a number of studies that have attempted to find the relationship between cognitive styles and national culture will be discussed in detail in the following paragraph since the scholars devote much attention on this topic.

In 1983, Doktor has conducted a comprehensive study between cognitive styles and national culture. The author investigated the thinking style between eastern and western culture. In his analysis, there is a difference between American's managers and Japanese managers in decision-making process. The study demonstrate that the Japanese cognition' as non-abstract, based on concrete observation, dependence on sense data, emphasizing the particular (not the universal) with sensitivity towards relationships and the environmental context whereby 'American cognition' is described as being based on logic and sequential connections, and abstractions to represent universals (Doktor, 1983). Undoubtedly, the Doktor's result has inspired more researches to drill into this interesting field. For example, Savvas *et al.,* (2001) explored the difference of cognitive styles among Egypt, Greece, Hong Kong and the UK. However, the study demonstrated that the respondents group did not differ at a statistically significant level between management and business students from Egypt, Greece and UK but statistically significant differences exist between Egyptian, UK and Hong Kong postgraduate and profesional development students. The study showed that Westerns participants were more intuitive than students from Egyptian and Hong Kong. Similarly, an exploratory study of 200 managers in Finland, Poland and the UK by Hill (2000) attributed cultural differences in style to different learning, socialization and acculturation processes (Armstrong *et al*., 2012). Allison and Hayes research on the national culture in year 2000, a total of 394 managers from six nations and 360

management students from different nations completed the cognitive styles survey. The results demonstrated that the most intuitive groups were located in the Anglo, North European and European Latin and the most analytic were in the Developing Countries and Arab categories (Allison & Hayes, 2000). All the studies reviewed so far seems to discuss and argued the categorization of the intuitive' East and the rational or 'analytic' West. Similarly, Nisbet *et al*., (2001) also postulated on the rational and analytical process where the author labelled, 'left-brained' West and the intuitive, holistic, 'right-brained' East. Finally, Yen *et al.,* (2002) also found out that Taiwanese senior managers who are from east, displayed stronger preference for MBTI sensing than their US partners which it is categorized under the intuitive thinking style.

(c) Teamwork and Interpersonal Relationship

i. Team dynamics, cohesion and performance

Through extensive research in the field of cognitive style, it has been identified that this field also influences in the performance of teamwork and interpersonal relationship in the work environment. Even though it is not a significant topic in the area of interest, but cognitive styles have been found to moderate team behaviour and effectiveness (Armstrong *et al*., 2012). For example, Priole *et al*., (2004) studied the effect of cognitive styles in a teamwork through observation, video-taping and communication with people who performed in a team task. The authors summarized that the problem-solving style or cognitive styles effect with the task to structure the situation in which the work group accomplished their exercise. To draw another example, Armstrong and Priola (2001) demonstrated that intuitive individuals and teams preferred more social-emotional acts and committed in more task-oriented behaviours than analytical team. In addition, the study also showed that analytical people reluctant to perform task-oriented works. Priola (2004) who investigated performance level between intuitive and

analytical group found out that intuitive team members could not perform well compared with analytics who comfortably and successful implemented the logical thought process required by the kind of problem, which corresponded to their preferred problem-solving style. Another example is through Karn *et al.,* (2007) who studied the effects of personality type and methodology on cohesion in software engineering teams. The authors found that highest performing teams to be largely falls in MBTI intuitive–thinking types which are very typical for engineers, whereas mix personality type teams performed less with more arising conflict among the members.

ii. Team role preferences and interpersonal relationship

By referring to the above discussions, it can be summarized that cognitive styles plays a significant role towards the both concept. Based on the limited publications in this area, the researches findings are summarized in Table 3.3.3(c).

Table 3.3.3(c): Cognitive styles and team role preferences and interpersonal relationship

Author	Findings	Note
Team role preferences		
Garfield (2001)	Intuiting–feeling / innovators generated more integrated-modifying ideas than did sensing–thinking / adaptors in a virtual team-working environment; innovators also generated more novel ideas.	Used MBTI and KAI instruments for evaluation
Aritzeta (2005)	Adapter: implementers', 'completer finishers', 'team workers' and 'specialists' Innovator: 'monitor evaluators' and 'coordinators' act as 'bridges', and 'plants', 'shapers' and 'resource investigators'	Used KAI and Team Role Preferences Inventory
Interpersonal relationship		
Atwater and Yammarino (1993)	intuitive information processing leader on transformational and transactional leadership	Used MBTI instrument
Allison *et al.*, (2001)	Intuitive leaders to be less domineering/more nurturing in leader–member exchange relationships than analytical leaders. Intuitive leaders were also more liked and respected by analytical members than analytical leaders were by intuitive members.	The analysis was conducted using the CSI measurement

(d) Creativity, entrepreneurship and innovation / Sales and Marketing

i. Entrepreneurship and innovation

Recent management research has seen an increased interest in the topic of entrepreneurship and innovation. It has been argued that the combination of entrepreneurship and innovation holds the key to organizational sustainability (Zhao, 2005). Before going further with discussion of entrepreneurship and innovation from cognitive styles perspective, definition of both terms is explored. According to Johnson (2001), entrepreneurship is a process where entrepreneur capture ideas, produce a product or services and then building a venture to deliver the product to market. Meanwhile, innovation is a concept that involving the synthesises of extant knowledge and techniques to provide a theoretical basis for a new concept (Bright, 1969). However when the both concept is merged together it is described as, "*innovation is the specific tool of entrepreneurship by which entrepreneurs exploit change as an opportunity for a different business or service*" (Zhou, 2005). The author also argued that entrepreneurship and innovation are systematic behaviours where the cognitive styles play a significant role in influencing the performance of both approach Table 3.3.3(d) summarized the previous studies that have investigated the link between cognitive style, entrepreneurship and innovation.

Table 3.3.3(d): Cognitive style, entrepreneurship and innovation

Author	Findings	Note
Olson (1985)	- individuals with a more intuitive cognitive styles would be more effective in the initiation phase (idea generation stage) - analytical style would be better in the implementation phase (ideas-into-practice stage)	Particular information processing approaches are likely to be effective in different phases of business process.

Table 3.3.3(d): continued

Author	Findings	Note
Stewart *et al*., (1999)	Entrepreneurs were significantly more innovative in their cognitive styles than managers in large established organizations	Used KAI- innovative/ adaptive instrument for analysis
Allinson *et al*., (2000)	-entrepreneurs were more intuitive than the general population of managers	Applied using the CSI instrument
Armstrong (2000)	-intuition is associated positively with seniority	A study of supervisors and subordinates engaged in working relationships
Sadler-Smith (2004)	intuitive cognitive styles showed a positive relationship with financial (sales growth) as well as non-financial firm performance from the aspect of : efficiency of operations, public image and goodwill, and quality of products and services)	The study was based upon data obtained from owner-managers and managing directors of small and medium-sized firms in two contrasting sectors using Mental Self-Government (MSG) Local and Global Thinking Styles and General Decision-Making Style (GDMS) questionnaire
Barbosa *et al*., (2007)	-Intuitive entrepreneurs : high preference for risk exhibited higher levels of opportunity identification efficacy : lower perceived self-efficacy concerning the establishment of relationship with investors, the economic management of the new venture, and capacity to tolerate ambiguity -analytical entrepreneurs : low preference for risk had higher levels of relationship and tolerance self-efficacy than intuitive individuals with a high risk preference	Investigated cognitive styles and risk preference separately and contributed to an individual's assessment of skills and abilities together with entrepreneurial intentions.
Cools & Van den Broeck (2008)	no significant differences between entrepreneurs and healthcare managers in Cognitive Styles Indicator (CoSI) creating style, managers did score more highly on knowing and planning styles	Used CoSI (Cognitive Style Indicator)
Groves *et al*., (2008)	- successful entrepreneurs reflected a much greater level of balance in linear/nonlinear thinking style -professional actor : predominantly nonlinear -accountant were predominantly linear	nonlinear (e.g., creative, intuitive) thinking style linear (e.g., rational, logical, analytic)

Table 3.3.3(d): continued

Author	Findings	Note
Ko (2008)	Entrepreneurs with higher preference for thinking in a liberal way will lead to more innovation in their technology-based firms.	Used The Sternberg-Wagner Thinking Styles Inventory (Sternberg, 1997).
Dutta & Thornhill (2008)	-intuitive entrepreneurs had a wider variety of growth intentions and demonstrated greater (upward or downward) levels of adaptation in their growth intentions when the competitive conditions changed. -Analytical entrepreneurs stayed closer to initial growth intentions and made only small changes over time	Investigated the relationship between entrepreneur's growth intentions, cognitive styles and perceived competitive conditions by focusing on whether and why intentions change over time.
Armstrong & Hird (2009)	Entrepreneurs were more intuitive and less analytic than non-entrepreneurs who exhibited higher levels of drive towards entrepreneurial behaviour, and those operating in the earlier stages of venture creation and growth exhibited higher entrepreneurial drive than those operating in mature stages	Investigated the relationship between cognitive styles and entrepreneurial drive using CSI (Cognitive Styles Index) and Carl and Entrepreneurial Index.
Ginn & Sexton (1990)	- Growth oriented founders prefer an intuitive approach or consideration of future possibilities when gathering information, and thinking or planned and organized approach to drawing conclusions.	compared psychological type preferences of founders/CEOs of fast-growth firms with those of slow-growth firms using MBTI instrument.

ii. Creativity

Creativity has been investigated from different aspects. Scholars have been trying to track its origin through the routes of personality and cognitive skill. The table below summarized how creativity subject have been investigated from cognitive styles perspective and how it effect on the relationship between cognitive styles and creativity.

Table 3.3.3(e): Creativity and Cognitive

Author	Findings	Note
Noppe & Gallagher (1977)	FIs were found to be more creative than FDs [FI : analytical information processors ; FD: Global information processors]	Understanding of the interrelationship of perception, personality, and cognition.
Puccio *et al.,* (1995)	-innovators were more likely to focus on developing products that are new, unusual, transformational and expressive -creative products for the adaptors tend to be useful, logical, adequate and well crafted.	Kirton's (1976) adaptor-innovator (A—I) theory was used to examine style.
Meneely & Portillo (2005)	While cognitive styles(HBDI) did not predict creative performance, flexibility between styles was significantly correlated to the creative personality.	-study examined domain-specific relationships between creative personality traits, cognitive styles, and creative performance in design. -Used cognitive stylesfrom Herrmann Brain Dominance Instrument (HBDI).
Miller (2007)	-FIs were judged to have produced more creative outcomes -significant relationships between flexibility of style and 'creative personality'.	Used Kirton's (1976) Adaptation–Innovation Inventory (KAI).
Munˇoz-Doyague *et al.,* (2008)	motivation, expertise and cognitive styles on individual creativity had the greatest effect on creativity	The cognitive styles was measured using a measurement derived from Kirton's (1976) Adaptation–Innovation Inventory.

iii. Sales and Marketing

Even though this subject is not really a welcoming topic in the field of project management, however, in future, researches may want to look into potential relationship between this subject with project manager's performance who are working in marketing consultancy firm. According to Armstrong (2012), majority of the studies in this subject have used the MBTI and KAI in connecting the relationship among cognitive style, sales and marketing. In summary, there is an urge to duplicate and extend the results with alternative cognitive measures which are measurable with the same standard or widely accepted theoretical framework for styles, and in specifically with those which

allow for the collaboration of affect and cognition (Slovic, 2004 ; Armstrong, 2012). Moving on, the topic of Management information system (MIS) did not devote much attention to cognitive styles field. However, O'Keefe (1989) who made a plea for greater styles' awareness in MIS, had encourage a number of scholars to investigate further the relationship between cognitive styles and MIS which is summarized in a Table 3.3.3 (f) and Table 3.3.3 (g).

i. Design of DSS (Decision Support System)

Table 3.3.3(f): Cognitive styles and MIS

Author	Findings	Note
Lusk & Kersnick (1979)	High analytics outperformed low analytics in all report formats and it was concluded that performance may be enhanced by assigning such tasks to highly analytical individuals.	effect of style and report format (raw data, tabular and graphical) on task performance
White (1984)	certain MIS activities are best supported when all four styles combine in one team and that style heterogeneity may lead to better team performance and more successful system design	Used MBTI Myers-Briggs Type Indicator
Green & Hughes (1986)	best training methods would be seminars for heuristic managers and 'hands-on' experience for analytical managers.	cognitive styles and type of DSS (Decision Support System) training interacted in their effect on managers' use of a DSS generator

(Source: Armstrong *et al*., 2012)

ii. Use of Internet, new technology and digital resources

The details regarding how cognitive styles have an impact towards internet usage, new technology and digital resources are summarized in the following table.

Table 3.3.3(g): Cognitive Styles and MIS

Author	Findings	Note
Palmquist & Kim (2000)	FD (Field Dependant) novice users took longer to retrieve information than FI (Field Independent) novices; for experienced users there was no statistically significant difference.	investigated the effects of cognitive styles(field dependent and field independent) and on-line database search experience (novice and experienced) on the World Wide Web (WWW) search performance.
Bowen *et al*., (2003)	Perceiving types (as opposed to judging individuals) made significantly fewer errors formulating their queries than judging types; intuiting types (as opposed to sensing) made fewer errors than sensing types.	examined the relationships between MBTI styles and the accuracy of database queries composed by managers when searching accounting information systems
J.C. McElroy *et al*., (2007)	Big Five personality factors were significant predictors of Internet use (e.g. openness to experience predicts general Internet use)	MBTI style failed to significantly predict any of their dependent variables.
Chakraborty *et al*., (2008)	Innovators were more likely to accept new technology and perceived it as more useful and easier to use than adaptors.	Used KAI
Frias-Martinez *et al*., (2009)	Users performed better in the adaptive version, FIs reacted more positively than FDs to the non-adaptive version, and FDs responded more positively than FIs to the adaptive version.	developed an adaptive version of a digital library to accommodate FDI and compared performance on this system with a non-adaptive version

(Source: Armstrong *et al*., 2012)

(e) Learning

Learning is one of topic which frequently being discussed in the cognitive styles field. Sadler-Smith and Badger (1998) proposed that cognitive styles might affect on people's behaviour in the learning process which indirectly give impact on the organizational learning and performance. Allison and Hayes (1998) who investigated the relationship between learning and cognitive styles highlighted that people will able to learn and be excellent in the situations where the information-processing requirements of the

situation suits with their cognitive style. Furthermore, it has been demonstrated that individual learning performance will be positively improved if the learning activity match with one's cognitive styles (Allison and Hayes, 1996). Somehow, there some findings shows that mismatched learning environment also can help them to develop a wider range of coping behaviour and learning strategies (Cofield *et al.*, 2004; Sadler-Smith, 1996). Interestingly, the matching–mismatching hypothesis was widely discussed in the style field (*e.g.*, Ford & Chen, 2001; Hayes & Allinson, 1996; Sadler-Smith, 1999). Hayes and Allinson (1996), for instance, concluded that analytical learners benefited from a match between their own cognitive styles and the one of their trainer, while intuitive learners benefited from a mismatch. Thus, it is clearly shows that cognitive styles may provide a basis for tailoring instructional methods to people's styles to optimise learning or be a basis for mismatching to enhance flexibility in thinking (Messick, 1994). The remaining paragraph will be discussing how the topic of learning related with cognitive styles from the view of training (human resource development); web-based learning; organizational learning and development.

i. Training (Human Resource Development)

Cognitive (learning) style has an important role to play in improving the effectiveness in organization (Hayes & Allison, 1997). Few scholars have proposed that the development of cognitive strategies to deal with situations that are not corresponding with individual's habitual style can be focused in the training and development programs in organisations, even though cognitive styles are fairly fixed individual characteristics (Armstrong & Sadler-Smith, 2006; Messick, 1996; Sadler- Smith, 2000). Hayes and Allinson (1997) identified how the training and development in work settings might benefit from a consideration of cognitive styles. Based on their investigation, in circumstances where a good match cannot be achieved, it may be possible to improve

the match through job re-design taking styles into account. Furthermore, cognitive styles has been identified as a factor that may assist employees to utilize a variety of specialized problem solving strategies that are matching with their own style to perform more effectively. Similarly, a better grasp on the relationship between of cognitive styles and learning may have positive implications for diverse research areas. For example, (a) the planning and design of business and management education; (b) the training and development in organisational contexts through matching or mismatching teaching and learning methods to the cognitive styles of learners; (c) the development of versatile behaviour by complementing cognitive styles with strategies (Sadler-Smith and Riding, 1999).

ii. Web-based learning

Web based learning not really a glamour topic in project management area but exposure on the influences of cognitive styles towards web based learning may help to identify potential area of research related with cognitive styles and web based learning for future work in project management education.

Web-based learning is a learning process where the education are delivered in a Web browser, together with materials packaged on CD-ROM or any other supportive media channel. According to Khalifa and Lam (2002), web based learning is an example of education revolution that uses teaching materials such as cyber courses, distance education, virtual classes and interactive learning. Interestingly, they found multiple learning methods, *e.g.*, constructivist, collaborative, and experiential, are being supported in implementing the web based learning. It has been criticized that the web based learning environments often lack a clear structure which require internal motivation (Palmquist & Kim, 2000). Moreover, things get complicated for those using

extensive hyperlinks and page-based learning can be socially isolating (Cook, 2005). However, by utilizing specific cognitive styles while adapting to the web-based environments is seen as one of the option to maximise the learning process. This is because, research shows that matching learners to specific WB formats, based on whether they have a rational or an analytic style has strong support in both theory and in the literature as a means to improve performance (Cook, 2005).

iii. Organizational Learning and development

Organizational learning is recognized as vital for a contracting organization's enhanced performance (Wong *et al.,* 2011). Organization learning is also known as a process to cooperate and apply the knowledge integrated from the people for organizational success (Wong *et al.,* 2008). From cognitive perspective, Duncan and Weiss (1979) defined OL as a cognitive system that is developed and shared by members of an organization. Adding to the knowledge of definition, Pedler *et al.,* (1996) defined organizational learning as an organization's process of cognitive and behavioural change for performance improvement. Fiol and Lyles (1985) proposed Behavioural Learning and Cognitive Learning as the major learning styles of organization. It is interesting to note that, Behavioural learning is described as a new way to react or response based on existing interpretations whereas Cognitive Learning referring to the improving working performance through continuous review and changing methods of working (Wong *et al.,* 2011). This definition parallel with the statement from Hayes and Allison (1998) who justified, the importance of styles in the context of individual learning was extended to organizational learning to which cognitive styles can be meaningfully applied to the understanding of learning at the level of the organization. Furthermore, the authors also recommended cognitive style as a factor to improve the individual and organizational performance.

Moving further, cognitive styles also has been investigated in relation to single-loop (SLL) and double-loop learning (DLL) in organizational setting. SLL refers to a discovering and correcting of errors without scrutinizing the organizational basic premises and norms that had led to the difference between the expected and the actual outcomes (Argyris & Schön, 1978). Meanwhile, DLL is applied when organizations notice and correct errors by inquiring into, and modifying if necessary, their underlying norms and assumptions (Argyris & Schön, 1978). According to Korth (2000), there are three things should be considered when investigating the concept of SLL and DLL from cognitive perspective: firstly, organizational development (OD) should alert that individuals may demonstrate different reactions to double-loop learning process and the outcomes are determined by their style; secondly, DLL learning process can be applied to assist employees to develop coping strategies in the disagreement conditions between individuals' cognitive styles and the surrounding cognitive climate; finally, OD consultants should play a role in enhancing organizational learning by educating clients about the approach of cognitive styles and assist them to appreciate the style diversities, and the affect of these for communication and learning between individuals and groups (Korth, 2000).

(f) Vocational and occupational issues

Basically, topic that covered under the umbrella of vocational and occupational issues are, vocational orientation and choice, profesional type and occupational level, employee selection and person- job fit and finally on the cognitive climate (Cools, 2007). Remaining paragraph will describe in general, how cognitive styles play its role in the vocational and occupational issues before ending up this sub-chapter on the topic of sales and marketing.

A considerable amount of literature has been published on vocational orientation and choice area even though this stream didn't get popularity over the years. According to Armstrong *et al.,* (2012), Holland's (1985) theory of vocational choice and guidance hypothesizes six vocational types (i.e. realistic, investigative, artistic, social, enterprising, and conventional) dovetails well with the concept of style (Alvi *et al*., 1988; Furnham 2001). The theory specified for people to seek environments that will encourage the use of their skills and abilities, which allow them to express their attitudes and values and assume agreeable roles (Alvi *et al.,* 1988). The one mismatch vocational may have some difficulty in making stable vocational choices (Alvi *et al.,* 1988) which will lead to dissatisfaction, unstable career paths and suboptimal performance (Holland 1996). Meanwhile, in the Witkin's theory, the author described an individual's differences in the dominant mode of perception involving thinking and problem solving and in how people overcome organization of the field and restructure it. Both of these theories are the application of field-dependence-independence. FI types which is known as Field Independence (i.e. analytical information processors) preferred vocations that required competence in analysis, whereas FD (Field Dependence) types (i.e. global information processors) were drawn to vocations with high levels of social content and an emphasis on interpersonal relations (Alvi *et al*., 1988). FIs prefer analytical-articulated cognitive structure such as chemistry, engineering, architecture, surgical nursing and mathematics. Furthermore, the FDs were drawn to occupations such as social work, teaching, sales and personnel management because of their social content and emphasis on interpersonal relationship (Witkin *et al*., 1977, Alvi *et al*., 1988, Armstrong *et. al*, 2012). Similarly, in occupations where adaptors or innovators can perform equally well (*e.g.,* general management) Kirton Adaption–Innovation Inventory (KAI) scores approximated to those of the general population (Kirton & McCarthy, 1988). The adaption-innovation theory by Kirton (1976) proposed that the

extremes of which are categorized by opposing approaches, the adaptive and innovative can be located in an individual on the continuum of intellectual styles (Gordon R. Foxall & Hackett, 1992). For example, KAI adaptations are found in the occupations that needed structure (*e.g.*, production or accounting), whereas, in occupations that required less structure (*e.g.*, marketing, sales or personnel) KaI means were scored towards innovation (Kirton, 1994).

Meanwhile, numerous studies have attempted to explain on how the cognitive styles influences the professional type and occupational level on an individual or towards a group of professionals. For example, Gul (1983) has demonstrated that the accountants' style are adaptive than innovative. When the accounts are labelled as adaptive, this group of profesional are characterised by precision, reliability, efficiency, prudence, discipline, and conformity. In addition, they also tend to accept the problems as defined and generate novel, creative ideas aimed at 'doing things better' (Kirton, 1976). Furthermore, Allison and Hayes (1996) who investigated using the CSI (Cognitive Styles Index) found accountants are grouped as intuitive thinkers which defines this professionals as relatively nonconformist, prefer an open-ended approach to problem solving, rely on random methods of exploration, remember spatial images most easily, and work best with ideas requiring overall assessment. Furthermore, intuitive thinkers are less concerned with detail, more receptive to 'soft' data, emphasise synthesis, and the simultaneous integration of many inputs at the same time (Allison & Hayes, 1996). Following by that, analysis of cognitive styles as sensing, thinking and judging perspective which originated from Myers *et al.*, (2003), shows that accountants looked forward factual, realistic, practical and here and-now-oriented sensing approach. Meanwhile, from thinking perspective, they prefer to be precise, logical, analytical, objective, and impersonal where finally from the judging point of view, they favour

clarity and order, dislike ambiguity, and make decisions quickly despite the fact that they may have little data (Cools, 2007).

When Gridley (2007) studied the cognitive styles of engineers and artists using the Thinking Style Inventory (TSI), the results shows that engineers like to organize their thinking more hierarchically without resisting implementing the plan of others while accepting inputs from sources outside themselves. Interestingly, artists preferred inventing and developing new ideas which are categorized under legislative style and change (liberal learning). They do not favour executive style which is a thinking style that implement pre existing ideas and status quo (conservative learning).

Finally, when the cognitive styles studied in terms of occupational level, scholars such as Allinson and Hayes 1996 and Sadler-Smith *et al*., 2000 found out that cognitive styles effect on job level revealed that senior managers tend to be more intuitive and less analytical than middle/lower level managers. Similarly, MBTI intuitive types (Ns) tended to predominate among senior managers, while sensing types (Ss) were more common at middle/ lower levels (Gardner & Martinko, 1996; Schloemer & Schloemer 1997), attributed to creative, imaginative and cognitively complex managers being better suited to executive position (Armstrong *et al*., 2012).

Moving further, issue regarding cognitive styles effect on the employee selection and person-job fit, it is noted that the assessment may assists to increase the efficiency of staff selection procedures (Riding & Rayner, 1998), build balanced teams (Kirton & DeCiantis, 1986) and optimize degree of fit between potential hires and job roles (Hayes & Allinson, 1994). Remaining paragraph will highlight on how cognitive styles

measurements have been manipulated in identifying the process of selection and recruitment, and work environment preferences.

Scholars in this particular field of study assumed that basically people prefer to be employed in the work demands that are compatible with the way that suits with their preferred way of information processing (i.e., cognitive styles) (*e.g.*, Foxall & Hackett, 1994; Whooten, Barner & Silver, 1994). It has been argued that people cannot easily alter their style to suit the environmental demands (Cools, 2007). Chan (1996) who came up with the theory where there is a mismatch between cognitive styles and the demands and task attributes of the work context. Several studies have been conducted to the test the theory. Interestingly the results demonstrated that individuals who best fits with one's cognitive styles and job demands is likely to perform positive outcomes in job satisfaction and career success. While a mismatch may leads to negative outcomes such as increased turnover, higher percentage of work-related stress and lacking of motivation (Brigham, De Castro & Shepherd, 2007; Chan, 1996; Chilton *et al.*, 2005; Fuller & Kaplan, 2004). This findings somehow confirmed the statement that previously claimed by scholars back in 1980's where they argued that people will be more satisfied and effective if they can work in conditions that are compatible with their cognitive styles and are likely to be unhappy and will try to leave if not suited with their style (Kirton & McCarthy, 1988). For example, Fuller and Kaplan (2004) investigated the implications of cognitive styles on task performance of auditors and the authors found that intuitive auditors performed better on tasks that involving intuitive thinking while the analytical auditors performed well on analytical tasks than intuitive tasks.

Cognitive climate is a state where the identification of similarities in preferred ways of dealing with information within occupational groups (Kirton & McCarthy, 1988). For

example, individual who worked within a structured environment and who is expected to work within prescribed rules (*e.g.*, established bankers), showed a bias towards the adaptive style. Meanwhile, a job environment which give more freedom of action and able to perform within less structured environments, demonstrated a bias towards the innovative style (*e.g.*, strategic planners) (Cools, 2007). Not many studies have investigated the relationship between cognitive styles and cognitive climate. However, referring on the limited sources, the existing literatures show an individual's style and workgroup cognitive climate were associated with communication problems (Kirton & McCarthy, 1988), conflict and stress (Kettelhut & Schkade, 1991), decreased performance levels (Chilton *et al*., 2005) and lower levels of job satisfaction (Brigham *et al*., 2007) (Cools, 2007).

3.3.4 Concluding Note on Cognitive Styles

From an extensive review of the literature on the cognitive styles, it can been seen that the topic have been studied across diverse research domains and different theoretical perspective. Interest in cognitive styles field has grown considerably over the last few years even though the development of the topic is besets with inefficiencies such as countless of test and definitions that are overlapping. However, it appears noteworthy that in the field of business and psychology, the cognitive styles remained an area of tremendous interest within industrial, work and organizational psychology. This may be because of the subject represent an important factor in influencing the behaviour of individual and organization (Armstrong, Cools & Sadler-Smith, 2012). Furthermore, a large and growing body of literature has demonstrated the relevance of cognitive styles in practise where the scholars provided conclusive evidence of this skill makes an

effective individual in business and management field. Based on the review of section 3.3.3 aforementioned, the following conclusions can be made:

a) Theory of cognitive styles –

Defining cognitive styles is the first and most important step for understanding the concept of cognitive styles in management. This will lay the foundation to create clarity on directions for further research in this subject. For the purpose of the present study therefore, the cognitive styles is 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, 2007, p.13). Then, issues on positioning the cognitive styles that have been investigated in relationship to four distinct approaches which are, ability, cognitive strategy, and personality and affect. Based on the literature reviewed, conclusions that can be made are:

- Cognitive styles and ability are unrelated each other. Cognitive styles concerned with the manner of an individual's performance whereby, ability relates on the level of performance.
- Discussions on the link between cognitive styles and cognitive strategies revealed that cognitive styles is more strongly associated with one's way processing information and dealing with a task according to their natural preference whereby, cognitive strategies described as how one deals with particular situations and tasks outside their natural preferences.
- When it comes to issues regarding cognitive styles and personality, both subjects are described to be independent. However, there is a consensus that cognitive styles and personality affect one's behaviour.
- There is also theoretical issues regarding cognitive styles and affect (emotions and moods, in this case). However, some scholars concluded that cognitive styles are rooted in cognition and not related with emotions and mood.

Apart from the definition and positioning the subject of cognitive styles, there are other unresolved issues within the theoretical context of cognitive styles . The field has been criticized for the increased number of alternative construct and assessment instrument. There are four different integration approaches that have been discussed in the preceding sections which consisted of onion model; cognition-centered, personality-centered, and activity-centered approaches; vertical classification, horizontal classification and style versus ability; integration of the integration. Out of these four commonly discussed approaches, the construct and assessment instrument of this study belong to the group of cognition-centered, personality-centered, and activity-centered approaches. The details will be discussed in section 3.5.1. Finally, under this section, many studies address the issue of unidimensional and multidimensional models that exist in the field. Unidimensional models known as bipolar models that conceived cognitive styles as separate dimensions; while, multidimensional models explained cognitive styles theories that situated on different bipolar dimensions (Hodgkinson *et al*., 2009). Following repeated arguments on how to conceptualize and measure the constructs, a conclusion can be drawn. The scholars have realized that unidimensional construct has undeniable impacts on many cognitive styles studies. However recent developments offer suggestions to move the field forwards by giving attention to multidimensional constructs since the approach are becoming increasingly important and makes a significance contribution by enriching understanding of individual differences in information processing (Hodgkinson & Sadler-Smith, 2003). As such, multidimensional construct has been adopted for this study.

b) Measurement of cognitive styles -

As mentioned before, the cognitive styles field have produced quiet a large number of tools and questionnaires which intended to measure the approach. Self-report

inventories, physiological assessments, and computer-based tests, are the methods that have been used most frequently in measuring the cognitive styles concept. Each method has its own strength and weakness. However, it is important to mentioning at this juncture that self-report inventories was selected for this study and it was based on the work of Cools and Van de Broeck's (2007). The details will be discussed in section 3.5.1.

c) Cognitive styles – Relevance for practise

Eight areas emerged from the review on the relevancy of cognitive styles in practise: (a) decision making; (b) national culture; (c) teamwork and interpersonal relationship; (d) creativity, entrepreneurship and innovation; (e) MIS and information management and use; (f) learning; (g) vocational and occupational issues; (h) sales and marketing. However, the objective of this study is to draw attention to the importance of project manager's cognitive styles from decision-making perspective with respect to executing projects successfully. Decision-making is desirable because it is expected to make a remarkable contribution to project manager's performance due to the involvement in the planning and organizing of project activities through decision-making process. Chapter 6 discuses the findings concerning the details about the decision making approach applied in the project manager's cognitive styles studies. Nevertheless, for future research, it is possible to integrate other relevant themes that emerged from the literature to assist project managers in improving the efficiency and effectiveness of a project execution.

3.4 Project Success

There have been a large number of previous studies on project success and factors affecting project success (Pheng, 2006). However, the judgement of success for a project is complicated. For example, the Sydney Opera House which is now considered one of the outstanding success and greatest projects in Australia , went 16 times over budget and overscheduled for several times (Nixon *et al*., 2012). Thus the following sections of literature review has been undertaken to explore the understanding of project success.

3.4.1 Schools of Thought

3.4.1.1 An Overview of Project success

Nowadays, companies are increasingly using projects in their daily work to achieve company goals. The only way organizations can be driven to achieve excellence is by keeping an eye on competition and world best practice in all aspects of the business (Bendell, 1998).Recently more and more organizations are recognizing that translating corporate strategies into actions requires project management. Consequently, it is vital that projects are successful (Baccarini, 1999). Since a decade ago, project success undoubtedly remains a central concern, and much has been written and said about this specific issue (Cooke-Davies, 2002). The subject of project success is at the heart of project management and it is considered top priorities of project managers and project stakeholders (Müller & Jugdev, 2012) which can be illustrated as in Figure 3.4.1.1.

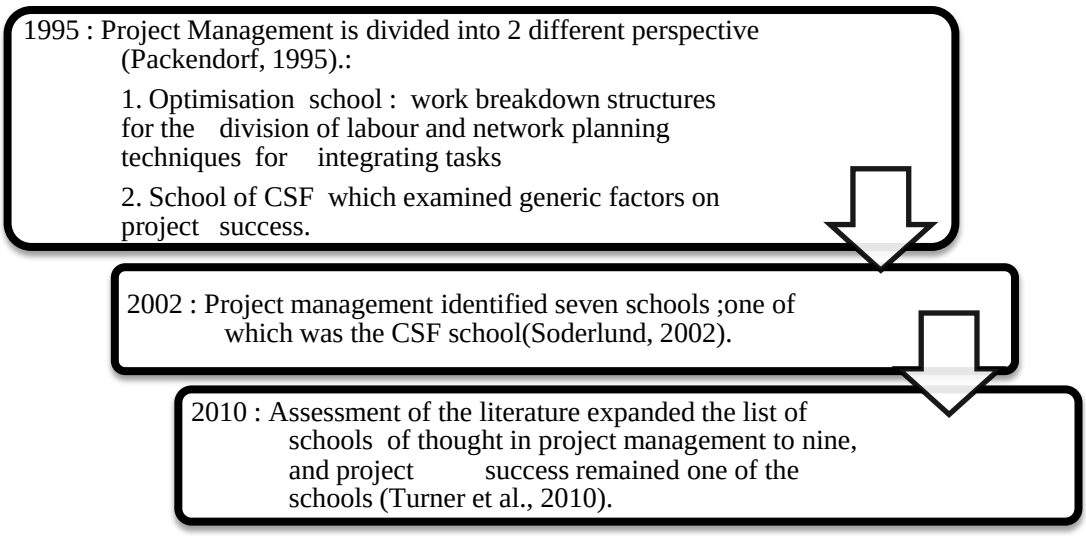


Figure 3.4.1.1: Project success in Project Management

(Source: Muller & Jugdev, 2012)

One interesting observation to note is that the topic of project success has been focus of many studies and yet the construct of project success is so rarely agreed upon (Pinto & Slevin, 1987). Things get worse when the specific ambiguity surrounding project success presents significant problems for researchers and has provoked lively debate (Ika, 2009). In this respect, the research is often criticized for being underdeveloped and not founded on a solid theoretical and conceptual groundwork (*e.g*., Shenhar & Dvir, 1996). Thus, before the following sections explore in depth the concept of project success, it would be a great input to glance through example of studies that have been conducted in relation to project success. Abdul Aziz Abdullah (2010) reviewed the literature from the period mid 80's till late 2000's and the study can be categorized into 41 different themes as summarized in Table 3.4.1.1. It should be noted here, however, the table only displays example of studies that generally address the project success topic within and out with the limited area of interest. Even though the author has produced a comprehensive study, however, Aziz's useful information would have been much more interesting if he had included type of industries for each categories as the

topic is widely used by a large number of industries such as construction, logistics, engineering and automotive (Bredin & Söderlund, 2013).

Table 3.4.1.1: Project success in literature

Categories	Author	Findings / Information
Project success Defined	Standing *et al.,* (2006)	No specific deliberation on project success and failure
	Nguyen *et al.,* (2004); Ashley *et al.,* (1987)	Time, budget, specification and stakeholders' satisfaction, Cost, Schedule, Quality, Safety and Satisfaction to the customer
	Chan & Chan (2004); Songer & Molennar, (1996)	Time, Cost and Quality
	Belassi & Tukel (1996); Atkinson (1999); Navarre & Schaan (1990)	• Duration, Monetary Cost and Performance (Project Level) • Three stages : process, systems and benefits
	deWit,1988 in Nguyen *et al.,*(2004)	" Meeting technical performance specification"
	Lim & Mohamed (1999)	• Achieving project objectives • Micro viewpoints: smaller components which are parties involved with the final part to achieve the objective in the construction process. • Macro viewpoint – time taken to complete the project and affected by factors e.g. economy, management or weather. Once completed it will satisfy the customers.
	Pinto & Pinto (1991)	Inter-personel relationship
Dimension of Project success	Shenhar *et al.,* (1997), cited in Chan and Chan (2004)	Four dimensions namely: (a) the period during project execution, (b) upon completion of project, (c) after project is delivered to clients and (d) assessment after 1-2 years, continued by 3-5 years after completion of project.
	Sadeh *et al.,* (2000)	Four Dimensions : meeting the design goals, benefit to the end user, development of the company and finally the development of the infrastructure of the country
	Pinto & Mantel (1990)	Efficiency on the implementation process measured by the performance of the project team (schedule, budget, meeting technical goals and working relationship)
	Diallo & Thuillier (2005)	Dimensions: time, cost, quality impact developments project
Project success in organization	Baccarini (1999)	Strategic organizational project's goals and objective ; satisfaction of final product of stakeholders' needs and customer satisfaction
	Diallo & Thuillier (2005)	Confirmation of time, cost and quality as the management dimension for project success

Table 3.4.1.1: continued

Project Management Factors	Atkinson (1999)	Cost, time and quality (triangle) link to the measurement of project management factors (Square Route)
	White & Fortune (2002)	Effective control and monitoring system reinforce the motivation of the project
Project Management Structure on Development Success	Larson & Gobeli (1989)	Success of development projects vary according to the project structure.
Criteria of Project success	Chan & Chan (2004); Lim & Mohammad (1999)	Project Objectives (Criteria)
	Ashley (1987); deWit (1988) in Nguyen *et al.,* (2004)	Five dimensions are : Budget performance, client satisfaction, functionality, contractor satisfaction and project manager/ team satisfaction.
Success criteria for IS-IT Project Management	Atkinson (1999)	The square root of the iron triangle, the information system benefits to organization and benefits to stakeholders
Project Classification	Dvir *et al*., (1998)	Factors for success " is not universal for all projects" i.e. " different projects exhibit different factors of success". Multivariate method is used to rank the " different managerial variables to their influence on project success".
Framework-Logical framework methodology	Baccarini (1999); Cooke-Davies (2002)	Project Management Success : Time, cost, and quality required to complete the project
Criteria for Success Framework	Al-Tmeemy, *et al.,* (2010)	Proposed framework to categories " building projects in Malaysia from the contractors' perspective"
Framework	Chan & Chan (2004) cited by Lam,*et al.,*(2007)	The concept of KPI framework of success criteria was introduced.
Multi – dimensional framework	Shenhar *et al.,*(2002)	4 Major dimensions have been identified : 1.Proejct efficiency 2.impact on customer 3.direct business and organisational success 4.preparing for future
Human Resource Management	Belout (1998)	Personal factors influence effectiveness and success
Transition countries	Kleinschmidt (1995)	14 factors affect new product success
Competencies for Project success	Pinto & Slevin (1988)	Related to project manager, team members or the institutional competencies of the project team itself. Critical individual competencies are technical, administrative and interpersonal
	White & Fortune (2002)	Relevant project experiences related to these competencies
Institutional competencies	Pinto &Slevin (1989); White &Fortune (2002); Westveld (2003)	Effective control and communication systems, good planning and scheduling, absence of bureaucracy, strong teamwork and leadership, lack of dysfunctional conflicts.

Table 3.4.1.1: continued

Categories	Author	Findings / Information
Factor of Success	Lim & Mohammad (1999)	Four perspectives of the individual owner, developer, user and general public
	Khang *et al.*, (2008)	• 3keys categories – competency, motivation and environment • Grouped the study of Pinto and Slevin,1987; Belassi and Tukel,1996; Diallo and Thuillier,2004,2005;Fortuna&White,2006
	Diallo & Thuillier (2005)	Communication and trust are factors that were found empirically critical to project success
	Nitithamyong & Tan (2007)	12 underlying PMC (Project Management Consultant) success factors: 1.interaction skills 2.efficient management of information 3.proper planning for project execution 4.establishement of standard procedures 5.organization of collaboration among team members 6.client support 7.PMC's commitment and flexibility 8.adequacy of resources and understand the client's requirement 9.Clear delegation of decision making authorities 10.client's characteristic and contribution 11.competency and experience 12.problem solving skill
	Nguyen *et al.*, (2004)	Four COM's : comfort, competence, commitment and communication
	Hartman & Ashrafi (2002)	Factors: Time, budget, quality and 10 other factors
	Sharma (2006)	Key account success: Market's relation assets, personel/social bonds, dissatisfaction and change in environment
	Jiang *et al.*,(1996)	13 factors have been identified for IT users and professionals which covered factors such as competent project managers, top management support, feedback capabilities and etc.
Factors of Success (Influencing manufacturing companies)	Kuen *et al.*,(2009)	• Critical success factors that influence the success of manufacturing companies in Malaysia • Literature – project mission, top management support, client consultation, technical task, personnel competency, client acceptance, troubleshooting, project pelan monitoring and effective communication. • Empirical – Micro project success(project personnel competency and project mission) and macro project success(top management support and project mission)
"Real" factors of success	Cooke-Davies (2002)	• Success criteria " measures against the overall objectives of the project and whose inputs to the management system leads directly or indirectly to the success of the project or business". ▪ Is answered by the factors that lead to project management success, project success, continuous project success

Table 3.4.1.1: continued

Categories	Author	Findings / Information
Motivation	Anderson & Jenssen (2000); Belassi & Tukel (1996); White & Fortune (2002)	Motivation factors are recognized as clear understanding of project goals, objectives and mission
Commitment	Cooke-Davies (2002)	Clear assignment of responsibilities is the way to accomplish commitment
Benchmarking	Lam, *et al.,* (2007)	Project success Index (PSI) used to benchmark the performance of the design and build (D&B) project. Cost, time,, quality and functionality are the principal success criteria for D&B projects.
	Maire, *et al.,* (2005)	Benchmarking is one of the most effective methods to measure performance
Performance	Chan & Chan (2004)	Performance as meeting the objectives
Formality	Naveh (2007)	There is positive relationship between formality and the achieved performance in R&D projects
Model	Bryde (2003)	Project Management Assessment Model (PMPA) model to assess quality management
	Nitithamyong & Tan (2007)	Project Management Consultancy (PMC) model with 12 underlying PMC success factor and 5 important criteria in assessing PMC performance
Project Planning	Zwikael & Golberson (2006)	The study is focused at he planning stage of the project.
	Pinto & Slevin (1989)	Numerous studies have indentified project planning as one of the project's critical success factors.
	Shelbourn *et al.,* (2007)	Focus of softer issues like business process and people in the organization
Implementation in project and organizations	Wixom &Watson (2001)	The successful implementation of projects and organization
Critical success factors (defence development projects)	Tishler *et al.,* (1996)	Multivariate analysis is employed to handle simultaneous attributes of project successsuch as design consideration, profesional qualification and team spirit.
Cooperation	Phua & Rowlinson (2004)	Very vital to success in construction projects
	Bennet & Jayes (1995,1998); Latham (1994)	Basis for project successin construction
Attribution theory	Kelly & Michela (1980)	The study of the inference or perception of the cause where the behaviour can be interpreted in terms of the cause
	Tarricone & Luca (2002)	The attributes that employee requires are knowledge, technical, generic skills
Measures of Project success	Morris & Hough (1986)	Project completed on schedule, within budget, according to technical specification, long term commercial success and termination efficiancy
Employeeship	Moller (1994)	Important to the success of the organization
	Johnson *et al.,* (2000)	Employee has several combinations of attributes which can impact success
Autonomy	Gemunden *et al.,* (2005)	Discussed on the comparison of structural and resource autonomy with project success

Table 3.4.1.1: continued

Categories	Author	Findings / Information
Consultant engagement	Appelbaum *et al.*, (2005)	Consultants provide solutions or new methods to client, able to measure improvement and sustain improvement overtime
	Jang &Lee (1988)	Success factors: characteristic of the client organizations, the competence of the consultant and consultation mode
	McLachlin (1999)	Good compatibility between consultant and client where : Consultant - must exhibit integrity, uphold client's best interest, competent Client - involved in the project and ready to change
	McLachlin (1999) cited by Appelbaum (2000)	Consulting relationships : contract role, clarification, data generation, prioritization, action and follow up
	Armenakis & Brug (1988) cited by Appelbaum (2000)	Consultant : Self report measures of satisfaction, leadership and group process
	Appelbaum (2000)	Consultant is profesional, well communication, and understand the urgency of the situation
Organizational culture and knowledge sharing	Al-Alawi *et al.*, (2007)	Factors that encourage knowledge sharing : trust, communication, information system, rewards and organization structure
Teamwork and social interdependence	Johnson & Johnson (1995,1999)	There is strong evidence of the relationship between the functionality and success of a team and positive social interdependence
Social interdependence	Tarricone & Luca (2002)	Promotes communication and collaboration that can enhance effective environment and successful teamwork.
Success criteria related to organizational success	Gronhaug & Falkenberg (1994)	Identification on how managers and organizations make sense of their internal and external environments, enabling them to act purposefully.
Partnering	Larson (1997)	Major partnering activities were found to be positively related to at least of the measures of project success
Communication	Lievens *et al.*, (1999)	Effectiveness of internal and external communication : level of intangibility; heterogeneity; simultaneity; perishabilty y of the new service offering
	Ebadi &Utterback (1984)	Positive effects on success of technological innovation : individual level, frequency, centrality, diversity of communication
Tacit knowledge	Koskinen (2000)	The value tacit knowledge was probably significant to project success

(Source: Abdul Aziz Abdullah, 2010)

3.4.1.2 Defining the Project success

As defined by the Oxford Dictionary (2013), success is "the accomplishment of an aim; a favourable outcome." The success of a project is traditionally measured by time, budget, and requirements criteria. Meanwhile, according to Chan and Chan (2004) and Turner (1999), most of the studies which have been conducted around 1980s and 1990s on the topic of project success are determined on the basis of time, cost and quality. Somehow, Pariff and Sanvido (1993) defined project success as an intangible perspective feeling that varies with management expectations, persons and project phases. In the early 2004, Nguyen *et al*., (2004) expressed project success is an accumulation of factors such as completion on time, within budget, according to specification and customer satisfaction. Otherwise, at the project level, project success is defined as duration, monetary cost and performance (Bellasi & Tukel, 1996; Atkinson, 1999; Navvare & Schaan, 1990). In the most recent research, defining and measuring success lead to discussions on efficiency and effectiveness at the organizational, team, and individual levels (Müller & Jugdev, 2012). In detail, efficiency is to "do things right," or to maximize output for a given quantity of inputs or resources, and effectiveness is to "do the right things," or to attain the project's goals and objectives (Ika, 2009). Unfortunately, the definition of project success represent an enormous challenge to investigators due to the concept of success which remains very broad, vague and ambiguous (Ika, 2009). Similarly, Wells (1998) also criticized on the definition of project success where little attention has been paid to defining success except what could be said in the most general terms.

However, a more recent study by Beringer *et al*., (2013), it was shown an average project success is defined along the three familiar dimensions of the project management triangle: cost, schedule and quality (Gardiner & Stewart, 2000).

Meanwhile, accepted well-known criteria for measuring project success falls within budget, on time and according to specifications for a successful project delivery (Lechler & Dvir, 2010; Pinto & Prescott, 1990; Shenhar *et al*., 2001). All the studies reviewed so far, however, suffer from the fact that there is no common set of definition has been agreed yet due to the nature of the projects which are differ widely in the practises. Thus, it is not practical to set criteria to measure success for all projects (Howsawi, 2011). It is worth mentioning at this juncture that the definition of project success for this study will be explained more in-depth in later topic after the discussion on the component of project success in the following section.

3.4.1.3 The Concept of Project success

Identifying the concept of project success would facilitate an understanding of the research requirements needed to support the topic. Even though project success undoubtedly remains a central concern and much has been written and said about this specific issue (Cooke-Davies, 2002) but the concept of project success remains very broad and ambiguous (Chan *et al*., 2004; Al-Tmeemy *et al*., 2011). Furthermore, a large and growing body of literature has demonstrated that project success is a multi-dimensional concepts (*e.g.*, Atkinson, 1999; Shenhar & Wideman, 1996; Al-Tmeemy *et al*., 2011). In addition, the topic of project success is further complicated when it is applied across various industries such as warehousing, information technology and defence industry (Abdul Aziz Abdullah, 2010) . From the management field point of view, project success is a strategic management concept where the project objectives must be derived directly to the organization's short and long term goals (Al-Tmeemy *et al*., 2011). Similarly, strategic project management has been comprehended as a critical issue for project success (Rodrigues & Bowers, 1996). Meanwhile, Ika (2009) has

identified that the project success actually can be categorized into two types: either they deal with project success criteria (or dimensions) or the critical success factors (CSFs) which has been explored since few decades ago (Table 3.4.1.3(b)). Furthermore, according to Wan Maimun Wan Abdullah (2010), success criteria is defined as a set of "*principles or standards used to determine or judge project success, and critical success factors refer more specifically to conditions, events, and circumstances that contribute to project results"*. According to Muller and Jugdev (2012), project success factors are defined as elements of a project which, when influenced, increase the likelihood of success which labelled as independent variables that make success more likely. On the other hand, project success criteria which are the dependant variables measures the success or failure of a project. It is interesting to note that, in a project environment, success criteria can be termed "what to achieve" and meanwhile, success factor can termed as "how to achieve" (Wan Maimun Wan Abdullah, 2010).

Table 3.4.1.3(a): Measuring success criteria and success factors across time

Timeline		**Project success**	
1960s-1980s	Murphy *et al.*, (1974); Pinto & Slevin (1988)	"Iron triangle" (time, cost, quality)	Anecdotic lists : Coordination and relations, Adequacy of project structure and control, project uniqueness, importance and public exposure, Success criteria clarity and consensus, competitive and budgetary pressure, Initial over optimism and conceptual difficulty, Internal capabilities build up.
1980s-2000s	Pinto & Slevin (1988); Shenhar *et al*., (2002)	Iron triangle Client satisfaction Benefits to organization (org) End-user's satisfaction Benefits to stakeholders Benefits to project personnel	CSF lists and frameworks : Project mission, top management support, project schedule/ plan, client consultant, personnel, technology to support the project, client acceptance. monitoring and feedback, channels of communication, trouble-shooting expertise

Table 3.4.1.3(a): continued

Timeline		Project success	
Years	**Example**	**Success criteria**	**Success factors**
21st Century	Hoegl & Gemu¨nden (2001); Jugdev & Müller (2005)	Iron triangle Strategic objective of client organizations and business success End-user's satisfaction Benefit to stakeholders Benefit to project personnel and symbolic and rhetoric evaluations of success and failure	More inclusive CSF frameworks and symbolic and rhetoric success factors : Team performance effectiveness, team performance efficiency, personal success in work satisfaction, personal success in learning
General		▪ IV (Independent Variable) that make success more likely. ▪ which are the elements of a project which, when influenced, increase the likelihood of success	▪ DV (Dependant variable) that measure success ▪ which are the measures used to judge on the success or failure of a project ▪ Do not change frequently although the attributes might be considered for revision and being updated

(Source: Creasy & Anantatmula, 2013; Ika, 2009; Muller & Jugdev, 2012)

Meanwhile, from the Table 3.4.1.3(a) above, what can be observed from the success criteria column is, there are a lot of other factors started to influence the success criteria attributes even thought the 'iron triangle' remains as vital factors in the process of achieving the project success. Near the end of 1980's, the literature showed a gradual trend towards including client satisfaction as a variable in assessing project success, both at the end of the project life cycle and into the product life cycle (Atkinson, 1999). Meanwhile, from the success factor attributes, the compiled list demonstrated on how the perspective of critical success factor (CSF) was developed and broadened from being merely structural in 1974 to being more task oriented in 1988, and team oriented in 2001 (Muller & Jugdev, 2012). Whereas, Ika (2009) who investigated project success from different metaphorical settings, has produced a detail study on the success criteria and success factor topic. The author has differentiated the success criteria and success factors from three distinct approaches which fall into universal tool, context-specific

tool and finally into social construct. Details regarding the proposed research focus as illustrated in the Table 3.4.1.3(b).

Table 3.4.1.3(b): Research focus of the project success topic in different metaphorical settings

Research metaphor / Research focus	As a Universal Tool	As a Context-Specific Tool	As a Social construct
	Project Success Framework		
Success criteria	A simplistic formula, unequivocal, easy to access, and agreed upon	Context-specific measures of success for different projects and environments	Symbolic and rhetoric evaluations of project success and failure
Success factors	A universal list or grouping of CSFs that objectively exist in practice and transcend projects and stakeholders in time and space	An idiosyncratic list or grouping of CSFs that objectively exist and vary according to projects and environments	Symbolic and rhetoric CSFs

(Source: Ika, 2009)

Meanwhile, in a most recent article on the topic of project success by Muller and Jugdev (2012), the authors have written the most complete synthesis on the issue by relating earlier understandings of project success to subsequent research in the field and underscores the significant findings by Pinto, Slevin, and Prescott. The authors were well known for their contributions to project success and related critical success factors (CSF) in the 1980s. Figure 3.4.1.3 highlighted some interesting findings from this article which provides greater insight into the key concepts of project success that may lead to an appropriate judgment for measuring project success for the purpose of this research. Somehow, their studies also have highlighted that a clear definition and measurable constructs of project success crucially needed to take the subject forward in a dynamic business environment. Furthermore, the authors also criticized on the deficiency of the critical success factors (CFS) theory which is crucial in meeting the project success constructs. There is a consensus among scholars that project success is a

complex and ambiguous and it changes over the project and product life cycle. Jugdev and Muller (2005) propose that projects are about handling expectations on success which is more than having general mission, top management support for resources authority and power to excellent on the project.

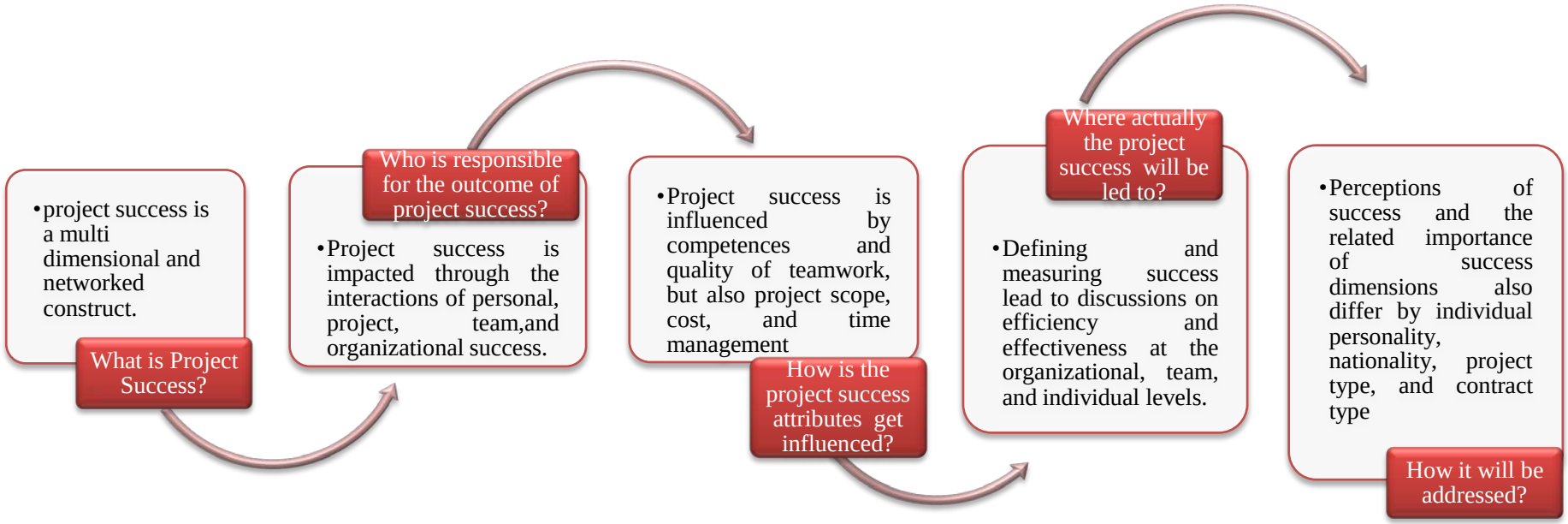


Figure 3.4.1.3: Concept of Project Success

3.4.2 Success Measures

It is interesting to discover through the literature that success measure can be measured through two distinct lines: success of the project and success of the project management activities (Munns & Bjeirmi, 1996). The authors produced this on the Standish Group study, which found that projects can succeed “even when management has failed and vice versa” (Munns & Bjeirmi, 1996). Similarly, Cooke-Davies (2002) made a distinction between project management success and project success by indicating project success is measured against the overall objectives of a project while the project management measured against the traditional gauges of performance (time, cost, and quality). However, by referring to the previous review on the project success concept, it is clearly shows that the topic itself is an abstract concept, and there is no a generally accepted measure. The field is well known by applying simple metrics like time, cost and specification to achieve project success. During 1980’s, when a project is completed on schedule, within budget and delivered as expected, it was a success (Pinto & Slevin, 1987). These attributes were frequently practised back then because “easy to use and within the realm of the project organization” (Jugdev & MÜller, 2005). Somehow, from the late 1980’s it has been noted that the “triple constraints” started to accept ‘client satisfaction’ as an additional attribute in evaluating the project success. The giants of project success; Pinto and Selvin (1988), proposed an integrated framework of project success which integrated both internal (project) factors and external (client factors). The authors labelled the metrics such as time, cost and performance under internal project factors while grouping the satisfaction, effectiveness and use in external client factors. On the other hand, Rad & Anantatmula (2010) suggested new perspective for measuring project success with three different sets of metrics: the client view (focused on the deliverables by measuring scope, quality, and client satisfaction) and team view

(focused on scope, quality and satisfaction) from enterprise perspective by considering financial and commercial aspects in the centre of attention. Furthermore, the authors also have proposed that project success should be evaluated by three different poles: project meeting its own cost duration targets, the deliverable meeting enterprise strategic objectives, and the deliverable meeting the enterprise financial objectives (Rad & Anantatmula, 2010). In her doctoral study, Dyett (2011), by referring on a large amount of literature that have published on success measures, identified and classified project success measures into three different type of measures which labelled as traditional measures, new measures and evolving categories as illustrated below.

Table 3.4.2: Evolving Project Success Measures

	Traditional Measures of Project success		**New Measures of Project success**	**Evolved Measure of Project success**
Management Emphasis	On the Project	+	On the Product	A comprehensive measure of project success that combines the project management measures of time, cost, and scope, with the product measures of client satisfaction, utilization, and benefit to the organization. The time frame for this project success measure is both short-term (taken during the project life cycle and at the completion of the project) and long term (assessed at some point in the future when organizational benefits can be measured).
Focus	Project Management and Implementation	+	Economic, Financial, and Utilization of Product/Service	
Success Perspective	On the Process	+	On the Deliverable	
Perspective of	PM and Project Team	+	Client/End-user	
Measured by	Internal factors under project manager's control	+	External factors under client's control	
Type of factors	Tactical factors	+	Strategic factors	
Measurements	Time, Cost, Scope	+	Client satisfaction, Organization benefit	
Assessed	At project completion	+	At some time in the future	
Time frame	Short-term	+	Long-term	

3.4.2. Success Measure in construction industry

In the construction industry, project success is among the top priorities of key players such as project managers and project stakeholders. Within the industry, the topic has remained as an ambiguously defined concept with a noticeable deficiency of a general consensus as to how it should be defined (Liu & Walker, 1998). There is a large and growing body of literature explores the concept of success and develop different frameworks for measuring the success of construction projects (Al-Tmeemy *et al.*, 2011). However further research is required because the existing criteria models and frameworks were criticized for not being able to integrate with the needs of the construction industry for new business strategies (Al-Tmeemy *et al.*, 2011) . Thus, the following reviews tend to provide example of studies undertaken on project success from construction industry perspective to allow a good understanding of the subject before the study attempts to bridge this gap by proposing a new framework that comprises of the success criteria from different perspective.

Back in 1999, Lim & Mohamed's research to explore the criteria of project success has identified construction project success from macro and micro viewpoints. The authors have categorized users and stakeholders in the macro viewpoint while developer and contractor in micro viewpoint. The macro perspective dealt with the users and stakeholders' satisfaction whereas the micro dealt with the attributes in the construction phase such as time, cost, performance, quality and safety. Even though the authors have proposed a comprehensive framework in assisting better understanding of the concept of project success, but the study might be more persuasive if the authors have considered viewpoint of strategic goals of the construction company (Al-Tmeemy *et al.*, 2011*).*

Meanwhile, during the same timeline, Baccarini (1999) proposed Logical Framework Method (LFM), which encompasses two components, project management success and product success. The project management success consists of project management process and stakeholder's satisfaction whilst the product success focused on the owner's strategy in achieving user's satisfaction, profitability and market share (Baccarini, 1999). However, in the year 2004, Chan & Chan who investigated the topic of project success from key performance indicator (KPI) perspective, have proposed two groups of success criteria where the first group covered the issues such as time, cost , environment and safety. Otherwise, the second group was measured on quality, functionality and satisfaction of different projects stakeholders. Similarly, Ahadzie (2007) who created a model for predicting the performance measures in mass house building projects has projected success criteria in to a group which labelled as: cost, time, quality, customer satisfaction and environmental-impact.

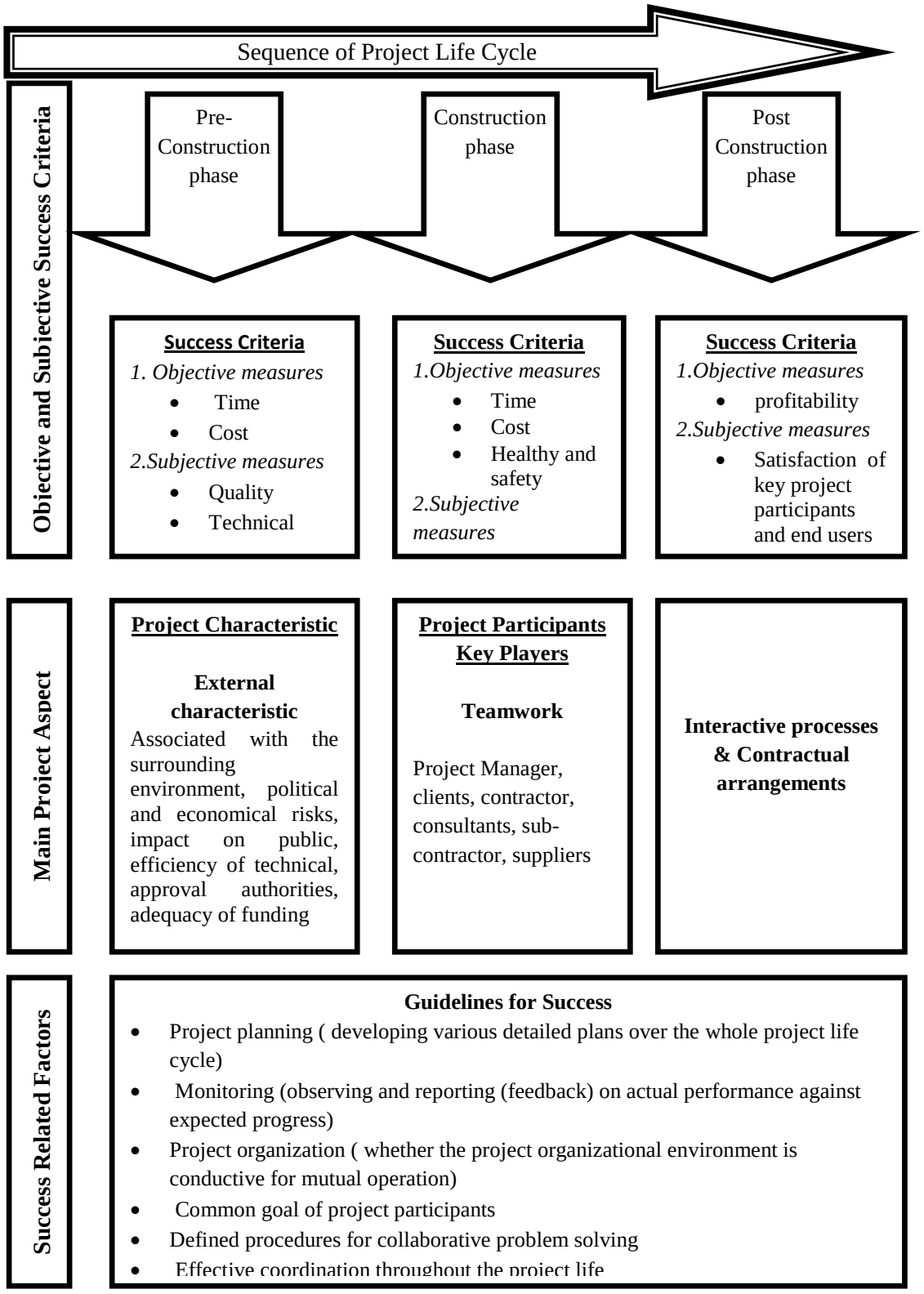
Next, Bryde & Robinson (2005) who studied the project success criteria from client and contractor organizations found out that both parties failed to agree the priority of measures of success in a project lifecycle. Interestingly, the study have highlighted that, from the client perspective, "there is a potential mismatch between the theoretical importance given to satisfying the needs of other stakeholders and the importance attached to this criterion as exhibited by project management practice", (Bryde & Robinson, 2005). The measures which covered the attributes such as cost, time, meeting the technical specification and customers' and stakeholders' satisfaction, were adopted from the Tukel and Rom (2001).

Moving on, Blindenbach-Driessen and Jan van den (2006) who conducted in-depth study of six cases of development projects in project-based firms, have identified a list

of success measures which have been categorized into three different levels. Firstly, important factors which consist of the application of contingent planning approaches, explicit project selection, senior management support, the availability of sufficient experts, making business cases and testing and launching the new services. Secondly, less important factors which represented by the use of cross-functional teams, heavyweight project managers, collaboration with customers and suppliers and performing market research and finally, equally important; the involvement of product champions and external team communication (Blindenbach-Driessen & Jan van den, 2006). The authors made some significant contribution s to the critical success factor school. One of the contributions is, the study has implied success factors from the new product and new service development into the project-based firms.

Numerous studies have attempted to produce various models for measuring the project success from the construction industry perspective. For example, Frodell *et al*., (2008), have identified important success factors such as keeping within the profitability, budget, time, maintenance costs and project goals through semi-structured interviews from 23 experienced construction practitioners. The findings might have been much more persuasive if the author had considered other key players such as project manager and contractor because Frodell's study was focused only on client's perspective. Meanwhile, Elattar (2009) has projected a hierarchical model framework which was established based on the typical project environment. The author produced a general overall impression of success criteria from three perspectives, which were owner, contractor and designer. From the owner's perspective, success measures that have been included were schedule, budget, quality, aesthetic value, end result satisfaction, product functionality, marketability, minimized aggravation and return on investment. Further, the second group comprised the designer's view on the success measures which

consisted of: client satisfaction, quality on the architectural perspective, budget and schedule, marketability, minimized problems, zero liability and claims, documented scope of work, socially accepted, client pays, Met design fee and profit goal, and finally the professional staff fulfilment. The final set is drawn from the perspective of the contractor: schedule, profit, quality, budget, zero claims, client satisfaction, good direct communication and well managed project. Even though the author has proposed a detailed framework (Figure 3.4.2.1), however the major drawback of this framework is, the author failed to categorize the attributes into success criteria and success factors which are crucial in providing better understanding on the subject area.



(Source: Elattar, 2009)

Figure 3.4.2.1: Hierarchal Framework for Project success

In the meantime, taking account from Malaysian perspective, several attempts have been made to identify appropriate success measures that can be used to enhance the performance of Malaysian construction industry. As example, Roshana Takim and Hamimah Adnan (2008) have addressed that the effectiveness measures were connected to the project outcomes achieved during the progress of construction project. The authors identified five principal factors namely: client satisfaction, stakeholder objectives, learning and exploitation, operational assurance and finally the user satisfaction. Contributing to the body of knowledge, Wan Maimun Wan Abdullah (2010) who investigated critical factors in project success from public sector construction projects has demonstrated that the success measures consisted of four main success criteria: time, cost, and quality and stakeholder appreciation. This study also has found eighteen significant success factor that were categorized under four factor groups of human management (team and leadership, project manager, communication, stakeholder management), process (monitoring and control, planning, scheduling, quality management, risk management), organization (organization structure, financial resources, policy and strategies, learning organization, external environment), contract and technical(contracting, contractor, innovation, technical). However, her findings would be more convincing if the author had considered input from private sector in the construction industry as private sector is instrumental in contributing to Malaysian economic growth overall. On the other hand, Al-Tmeemy *et al.*, (2011) who investigated success measures from private sector, specifically from the contractors' perspective, have identified thirteen critical factors which were: time, cost, quality, safety, scope, customer satisfaction, technical specification, functional requirements, market share, competitive advantage, reputation, revenue and profits, and benefit to stakeholder. In their detail analysis of project success measures, it is noticeable that the authors were able to classify the success criteria into three important categories which

were labelled as project management success, product success and market success. This categorization may help future researchers to focus on the important attributes to improve the performance of building projects in the Malaysian context.

3.4.3 Project Manager and Project success

In 1988, when Pinto and Slevin identified the project manager's role is more than a moderator on project success, theories have emerged in designing the "right project manager" (Dyett, 2011). This topic is created to identify the root idea builds on the roles of project manager from the project management areas, which posits that project managers are crucial for the achievement of project success. Having the needed resources to control the interaction of project manager's management skill, knowledge and behavioural attributes towards project success, this topic will transfer this idea to the realm of cognitive styles and project success in the following chapter.

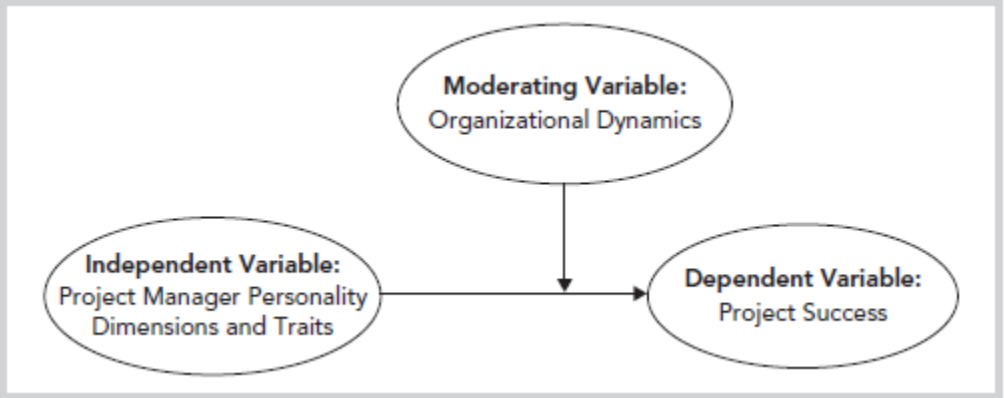
Back in 1986, Pinto's seminal work on the ten factors PIP (Process model of Project Implementation) is one of most prominent work which has demonstrated that the project manager is a vital factor in achieving project success. The study which explored the CSF (critical success factor) of project success, reported that project manager able to achieve a successful project through high technical skill, administrative and soft skills, together with appropriate granted authority which can offset project technical activities on the part of the project team (Pinto, 1986). Similarly, Kerzner (2004) in his qualitative study on CSF has found that project manager is a factor in project success and the appointing the "right" project manager is a critical factor to project success (Dyett, 2011).

Numerous studies have attempted to create link between project manager's managerial attributes and project success. As example, from the leadership approach, Zimmerer and Yasin (1998) conducted a mixed method study to identify characteristic of effective project managers towards the accomplishment of project success. The results from the analysis showed that, "project managers to combine technical competency with the application of proven project management tools that support project planning and control, and to practice leadership skills that are compatible with the internal motivations of the team and the external strategies of the client", (Zimmerer & Yasin, 1998). Furthermore, the study also admitted that the top reasons projects succeed include the ability of project manager's quick response to changes initiated by the project stakeholders. Meanwhile, Smith (2001) for another example, has conducted a qualitative study applying the Myers Briggs Type Indicator (MBTI) instrument to investigate the effect of psychology and personality of project managers. The author verified that the training tool can help project managers as project leader to perform better in project environment by improving one's personel approach to achieve project successfully. On the other hand, Barber & Warn (2005) who investigated the relationship between project leadership and project manager through firefighter - firelighter model, confirmed that type of behaviours (reactive and proactive project manager) affect project success. This finding also supported the Prabhakar's (2005) and Sumner *et al*., (2006) studies which affirmed, there is a link between project manager's leadership and project success. Later, Geoghegan & Dulewicz (2008) have hypothesized whether there is any significant relationship between a project manager's leadership competencies and project success. The study somehow has confirmed that the leadership dimensions were found to be statistically significantly related to project success (Geoghegan & Dulewicz, 2008).

Considerable amounts of literature have published research on the project manager's knowledge and skill and project success. Schlick (1988) and El-Sabaa (2001) for example, have proposed knowledge and skills models in three different categories for project manager: project specific/technical; project management/organizational; and people management/human knowledge and skills. The studies however highlighted that, people management skills are the most important to project success for project manager (Dyett, 2011). Meanwhile, Shenhar & Wideman (2001) who investigated the influence of project manager styles model towards project success have theorized that, a matrix of project type and project phase in selecting leader type would optimized the project success. Meanwhile, from intellectual competencies, Turner and Muller's (2005) study whether project manager competency contribute to project success, showed that emotional competencies (example: communication) were significantly contributed to project success. Later, Dvir *et al.*, (2006) who carried out study on the project manager's characteristics and project profile, the authors discovered that there is a connection between project managers' personality and management styles, and the types of projects towards the achievement of project success. During the same timeline, Leybourne & Sadler-Smith (2006) who investigated the relationship between intuitive and improvisation in achieving project outcomes, has demonstrated that the intuitive judgements is related to externally focused project success. In their detail analysis on the proposed attributes, the authors were able to exhibit the importance of intuitive as one of the important competencies for project manager to put into practice for a successful project delivery. Next, following paragraph proceeded to provide review on the empirical studies on the influence of project manager's attributes towards the achievement of project success from the construction industry.

To date, there is a lack of research directed at understanding the relationship between project manager's soft skill and project success in the construction field. In a most recent study by Zhang *et al*., (2013), the authors have criticized that previous studies have demonstrated the important of competencies for construction project manager to perform well but majority of those studies those studies focussed on technical skills whereas social competencies were largely overlooked. Project manager's management skill, knowledge and behavioural requirements have been identified as an important competency for promoting performance excellence and predicting project success (Cheng *et al*., 2005). However, by an overall lack of information and empirical findings in linking the project manager's competencies to project success may be due to the explanations suggested by Turner & Muller (2005): (1) studies conducted did not include respondent impact, just project manager impact; (2) studies conducted did not actually measure project manager impact, thus were not recorded; (3) project managers simply have no impact. However, different researchers made few attempts to correlate project manager's competencies and project success from construction perspective (Clarke, 2010; Madter *et al*., 2012; Papke-Shields *et al*., 2010). For example, Creasy & Anantatmula (2013) in their groundbreaking investigation into personality traits and dimensions of project managers and project success have proposed a theoretical model which incorporates personality dimensions and their subsequent effects on project success (Figure 3). Based on a large and growing body of literature, the theoretical paper has identified six independent factors which are labelled as: communication apprehension, innovativeness, level of self-monitoring, conflict management style, change initiation, and finally on the Myers-Briggs (MBTI) assessment personality type. Interestingly, the authors also have surmised organizational dynamics such as structure, incentive systems, and organizational project management maturity may become moderating factors in the relationship between personality dimensions and project

success. Meanwhile, for the dependant variables, Creasy & Anantatmula (2013) have considered time, cost, scope, quality and team as important attributes in defining project success for this particular conceptual paper. This conceptual paper managed to bring forward the importance of project manager's 'human skills' in achieving desired project success in construction industry. This is due to the fact that a well defined framework can have a major effect on the project performance (Figure 3.4.3). Thus, empirical validation on the proposed attributes may provide potential area of future study on the field of project management.



(Source: Creasy & Anantatmula, 2013)

Figure 3.4.3: Personalities, organizational dynamics, and project success

3.4.4 Concluding Note on Project success

This section, 3.4 seeks to review the current literature on project success in order to identify potential project success variables to be investigated in relation to cognitive styles approach. The topic of project success as a subject of interest has been largely discussed by scholars of project management since few decades ago to date. In simple terms, project success sis described as list of criteria that used to assess project outcomes. Based on extensive literature review, it can be concluded that there is a broad set but no finite picture on the project success concept. This lack of clarity suggests that, there is need to view project success from different perspectives as it changes over the

project and product lifecycle (Jugdev & Müller, 2005). In spite of increasing interest in project success definition, however, for the purpose of this study, the concept of project success will be referred to based from Pinto and Slevin's (1986) project implementation profile (PIP) that uses a model of two key themes: the project and the client (Geoghegan, 2008). Further discussion of this approach can be found in following section (3.5.2.).

3.5 Bridging the Cognitive Styles and Project Success

This section is divided into three sections, titled, responsive variable, explanatory variable and theoretical framework. There are three responsive variables describing the cognitive style: knowing style, planning style and creating style. The explanatory variable deals with the project success. The theoretical framework depicts the combined explanatory relationships among dependant and independent variables which will be elaborated in detail in the final section.

3.5.1 Cognitive Styles

As mentioned before, in the chapter two, the review of the literature in the project management area have received considerable attention in recent years the importance of human-related factors to the success of construction projects (Yong & Mustaffa, 2013). Even though the human-related factors usually deals with the 'soft' issues and are much more subjective and difficult to measure, but these factors have been identified as subjects that deal with the root cause of the problems in the construction industry by understanding and fostering long-term attitudinal (Yong & Mustaffa, 2013). Thus, the cognitive styles has been chosen as a potential soft skill factor in determining the project

success because of the supremacy of the attributes that being explored in the correlation of individual performance (Muneera Esa *et al*., 2013). Another reason why this study focused on the cognitive styles is due to the long lasting dilemma of whether effective managerial action is better served by analytical or intuitive judgments in project management (Leybourne, 2006) remains questionable. Furthermore, Allison & Hayes (1996) also agreed that the cognitive styles have a potential value in the study of organizational behavior and the understanding of management problems. Thus, there can be no doubting in evaluating the cognitive styles as a crucial factor that promotes soft skill performance in project management professionalism by project managers. Therefore, an evaluation of the influence of cognitive styles towards project success may enhance project manager's work performance which indirectly improves the construction industry's quality, the most men-dominated and aggressive industry (Smithers & Walker, 2000).

For the purpose of this study, the cognitive styles variables are adopted from Cools and Van de Broeck's (2007) Cognitive Styles Indicator (CoSI) because in the cognitive styles literature, it is recommended to focus on more recent theoretical constructs and measures (Cools, Armstrong, & Verbrigghe, 2013). Cognitive Styles Indicator (CoSI) is a multidimensional cognitive framework which is created for business and psychology research. Selecting appropriate theoretical constructs and measure is very important as only rigorous research can ultimately build a bridge between science and practice, which is so often called for in business and psychology studies (Hodgkinson *et al.*, 2001; Hodgkinson & Rousseau, 2009). The three variables describing the cognitive styles are: knowing style, planning style and creating style. In general, people with knowing style are described as a person who looks for data, want to know exactly the way things are and tend to retain many facts and details, like complex problems and try

to find rational and logical solutions (Cools & Van den Broeck, 2007). Meanwhile, planning style implies a preference for a structured, organized, efficient way of information processing (Armstrong *et al*., 2012). The final variable is the creative style which explains the characteristic of people who prefer to be creative and experimentation, forecast problems as opportunities and challenges and like uncertainty and freedom (Cools, 2009). The details on the triple variables are as summarized in Table 3.5.1.

Table 3.5.2: Description on Knowing Style, Planning Style and Creating Style

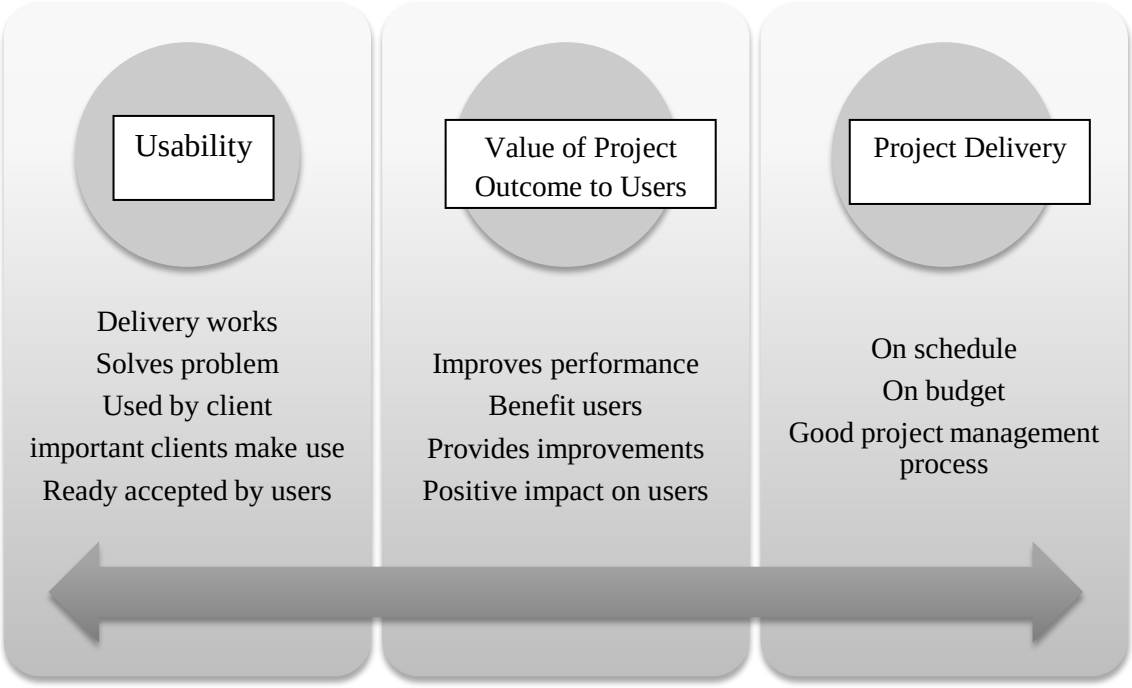
	KNOWING STYLES	PLANNING STYLES	CREATING STYLE
Prefer	Facts, logic, rational	Structure, plans, control	Ideas, possibilities
Focus	Factual content	Process	Creative content
Decision making	• Detailed analysis • Take time	• Structured analysis • Quick decisions	• Intuitive analysis • Quick decisions
Strength	Logical reasoning	Sticking to agreements/ protocols	Out-of-the-box thinking
Task	Intellectually challenging tasks	Tasks involving organised work / Structured	Creatively challenging tasks
Main quality	Reliable	Dutiful	Flexible
Attributes	Facts Details Logical Reflective Objective Impersonal Rational Precision	Sequential Structural Conventional Conformity Planned Organised Systematic Routine	Possibilities Ideas Impulsive Flexible Open-ended Novelty Subjective Inventive

(Source: Cools, 2007)

3.5.2 Project success

In simple definition, project success consist standards or criteria that evaluate project outcomes or results. Over a period, project success from narrow but universally accepted group of criteria of scope, cost and time, has included other criteria as well (Dyett, 2011). Even though a number of scholars have called for a wider set of success criteria (Atkinson, 1999) but it is noted that no common set has been established yet (Muller, 2010a). However, according to Muller (2010), time plays a significant indicator when suggesting a distinction between project success and project management success because project success deals with the success criteria (i.e. long term) while project management success prioritize the importance of success factors (i.e. short term). It has been highlighted that project managers assign higher importance to project success while other stakeholders emphasize on the importance of success factors related to project management success (Muller, 2010). Thus, this study concerns with the relative importance of success criteria at the level of project success. Considering the definitions of project success, this study selected PSQ (Project Success Questionnaire) which is based from Pinto and Slevin's (1986) project implementation profile (PIP) that uses a model of two key themes: the project and the client (Geoghegan, 2008). The main reasons for adopting this construct as dependant variable, was because of its coverage on the common measures of project success: the schedule, on budget, the performance and has been developed and tested as a generalized project manager success measure (Geoghegan, 2008; Pinto & Slevin's, 1986). For the purpose of this study, the project success factors are grouped into three factors which were named: usability, value of project outcome to project users and project delivery. The factors were excellently separated by Geoghegan (2008) who

conducted an investigation on the project manager's leadership influences on the project success. The details are as summarized below.



(Source: Geoghegan & Dulewich, 2008)

Figure 3.5.2: Description on Project success

3.5.3 Conceptual Research Model

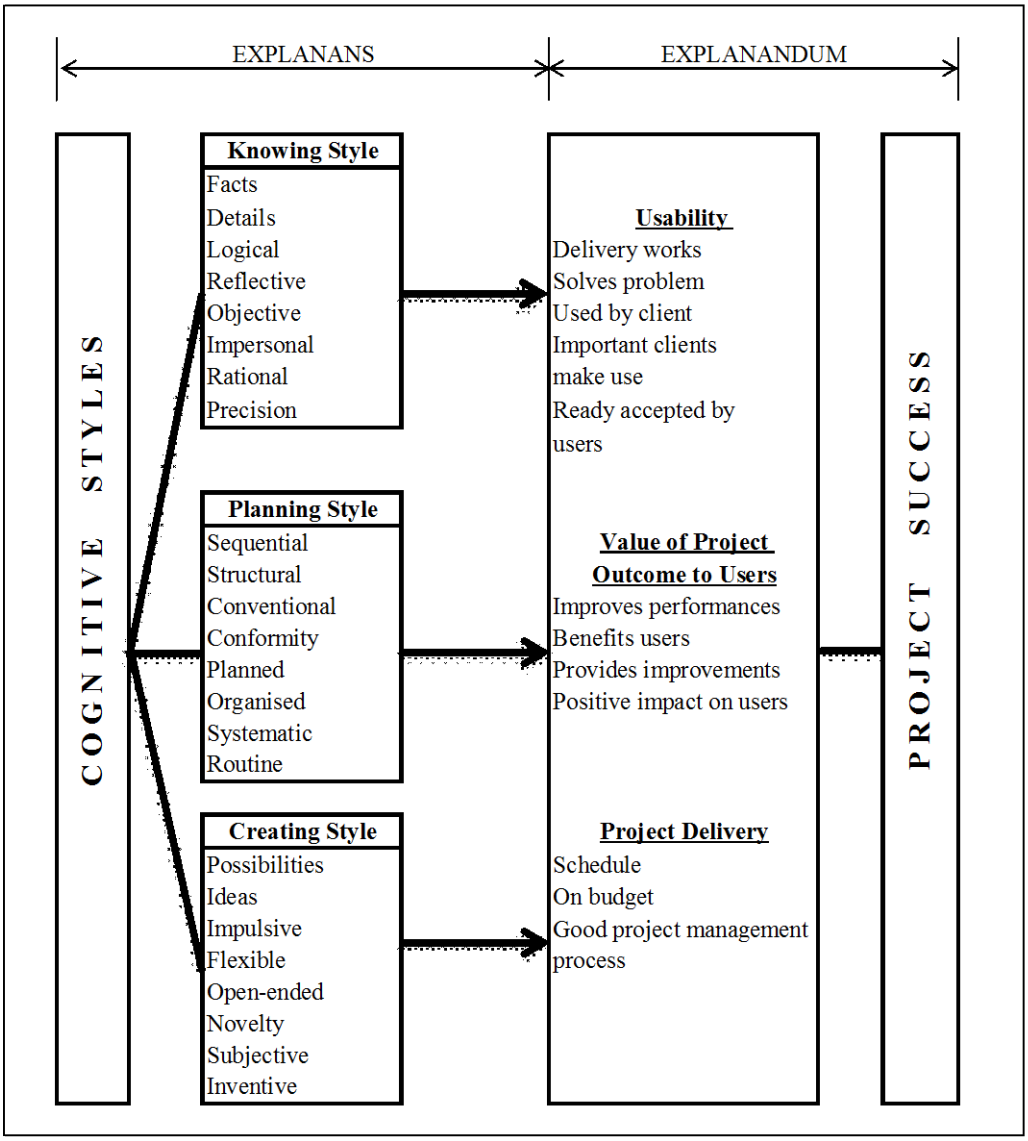
Apparently, a project manager's role is challenging especially in the construction industry where the projects are unique and often related with complexity and ambiguity. However, there seems to be little support for the study on the effect of project managers on the positive project success (Anantatmula, 2010). A large and growing body of literature focuses on the technical proficiencies associated with project managers but it is noted that in the recent studies, there is a shifting from a technical skills to project manager soft skills (Anantatmula, 2010; Hyväri, 2006; Brown, 2000). Furthermore, Lechler (1998) also commented that soft skills or competencies (human-related factor) contribute more to project success than technical skills. Drawing from literature

(Section 3.3, Section 3.4), it could be proved that project manager's human-related factor may provide an essential and appropriate judgement for measuring project success. Furthermore, Ananthamula (2008) asserted that different types of task associated with different types of project out which must be managed differently in order to achieve project success. Hence, it is the role of project leadership to determine specific application in the context of each different project even though the practise and accompanying tools are transportable between different types of project (Wirth, 1992). Therefore, this study proposes a need to extend management practises for project manager by incorporating the cognitive styles approach towards the achievement of project success. The proposed conceptual model integrates the cognitive styles and project success variables that were explained in the previous sections. Hergenhahn and Olson (2001) commented that a model is not typically used for explaining complicated process, but it does assist by simplifying the process and making it more understandable.

The model was adapted and modified from the model that integrates different elements which consisted of influencing factors, contingency factors and outcomes factors that were build as the basis for a project management theory (Hanisch, 2011). For the purpose of this study, the independent variables which consists of cognitive styles construct were adopted from Cools and Van de Broeck's (2007) Cognitive Styles Indicator (CoSI). The three variables describing cognitive styles are knowing style, planning style and creating style. In general, people with knowing style are described as a person who looks for data, want to know exactly the way things are and tend to retain many facts and details, like complex problems and try to find rational and logical solutions (Cools & Van den Broeck, 2007). Meanwhile, planning style implies a preference for a structured, organized and efficient way of information processing

(Armstrong *et al*., 2012). The final variable is creative style, which explains the characteristic of people who prefer to be creative and experimentation, forecast problems as opportunities and challenges and like uncertainty and freedom (Cools, 2009). The scales were rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Meanwhile, for dependent variable, this study selected PSQ (Project Success Questionnaire) which is based on Pinto and Slevin's (1986) project implementation profile (PIP) that uses a model of two key themes: the project and the client (Geoghegan, 2008). The main reason for adopting this construct as dependent variable was because of its coverage on the common measures of project success: the schedule, on budget, and the performance,which havebeen developed and tested as a generalized project manager success measure (Geoghegan, 2008; Pinto & Slevin, 1986).



Source: Author

Figure 3.5.3: Conceptual Research Model

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3.6 Summary of Review

Project management is an area where a blend of human skills, organizational skills and technical skills are needed for a successful project execution. Mastering the process involved 80% on managing people skills and 20% on technology (Flannes, 2005). Summarizing from the preceding review and discussions, it can be concluded that cognitive styles can be a potential human-related factor that shall assist project managers to achieve better results of project success. However, to confirm the relationship between the subjects, an empirical study is needed to merge this psychological construct and project management practise. Therefore, it is clearly demonstrated that the purpose of the current study which is to explore the association between cognitive styles and project success. In the following chapter, Chapter 4, discussion on the research design is carefully reviewed by identifying potential respondents and data collection methods. Method of analysis also highlighted at the end of chapter.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

Choosing an appropriate research methodology is crucial for several reasons. One of the important reason is that a body of research is usually judged in terms of the methodology utilized (Allen, Eby, O'Brien, & Lentz, 2008). This is because the research design which covered the subjects about instruments, data analysis and construct validation give implications on the conclusions that can be drawn (Sackett & Larson, 1990). Therefore, this chapter provides the different research design and methods applied to conduct this study. Firstly, methodological paradigms are described. Then, the school of thought in project management field and methodological issues in construction management are reviewed to provide possible patterns of research methodology emerging over recent decades within the field (Scandura & Williams, 2000). Thereafter, the research paradigm adopted for this study is presented. The following sections discusses the research design applied in this study in detail. Subsequently, the relevant information on the development of the survey instruments, survey sample, and procedures used to distribute and collect the questionnaires are discussed, followed by the techniques of quantitative data analysis applied are presented.

4.2 Choosing an Appropriate Research Methodology

The methodological paradigms are first elucidated (Table 4.2.1). The school of thought in project management is then described (Table 4.2.2), following by methodological issues in construction management. Subsequently, the research paradigm adopted for this study in explained.

4.2.1 Methodological Paradigms

Webster Dictionary defines paradigm as, "*a philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated*". Meanwhile, according to Thomas Kuhn (1962, 1970) in the book titled, 'The Nature of Science Revolution', the author defined paradigm as the underlying assumptions and intellectual structure upon which research and development in a field of inquiry is based (as cited in Dills & Romiszowski, 1997). Denzin & Lincoln (2000) provided three different categories that covered the meaning of paradigm which are, (a) Ontology: what kind of being is the human being. Ontology deals with the question of what is real; (b) Epistemology: what is the relationship between the inquirer and the known; (c) Methodology: how do we know the world, or gain knowledge of it?

Two main research paradigms are in popular use especially in social science related research are positivism and interpretivism (Walliman, 2001). Positivism refers to the general belief that social science can be scientific akin to physics or chemistry (Liamputtong & Ezzy, 2005). The quantitative approach is favoured by positivist researchers who assume a realist ontology and adopt a deductive logic of reasoning

using structured questions and scales that can be analysed with statistics (Liamputtong & Ezzy, 2005). As Neuman (2003) explains, deductive approach inquiry begins with abstract ideas and principles then works toward concrete empirical details to test the ideas. Positivist researchers are concerned with theory verification and hypotheses testing using 'hard' quantitative data (*e.g.*, experiments and survey). Interpretivism, on the other hand is preferred by interpretive researchers who assume a relativist ontology and adopt an inductive logic of reasoning (Denzin & Lincoln, 2003). Inductive approach inquiry begins with concrete empirical details and then works towards abstract ideas or principles (Neuman, 2003). Interpretive researchers are concerned with discovering and understanding phenomenon in natural settings using 'soft' qualitative data (*e.g.*, direct observation and interview).

Therefore, in deciding which research method to use, it is important that the strengths and weaknesses of both methods are understood and deliberated. Table 4.2.1 shows a comparison between various characteristics of the two research approaches. The comparison clearly shows that both approaches have its own advantages and disadvantages. One of the main differences between the two approaches is the nature of the data collected which subsequently affects their data collection and data analysis process (Neuman, 2003).

Table 4.2.1: Contrasting implications of positivism and interpretivism

Aspect of Comparison	Positivism	Interpretivism
The observer	Must be independent	Is part of what is being observed
Human interests	Should be irrelevant	Are the main drivers of the science
Explanations	Must demonstrate causality	Aim to increase general understanding of the situation
Research progress through	Hypothesis	Gathering rich data from which ideas are induced
Concepts	Need to be operationalised so that they can be measured	Should incorporate stakeholder perspectives
Unit of analysis	Should be reduced to simplest terms	May include the complexity of whole situations
Generalisation through	Statistical probability	Theoretical abstraction
Samples required	Large number selected randomly	Small numbers of cases chosen for specific reasons

Source: Keraminiyage (2005)

Before the researcher explained on the research paradigm adopted for this study, the next section described on the methodological paradigm in the field of project management in general spectrum and following second from the construction management angle. The following sections review in these areas to provide the necessary information to guide the researcher on the choosing the most appropriate method that has to be adopted.

4.2.2 School of Thought on Project Management

Project management field makes a significant contribution by being a key for better performance in the global economy through continuous development of competence at all levels, individual, team organization and society (Gareis & Huemann, 2007). In order to support the global development, the project management field is urged to develop a sound theory and not just case histories and opinions of doubtful rigour to support the rapid economic growth (Turner *et al*., 2013). Furthermore, Cicmil *et al*., (2006) commented that to develop a sound theoretical basis for project management, the

nature of projects needs to be inspected, and essential questions addressing the different underlying theoretical perspectives emerging from and supporting the project management field are yet to be explored. For the purpose of this study, perspectives on schools of thought in project management are reviewed in Table 4.2.2(a) to grasp information on the substantial progress and trends of this subject. The table also helps to identify the school that belongs to this study which falls into one of the following categories: optimization school, factor school, contingency school, behaviour school, governance school, relationship school and decision school (Söderlund, 2011).

Subsequently, the Table 4.2.2(b) demonstrates examples of contributions by the school of thoughts which was produced through extensive review of 305 highly cited publications addressing project management issues by the author. It is noted that the most frequently cited schools include optimization, factor and behaviour. Out of these three schools, it shows that this study belongs to the Factor School of thought because it deals with the attributes such as project success, measure and criteria. Factor Schools deals on the issues of how to determine what a successful project is and what seems to cause project success (Söderlund, 2011). Furthermore, Factor Schools also labelled as Success School, Critical Success Factor Schools (Jugdev & Muller, 2005; Soderlund, 2002) which mirroring the research approach (bridging the cognitive styles and project success) as described previously.

Table 4.2.2(a): Schools of project management research

	No. of papers in data set	Examples of highly cited contributions (based on citation analysis, presented in chronological order)	Keywords from paper summaries	Base discipline/key influence
Optimization School	73	Fulkerson (1961), Wiest (1981), Davis and Heidorn (1971), Davis and Patterson (1975), Cooper (1976), Talbot (1982), Liberatore and Titus (1983), Northcraft and Wolf (1984), Drexl (1991), Demeulemeester and Herroelen (1992), Adler and Mandelbaum (1995), Kolisch (1996), Levitt *et al.* (1999), Eppinger (2001), Huchzermeier and Loch (2001)	Optimal, quantitative, analysis, logical, management science, analytical, techniques, critical path, PERT, planning, work breakdown structure, resource allocation, project scheduling, value, activity networks, algorithm, duration, estimates, modelling.	Management science, applied mathematics
Factor School	64	Alter and Ginzberg (1978), Katz (1982), Katz and Allen (1985), Larson and Gobeli (1987; 1988; 1989), Pinto and Prescott (1988), Pinto and Mantel (1990), Henderson and Lee (1992), Pinto *et al.* (1993), Clark (1989), Iansiti (1995), Tatikonda and Rosenthal (2000), Hoegl and Gemuenden (2001), Bonner *et al.* (2002)	Project success, failure, determinants, satisfaction, performance, criteria, antecedents, effects, critical, outcome, measure.	Diverse, including innovation studies, operations and technology management
Contingency School	42	Tushman (1978), Takeuchi and Nonaka (1986), Clark and Wheelwright (1992), Ford and Randolph (1992), Eisenhardt and Tabrizi (1995), Adler (1995), Kirsch (1996), Shenhar and Dvir (1996), Lindkvist *et al.* (1998), Hobday (2000), Shenhar (2001), MacCormack *et al.* (2001), Pich *et al.* (2002), De Meyer *et al.* (2002)	Contingency, project organization, structure, information, decentralization, design, flexibility, fit, environment, conditions, characteristics, approach, matrix organization, adaptive, typology, framework, cross-functional structure, communication, taxonomy, complexity, uncertainty, flexibility, interdependence, complex tasks, co-ordination, differences.	Sociology, organization theory
Behaviour School	64	Gersick (1988; 1989), Goodman and Goodman (1976), Lundin and Söderholm (1995), Packendorff (1995), Kreiner (1995), DeFillippi and Arthur (1998), Jarvenpaa and Leidner (1999), Hoopes and Postrel (1999), O'Mahony (2003), Engwall (2003)	Behaviour, process, learning, team, emotion, development, communication, creativity, longitudinal, climate, boundary object, transition, time, conflict, human, temporary, evolution, knowledge integration, motivation, role, practice, culture, diversity, pacing, gender, power, trust, change.	Organizational behaviour, organization theory psychology, learning,
Governance School	19	Stinchcombe (1959), Eccles (1981), Croisier (1998), Turner and Keegan (2001), Clegg *et al.* (2002), Gerwin and Ferris (2004), Turner and Müller (2004)	Governance, authority, transaction cost, bureaucracy, market, variability, administration, contract, incentive, control, contracting, subcontracting, co-operation, construction projects, joint venture, consortium, hierarchy, strategic, alliance, principal, agent.	Economics, transaction cost theory, principal agent theory
Relationship School	18	Hellgren and Stjernberg (1995), Hadjikhani (1996), Cova *et al.* (1996), Millman (1996), Cova and Hoskins (1997), Starkey *et al.* (2000), Vaaland and Håkansson (2003)	Project network, formation, marketing, project business, network development, international projects, systems selling, project milieu, stakeholders, social capital.	Industrial marketing, economic geography
Decision School	25	Ross and Staw (1986), Ross and Staw (1993), Harrison and Harrell (1993), Conlon and Garland (1993), Staw and Ross (1978), Matta and Ashkenas (2003), Lovallo and Kahneman (2003)	Information, bias, escalation, commitment, influence, investment, project assessment, politics, termination, risk, option.	Political science, psychology

Source: Soderlund (2011)

Table 4.2.2(b): Schools of Project Management; Main focuses, research approach and methodologies

School	Main focus of analysis	Primary research approach and methodologies	Empirical context	Key questions/issues investigated	Dominant project idea	Project management maxim
Optimization	Planning, breakdown techniques and scheduling of complex tasks	Logic-based, modeling, simulation,experiments, static/dynamic	Engineering, R&D	How to manage/plan a project?	Complex set of activities	Optimizing project implementation by planning'
Factor	Success factors and project outcomes/project performance	Surveys, quantitative cross-sectional analysis, regression analysis, deductive, static	R&D	What determines project success?	Complex task	'Targeting project management by factors'
Contingency	Project organization design/structure	Surveys, multiple case studies, single case studies, deductive/inductive, static	R&D	Why do projects differ?	Organizational structure	'Adapting project organization to contingencies'
Behaviour	Project organization processes	Case studies, experiments, inductive, longitudinal, dynamic	Change development	How do projects behave?	Organizational process	'Shaping processes of project organization'
Governance	Governance of project organizations/ transactions	Case studies, deductive, static	Construction	How are projects governed?	Complex transaction	'Governing project organization/ transactions'
Relationship	Management of the formation and development phase of projects	Case studies, inductive, longitudinal, dynamic	Engineering, construction	How are the early stages of projects managed and how are projects formed?	Multi-actor network	'Developing relationships and projects'
Decision	The interplay among decision-makers in the (mainly) early stages of projects	Case studies, longitudinal, deductive/inductive, dynamic	Public sector, IT	Why are projects instigated, why do they continue to live?	Large-scale investment	'Politicking and influencing decision-making processes'

Source: Soderlund (2011)

4.2.3 Methodological Issues in Construction Management

In this section, a review on the methodological issues published in the construction management field is highlighted to provide an overall picture of the complex reality. From the mid-1990s onwards, researches have debated the choice of research approach in construction management. Seymour *et al*., (1997) started the debate in paper titled, "The role of theory in construction management: a call for debate", by claiming that the positivist research methods are inappropriate for research into construction management. Positivist approach is based on knowledge gained from 'positive' verification of observable experience rather than introspection or intuition. Scientific methods or experimental testing are the best way of achieving this knowledge (Cohen & Crabtree, 2006). Furthermore, the authors suggested interpretative (qualitative method) is more suitable than rationalist (which is usually but not necessarily quantitative) in the construction management field. However, the debates continued with Runeson (1997) replied to Seymour *et al*., (1997) by defending that the positivist methods provide the best insurance against bad research in construction management studies. In addition, he also claimed that the quantitative methods have been modified adequately to cope with the demands of management research. Meanwhile, Raftery *et al*., (1997) who wrote a note written in response to Seymour's call for debate, have suggested that a multiple paradigm approach is superior to the single interpretist approach (mixed method). The authors emphasized on the importance of combining quantitative and qualitative methods by arguing that mixed methods are important to compliment and validate each other in producing excellent knowledge in developing and advancing the research method.

However, a possible conclusion that can be drawn from the debate generated by Seymour *et al*., (1997) is, it is tough to accept that a single research method is suitable to be applied to all management research problems because research is a lot more than merely investigating something the researcher does not know because it looks for particular relationship, correlation, predictions and generalizations which form a systematic study (Wing *et al*., 1998). Thus, for the purpose of this study, to ensure the proposed research method is appropriate and fulfil the standard of doctoral study, the characteristic provided by Wing *et al*., (1998) is used as general guideline to produce a comprehensive research model.

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Figure 4.2.3: Characteristic of research method

This section end with a comment given by a group of scholars who provides a valuable insight on the importance of considering appropriate research methodology to allow a research to be completed in an appropriate framework. According to Wing *et al*., (2008), the choice of research method made by a researcher needs to be carefully matched with the nature of the research and should be explained in details. This means specifically to make transparent and clear descriptions by ensuring the methods comply with the rules and procedures.

4.2.4 Research Paradigm Adopted

The key research questions and the research phenomenon influence the type of paradigm that has to be adopted (Remenyi *et al*., 1998; Pollack, 2007). The conceptual model is also strategic in deciding which paradigm to follow (Miles & Huberman, 1994). Moreover, the conceptual model also forces the researcher to be rational and systematic about the constructs and variables to be included in the research instrument

In this study, after taking into consideration inputs from the school of thought of project management and issues on methodology in construction management area, the hard paradigm or quantitative research method is adopted. Scholars and researchers have recognized the complexity involved in measuring behavioural competencies - cognitive styles, in this case. However, there is still a general consensus that by considering the contribution of an individual's behavioural action over a period of time, it should be possible to scale the degree to which they are desirable with enough precision to distinguish between them (Gellatly, 2001; Larson, 2005; Motowidlo, 1997). Quantitative study remain reasonably valid and reliable for predicting human performance even though it has been criticized for unreliable and vulnerable to numerous sources of distortion in measuring human behaviour (*e.g*., Murphy *et al.*, 1982; McCloy *et al*., 1994; Borman *et al*., 1995). That is, while the method of collecting data might differ depending on research focus and resources available (Ahadzie, 2007), researcher has come across studies in relation to behavioural competencies including project management practise which have been largely subjected to quantitative analysis (*e.g*., Soderlund, 2011). This section ends with the Table 4.2.4 that highlighted how the proposed conceptual model of this study embrace with the key principals that underpin the Factor School which subsequently supported the research paradigm adopted.

Table 4.2.4: Research Paradigm

Key Principals	Focus of Factor School	Focus of this study	Does this study reflect the Factor School?
Main Focus	Success factors and project outcomes/project performance	Cognitive styles influences on the project success	√
Methodology	Surveys, quantitative cross-sectional analysis, regression analysis, deductive, static	Quantitative Analysis	√
Context	Research and Development (R& D)	Research and Development for construction project manager	√
Key questions	What determines project success?	Do cognitive stylesattributes contribute to the project success?	√
Dominant idea	Complex task	Throughout project lifecycle	√
Project Management maxim	'Targeting project management by factors'	Target to achieve project successthrough project management's soft skill	√

However, in a glance, it can be said that this study also can be considered under bahavioural school. However, when we look into detail the criteria that formed the behavioral school, those criteria however seems unmatched with the objectives of this study. To explain further, Soderlund in his articles, summarized that the important feature of Behavioral school is related to the project organization process where it more concern on the analysis of the nature and process of the behavior of projects rather than on individual, which is the main focus of this study.

4.3 Research Design

4.3.1 Research Design and Research Process

The research design outlined the plans and procedures that span the decisions from broad assumptions to detailed methods of data collection and analysis in a research (Creswell, 2009). It is also known as a blueprint that is established through the framework in which the information is collected by researches to the study: procedures of inquiry (called strategies) and specific methods of data collection, analysis and interpretation (Bryman, 2004; Bryman & Bell, 2007; Creswell, 2009). In his comprehensive definition of research design, Kumar (2005) commented that a research design is a framework that is adopted by researches to answer questions objectively, accurately, economically and validly. Furthermore, Miller & Lessard (2001) have recommended components of research design which encompassed the following subject; research problem and questions, sampling procedures and data collection methods. Meanwhile, Rockinson-Szapkiw (2013) expressed that a research design should fulfil the following criteria: (a) when and how often to collect data, (b) what data to collect and whom the targeted respondents, (c) how data should be analyzed, (d) the researcher able to examines linkage, causation or relationships in the proposed study. Meanwhile, research process is the systematic process of developing a research from the development of an idea to the completed study.

The research design and process of this study is adapted and modified from Sekaran & Bougie (2010) and Mohamad Noorman Masrek (2011). The rationale for this adaption is that the Sekaran & Bougie's framework provides a definite guidance in the execution

of the proposed study while, the research process by Mohamad Noorman Masrek focused solely on the quantitative study which is suitable on the proposed topic.

4.3.1.1 Research Design

Issues such as purpose of the study, the study setting (the location of the study), type of investigation, extent of researcher interference, time horizon (its temporal aspects) and the unit of analysis (level in which the collected data were analyzed) are fundamental to research design (Sekaran & Bougie, 2010) and are discussed in this section. In addition, sampling design, data collection method, explanations on how variables will be measured (measurement and measures) and data analysis (how they were analyzed to get answers for research questions) to be discussed in subsequent sections.

Quantitative method is the research method selected for the current research. Quantitative method is defined as “a description of trends or an explanation of the relationship among variables” (Cresswell, 2005). Furthermore, the relationship between two or more variables are validated through quantitative method (Leedy & Ormrod, 2005). The quantitative method suits with the current research because the approach to a quantitative research is deductive, objective, focused, and outcome oriented (Creswell, 2005). A qualitative approach is inappropriate because qualitative method deals with open-ended questions, emerging approaches and requires data to be collected with interviews and observations (Creswell, 2009; Leedy & Ormrod, 2005). This is the opposite of the forced-choice questions found in the Cognitive Styles Instrument (CoSI) and PSQ (Project success Questionnaire) measured in this study. The rationale for this approach is that the most common formats in assessing behaviour patterns such as personality, social attitudes and psychopathology largely rely on self-reported measures

where respondents evaluate one question at a time, often depending on a rating scale (*e.g.*, Likert-type items) (Brown & Maydeu-Olivares, 2013). Moreover, the advantage of structured questionnaire is the ease of scoring and their objectivity (Salkind, 2003). Furthermore, it is well documented that the field of cognitive styles research uses quantitative (94%) and relies heavily on self-reports (57%), sample surveys (70%), which seems to be in accordance with characteristics of other organization studies (Aguinis *et al.*, 2009; Podsakoff & Dalton, 1987).

The primary purpose of this study was to examine the relationship between project manager's cognitive styles and project success in construction industry setting. In the research design, it is also crucial to identify the unit of analysis even as the formulation of research questions, since the data collection method, sample size, the variables designed in the framework guided by the at which data are aggregated for analysis (Sekaran & Bougie, 2009). The unit of analysis for this study is individual because a considerable amount of literatures have noted that one of the most critical factor for project success was the project manager (Jiang, 1998; Powl & Skitmore, 2005; Schwalbe, 2004). In addition, Howard (2001) also agreed that selecting right project manager and team players enhanced the productivity. Thus, this study is looking at the data gathered from project managers and treating each project manager's response as an individual data source. In a research design, researcher also has to decide whether a causal, correlations or comparative study needed to find a solution to the research problem. Causal study was chosen over other options because this approach aims to establish casual relationships between an observed phenomenon (the explanandum) and factors (the explanans) that influence the phenomenon (Bacharach, 1989; Whetten, 1989). The explanans or known as independent variable, explains or influences the changes in a responsive variable (dependant variable) (Moore, 2006). Thus, in this case,

this study is conducted to test the relationship between project manager's cognitive styles (explanatory variables) and project success (responsive variables) and to identify the level of influences of cognitive styles and its contributing variables on project success drawing from empirical data on project manager professionals working in construction industry. Next, the extent of interference by the researcher in this study falls in the minimal interference group within the normal flow of project manager's routine. In this case, questionnaires were distributed to the project managers and data collected at one point time. The researcher has not interfered with the normal construction activities, which it was in non-contrived settings (natural environment).

4.3.1.2 Research Process

Referring to the Figure 4.3.2.1, this section summarized the flow of the research process for the current study, with an emphasis on how it fits into the plan to produce a comprehensive research outcome at the end of the investigation (as explained earlier in Chapter 1).

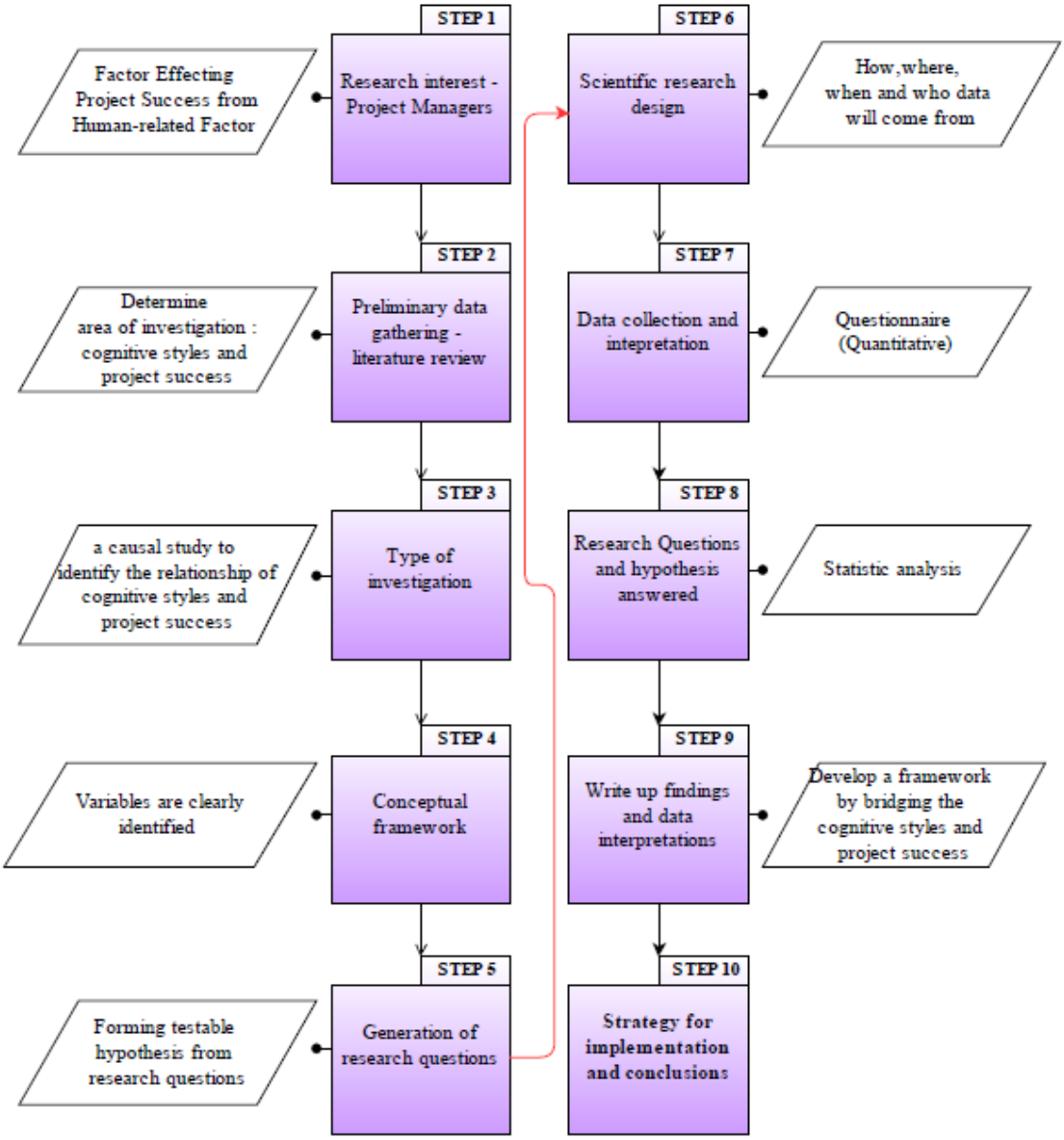


Figure 4.3.1.2: Research process for this study

4.3.2 Sampling Design

The sampling process involves selecting an adequate number of the right elements from the population, so that an investigation of the sample and understanding of its characteristics make it feasible for a researcher to generalize such characteristics to the population elements (Sekaran & Bougie, 2009). Furthermore, Punch (1998) pointed out that sampling is crucial in a research process because no study, whether quantitative or

qualitative can cover everything. In the social and behavioural sciences, there are actually four distinct categories; probability sampling, purposive sampling, convenience sampling and mixed methods sampling even though the sampling procedures frequently divided into two groups (probability, purposive) (Teddlie & Yu, 2007). The categories were illustrated in Figure 4.3.2(a) with a simple description to provide an overview of each group identified.

Table 4.3.2(a): Taxonomy of Sampling Techniques for the Social and Behavioural Sciences

Category	Description	Overall purpose
Probability	• Random Sampling • Stratified Sampling • Cluster Sampling • Sampling Using Multiple Probability Techniques	Designed to generate a sample that will address research questions
Purposive	• Sampling to Achieve Representativeness or Comparability • Sampling Special or Unique Cases • Sequential Sampling • Sampling Using Multiple Purposive Techniques	Designed to generate a sample that will address research questions
Convenience	• Captive Sample • Volunteer Sample	Easily accessible and provide some basic information quick and efficiently
Mixed Method	• Basic Mixed Methods Sampling • Sequential Mixed Methods Sampling • Concurrent Mixed Methods Sampling • Multilevel Mixed Methods Sampling • Combination of Mixed Methods Sampling Strategies	Apply both samplings method: Quantitative (to increase external validity) and Qualitative (to increase transferability)

This research applies ‘non-random judgment sampling’ or ‘purposive sampling’. According to Leedy and Ormrod (2005), the purposive sampling, a non-probability sampling, is used when a specific group of people were 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. The researcher identified the instances of the representative who are likely to have required knowledge, information and ready to

share it. Even though purposive sampling is largely being applied in qualitative and mixed method studies, but this non-probability sampling also can be used in quantitative research designs due to the inadequacy to use probability sampling (Laerd Dissertation, 2012). Table 4.3.3(b) descriptions on the purposive sampling.

Table 4.3.2(b): Purposive Sampling

Dimensions	Purposive Samplings Techniques
Alternative name	Purposeful sampling Nonprobability sampling
Overall purpose of sampling	Designed to generate a sample that will address research questions
Issue of generalizability	Seeks a form of generalizability
Rationale for selecting units	To address specific purposes related to research questions Focus on Project Manager (representative of the population)
Sample size	Adequate to perform the data analysis
Breadth of information per unit	Focus on breadth of information generated by the sampling units
When the sample is selected	Before the study begins
How selection is made	Utilizes expert judgment (In this case, the project manager)
Sampling frame	List frame
Form of data generated	Numeric data generated

Source: Teddlie & Yu (2007)

It is important to address that the best sampling technique for this study's primary unit of measurement (project manager) is a probability sampling. However, due to the following reasons, non-probability sampling was adopted:

a) The researcher focused on a specific group of people (project manager) and this method able to generate a sample that will address the research questions.

b) Lack of access to a list of the population being studied

- Initially, the researcher intended to conduct a probability sampling drawing upon the list of Project Management Consultancy (PMC) organizations registered with Ministry of Finance. Unfortunately, the information provided was notably vague and outdated during the period of survey.

- Then, the researcher contacted The Project Management Institute, Malaysia Chapter (PMIMY) to obtain a list of registered project managers in Malaysia because Project Management Institute (PMI) is very well known as the world's largest not-for-profit membership association for the project management profession. Regrettably, PMIMY and PMI's Asia Pacific were unable to care the necessary information (mailing list) due to confidential issue.

The research sample were drawn randomly from the registered list of the Construction Industry Development Board of Malaysia (CIDB) under ISO 9001-2000(G7) certified companies. The G7 class has tendering capacity of more than 10 million Ringgit Malaysia. The reason why ISO certified companies were chosen because in the construction industry, the ISO system guide the managers in identifying the nature of workmanship, defective works, productivity problems and finding solutions to increase the efficiency of their workforce through a proper development of in-house management (Iwaro, 2012; Nafees Ahmed Memon *et al*., 2011). Thus, it is expected that the respondents (project manager) from ISO organizations are able to provide an appropriate and valuable insights that add important knowledge of the value and practice of the project manager from the perspective of this study. There are advantages to such approach toward participant selection. Firstly, respondents will have sufficient knowledge of the issues being questioned. Secondly, the respondents will be answering from a position that reflects actual practitioner recognition and application of the issues. According to Leybourne (2006), salience is an important factor in influencing respondents to complete and return questionnaires. The process involved in obtaining the data from the sources (project manager) is discussed in detail in the following section. At the time of enquiry, the total number of organizations was around 550

(Peninsular Malaysia only). Referring to the rules of thumb determining the sample size, around 50% was sampled. Initial contacts and invitations to participate in the study were emailed and faxed to 200 companies through Head of Project Managers. The initial invitation process was followed up by telephone. A total of 190 companies responded and each company had nominated a project manager. In the following procedure, the questionnaires were successfully delivered. Details regarding this process can be found in the following section.

4.3.3 Data Collection

In a research design, data collection methods are crucial since the use of appropriate methods significantly enhance the value of a research. This section outlines the steps involved in data collection process to make sure that the information collected done in a way that is consistent with the study needs. Furthermore, the information gathered using accepted data collection techniques help to protect the credibility and reliability of the data. Every step of the data collection in this study is presented in the following paragraphs.

Prior to the actual data collection process, the questionnaire were administered to a small pilot sample of 10 experienced construction project managers who registered with the Project Management Institute, Malaysia Chapter (PMIMY) to assess the ease of understanding and completion of the questionnaire, the time taken to complete the questionnaire and any deficiencies in the questionnaire design. The list was provided by the Director of Membership PMIMY from his personal network. This exercise allowed the researcher to validate the instruments in the Malaysian context because this study adapted the structured and standardized instruments. The feedback from the pilot

sample was good and the pilot respondents did not suggest any modifications to the both instrument (CoSI and PSQ). The pilot respondents not included in the research study because pilot respondents only provided feedback and assisted to establish time parameters (Creswell, 2005) for completing the COSI and PSQ instrument. .

Following piloting, the questionnaires were issued. Initial contacts and invitations to participate in the study were emailed and faxed to 200 companies through Human Resource Department/Management Department. The initial invitation process was followed up by telephone. As most of the construction companies were large organisations, awaiting responds from their management was a long and difficult process. A total of 190 companies responded and each company has nominated a potential respondent who has experience in the management of projects to participate in the study. The nominated individuals were reviewed to ensure that the sample is represented by individuals who are project managers.

Questionnaires were successfully delivered to the targeted respondents through electronic questionnaires (email) and personal delivery of self-administered questionnaires. The email survey has been chosen because it can be quicker and more effective than postal surveys at reaching a wider audience (Adams & Brace, 2006). Meanwhile, personal delivery was made to increase the rate of response. Another likeable aspect of this approach is the greater control it gives over sample design by ensuring a proper representation of the sample (Lovelock *et al*., 1976). After a series of reminders through emails, internet, fax services and telephones, 183 individuals out of the 190 questionnaires delivered to targeted companies responded giving a response rate of 96%. The questionnaire survey was conducted in 2013 (January – July). The questionnaire is divided into three sections covering different aspects. In the first

section, the respondents specified their socio-demographic characteristic. The explanatory variables and responsive variable were assessed in the second and final sections of the questionnaire. The details on the instruments were discussed in depth in following section.

4.3.3.1 The Survey Instrument Design

This study is a quantitative study and basically quantitative research use standardized instruments to collect data and measure the variables involved (Leedy & Ormrod, 2005). The instruments chosen for the current research are the CoSI (Cognitive Styles Indicator) and the PSQ (Project Success Questionnaire). The CoSI is a self report questionnaire which based on three cognitive styles: Knowing Style, Planning and Creating Style. The CoSI instrument was used to determine a participant's cognitive styles type. Meanwhile, the PSQ was used to collect data on project success. It was based on Pinto & Slevin's (1986) project implementation profile that uses a model of project success consisted of two key themes: the project and the client total.

There are three main parts to the survey instrument plus a preamble that explains the purpose of the research, the expected outcome and how the findings are to be disseminated including feedback to the participants (see Appendix A). The substantive parts of the instrument are as follows:

Demographic

Aside the preamble, the first part of the survey instrument contained demographic information related to the classification of the participants; age, gender, position in firm,

how long they have been in business and project nature they have involved in recent years.

Cognitive Styles Indicator (CoSI)

Eva Cools and Herman Den Broeck (2007) developed CoSI instrument based upon three cognitive styles: Knowing Style, Planning Style and Creating Style. It is a non-unitary conceptualization of style (Hodgkinson & Sadler-Smith, 2003) which offers a flexible approach to style assessment (Miron, Erez & Naveh, 2004) where a total number of 18 items are used in describing those styles. This multidimensional instrument is different than unidimensional approach where the requirement of unidimensionality measure one attribute at a time (Sick, 2010). Meanwhile, multidimensional instrument involved several dimensions in a measurement instrument. People with Knowing Style is labelled as individuals who have strong analytical skills; 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). Meanwhile, individuals who fall in Planning Style categorized by a need for structure who prefer to organise and control in a well-structured work environment (Cools, 2007). The planners also make decision in a structured way and focus in the process of preparation and planning to reach targeted objectives (Armstrong *et al.*, 2012). Individuals who categorized in Creating Style tend to be creative and prefer experimentation where 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).

When it comes to the selection of appropriateness, the CoSI instrument was chosen over other instruments because in the most recent studies in the field of cognitive style, the scholars recommended to employ alternatives instruments of multidimensional concepts such as CoSI of Cools and Van den Broeck (2007), REI of Epstein *et al*., (1996), and the LNTSP of Vance *et al*., (2007) (Armstrong, 2012). Among the suggested instruments, the CoSI was selected because the instrument has demonstrated some promising findings which are valid, reliable and convenient multidimensional instrument for use with professional and managerial groups (Cools, 2007). Furthermore, this instrument also focuses on the business and management area of application by overcoming the issues regarding validity, reliability and scoring. In the field of cognitive styles, in the examination on psychometric grounds, the measures received criticisms such as lengthy measures, some measures not applicable to business field, lacking of published independent evaluation of several self-reporting instruments developed as management training tools and some measures requires a trained rater for scoring and interpreting the results (Allison & Hayes,1996; Cools, 2007). The CoSI instrument provided a firm support for the reliability and validity of the measurement instrument. During the development of the instrument, reliability, factor analysis, and measurement item have demonstrated the internal consistency and homogeneity on the three styles: Knowing, Planning and Creating Styles. The instrument demonstrates internal consistency, with Cronbach's alpha coefficients ranging from .73 to .85. The instrument also shows a clear factor structure which was conducted in a two-stage factor analytic procedure. Exploratory factor analysis (EFA) explored the underlying factor structure and recommended a three-factor solution (knowing, planning, and creating styles); while the Confirmatory factor analysis (CFA) demonstrated adequate factor loadings that fit for this three-factor model (Cools, 2007; Cools & Van den Broeck, 2007). The test scores also demonstrated temporal stability from the procedure of test-

retest reliability ranging from 0.75- 0.87 (Cools, 2007). Meanwhile, the construct validity of the instrument has been proven by including other well known instruments in the validation process. The validity strengths has been examined with the Kirton Adaption–Innovation Inventory (KAI), the Rational–Experiential Inventory (REI), and the Cognitive styles Index (CSI), Myers-Briggs Type Indicator (MBTI) and finally with Single-Item Measures of Personality (SIMP).

Project Success Questionnaire (PSQ)

The questionnaire that was used to collect data on the project success is the short questionnaire which was based from project implementation profile (PIP) questionnaire. The PIP was based on Pinto and Slevin's (1986) instrument that uses a model of project success composed of two key themes: the project and the client which is a classic and still widely quoted paper (Muller & Turner, 2010). The scholars have been identified as early giants of project success due to their significant contribution which enabled organizations to "benchmark" the projects status against the average assessment results by applying PIP instrument to more than 400 projects and the organization managed to identify areas for improvement in their own projects (Finch, 2003; Muller & Jungdev, 2012).

The questionnaire for this study covered the common measures of project success which labelled as schedule, on budget and the performance. Furthermore, this questionnaire also covered client measures such as client satisfaction (on the performance of the project), usage of the project (used by the targeted client) and impact of the project on organizational effectiveness (benefit the targeted users) (Geoghegan & Dulewitch, 2008).

When it comes to the selection appropriateness, this short questionnaire (PSQ) was selected because the measure has been developed and tested as a generalized project manager success measure (Geoghegan & Dulewitch, 2008; Pinto & Slevin, 1986). The reliability of the questionnaire is ensured through the Cronbach's alpha testing and the PSQ demonstrated a very good strength of association with a coefficient of 0.81 (Geoghegan & Dulewitch, 2008). Furthermore, PSQ can be measured at any stage of a project lifecycle and interestingly, it can be applied a number of times at different stages to identify areas of concern (Finch, 2003). One of the most important reason why the researcher proceed with the PSQ from Pinto and Slevin's PIP is due to the strong recommendation from Muller and Jungdev (2012) who critically reviewed the Pinto & Slevin's contribution. According to Muller & Jungdev (2012), Pinto & Slevin's PIP which was established through cooperation and collaboration between their studies and associated publications provide a firm groundwork for a in-depth future study in relation to project success. It was found that the authors methodically focused on aspects of project success, such as measuring success or identifying the importance of CSFs. Furthermore, the uniqueness of the measurement lies on their comprehensive approach of defining project success, gathered a comprehensive list of factors that supported success and finally provided a detail assessment of the different weights of these identified factors over the project life cycle and in different settings of field. It is remarkable that Pinto and Slevin able to develop a tool which able to assist project managers to assess the status of projects by comparing them with a database of over 400 projects (Pinto & Slevin, 2006).

4.3.3.2 Validity: Internal and External

In this study, the internal and external validity of the questionnaire has been considered since the selection of the measurement items was extracted on a review of the theoretical and empirical literature. According to the Leedy & 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 the internal validity is considered from theory to hypothesis testing, research design, instruments, procedures and data analysis that affects between two variables (Dyett, 2011). Meanwhile, the external validity deals with truth of conclusions that a researcher draw for generalizations (Trochim, 2007). Thus, the research methodology was evaluated to ensure the internal and external validity of this study was taken care of properly. The details have been summarized in the table below.

Table 4.3.3.2: External and Internal Validity

Internal Validity	External Validity
• During the research, participants were verified as Project Manager or construction practitioners who have experience in the management of projects. • The internal consistency reliability and construct validity in previous studies were checked to ensure that they are inherently sound (Pallant, 2007) • Use of regression analysis to examine the relationships among responsive and explanatory variables	• Survey is completed in natural environment- the data collection process not interfered with the normal construction activities, which it was in non-contrived settings • A purposeful sample was used to select the participants for the current research.

4.3.4 Method of Analysis

Having taken delivery of the data, a quick visual scan was undertaken to determine the extent to which the respondents had followed the instructions. The first impression was that the respondents had responded reasonably well to the questionnaire. Thereafter, data entry began by inputting into SPSS version 20.0. for subsequent analysis. The methods of data analysis include factor analysis, reliability and validity of the measures used in this study. Subsequently, inferential statistics were used to answer the research questions and hypothesis.

Firstly, the demographic analysis were performed to provide statistical characteristic of the respondents' background. Quantifying of data, analyzing trends of the data, identifying particular needs and making projections are examples of demographic analysis involved in the process of quantifying the data (Loprest, 2012). The demographics found within this study provided the baseline data necessary for the researcher to quantity and analyzed trends in sample such as gender, age, work position, work experience and project nature.

After the completion of demographic analysis, to assess the psychometric properties of the measures or constructs used in this research, factor analysis and reliability analysis were conducted. Exploratory factor analysis using principal components analysis was used to investigate the construct validity of the constructs. The internal consistency reliability for the different constructs was determined with Cronbach's alpha coefficient (Cronbach, 1951).

To find answers for research questions (RQ2 and RQ3) and to test research hypothesis proposed in this study, a series of analysis are performed to discover the solutions. To test the research hypotheses which address the research questions, the relationships between the variables were investigated using bi-variate correlation analysis. At the second stage of data analysis, linear regression test has been carried out. Linear regression is the following step after correlation test in statistical analysis. In this study, there are two reasons that this study opted for linear regression test. Firstly, to further explore the collected data and validate earlier inferences about correlations and secondly to find solutions for fourth research question (RQ4) which would like to identify the level of influences caused by the project manager's cognitive styles on project success and its elements. However, before the linear regression test is conducted, the assumptions test have been demonstrated to ensure the data collected met all the assumptions for the linear regression. "Passing" the assumptions are required for a linear regression test to produce a valid result. In this study, all the assumptions of linearity were met successfully.

4.4 Summary

In this chapter, research design and methods used to achieve research objectives were discussed. The chapter began with the introduction on research paradigm in project management field. It discussed the research paradigm from broad spectrum before focusing on the construction management area. This section has identified that this study belongs to the Factor School of thought because it deals with the attributes such as project success, measure and criteria. This was followed by the main part of the methodology chapter. The research strategy employed in the study is based on quantitative approach. The quantitative method is carried out through questionnaire

survey where the respondents are drawn from purposive sampling. The questionnaires are standardized instruments which were adopted from prominent authors in the respective field. Clear support for the validity and reliability of this study are also provided before the method of analysis applied on this research ended the chapter.

CHAPTER 5

RESULTS AND ANALYSIS

5.1 Introduction

Previous chapters have successfully concluded the introductory, reviewed the relevant literature and explained the research methodology, thus, this study now moves into the analysis zone by discussing the findings of the study about the relationship between cognitive styles and project success. As discussed in Chapter 4, several methods of statistical analysis were employed to find the answers for research questions postulated in this research. The data collected were analyzed with the Statistical Package for the Social Sciences (SPSS) version 20. This chapter first presents the background of the respondents, following by the factor analysis, reliability and validity of the measures used in this study. Subsequently, inferential statistics were used to answer the research questions and hypothesis.

5.2 Psychometric Assessment

To assess the psychometric properties of the measures or constructs used in this research, factor analysis and reliability analysis were conducted. Exploratory factor analysis using principal components analysis was used to investigate the construct validity of the constructs. The internal consistency reliability for the different constructs was determined with Cronbach's alpha coefficient (Cronbach, 1951). Generally, a minimum Cronbach's alpha-value of .70 is regarded adequate and an alpha-value of .80 or more is considered good (Nunnally, 1994). The assessment results found that all the

measures have good reliability and validity for this research. Before that, using descriptive statistics, the normality test was performed in order to meet the assumption of normality. In this study, to access the normality assumption, the information of Skewness and Kurtosis statistics and also Normal Q-Q plot that was gathered from descriptive statistics was used.

The variable seems to be approximately normally distributed if the value of Skewness and Kurtosis coefficients in the range of ±2.0. Normal Q-Q plots also one of the tools to measure the normality of the variable. If majority observed values (smaller dots) lies on the straight line in this plots, this variable is approximately normally distributed. Referring to the table below (Table 5.2), all variables were normally distributed since majority criterions (2 from 3 criterions) claim each variable was normally distributed.

Table 5.2: Normality Checking

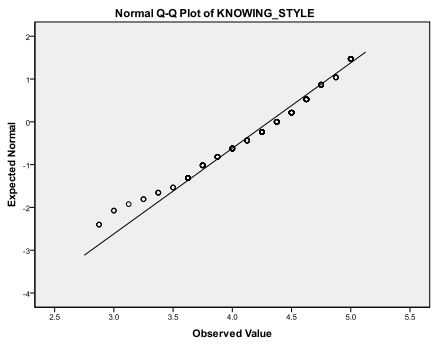
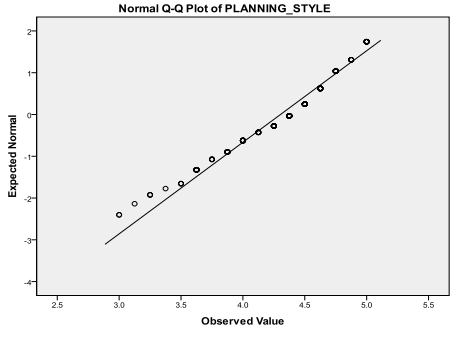
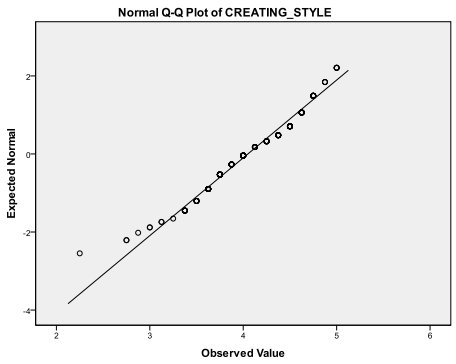
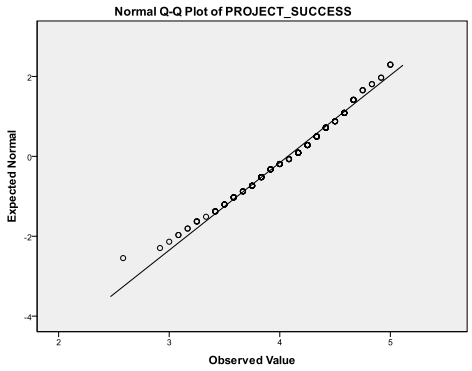
ITEM	SKEWNESS	KURTOSIS	Q-Q PLOT
Knowing Style	-0.598	-0.094	
Planning Style	-0.591	-0.167	

Table 5.2: continued

ITEM	SKEWNESS	KURTOSIS	Q-Q PLOT
Creating Style	-0.353	0.122	
Project success	-0.382	-0.072	

Referring to the above charts, all variables were normally distributed since majority criterions (2 from 3 criterions) claim each variable was normally distributed.

5.2.1 Assessment of Project Success Constructs

Principal Component factor Analysis (PCA) with varimax rotation was conducted to validate the underlying structure of the project success constructs. Factor analysis using factor loadings of .50 (as recommended by Hair *et al.*, 2006) is performed. Factor analysis was performed for the 12 project success factors that form the PSQ using a statistical package for the social sciences (SPSS). The sample was first assessed for its

suitability to the factor analysis application. The Kaiser–Meyer–Olkin Sampling Adequacy Test and Bartlett's Test of Sphericity were carried out. The results of these tests are reported in Table 5.2.1(a). The Bartlett Test of Sphericity was 817.99 and the associated significance level was 0.000, indicated that the population correlation matrix was not an identity matrix (Larose, 2006). Moreover, the value of the Kaiser–Meyer–Olkin (KMO) measure of sampling accuracy was 0.828, and was considered acceptable (Hair *et al*., 2006). The results of these tests showed that the sample data were appropriate for factor analysis. Subsequently, for clarity and interpretative purposes, the loading values (factor analysis) were examined using Hair et al.'s (2006) guideline for practical significance. This guideline indicated that a component loading of ±0.3 meant the item was of minimal significance, ±0.4 indicated it was more important, and more than ±0.5 indicated that the component was significant. The table 5.2.1(b) demonstrated that the 12 items of project success are clustered into 3 factors, with the factor loadings for most of the items are between 0.5 and 0.8, which is considered valid and consistent with the theoretical framework in this study.

Table 5.2.1(b) reveals the factor grouping of the project success criteria using the Varimax rotation with Kaiser normalization method. Three components were obtained from the factor analysis with Eigen values greater than 1.0.

Table 5.2.1(a): KMO and Bartlett's test for Project success

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.828
Bartlett's Test of Sphericity	Approx. Chi-Square	817.99
	df	66
	Sig.	0.000

Table 5.2.1(b): Principal components analysis of Project success

	Factor		
Item	**1**	**2**	**3**
Usability			
Deliverable works	-.012	**.569**	.552
Solves problem	.135	**.744**	.241
Used by client	.243	**.701**	.195
Important clients make use	.401	**.533**	.078
Ready accepted by users	-.156	**.798**	.294
Value of Project Outcome to Users			
Improves performance	**.686**	.239	.280
Benefits users	**.637**	.314	-.138
Provides improvements	**.588**	.379	-.050
Positive impact on users	**.664**	.353	-.005
Project Delivery			
Schedule	.028	.203	**.881**
On budget	.051	.238	**.862**
Good project process	.067	.160	**.785**
Eigenvalues	2.744	2.638	2.116
Percentage of variance	22.863	21.986	17.635
Cumulative percentage of variance	22.863	44.849	62.484

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Major loadings for each factor are in bold.

5.2.2 Reliability Analysis

To check the quality of the research instrument that have been used in this study, reliability of the measurement was conducted. The analysis of Croanbach's Alpha-Coefficient was performed in order to access the reliability of the measurement.

According to Halilah (2010), the widely accepted social science cut-off is that alpha value should be .70 or higher for a set of items to be considered scale, but some use .75 or .80, while others are as lenient as .60. Croanbach's Alpha values which are quite sensitive to the number of items in the scale. The Croanbach's Alpha values will reduce below 0.60. In this case, it may be appropriate to report mean inter-item correlation for the items. The optimal range for the inter-item correlation is .20 to .40 (Briggs and Cheek, 1986).

The Cronbach alpha coefficients in this study for the cognitive styles are 0.78, 0.81 and 0.82 for the knowing, planning, and creating style respectively. Meanwhile, the internal consistency of the project success measures was tested and a coefficient of 0.85 was found. The Cronbach's alpha for this construct demonstrated good internal consistency among different dimensions of success. From the results, it showed the entire instruments that have been applied for the purpose of this study, have a good internal consistency of measurement. This is due to the value of each construct demonstrated Croanbach's Alpha value more than 0.70. Thus, this result confirmed that the proposed measurement were good and appropriate for the study.

5.3 Background of Respondents

The demographic analysis were performed to provide statistical characteristic of the respondents' background. Tables 5.3 showed the profile and demographics of the respondents. Respondents are carefully selected by identifying the persons with adequate background and experience. This approach helped the researchers select the right respondents who possess adequate knowledge to properly evaluate the subject and are capable of answering all of the survey questions. The final sample consisted of 183

participants with 120 (66%) males and 63 (34%) females. From this group, majority of the respondents (40%) were between 31 to 40 years old. This is followed by age groups between 21-30 (33%) years old and 41-50 years (17%) old respectively. Notably, the participants well represented the sample where all the respondents had experiences in the management of construction projects and they belonged to upper management level within their organizations. Of those who participated in the study, 90% of the respondents are project managers. Programme manager (9%) and organizational manager (1%) represented the remaining respondents. Respondents represented various segments of project nature that currently they were involved: 77% managing complex projects, 11% in infrastructure projects and 12% involved in different type of projects.

Table 5.3: Demographics of survey respondents

Category	Items	No. of Respondents	Percentage
Gender	Male	120	65.57
	Female	63	34.43
Age	21-30 years old	60	32.79
	31-40 years old	74	40.44
	41-50 years old	32	17.49
	51-60 years old	16	8.74
	More than 60 years old	1	0.55
Work Position	Project Manager	165	43.17
	Programme Manager	17	9.29
	Organizational Manager	1	0.55
Work Experience	Less than 5 years	41	22.40
	5-10 years	65	34.43
	11-15 years	38	20.77
	16-20 years	25	13.66
	More than 20 years	16	8.74
Project Nature	Residential	12	6.56
	Office	6	3.28
	Shopping Centre	3	1.64
	Infrastructure	20	10.93
	Complex	141	76.96
	Others	3	1.64

5.4 Inferential Analysis: Correlations and Regressions

5.4.1 Pearson's Correlation : Hypothesis Testing

In order to find answers for RQ2 and RQ3, research hypothesis were postulated . As such, a series of analysis are performed to discover the solutions.

a) *How does the project manager's cognitive styles relate to project success in this sample? (RQ2)*

*H*1o: There is no statistical relationship between the project manager's cognitive styles and project success

$H1_{a:}$ There is a positive statistical relationship between cognitive styles and project success

b) *Are there any relationships between the variables of cognitive styles and project success constructs? (RQ3)*

*H*2o: There is no statistical relationship between the Knowing Styles and project success

*H*2a: There is a statistically significant positive relationship between Knowing Styles and project success.

*H*3o: There is no statistical relationship between the Planning Styles and project success

*H*3a: There is a statistically significant positive relationship between Planning Style and project success.

*H*4o: There is no statistical relationship between the creating Styles and project success

*H*4a: There is a statistically significant positive relationship between Creating Style and project success.

To test the research hypotheses which address the research questions, the relationships between the variables were investigated using bi-variate correlation analysis. In general, the purpose of performing correlation test are: (a) to find out whether there is a relationship between variables, (b) to identify the direction of the relationship between the variables- whether it is negative, positive or zero and finally to discover the strength of the relationship between the proposed variables (Natrella, 2012). For the purpose of this study, the Pearson's Correlation test has been conducted to test the hypotheses that have been designated earlier. The parametric Pearson's correlation coefficient test results showed that project success construct was significantly correlated with the cognitive styles construct and with each of its variables. Results are given in Table 5.4.1(a) and Table 5.4.1(b).

Table 5.4.1(a): Correlation between Cognitive styles and Project success

		Cognitive Styles	Project success
Cognitive Styles	Pearson Correlation	1.000	.649
	Sig. (2-tailed)		.000
	N	183	183
Project success	Pearson Correlation	.649	1.000
	Sig. (2-tailed)	.000	
	N	183	183

** Correlation is significant at the 0.01 level (2-tailed)

Table 5.4.1(b): Pearson's correlation of independent and dependent variables.

	Cognitive Style	Knowing Style	Planning Style	Creating Style	Project success	Usability	Project Outcome to Users	Project Delivery
Cognitive Style	__							
Knowing Style	.762	__						
Planning Style	.775	.486	__					
Creating Style	.774	.320	.375	__				
Project success	.649	.514	.541	.456	__			
Usability	.599	.506	.476	.413	.906	__		
Project outcome to Users	.556	.397	.480	.415	.873	.676	__	
Project Delivery	.551	.452	.467	.369	.849	.705	.580	__

** Correlation is significant at the 0.01 level (2-tailed) for all variables associations in the table given above

a) Hypothesis 1

Hypothesis 1 was tested to determine whether an association exist between project manager's cognitive styles and project success. Pearson correlation was used to test the association where the null hypothesis can be rejected at a 0.01 level of significance. Pearson coefficient between the variables was set at 1 percent in order to demonstrate that all the elements of cognitive styles have a significant contribution to project success. The results of the correlation indicated that there is a significant association between project manager's cognitive styles and project success ($p<0.01$). The null hypothesis was rejected since the result was significant.

b) Hypothesis 2 – Hypothesis 4

Hypothesis 2 until Hypothesis 4 was tested to identify how the variables of cognitive styles associate with the project success construct. Again, using the same Pearson's test, the relationship between the variables are examined (n=183). The results successfully indicated that there were a significant association between the project success and project manager's cognitive styles variables ($p<0.01$). The variables of cognitive styles are consisted of Knowing Styles, Planning Styles and Creating Styles. Correlation associations for Knowing Style, Planning Style and Creating Style with the project success construct have a high co-efficient value (0.762, 0.775 and 0.774 respectively). The results show that this study rejects the nulls for all $H2_0$, $H3_0$, $H4_0$ to support the suppositions in the alternates. Besides the positive association between the Cognitive styles variables and project success construct, an interesting observation as part of analysis, there are some interesting high correlations coefficients between the individual variables of cognitive styles construct and the individual variables of project success in Table 5.4.1(c).

Table 5.4.1(c): Correlation association between individual cognitive styles variables and individual variables of project success.

	Knowing Style	Planning Style	Creating Style
Usability	0.506	0.476	0.413
Project Outcome	0.397	0.480	0.415
Project Delivery	0.452	0.467	0.369

Notes: Correlation is significant at the 0.01 level (2-tailed) for all variables associations in the table given above.

5.4.2 Linear Regression

At the second stage of data analysis, linear regression test has been carried out. Linear regression is the following step after correlation test in statistical analysis. It is most commonly used technique to predict how one variable of interest (the responsive variable) is affected in another explanatory variable. There are two reasons that this study opted for linear regression test. Firstly, to further explore the collected data and validate earlier inferences about correlations and secondly to find solutions for fourth research question (RQ4) which would like to identify the level of influences caused by the project manager's cognitive styles on project success and its elements.

RQ4 : What effect do project manager's cognitive styles and variables have on project success and its elements?

This was the case due to the fact that correlation does not prove that one variables causes a change in another variable. The linear regression test would allow to look deeper into the strong correlation value between cognitive styles and project success and to advance an understanding of the project manager's cognitive styles effect on project success. This will help to develop an appropriate cognitive styles framework that will

enable project managers to perform better and lead to project success. This Research Question 4 were not expressed as hypotheses.

However, before the linear regression test is conducted, the assumptions test have been demonstrated to ensure the data collected met all the assumptions for the linear regression. This is because, when the researcher decided to analyze the data using linear regression, part of the process involves checking to ensure that the data that needed to be analyzed can actually be analyzed using linear regression. “Passing” the assumptions are required for a linear regression test to produce a valid result. The assumptions are: (a) Linear relationship between 2 variables, (b) There should be no significant outliers, (c) There should have independence of observations, (d) Data is homoscedasticity, (e) Residuals (errors) of the regression line is approximately normally distributed.

Assumption (a) was access by performing plot of Normal P-P plot that was automatically produced by the multiple regression analysis option by SPSS software. By looking at the scatter plot of standardized residual value against standardized predicted value (Figure 5.4(a)), the figure clearly showed that explanatory variables have a linear relationship to responsive variable for this study. The assumption of linearity was meeting from the scatter plot below, which indicated that no pattern existed. Therefore, it can be concluded that the assumption of linearity was met.

In any statistical test, identifying outliers is important because outliers make statistical analysis difficult. An outlier is defined as, “an observation that lies an abnormal distance from other values in a random sample from a population” (NIST/SEMATECH, 2012). To identify no significant outliers presents for assumption (b), diagnostic outlier with respect to explanatory variable and responsive variable were conducted.

a. Diagnostic outlier with respect to Dependent (Responsive) Variable.

Diagnostic outlier with respect to dependent variable (y) was conducted by analyzing the scatter plot of the standardized of residual values against standardized of predicted values (scatter plot in Figure 5.4 (b)). This scatter plot indicates that the presence of the outlier respect to dependent variable (y) does not exist because all the plots dots are in the range of ±3.0 standard deviation.

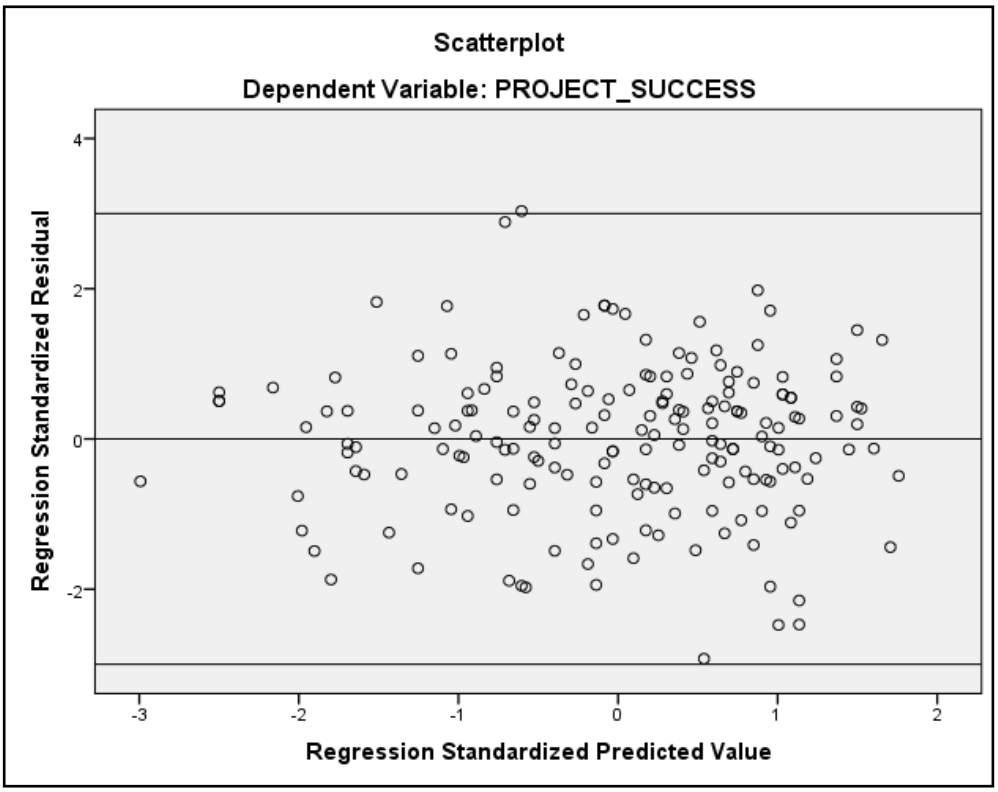


Figure 5.4.2(a): Diagnostic outlier with respect to Responsive Variable

b. Diagnostic outlier with respect to Independent (Explanatory) Variable

The diagnostics of the outlier with respect to independent variables was performed by doing a Mahalanobis Distance test. If each of case values is greater than this critical value test (χ^2 (.001,3) = 16.268), this case can be classified as an outlier cases. In the psychology, the Mahalanobis Distance is used to identify plots that don't "fit" in what is

expected given the norms for the data set. In this case, the process assisted the researcher to identify any cases that seems extreme and do not fit in with the data set. However, referring to the Residual Statistics table below, it can be concluded that the presence of the outlier among independent variables does not exist and met with the assumption of the multiple linear regressions, because the highest value of Mahalanobis Distances is 8.958, which is less than the critical value test (χ^2 (.001, 3) = 16.268)

Table 5.4.2 (a): Mahalanobis Distance test

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1932	4.5788	4.0661	.29162	183
Std. Predicted Value	-2.993	1.758	.000	1.000	183
Standard Error of Predicted Value	.025	.080	.034	.010	183
Adjusted Predicted Value	3.2044	4.5827	4.0661	.29154	183
Residual	-1.00296	1.04019	.00000	.34187	183
Std. Residual	-2.926	3.034	.000	.997	183
Stud. Residual	-2.936	3.046	.000	1.002	183
Deleted Residual	-1.01008	1.04802	-.00007	.34538	183
Stud. Deleted Residual	-3.000	3.118	-.001	1.009	183
Mahal. Distance	.001	8.958	.995	1.327	183
Cook's Distance	.000	.043	.005	.008	183
Centered Leverage Value	.000	.049	.005	.007	183

Dependent Variable: Project_Success

To rule out the issue of multicollinearity in the regression analysis (assumption (c)), a Variance Inflation Factor (VIF) test was performed. There are few common methods available for detecting multicollinearity but many regression analysts often rely on VIF which quantifies how much the variance is inflated (Young, 2013). Table 5.4.2(b) shows the VIF test results for the independent variables with the project success

construct as the dependent variable. Given that the VIF values are below 10 and tolerance levels are above 0.2, this confirms that multicollinearity is not a problem in this data set for regression modelling (Field, 2009). The Durbin–Watson test was also performed to detect the presence of autocorrelations in the residuals. The values of the Durbin–Watson statistics reported in Table 5.4.2 (b) are close to '2' which are considered acceptable for this test (Field, 2009).

Table 5.4.2(b): Summary Results of Collinearity Statistics

Variable	VIF	TOL
Knowing Style	.741	1.349
Planning Style	.710	1.409
Creating Style	.834	1.199

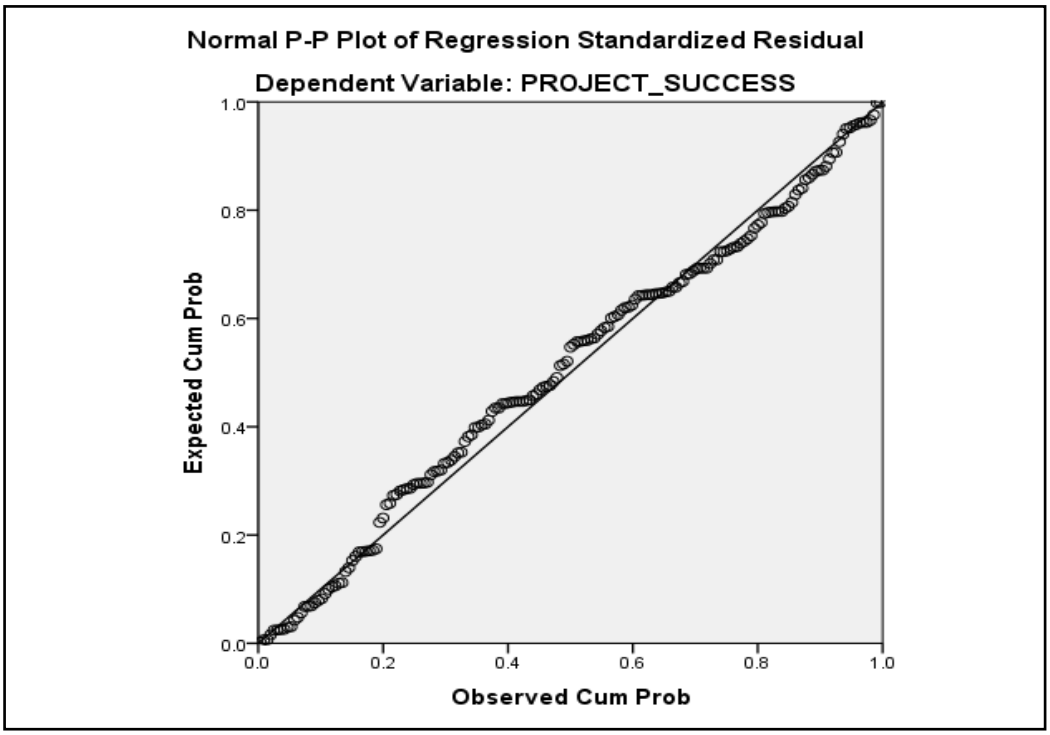
Note: VIF = Variance Influence Factors Statistics; TOL = Tolerance Statistics

To fulfil assumption (d), the data needs to demonstrate homoscedasticity. The scatter plot shows the variances along the line of best fit remain along the line. The plots that do not fit in the line are called heteroscedasticity. By looking at the scatter plot of standardized residual value against standardized predicted value (Figure 5.4(b)), the pattern of this graph were at random. The figure showed no serious pattern depictured from the line. Therefore, from this graphical method analysis, it can be confirmed that the residual of this model is homocedasticity.

The last step in completing the assumptions for linear regression test (assumption (e)), involves checking the normality of the distributed regression line. Two common methods to check this assumptions are by using a Normal P-P Plot or a histogram (with a superimposed normal curve). For the purpose of this study, the P-P Plot was referred to confirm the assumption. The residual of the model is normally distributed because

majority of the observed values (small dots) lies on the straight line (Figure 5.4(b)). This graphical situation can confirm that the residual of this model are normally distributed

Figure 5.4.2 (b): Plot of standardized residual value against standardized predicted value



Linear Regression Results

Summarized results of the linear regression for RQ3 are presented in Table 5.4.2.1(a) - 5.4.2.1(c). In the following, key findings from analysis are outlined.

a) An analysis of the relationship between the variables of cognitive styles and project success

It is apparent from the Table 5.4.2.1(a) that the cognitive styles is highly associated with project success where in overall it explained 41.8% of the variance in project success, with a very significant relationship explained by F values and Beta values ($F = 131.701$, $\beta = 0.649$, $p < 0.001$). The single most striking cognitive styles variable to emerge from

the data is Planning Style where it explained almost 30% (29.3%) variances in project success with significant relationship having F=75.017, $\beta = 0.541$, $p < 0.001$. All other variables, Knowing Styles and Creating styles, though demonstrated significant relationship, explained less than 30% variance in the dependent variables (each with significant relationship having $p < 0.001$, high F values and Beta values of 0.514 and 0.456 respectively).

b) Findings—correlation and linear regression cross validation

Consequently, the findings from section Table 5.3.2.1(a) can be cross examined by cross tabulating the results. The main reason for cross tabulating the results is to provide an overview of the interrelation and interaction between variables. The results of both Pearson r correlations and linear regression against each other are tabulated in Table 5.4.2.1(b). This table shows the F values from linear regression ranked in descending order along with the correlation values from the Pearson correlations. Interestingly, it is monitored that the linear regression analysis supports the results of the correlation tests.

c) An analysis of the relationship between the variables of cognitive styles and project success elements

Finally, in order to discover the effect of cognitive styles variables over project success elements, linear regression models were run for cognitive styles and each of its variables (Explanatory variable) against each variable of project success (Responsive Variables). This step allows testifying which individual project success elements highly affected by the cognitive styles approach towards the achievement of successful project by project managers.

Table 5.4.2.1(c) lists 4 models summaries (first 3 models representing each variable for cognitive styles and the 4th model was made for cognitive styles construct itself) for each variable of project success construct (responsive variables). The tables highlights the 3 models in which variables are arranged according to their strength. Solid shaded boxes model fit values (Adjusted R Square) to indicate which Explanatory Variables explain most in the corresponding Responsive Variables. The result indicates that cognitive styles construct itself is amongst the top 3 models hence explaining the most for each variable of project success. It explains in Usability (35.5%) and Value of Project Outcome to Users (30.6%) and surprisingly, the Project Delivery factor was found to be least significantly predictive project success element in relation to cognitive styles approach with total percentage, 30%.

The interpretation and possible explanations on the research questions and research hypothesis postulated for this study are performed in the following chapter.

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Table 5.4.2.1(a): Summarised results of linear regression

Independent Variables	Dependent Variables	R	R Square	Adjusted R Square	Durbin-Watson	F	Sig.	t	Sig.	Unstandardised Coefficients		Standard Coefficients	Tolerance	VIF
										B	SE	Beta		
Constant	Project success	0.649	.421	.418		131.701	0.000	3.350	0.001	.922	.275			
Cognitive Style					1.439			11.476	0.000	.757	.066	.649		
Constant	Project success	0.514	.264	.260		64.884	0.000	7.903	0.000	2.020	.256			
Knowing Style					1.448			8.055	0.000	.482	.060	.514	.741	1.349
Constant	Project success	0.541	.293	.289		75.017	0.000	6.495	0.000	1.748	.269			
Planning style					1.582			8.661	0.000	.544	.063	.541	.710	1.409
Constant	Project success	0.456	.208	.204		47.548	0.000	12.809	0.000	2.653	.207			
Creating Style					1.359			6.895	0.000	.357	.052	.456	.834	1.199

Table 5.4.2.1(b): Combined results for correlation test and linear regression tests

Independent variables	Dependents variables	Pearson's Correlation	Linear regression results	
			F	Sig.
Cognitive Style	Project success	0.649	131.701	0.000
Planning Style	Project success	0.541	75.017	0.000
Knowing Style	Project success	0.514	64.884	0.000
Creating Style	Project success	0.456	47.548	0.000

Table 5.4.2.1(c): Linear regression results for independent variables with individual variables of Project success

Independent variable	R	R Square	Adjusted R Square	Std. error of the estimate	Dependent Variable
Knowing style	0.506	.256	.252	.454	Usability
Planning style	0.476	.226	.222	.463	
Creating Style	0.413	.170	.166	.479	
Cognitive Style	0.599	.359	.355	.421	
Knowing style	0.397	.158	.153	.520	Value of Project Outcome to Users
Planning style	0.480	.230	.226	.497	
Creating Style	0.415	.172	.168	.516	
Cognitive Style	0.556	.310	.306	.471	
Knowing style	0.452	.205	.200	.400	Project Delivery
Planning style	0.467	.218	.214	.396	
Creating Style	0.369	.136	.131	.417	
Cognitive Style	0.551	.304	.300	.374	

5.5 Summary

This chapter has presented the internal scale reliability and construct validity of the survey constructs included in this research. The results from the psychometric assessments suggest that the constructs had good internal consistencies and construct validities and thus, provided confidence for hypotheses testing. Consequently, the hypotheses proposed in this research were tested. The hypotheses and the results from the tests are shown in Table 5.5. Furthermore, the demographic results suggest that the respondents have reasonable experience in construction project management which should give credence to the data collected.

Table 5.5: Hypothesis Testing

Hypotheses		Results
$H1_0$	There is no statistical relationship between the project manager's cognitive styles and project success	Rejected
$H2_0$	There is no statistical relationship between the Knowing Styles and project success	Rejected
$H3_0$	There is no statistical relationship between the Planning Styles and project success	Rejected
$H4_0$	There is no statistical relationship between the Creating Styles and project success	Rejected

So far, this chapter has demonstrated that cognitive styles has a significance relationship with project success. It is now necessary to interpret and explain the course and outcome of this statistical analysis that may help project managers to develop a better grasp of cognitive styles influences in attaining project success. The interpretation will be discussed further in the following chapter. Thereafter the development of the framework by bridging the cognitive styles and project success is described.

CHAPTER 6

DISCUSSIONS

6.1 Introduction

The chapter five has described the relationship between cognitive styles and project success through statistical analysis. The correlation and linear regression techniques which demonstrate a statically significant relationship provides supportive evidence to link the cognitive styles approach and project success. As already noted, the main aim of this study was to develop a framework by bridging the concept of cognitive styles and project success for Malaysian construction project managers. The motivation for the study stems from the increasingly important role that project managers are playing in the process of achieving project success in the construction industry and the subsequent necessity to address the direct influence of a project manager's cognitive patterns on project success from a human related perspective. Here the significance of cognitive styles and the individual variables towards engendering effective managerial performance in achieving project success and its elements elucidated. Thereafter, the discussion of the findings including potential implications for project manager's performance is argued in the context of how they converge with the body of literature in the human related perspective especially from applied psychology.

6.2 Interpretation of the Results and Discussions

6.2.1 An Overview of Findings from Statistical Analysis

The results from quantitative data analysis are reiterated in Table 6.2.1 together with the research questions designated for the purpose of this study.

Table 6.2.1: Summary of Findings

Research Questions	Hypothesis		Findings
RQ2: How does the project manager's Cognitive styles relate to Project success in this sample?	*H*1o	There is no statistical relationship between the project manager's Cognitive styles and Project success	• Hypothesis Null Rejected • Positive relationship found between cognitive styles and project success • There is a statistically significant relationship ($p < 0.01$) between the explanatory variables and the project success construct.
	$H1_a$	There is a positive statistical relationship between Cognitive styles and Project success	
RQ3: Are there any relationships between the variables of Cognitive styles and Project success construct?	*H*2o	There is no statistical relationship between the Knowing Styles and Project success	• Hypothesis Null (*H*2o, *H*3o, *H*4o) rejected • Correlation associations for Knowing Style, Planning Style and Creating Style with the Project success construct have a high co-efficient value (0.762, 0.775 and 0.774 respectively).
	*H*2a	There is a statistically significant positive relationship between Knowing Styles and Project success.	
	*H*3o	There is no statistical relationship between the Planning Styles and Project success	
	*H*3a	There is a statistically significant positive relationship between Planning Style and Project success.	
	*H*4o	There is no statistical relationship between the Creating Styles and Project success	
	*H4*a	There is a statistically significant positive relationship between Creating Style and Project success.	

Table 6.2.1: continued

Research Questions	Hypothesis	Findings
RQ 4: What effect do project manager's cognitive styles and variables have on project success and its elements?	not expressed as hypotheses	• Cognitive styles is highly associated with Project success where in overall it explained 41.8% of the variance in Project success, with a very significant relationship explained by F values and Beta values ($F = 131.701$, $\beta = 0.649$, $p < 0.001$). • Planning Style where it explained almost 30% (29.3%) variances in Project success with significant relationship having $F=75.017$, $\beta = 0.541$, $p < 0.001$. • Knowing Styles and Creating styles, though demonstrated significant relationship, explained less than 30% variance ($p < 0.001$, high F values and Beta values of 0.514 and 0.456 respectively).

6.2.2 Interpretation and Discussions

This section discusses the interpretation on the relationship of the cognitive styles and project success constructs which results from the quantitative analysis. Firstly, it focuses on the significance of project manager's cognitive styles and project success in an overall picture. This is then followed by an in-depth discussion of the emerging importance of cognitive styles variables (Knowing Styles, Planning Styles and Creating Styles) in achieving project success. Subsequently, the impact of cognitive styles construct on the elements of project success is evaluated to provide evidence that

enhanced project outcomes can be achieved for individual project success elements by focusing on this psychological construct.

6.2.2.1 Relationship between Cognitive styles and Project success

The statistically positive relationship found between cognitive styles and project success suggests that project manager's cognitive style is positively related to their achievement of project success. The linear regression results show that cognitive styles explained 41.8% of the variance in project success, with a significant relationship explained by F values and Beta values ($F = 131.701$, $\beta = 0.649$, $p < 0.001$). This indicates that by managing cognitive styles, the chances of project success can be significantly increased. Managing cognitive styles means that, once project managers are fully aware of the presence of this underlying mental skill, they are expected to direct their preferred style or mixture of styles into proper channel. This in turn increases the project performance because project managers are doing in a way they are good in it without rigidly sticking to the traditional approach of executing a task.

The findings of the current study are consistent with those of Mazur *et al*., (2014) who found that cognitive skills enhances the project success where the authors investigated from the aspect of cognitive flexibility. Dulewicz & Higgs (2003) identified three types of leadership competence associated with success: emotional, managerial and intellectual competence. In this research, the cognitive styles contains elements of managerial and intellectual aspects and show they are indeed related to project success supporting the work of Dulewicz and Higgs (2003) and the work of Müller and Turner (2010). Therefore, this study does hold potential to strengthen to understand of how people skills can enhance project success. This is supported by previous research which

suggested that many factors which drive project to success are derived from the human side (Mullaly, 2004; Thamhain, 2004). The result also in line with Cooke-Davies (2002) who highlighted that people are involved in every process and human dimensions presents in nearly all critical factors related to the project success including the task to determine the sufficiency of each process that has been carried out. Thus, the cognitive styles of project managers contribute significantly to project success in a construction project lifecycle because humanistic approach is crucial for effective project performance (Muller, 2010b). This is also supported by more studies which have featured the role of the human factor as a key element of project success (Belout, 2004; Kendra, 2004). Even though the performance of leadership is reported as the most researched aspect of human behaviour (Dulewicz, 2005) in contributing to project success, the important role of the cognitive styles from this human-related factor should not be overlooked. Interestingly, it has been argued that cognitive styles symbolized as a fundamental factor in determining individual behaviour (Armstrong *et al*., 2012). Furthermore, the cognitive styles also believed as a crucial variable influencing management practice (Hayes & Allison,1994) and performance (Armstrong *et al*., 2012).Thus, the results from this study indicated that cognitive styles drive managerial skills of project managers either directly or indirectly in the use of project management practices. Personal managerial skills of a project manager is steadily gaining emphasis and more widespread acceptance in the construction industry (Pheng & Chuan, 2006). As example, social skills, decision-making skills and problem handling skills have recognized as personal attributes that affecting project success. Therefore, by understanding the uniqueness of cognitive styles towards the achievement of project success by project managers, offer a promising direction in human-related factor studies. The following paragraph in this section explores what taking cognitive styles

seriously would imply for project management practise, supported by research findings by answering, “Cognitive styles – so what?”

Project managers are urged to perform effectively, be nurtured and encouraged (Pinto & Slevin, 1989); be generalist rather than specialists (Pinto & Kharbanda, 1995); able to perform within a system that support innovation and creativity (Webb, 2000); do ‘the right thing at the right moment’ (Rämö, 2002) by avoiding unproductive practises (McKenna, 1998). Thus, this views the managerial competencies as either the behavioural factors that enable project managers to carry out their responsibility that result in superior performance due to the nature of the project manager’s managerial position. A wide range of activities covered managerial positions (Keller, 2005). The definition of management is described as “the process of working with and through others to achieve organisational objectives in an efficient and ethical way” (Kreitner, 2002). This definition covered a task-oriented aspect and a people-oriented aspect (Cools, 2007). The task-oriented aspect deals with subject that matter on the achievement of goals. Meanwhile, the people-oriented aspect deals with issues regarding working with and through others (Cools, 2007). Researchers have investigated the topic of cognitive styles in relation to both of these aspects where it has been identified as important factor for effective decision-making and successful interpersonal relationships (Armstrong & Priola, 2001). For the purpose of this study, the focus is only on the task-oriented aspect where the researcher linked the empirical results with regard to decision making as an aspect of task-oriented managerial behaviour towards the achievement of project success construct.

An effective management of a project requires important skills from the aspects of decision-making, information processing and problem solving (Tett, Guterman, Bleier,

& Murphy, 2000). It has been noted that the job of managing is vitally one of processing information because forty percent of manager's time is almost exclusively dedicated to it (Mintzberg, 1994). This is in line with Mango (2009) who argued that the project manager is a profession that values thinking because they taught to think about what they are going to do before they do (Mango, 2009) in organising and evaluating information. Thus, it can be concluded that the importance of cognitive styles in describing organisational behaviour underlies with the fundamental management task of organising and evaluating information (Allison & Hayes, 2000) in decision making process. The dimensions such as strategic decision making, risk, escalation of commitment and framing effects and decision styles which influencing the decision making process from cognitive styles perspective has been implicitly addressed in the literature previously. Thus, the results from this study indicated that project managers do apply cognitive styles in organising and evaluating information from a task-oriented aspect in achieving desired project outcomes. However, the awareness of the need and ability to manage different types of cognitive styles and their "how, why and when" issues are addressed appropriately in the following paragraphs to grasp the understanding of the issues.

In the strategic decision making dimension, prior research has explored the relationship between cognitive styles and strategic decision making process (*e.g.*, Hough & Ogilvie 2005; Khatri & Ng, 2000) and scholars have confirmed that different cognitive styles use different problem-solving strategies and revealed various decision-making behaviours (*e.g.*, Gardner & Martinko, 1996; Hough & Ogilvie, 2005). It is interesting to note that cognitive versatility is the most valued approach for strategic decision making which enable individuals to unify and flex to the varying information processing demands (Hodgkinson & Rousseau, 2009). As example, Gallen (2006) discovered that

analytical types were more frequently expressed the defending strategy as the most preferred option. The defending strategy offers a stable set of products and competing mainly based on price, quality, service, and delivery (Gallen, 2006). Meanwhile, individuals with intuitive preferred approach favour a prospector firm strategy (*i.e.*, having a broad product definition, striving to be first in the market, and focusing on change and innovation) (Gallen, 2006).

Meanwhile, the dimension of risk discusses on how the cognitive styles influences a person's decision making process by identifying the person as a risk taker or risk avoider. In this case, identifying own cognitive styles will assist project managers in explaining the likelihood of taking strategic action and the perceived risk in a project cycle to achieve project success. As example, managers with a preference for sensing and thinking were most reluctant to take risks when making strategic decisions (Nutt, 1990).

The following dimensions, the escalation of commitment and framing effects also have been studied in relation to cognitive styles approach. The results of this correlational study may suggested that project managers are attached to the escalation of commitment where they have tendency to persist in a failing course of action to demonstrate that their previous decisions was correct (Wong *et al*., 2008). The framing effect also may exist in the decision making process by project managers where it is actually believed to happen when similar descriptions of a problem lead to systematically different decisions (Shafir, 2002).

Finally, the cognitive styles also noted to be closely related with the decision making strategy. An individual's decision style is established by combining one's perceiving

and judging tendencies, differentiating between ST (sensation-thinking), SF (Sensing–feeling types), NT(Intuition-thinking) and NF (intuition feeling) types (Cools & Van den Broeck, 2006). Thus, the identification of project manager's cognitive styles may indirectly assist in determining the decision making style that being practised by project manager professionals in order to achieve desired project success. The relation between the cognitive styles and with these four decision styles are summarized in the following table based on previous studies (Cools, 2007).

Table 6.2.2.1: The relationship between Cognitive styles and Decision Styles

Cognitive Styles	Decision Styles	Description
Knowing Style	ST and NT	ST- individuals in this group senses for perception and rational thinking for judgment. Preferred practical approach that relies on logical analyses of factual data NT- apply logical, impersonal, and theoretical analyses to explore the possibilities vested in a problem
Planning Style	ST and SF	SF – prefer to gather facts by relying on personel values to evaluate facts. Individuals in this group also like to deal with others with warmth, sympathy, and friendliness.
Creating Style	ST and NF	NF- likely to demonstrate artistic flair while relying heavily on personal insights rather than objective facts.

6.2.2.2 Importance of cognitive styles variables in achieving project success

Referring to the Pearson's correlation and linear regression results, the findings clearly showed that enhanced project success can be achieved by focusing on the cognitive styles variables which consists of Knowing Styles, Planning Styles and Creating Styles. Therefore, this section provides linkages between the project manager's cognitive styles

variables and Project success under project management approach. Accordingly, the information derived from this section could provide as basis of future project manager's performance management tools from cognitive perspective.

First and foremost, detailed analysis will be carried out on the Planning Styles. The Planning Style is the most significant individual variable contributing towards the Project success in this sample. Planning Style implies a preference for a structured, organized, efficient way of information processing (Armstrong *et al*., 2012). A simple description can be summarized as 'plan before act' (Cools, 2007). Individuals with Planning Style attach importance to preparation and planning to reach their objectives (Cools, 2007). Therefore, it can be asserted that, project manager's Planning Style which explains the most in Project success, perhaps not a surprising result since project management is the facilitation of the planning, scheduling and controlling of all activities to meet projected project objectives (Leban & Zulauf, 2004). A considerable amount of literatures have emphasized that planning techniques are required for an effective management of a project especially when the project is large (*e.g*., Bourne, 2004; Chan & Chan, 2004; Turner, 2005). For example, Dvir and Lechler (2004) investigated the relationships between three planning variables (i.e. the quality of planning, goal changes, and plan-changes) and project success. Using multivariate analyses, they demonstrated that planning was significantly and positively related to efficiency and project success. 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) also demonstrated that in order to be a competent good project manager, one must be capable to understand a situation by breaking it down into small parts or keep on record the effect of a situation in step-by-step, causal way. This is where the elements of Planning Style may come into

play. For instance, in a project planning stage, project manager need 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 execution process. Furthermore, project managers need to plan carefully and allocate human resources by work packets to avoid the shortages or surpluses of human resource during the project's execution (Belout, 2004). Therefore, the statistical analysis from this study able to confirm that project managers are right to give Planning Style the most attention compared to other styles in the process of making decisions and operationalising strategies to execute the project to success. It has been well documented in the literature for the needs of planning skills because a good plan can serve as a baseline, so that changes and actualisation can be followed by the continuous improvement of plans (Cserháti & Szabó, 2014). Inadequate advance planning skills contributes to the emerging crises during the course of a project (Doloi *et al*., 2011). As a result, Planning Style can assist project managers to contribute more effectively to Project success by enabling understanding of effective Planning Style skills for a job role. Thus, the following table (Table 6.2.2.2 (a)) presents the description of Planning Styles attributes which can be used to gain full understanding of the attributes and underpin an individual's performance level to achieving superior performance.

Table 6.2.2.2(a): The Descriptions of Planning Style Attributes

Planning Style Attributes	Descriptions
Sequential	• Prefer step-by-step approach to processing information • Depend on systematic methods of investigation • Generate solutions from a deeper investigation • Extract information through hands-on experiences and prefer well-structured work environments
Structural	• Prefer structured task and analysis; want to know exactly what has to be done and when (for example, where salient variables are known, quantifiable and controllable) • Like to make decisions in a structured way and are mostly concerned with the efficiency of the process

Table 6.2.2.2(a): continued

Planning Style Attributes	Descriptions
Conventional	• Adherence to rules-based approach – what and why do it. • functions according to a person's understanding of conventionally established rules of logic • Work with data under well-structured situations
Conformity	• Reflects a preference for operating within rules, structures, and consensus • Prefer to conform and respect to authority • Conform to the expected ways of doing business. need to operate on the basis of consensus and agreement • Solve problems in previously tried and proven ways.
Planned	• Like to work in a orderly way • They attach importance to preparation and planning to reach their objectives
Organised	• Like to organize and control • Setting priorities on a rational basis; and identifying time sequences and causal relationship.
Systematic	• Perform tasks according to a fixed plan or system • use of systematic procedures designed to thoroughly assess all pertinent information, evaluate costs and benefits, and, ultimately, make a decision based on conscious deliberation
Routine	• Carry out task as part of a regular procedure • Prefer same ways of doing things

(Source: Savvas, 2001; Sun & Hui, 2012; Zhang & Sternberg, 2005; Cools, 2007; Leybourne, 2007; Dutta & Thornhill, 2008; Cools & Van den Broeck, 2007; Mei *et al*., 2005; Dane,2007; Ko, 2008)

Turning now to the Knowing Style where it has been identified as the next important individual independent variable contributing towards Project success. Knowing Style is described as a person who has strong analytical skills; 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). At a first glance, the definition of Planning Style and Knowing Style is quite similar. However, the underlying motto of people with a Knowing Style can be summarised as 'think before you act' where characterised by a preference for facts and details, while people with a Planning Style show a preference for structure and order (Cools, 2007). Over the last 20 years, the importance of rational

and analytical thinking has been considerable interest in testing new paradigms of leadership in project managers (Leban & Zulauf, 2004).This view is supported by Thomas and Mengel (2008) who writes that rational and analytical knowledge able to direct project manager to grow towards a competent and proficient performer. In the same vein, Muller & Turner (2010) notes analytical thinking as one of the important competencies that should be possessed by project managers in achieving project success. This due to the fact that most of the thinking done by project managers in a project management process is analytical thinking (Mango, 2009). For example, construction projects which involve high levels of mobility and a continuous deadline pressure (Bredin & Söderlund, 2013) need project managers to calculate cost estimate, setting up a baseline, or even calculating a schedule through procedures and analyze them critically and apply different techniques to generate desired output (Mango, 2009). Analytical and rational thinking helps project manager to intuitively understand and inspire action through identification of the purpose, cause or belief towards solving any arising problems. Therefore, it is strongly suggested to make Malaysian construction project managers develop a strong Knowing Style consciousness so that they can perform better in achieving desired Project success. It can be concluded, therefore, that the construction project managers who demonstrate a level of Knowing Style should enable them to perform better in achieving desired Project success. Table 6.2.2.2(b) provides a comprehensive review on the attributes of Knowing Styles. Ultimately, this led to a deep understanding on how Knowing Styles attributes play it roles in impacting the achievement of project success by project managers.

Table 6.2.2.2(b): The Descriptions of Knowing Styles Attributes

Knowing Style Attributes	Descriptions
Facts	• Focus on factual contents • make informed decisions based on facts and figures, using logical and rational arguments.
Details	• have an enormous capacity for details, make errors seldomly, and are good at demanding tasks
Logical	• Tends to make logical inferences- consider every aspect of a given problem, and acquire information by careful analysis and the collection of large amounts of data
Reflective	• so as to question one's own thoughts, identify the errors in one's own thinking, and then make reasonable corrections.
Objective	• Make decisions based on objective information
Impersonal	• Entails the ability to make decisions without being influenced by the background.
Rational	• based on or in accordance with reason or logic
Precision	• Value accuracy and exactness and attention to details

(Source: Armstrong *et al.* 2012; Cools, 2007; Sun & Hui, 2007)

Creating Style is the lowest ranked in the analysis of the relationship between cognitive styles variables and project success which confirming project managers tended to give least attention to Creating Style compared to other information because Creating Style is labelled as creative and prefer experimentation where they treat problems as opportunities and challenges (Cools, 2007). Whereas it is identified that 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 (Mango, 2009) but unfortunately, a big chunk of previously mentioned routine slowing down project managers to practise the Creating Style. A possible explanation for this might be that project managers generally

have to follow procedures by taking a group of inputs, analyzes them and uses different techniques to generate outputs (Mango, 2009). Due to the fact that there is not much new in the output, little innovation is involved and hence a barrier to practise creativity and innovation in the process of accomplishing project success even though over the past decades. Most researches in innovation have emphasized the use of innovation in the construction industry in order to meet the increasing requirements of complex projects being conducted on the edge of chaos (*e.g.*, Dulaimi, Y.Ling, Ofori, & Silva, 2002; Hartmann, 2006; Winch, 1998). A considerable amount of project manager's competency research discusses on the importance of creativity skills in executing their daily tasks (*e.g.*, Prabakar, 2005; Hölzle, 2010). For example, Belzer (2001) sees creativity as one of the soft skill that will enhance the success of a project exponentially. Since every project is unique and each project require different components, templates, tools and techniques, applying creativity skills effectively will help in delivering a successful project (Belzer, 2001).

Therefore, the findings from this study indicate that it is important to help project managers understand the necessary of the Creating Style dimensions in project management. Furthermore, Sun & Hui (2012) clearly emphasized the benefits of creating style in an individual's activity where a project manager will be able to interpret problems in a new way and avoid being limited by conventional thinking, identify the most important and novel ideas and finally always looking forward to demonstrate the values of that particular idea. It is believed that by continuously practising the Creative Style would assist individuals to welcome the changes and innovations which is crucial in an effort to enhance the performance of the industry. Table 6.2.2.2(c) provided detail descriptions of Creative Styles attributes which may

assist project managers to identify and appreciate the potential creative styles characteristics embedded in one's behaviour.

Table 6.2.2.2(c): Descriptions of Creative Styles Attributes

Creative Style Attributes	Descriptions
Possibilities	Prefer dynamic structures and are constantly searching for hidden possibilities and new horizons.
Ideas	search for renewal and are attracted by new ideas.
Impulsive	Tend to respond impulsively without (forethought)without sufficient forethought
Flexible	Prefer to work in the environment that are more free, open, and spontaneously flexible way of decision making
Open-ended	Explained as an open-ended reflection which opens up possibilities other than those in one's current representations of life space
Novelty	identify the most valuable and novel idea (analytic skills), and make out ways to demonstrate the values of that idea
Subjective	• to think globally and progressively rather than conservatively • In making decisions, more affective and personal, relying on subjective information. • like harmony on the basis of common values, and dislike intellectual analysis.
Inventive	Would interpret problems in a new way and avoid being bounded by conventional thinking (synthetic skills).

(Source: Cools, 2007; Sadler-Smith & Shefy, 2007; Sun & Hui, 2007; Zhang & Sternberg, 2005)

6.2.3 CoSProS Framework

Following the statistical analysis, interpretation and discussions presented in preceding sections, this section now provide a forecasting framework to enable project managers to rapidly assess the possibility of a successful project from cognitive aspect viewpoint.

As already explained, the main purpose of this study is to establish a framework by linking the cognitive styles approach and project success which can be used to supplement existing human-related factors that contribute to project success for project manager. The proposed framework is expected to provide project managers with a better understanding of cognitive styles attributes that are required to compliment with other soft skills competencies in achieving project success. The following figure (Figure 6.2.3) presenting the hierarchical model of CoSProS Framework for construction project managers. The framework is based on two key inputs: cognitive styles and project success. At the top of the hierarchy are Cognitive styles variables which embrace the three main variables namely, Planning Style, Knowing Style and Creating Style. For each domain, there a list of attributes that describes the main construct. The following are aspects of project success which occupy the lower level of the framework. They are consists of three different factors namely, impact to usability, impact to project delivery and finally impact to value outcomes to users.

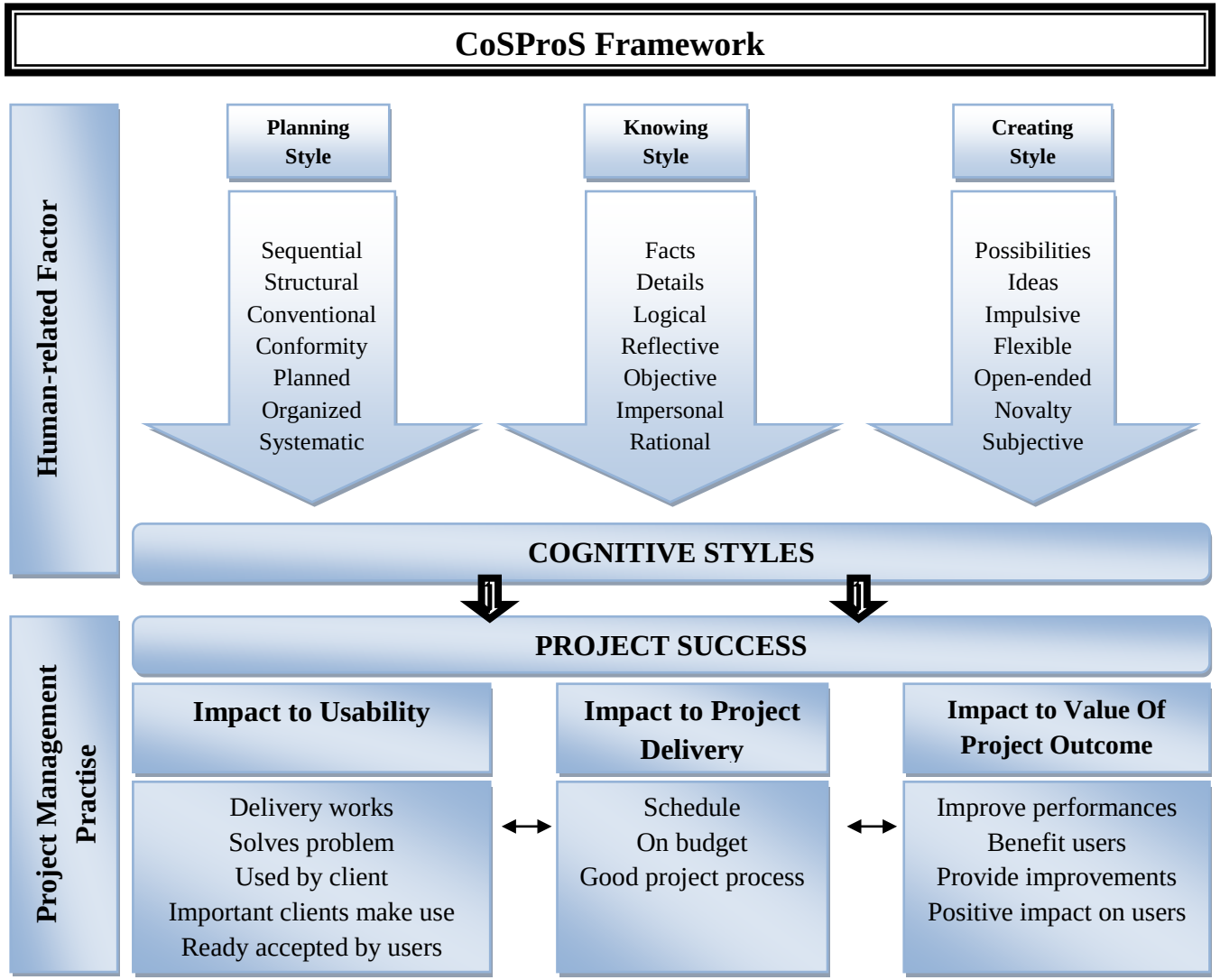


Figure 6.2.3: CoSProS Framework

6.3 Concluding Remarks

Previous section (Section 6.3) considers the implementation of CoSProS Framework on curriculum development towards engendering project management practises in the construction industry. It also proposed CoSProS as a foundation for developing curriculae for education and training in the management of project manager's cognitive competence skills. The cognitive styles measures enables project managers to understand their strengths and weaknesses and, this contributes more effectively to their professional development. The CoSProS Framework could facilitate the CPD of project managers by ensuring that they maintain the scope of the knowledge and skills from cognitive perspective that are required by the demands of the job in achieving project success. Potentially, this framework could supplement in the process of developing a knowledge-based tool-kit or a skills charting competency mapping processes (*e.g*., Lyons, 2003) for which project managers can review, plan and undertake self-assessment of the key knowledge and skills they require to enhance their managerial performance. The cognitive styles measures also can be used for administrative purposes with regard and selection of project managers. Creasy and Anantatmula (2013) have observed that, one of the most important critical success factors to complete a project within time, scope and cost is the project manager selection criteria. Furthermore, Ogunlama *et al*., (2002) identified that one of the key problems often encountered by construction executives in project based industries is the appointing of the "right" project manager. In particular any mismatch has a potential basis for a conflict of interest which can result in differing behaviours and outcomes from an individual (Arglye, 1994; Pickett, 1998; Dainty *et al.*, 2003). Therefore, these research findings can be used for administrative purposes with regard to the matching and

selection of project managers in the context of achieving desired successful project outcomes.

6.4 Summary

This chapter presented detailed discussions in relations to each research objectives. The discussions in this chapter have demonstrated the importance of identifying cognitive styles as a significant human-related factor in achieving project success by project managers. The findings from the quantitative study and supportive arguments from literature provide a firm support in proposing the cognitive styles in educational training for project managers. However, if this approach is chosen to be applied in project management field, it would be an ultimate goal for educators/instructors in training sector to create an environment that is encourage professional growth training by identifying ways through appropriate strategy, structure, and processes, to improve the application of cognitive styles in real working life. Furthermore, it should be borne in mind that, knowing about and acquiring the cognitive styles skill, is no guarantee in executing a successful project. Project managers need to apply and then make initiative to modify them to make them work even better. Taken together, this chapter provided strong recommendations to consider the applications of cognitive styles for management education, training and development to further enhance the effectiveness and efficiency of Malaysian project managers. Thus, in the following concluding chapter, the researcher summarized all the findings and ended this research thesis with recommendations for future research

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter concluded the works that have been undertaken in accordance to the research objectives and underlines the significance of the findings based on the investigations. Referring to the research methodology employed (quantitative surveys), this study successfully carried out the survey, collecting relevant data and information with regard to the nature and scope of this research, which is to investigate the role of cognitive styles on project success by project managers. The empirical evidence is very important and significant because it proposed a new view on the impact of project manager's cognition on the project success where the cognitive styles are able to explain the behaviour of project managers in achieving project success from a managerial psychology perspective. Furthermore, it has proposed a framework that integrates the science and practice by developing CoSProS Framework (cognitive styles and project success). In order to ensure that the framework being proposed is acceptable and implementable by the parties concerned, this study suggested strategies to be applied by indentifying encouraging ways to improve through appropriate strategies, structures and processes. The six chapters presented so far have elucidated the literary, conceptual, methodological and substantive approaches for addressing the research agenda.

In this chapter, the research is brought to a close by summarising the issues addressed throughout the study. Firstly, a summary of research is presented to remind the linkages

between the research background and findings. This is then followed by a recapitulation of the research objectives. Thereafter, a summary of how the key objectives were satisfied is elucidated followed by the main conclusions of the research. Subsequently, the contributions of the study through theoretical and practical context for engendering improved performance of project managers in achieving project success are presented. The thesis is brought to a close with limitations and recommendations for future research.

7.2 Summary of Research

The construction industry is an essential contributor to the economy of many countries and from the project-based industry, it perhaps the largest and most established field. The environment in construction projects is unique market to operate as it is operates with a diverse group of professionals from different organizations who are brought together for a short period and for a specific purpose. Construction projects are described as project-based workplaces that it is characterized by short-term interaction and engagement and very challenging for those who are charged with managing performance within them. However, despite the contribution of this industry has to the Malaysian's GDP (Gross Domestic Product), this field also earned it a less than a favourable reputation.

In the context of Malaysia, the construction industry performances are beset with inefficiencies. Studies and reports have highlighted negative construction performance such as construction delays, cost overruns and disputes, which seems customary with a low probability of successful project delivery. As such, the importance of the construction industry as vital link to the gross development product and nation building

demand the construction industry to improvement of construction projects implementation and enhancement of project success. Subsequently, the effective performance of the project manager is identified to be single most critical factor affecting project success. As such, scholars reported that soft skills or human-related factor contribute more to project success than technical skills but these soft skills (human-related factors) received insufficient attention especially with regard to the project manager's personality traits.

Although the body of project management continues to investigate on a range of diverse subjects in regard to the personality traits required by the project managers, however there are still only limited results of the literature on the subject of cognitive. Review of previous literature reveals that there is not enough knowledge on cognitive perspective in project management setting and there is a need to welcome research on the cognitive aspects of project success.

The investigation is in response to these trends and calls for research. The current study provided significant insights into cognitive styles, a fundamental factor in determining individual and organizational behaviour (Armstrong *et al*., 2012) which is believed to be a vital variable influencing management practice and performance (Hayes & Allison, 1994; Armstrong *et al*., 2012). A growing interest in the field of business and psychology on cognitive styles, strongly supported a need for further investigation on the effect of this human-related factor has on the project success by Malaysian project managers.

In light of the foregoing, this research has investigated the potential relationship of cognitive styles and its variables towards the achievement of a successful project. This

study also proposed CoSProS Framework for enhancing the performance of project managers in Malaysian construction industry. Subsequently, the appropriate strategies for engendering improved performance of project managers in achieving project success through educational training have been proposed.

7.3 Conclusion of Main Findings

7.3.1 Review of Research Objectives

Overall, all the research objectives for this study were achieved. In this section, answers for the objectives of this research presented. The research objectives introduced in Chapter 1 reiterated in Table 7.3.1.

Table 7.3.1: Research Objectives

Research Objectives	
RO1	To analyze and evaluate recent developments in bridging management science and practise, in particular, the project manager's human-related factors (soft skills) and project management.
RO2	To critically assess the subject of cognitive styles and project success towards identifying suitable cognitive styles and project success measures for achieving the key research aim.
RO3	To identify the relationship between cognitive styles and project success, that can increase the effectiveness of project manager's ability to achieve the ultimate goal of project outcomes.
RO4	To develop a framework, that comprises the cognitive styles and project success measures that enables project managers to rapidly assess the possibility of a successful project in Malaysian construction environment.

Here, in the following paragraphs, the research objectives are revisited to highlight the extent to which they were accomplished through the various phases of the research.

Objective 1: To analyze and evaluate recent developments in bridging management science and practise, in particular, the project manager's human-related factors (soft skills) and project management.

Some important issues regarding the significance of bridging rigour-relevance gap in management were identified from the broader managerial psychology literature. Whether the rigour-relevance gap in management research could be bridgeable has been the topic of continuous debate among scholars. While scholars and practitioners alike have apply and disseminate the research findings to address the research questions from the perspectives of different academic and practitioner users in the field of project management, it was debated that rigour–relevance gap in management research is unbridgeable due to the distinction of the social system between the management science and practise. However, the literature revealed that a large number of publications have demonstrated collaborative studies provided findings are both useful and used where the "filled gap" proved how much impact science to date has on management practise. The review (Chapter 2, Section 2.2) was therefore helpful in underpinning the view that the associations between academic and practitioner will provide valuable insights that add important knowledge development. As a result, both science and practise would be of great benefit in effort to exert successful collaboration in order to narrow the gap between research and practice. Therefore, the proposed study on the collaboration between cognitive psychology and project management aspects (cognitive styles and project success in specific), is expected to provide more diverse kinds of knowledge than the current practises from the construction management perspective.

Research Objective 2: To critically assess the subject of cognitive styles and project success towards identifying suitable cognitive styles and project success measures for achieving the key research aim.

The second research objective was satisfied by undertaking an extensive review of developments in cognitive styles and project success. The literature review revealed a reliance on psychology - based theories in measuring the cognitive styles of project managers. Meanwhile, in project management field, project success undoubtedly remains a central concern, a great deal of work have been devoted to it exclusively. This second objective was therefore addressed by reviewing, in particular, the relevant literature on mainstream applied psychology literature for cognitive styles and in top project management journals for project success. This led to the identification of appropriate cognitive styles construct and project success measures for establishing the conceptual framework of this study.

Since selecting an appropriate theoretical construct and measure is very important as only rigorous research can ultimately build a bridge between science and practice in business and psychology studies, Cognitive Styles Indicator (CoSI) has been chosen over other options. The CoSI construct consist of three variables describing the cognitive styles namely, Knowing Style, Planning Style and Creating Style. The reason behind this selection was because; it is a multidimensional cognitive framework which is created for business and psychology research. Furthermore, it is belongs to the group of recent theoretical constructs and measures in cognitive styles field. Meanwhile, for the project success, this study selected PSQ (Project Success Questionnaire) which is based from Pinto and Slevin's (1986) project implementation profile (PIP) that uses a model of two key themes: the project and the client. The main reasons for adopting this

construct was because of its coverage on the common measures of project success: the schedule, on budget, the performance and has been developed and tested as a generalized project manager success measure. Drawing on the cognitive styles and project success constructs, conceptual framework was developed for a potentially more detailed conceptualisation of the project manager's cognitive dimension.

Research Objective 3: To identify the relationship between cognitive styles and project success, that can increase the effectiveness of project manager's ability to achieve the ultimate goal of project outcomes.

In fulfilling this objective, a series of analysis are performed. To test the research hypotheses which address the research questions, the relationships between the variables were investigated using bi-variate correlation analysis. At the second stage of data analysis, linear regression test has been carried out.

The statistically positive relationship found between cognitive styles and project success suggests that project manager's cognitive styles is positively related to their achievement of project success. Exactly 41.8% of the variance in cognitive styles on project success constructs indicated that project managers use cognitive styles and it is point of argument for including cognitive styles as a topic for discussion in relation to its human elements from project management perspective. Every project manager has a cognitive function where their problems are characterized by multiple contingencies and complex interactions which has been frequently described within goal setting, decision making, execution of decisions, and evaluation of the effects of the previous decisions taken (Das, 1995) in achieving project success. Exposing project managers to engage in the construction activities by acknowledging their own cognitive styles may assist them

to facilitate the projects effectively. Above all, the findings obtained emerged reasonably convincing and supported by the literature (see section 6.2.2).

Research Objectives 4 : To develop a framework, that comprises the cognitive styles and project success measures that enables project managers to rapidly assess the possibility of a successful project in Malaysian construction environment.

The final objective was fulfilled by bridging the cognitive styles constructs and project success constructs, results from the statistical analysis. This framework is expected to assist project managers to rapidly assess the possibility of a successful project from cognitive aspect viewpoint. The proposed framework is expected to provide project managers with a better understanding of cognitive styles attributes that are required to compliment with other soft skills competencies in achieving project success. Therefore, this study findings offering a platform in order to carry forward this human-related issues 'out of the closet' and ultimately this cognitive function may be better understood and more effectively managed (see section 6.2.3).

7.3.2 Main Conclusion

The main research premise was stated in Chapter 1 (Section 1.2.2) as:

"Research on the relationship of project manager's soft skills and project success received very little attention in Malaysian construction industry, in particular from personality traits field. Therefore, there is a need for investigation on how the aspect of cognitive styles assists project manager to achieve project success by providing empirical evidence on the influential of project manager's cognitive styles in project

success. Furthermore, a framework that links the cognitive styles and project success is needed to help project managers to rapidly assess the possibility of a successful project from an individual's cognitive perspective".

The core of this research addresses four main questions:

1. In recognition of the unique and challenging construction project environment, what cognitive styles are appropriate for engendering the project manager's performance in achieving the project success?
2. How does the project manager's cognitive styles relate to project success in this sample?
3. Are there any relationships between the variables of cognitive styles and project success constructs?
4. What effect do project manager's cognitive styles and variables have on project success and its elements?

Referring to above research premise and research questions, the following paragraphs presents a main conclusion of the current research.

The focus of this research is on the approach of cognitive styles and project success in construction project managers. This research was an attempt to explore the value of science and practise by linking the cognitive styles constructs that stemmed from individual personality traits and project success from project management practice. Even though a significant amount of researches has published on relationship of human-related factors (soft skills) and project success but there is very little attention has been paid to personality traits and dimensions, especially in relation to the effect of project manager's cognitive. Furthermore, the uniqueness of this study relies on the cognitive

styles approach, which was introduced as a promising personality trait towards the achievement of project success in construction project management. This research has identified the cognitive styles positively related to project success. This study also successfully demonstrated that all the variables of cognitive styles contributed towards the achievement of project success. Planning Style is the most significant contributing variable, followed by Knowing Style and Creating Style. Subsequently, this research summarized that project managers tend to stimulate their cognitive competence by incorporating Planning Style, Knowing Style and Creating Style variables in achieving desired project success. In conclusion, this research has provided information and empirical findings on how the cognitive styles approach has influences on the achievement of project success by Malaysian project managers. The project managers' ability to understand and manage their cognitive styles as one of the personality trait that is vital in dynamic with high complexity and uncertain project environments is an intriguing for future research.

As noted throughout the thesis, the cognitive styles as one of the individual's personality dimensions seems to be helpful for project managers to accomplish desired goals in construction project. Therefore, the CoSProS framework here offers Malaysian project managers in the construction industry to have a clearer idea of this cognitive competence aspect in relation to project success. These findings also can be used as an additional human-related factor on educational models in supporting and fostering continuous professional development training towards best practise for project managers. This study supports the growing body of research on personality traits and dimensions where the "soft" competencies would able to assist the project managers to perform better in complex, unknown and uncertain environments of construction project.

7.4 Contributions of the Study

The current research has endeavoured to contribute both theoretical and practical contributions for construction project management within Malaysian construction practitioners. This research offers several contributions to the literature of project management and construction management. It also provides notable practical implications and applications for the project managers in construction industry. The contributions and significant are explained in the subsequent sections.

7.4.1 Contribution to Knowledge

An original contribution to knowledge is an important concern in any doctoral research. Walker (1997) has documented various ways to demonstrate originality such as development of new methodologies, tools and/or techniques, new areas of research, new interpretation of existing material, new application of existing theories to new areas or a new blend of ideas. Drawing on this background the contribution to knowledge of this research could be viewed in respect of its immediate contribution and what potential it may have in the future if further work is carried out.

Presently, managerial competencies are becoming increasingly important issues in a variety of settings including education, organizations and practitioner groups. In the construction project management, recent studies have indicated that soft skills (human-related factor) or competencies contribute more to project success than technical skills. It has been argued that project management effectiveness requires project managers to understand the competencies that required and what personality traits he or she possess that compliments or competes with those competencies. However, identifying and

developing appropriate soft-skills measures for project-based sectors of the construction industry, particularly in Malaysia is still insufficient. Research keeps discovering more criteria to measure the importance of project manager personality traits and dimensions with respect to executing projects effectively and successfully. This has led scholars to include project manager's cognitive competence as a one of the important elements.

Consequently, identification of the influences of cognitive styles and its attributes on the project success in this study, contributed in a supplementary way to the reinforcement of understanding the concept of individuals cognitive which has been addressed in general in the project management field. Subsequently, these findings may help project managers who already possess the relevant competencies may appreciate the findings as it may provide a knowledge-based impetus for achieving higher performance. Furthermore, project managers who lack the relevant competencies (i.e. Planning Style, Knowing Style and Creating Style) to strive to acquire the relevant training part of their professional development.

Thus, a contribution to knowledge from the findings reported in the thesis is the identification of cognitive styles attributes towards the achievement of project success in project - based sectors in Malaysian construction industry. Furthermore, the concept of linking the project managers' cognitive styles and project success is also a novel contribution in construction management research. That is, while other studies provide evidence that project manager's cognitive contribute as a dimension that influence the leadership ability and behavioural competencies of a project manager, this attempt at explicitly focussing the internal characteristic of cognitive styles and its attributes in relation of the project managers performance to the achievement of project success. This finding adds significantly to the knowledge base of construction management

research. As such, the proposed CoSProS Framework can be used as a guideline or mapped together with other personality traits and dimensions towards improving work place learning and/or training requirements of project managers in establishing key managerial competencies required for superior performance in Malaysian construction industry.

7.4.2 Significance of the Study: A Point form

a) Integration of science and practice: The relationship of cognitive styles and project success exposed
b) Findings proved that Malaysian project managers practise cognitive styles in executing projects towards accomplishing a successful project.
c) Referring to the cognitive styles attributes, this study has identified type of thinking styles (i.e. Planning Style) that is most influential in the process of achieving project success in local context.
d) For a better effectiveness and efficiency of Malaysian project managers from the aspect of individual's cognitive performance, this study has linked the cognitive styles and project success constructs in proposing the CoSProS Framework,
e) Explained strategies for implementation to foster the individual's cognitive styles through appropriate channels for Malaysian project managers.
f) The instrument used in this research were predominantly developed and tested in Western nations. The adoption of the measure to a different country, different demographics with significantly different field extends the application of the measures. In this study, all the applied instruments achieved satisfactory psychometric properties in relation to internal consistency reliability and

construct validity. It provides support for the viability of the CoSProS Framework.

7.5 Limitations of the Study

As with all survey based research there are bound to be limitations, which need to be acknowledged.

One of the limitations of the current study is that while respondents were expected to answer the questions honestly and in terms of experiences, the results were based on the validity and reliability of the CoSI and PSQ instruments. Another limitation is time. In the construction field, the projects commenced on different time and progressed at different stages. Thus, it was impossible to follow the respondents through the duration of the project lifecycle. Consequently, it also limited the ability of this study in exploring and comparing on how different phases of the project influence the project manager's cognitive styles. Furthermore, this research examined the project managers' perception of project success and the study does not review project metrics. Finally, such research can include moderating variables to further explain aspects from external factors that can influence project manager's cognitive styles preferences in achieving desired project success.

7.6 Recommendations for Future Research

This study belongs to one of the few studies that have investigated into an area that is still need exploration – psychological aspect of construction project managers. It joints the rank of construction researchers' call for more empirical research to be investigated

in the human-related perspective in construction field from both local and international level. With reference to this research, future studies can be extended to the following areas:

a. Detail studies investigating specifically into how other demographic factors as possibly influences the individual cognitive style. For example, gender, the ethnicity, the religion, or trait and personality of the individuals would be great input in providing a basis to develop appropriate training and development programme that would allow training to be appropriately targeted and delivered for efficient continuous professional development of Malaysian construction project managers from the perspective of human-related factor. Further exploration using T-test would lead to knowledge enrichment in this field.

b. A longitudinal research looking into changes and development of cognitive styles attributes (Knowing Style, Planning Style and Creating Style) over the duration of construction projects. It is undeniable that such undertaking would be very demanding in resources and time but it can elicit valuable insights.

c. It is acknowledged that other factors influence project success besides cognitive style. Indeed 41.8% of variance is explained by the cognitive styles construct whereas 58.2% variance remains unexplained. Previous studies also suggested that project success perceptions are influenced by other external and internal factors. Thus, the unexplained variance can be explored further together with this cognitive styles constructs.

7.7 Strategy for Implementation

How cognitive styles influence the project success was identified in the previous section. Variables within each group are intra-related. Regression analysis demonstrated a variable in one group could influence a variable in the others. The CoSProS Framework has been established as the outcome of this study. However, the proposed framework will be ended in vain if there is no systematic implementation strategy for leveraging the information. Therefore, this section deals with the issues on how to ensure the information on the CoSProS Framework will be delivered to the targeted population (construction project managers in this case) and address the possible ways of fostering these thinking skills and ultimately improve the success of a project in future.

Firstly, in attempting to educate project managers on cognitive styles, continuous professional development could play vital role in alerting this professional group of people become more aware of important qualities in themselves and others leading to measurable benefits in communication and performance. But the question is, why CPD? Continuing Professional Development (CPD) is becoming increasingly recognized by professional institutions as essential for ensuring their members remain up to date and maintain their professional competence (Jones and Fear, 1994). Continuous improvement considered as an ongoing effort to improve project management services in the construction industry which in regard to organisational quality and performance, focuses on development of personal qualities necessary for the execution of professional and technical duties. Continuous improvement basically involving continues and systematic maintenance, improvement and broadening of knowledge and individual skills throughout professional working life. In construction industry, professional bodies around the globe increasingly aware the potential impact of CPD and the need to

provide opportunities for project managers to update their skills. For example, PMI (Project Management Institute) is taking responsibility for ensuring continuing competence among project managers by emphasizing CPD as one of the core activities of professionalism enhancement program. From Malaysian construction industry perspective, it couldn't be argued that the professional bodies in the construction field, like PAM (Malaysian Institute of Architects), ISM (Institute of Surveyors Malaysia), MBAM (Master Builders Association Malaysia, IEM (Institute of Engineers Malaysia) providing own CPD guideline for their professionals to enhance their professional's value in the industry. Consequently, project managers are urged to take more proactive role in planning their own development in enhancing the level of knowledge by gaining support from professional bodies to ensure the process of learning continuously flow within the individuals itself. Professional body is the best place to convey to the members that entry to the profession does not signify the end of learning but rather a place to help project managers to identify personal qualities which contribute to the efforts in discovering potential ways of enhancing projects and project management performance. Therefore, this is where the Cognitive styles approach may come into play.

To foster the Cognitive styles among project managers through the training programmes, one of the initial steps are to let them comprehend "What are these practical skills?", "How can they be carried out?", and "Why these skills are needed?" to assist the project managers to incorporate, self-regulate and to practise the learnt skills. For the purpose of this research, three ways have been chosen to accomplish which are either through direct teaching (bolt-on approach), embedded approach and finally infusion approach (Sun & Hui, 2012). One important reason for this was that these methods have been proposed as potential ways of fostering individual cognitive

competence by Sun & Hui (2012). Since the cognitive styles deal with the issues that stems from the cognitive competence approach, therefore, proposing the same methods through different strategies that suits with the profession would appropriate for this case. Table 7.7 described in details the method proposed.

Table 7.7: Methods to Foster Cognitive Styles

Method	Process	Proposed Strategy
Direct Teaching (Bolt-On Approach)	• The direct instruction strategy is the most effective way to teach explicit, guided instructions. This strategy provides information or developing step-by-step skills. This method relying on strict lesson plans and lectures with little or no room for variation. • In direct teaching through training programmes, the instructor play a crucial role in guiding the participants to master the Cognitive styles kill by defining problems, developing strategies and process and link the knowledge to real-life situation.	• Profesional bodies in the construction field, especially those involved in profesional development, should develop a course on the cognitive aspect. • To be included as one of the syllabus in project management course • For example: CIDB (Construction Industry Development Board Malaysia) Directly introduce Cognitive styles as a subject in CPD module
Embedded Approach	• Embedded approach used to promote project managers engagement, learning and independence during educational training programme. Project manager's priority learning targets are implemented in the context of on-going activities during training programme. • Are taught and are practised within a subject in educational programme. • The cognitive styles are taught and are practised within a subject in educational programme. For the purpose of this study, "problem-based learning" would be an appropriate method. The problems required to be novel, ambiguous, or challenging, so as to generate cognitive conflicts and stimulate higher-order thinking (Sun & Hui, 2012).	• During 'problem-based learning' course, instructor and participants systematically work together on analysing a case, brainstorming and coming up with creative solutions to problems by incorporating the cognitive styles approach together with other skills. • During in-house/public training- problem-based learning courses for project managers.

Table 7.7: continued

Method	Process	Proposed Strategy
	• Problems are structured with reference to the project manager's prior knowledge in the project management area and existing levels of cognitive styles with the purpose to progress project manager's cognitive styles in analyzing and solving problems. Project managers can become more skill full in mastering the cognitive styles and transfer it successfully to the real world.	
Infusion Approach	• The infusion method is described as having the subject matter and thinking skills learnt collectively across curriculum (Sun & Hui, 2012). • It means, the process doesn't involved any specific lessons designed to educate the project managers on cognitive styles where as the instructor plan and deliver courses with an emphasis on cognitive stylesand to allow project managers to develop the feeling of competency and autonomy through self-regulation. This method encourages the managers to transfer the skills across a variety of situations while supporting the project's goals.	• To be included in any CPD programmes designated for project managers. • For example: In a leadership course, the instructor will emphasize on the importance of Creating Style and its attributes together with the leadership skills so the project managers learn more effective practises to apply to daily challenges especially towards achieving project success.

However, when it comes to educating professionals in practice, the challenge comes in how to facilitate the learning of cognitive styles in meaningful, authentic and transferable ways. This is because it is extremely difficult to ensure a systematic assessment and learning of transferable lessons being incorporated in subsequent projects. Additionally, several researchers noticed that "softer" skills if addressed in project management programmes, are often taught separately from project management administration skills (Brill, 2006). As such, this situations cause professionals unable or unmotivated to apply these skills effectively in practise (Dannels, 2000; Maznevski & Distefano, 2000; Smith, 2003). Despite declining interest in soft skills, one way to avoid decontextualizing this softer skills might be to expose project managers to master project management administration competencies (*e.g.*, project analysis, planning, executing) while concurrently mastering this cognitive style. Previous work has indicated that project managers need to more emphasis on educational models supporting and fostering continuous change, creative and critical reflection, increasing self-knowledge and enhance the ability to build and contribute to excellence performance (Thomas, 2008). Furthermore, project managers are urged to play proactive role in the process of learning in a learning environment that fosters important reflection on theory while they engage in practise on an ongoing basis (Thomas, 2008). Therefore, effective profesional development enables project managers to develop the knowledge and skills that they need to address the professional's challenges.

As such, introducing the CoSProS Framework to project managers through training programme would be the best channel to address the importance of understanding the psychological constructs proposed in this study and ensuring this human-related factor fits within the overall strategy of project management competence to determine project manager's best practices.

REFERENCES

Abdul Aziz Abdullah. (2010). *An Empirical Study On The Factors Influencing The Success of Planning Approval of A Development Project : Malaysian Context.* University of Malaya, Kuala Lumpur.

Abu Bakar Abu Hasan, A. A. R., Shardy Abdullah, Aidah Awang. (2009, 30 Julai-1 Ogos 2009). *Project Management Success Factors For Sustainable Housing: A Framework.* Paper presented at the International Conference Of Construction Industri 2009, Padang Indonesia.

Abu Hassan Abu Bakar, M. R., Muhammad Asim Tufail and Lew Yuh Jyue. (2011). Project Management Best Practices For Achieving Better Housing Development Project Performance: The Case Of Penang, Malaysia. *International Journal of Construction Project Management, 3*(2), 1–17.

Abu Hassan Abu Bakar., A. A. T., Arman Abdul Razak.,Mohamad Nizam Yusof. (2012). Key Factors Contributing to Growth of Construction Companies: A Malaysian Experience. *World Applied Sciences Journal 19* (9), 1295-1304.

Adams, K., Brace, I. (2006). *An introduction to market and social research: planning and using research tools and techniques*. London,United Kingdom: Kogan Page Ltd.

Affandi, H. M., Hassan, F., Ismail, Z., & Kamal, M. F. M. (2012, 24-27 June 2012). *Soft skills implementation in construction management program: A survey of Malaysian public universities.* Paper presented at the Humanities, Science and Engineering Research (SHUSER), 2012 IEEE Symposium on.

Aftab Hameed Memon. Ismail, A. R., Ade Asmi Abdul Aziz,. (2012). The Cause Factors Of Large Project's Cost Overrun: A Survey In The Southern Part Of Peninsular Malaysia. *International Journal of Real Estate Studies, 7*(2).

Aguinis, H., Pierce, C. A., Bosco, F. A., & Muslin, I. S. (2009). First Decade of Organizational Research Methods: Trends in Design, Measurement, and Data-Analysis Topics. *Organizational Research Methods, 12*(1), 69-112.

Ahadzie, D. K. (2007). *A model for Predicting the Performance of Project Managers in Mass House Building Projects in Ghana.* University of Wolverhampton.

Ahmad Nabil Md Nasir, Dayana Farzeeha Ali, Noordin, M. K., & Mohd Safarin Nordin. (2011). *Technical Skils and Non-Technical Skills: Predefinition Concept.* Paper presented at the IETEC'11, Kuala Lumpur, Malaysia.

Allé, B. (2003). The management science researcher between theory and practice. *Organization Studies, 24*, 1097–1114.

Al-Tmeemy, S. M. H. M., Abdul-Rahman, H., & Harun, Z. (2011). Future criteria for success of building projects in Malaysia. *International Journal of Project Management, 29*(3), 337-348.

Allen, T. D., Eby, L. T., O'Brien, K. E.,Lentz, E. (2008). The state of mentoring research: A qualitative review of current research methods and future research implications. *Journal of Vocational Behavior, 73*, 343-357.

Allinson, C. W., Armstrong,S.J.and Hayes,J. (2001). The Effects Of Cognitive Style On Leader-member Exchange: A Measure Of Intuition -analysis For Organization Research. *Journal of Occupational and Organizational Psychology, 74*, 201-220.

Allinson, C. W., Hayes,J. (1996). The Cognitive Style Index: A Measure Of Intuitionanalysis For Organizational Research. *Journal of Management Education Studies, 33*(1), 119-135.

Allinson, C. W., Chell,E., Hayes,J. . (2000). Intuition and entrepreneurial behaviour. *European Journal of Work and Organizational Psychology 9*(1), 31-43.

Alpay, G., Bodur, M., Yilmaz, C.,Buyukbalci, P. (2012). How does innovativeness yield superior performance? The role of marketing effectiveness. *Innovation: Management Policy & Practice, 14*(1), 107-128.

Alvi, S. A., Khan, S. B., Hussain, M. A., & Baig, T. (1988). Relationship Between Holland's Typology and Cognitive Styles. [doi: 10.1080/00207598808247778]. *International Journal of Psychology, 23*(1-6), 449-459.

Anantatmula, V. S. (2008). The role of technology in the project manager performance model. *Project Management Journal, 39*(1), 34-48.

Anderson, N. (2007). The practitioner-researcher divide revisited: strategic-level bridges and the roles of IWO psychologists. *Journal of Occupational and Organizational Psychology, 80*, 175–183.

Anderson, N., Herriot, P., & Hodgkinson, G. P. (2001). The practitioner-researcher divide in Industrial, Work and Organizational (IWO) psychology: Where are we now, and where do we go from here? *Journal of Occupational and Organizational Psychology, 74*(4), 391-411.

Aritzeta, A., Senior, B. and Swailes, S. . (2005). Team role preference and cognitive styles: a convergent validity study. *Small Group Research, 36*, 404-436.

Armstrong, S., & Hird, A. (2009). Cognitive Style and Entrepreneurial Drive of New and Mature Business Owner-Managers. *Journal of Business and Psychology, 24*(4), 419-430.

Armstrong, S. J. (2000). The Influence of Individual Cognitive Style on Performance in Management Education. [doi: 10.1080/014434100750018020]. *Educational Psychology, 20*(3), 323-339.

Armstrong, S. J., Cools,E. and Sadler-Smith,E. (2012). Role of Cognitive Styles in Business and Management: Reviewing 40 Years of Research. *International Journal of Management Reviews, 14*, 238–262.

Armstrong, S. J., Sadler-Smith,E. (August 11-16). *Cognitive style and its relevance for the management of careers.* Paper presented at the 66th Academy of Management Conference, Atlanta.

Atkinson, R. (1999). Project management: Cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. *International Journal of Project Management,, 17*, 337–342.

Atwater, L. E., Yammarino, F.J. (1993). Personal attributes as predictors of superiors and subordinates perceptions of military academic leadership. *Human Relations, 46*, 645–688.

Avots, I. (1969). Why does project management fail? *California Management Review, 24*(4), 77–88.

Babic, M., Davis, E., & Cunningham, R. (1999). The Kirton Adaptation Innovation Inventory : Validity Issues, Practical Questions. *Review of Public Personnel Administration, xix*(2), 18-31.

Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal, 30*(4), 25-32.

Bacharach, S. B. (1989). Organizational Theories: Some Criteria for Evaluation. *The Academy of Management Review, 14*(4), 496-515.

Bale, J. (2010). *CIOB's Professionalism: An Inclusive Definition Of Construction Management*. united Kingdom: The Chartered Institute of Building (CIOB)

Bandow, D., Summer,. (2001). Time to create sound teamwork. *The Journal for Quality and Participation, 24*, 41–47.

Barber, E., & Warn, J. (2005). Leadership in project management: from firefighter to firelighter. *Management Decision, 43*(7), 1032-1039.

Barbosa, S. D., Gerhardt, M. W., & Kickul, J. R. (2007). The Role of Cognitive Style and Risk Preference on Entrepreneurial Self-Efficacy and Entrepreneurial Intentions. *Journal of Leadership & Organizational Studies, 13*(4), 86-104.

Barlow, J., Jashapara, A. (1998). Organisational learning and inter-firm "partnerning" in the UK construction industry. *The Learning Organization, 5*(2), 86-98.

Barsade, S. G., & Gibson, D. E. (2007). Why Does Affect Matter in Organizations? [Article]. *Academy of Management Perspectives, 21*(1), 36-59.

Bartunek, J. M., Rousseau, D. M., Rudolph, J. W., & DePalma, J. A. (2006). On the Receiving End: Sensemaking, Emotion, and Assessments of an Organizational Change Initiated by Others. *The Journal of Applied Behavioral Science, 42*(2), 182-206.

Battilana, J., Casciaro, T. (2012). Change agents, networks, and institutions: A contingency theory of organizational change. *Academy of Management Journal, 56*(2), 381–398.

Beal, D., Weiss, H., Barros, E.,MacDermid, S. . (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology, 90*, 1054–1068.

Beer, M. (2001). Why management research findings are unimplementable: an action science perspective. *Reflections, 2*, 58-65.

Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management, 14*(3), 141-151.

Belassi, W., Tukel, O.I.,. (1996). A new framework for determining critical success/failure factors in projects. *International Journal of Project Management, 14*(3), 141–151.

Belling, B., Mangelaars, F. . (2004). *How filters and perceptions influence your thinking in project management.* Paper presented at the 2004 PMI Global Congress Proceedings.

Belout, A., Gauvreau,C. (2004). Factors influencing project success: the impact of human resource management. *International Journal of Project Management, 22*, 1-11.

Belzer, K. (2001). Project Management : Still More Art than Science. Retrieved 26 October 2012, from ttp://www.pmforum.org/library/papers/2001/ArthanScience.pdf

Bendell, T., Boulter,L., Kelly,J. (1998). *Benchmarking for Competitive Advantage*. London: Pitman Publishing.

Beringer, C., Jonas, D., & Kock, A. (2013). Behavior of internal stakeholders in project portfolio management and its impact on success. *International Journal of Project Management, 31*(6), 830-846.

Berr, S. A., Church, A. H., & Waclawski, J. (2000). The right relationship is everything: Linking personality preferences to managerial behaviors. *Human Resource Development Quarterly, 11*(2), 133-157.

Betsch, C. (2008). Chronic preferences for intuition and deliberation in decision making: lessons learned about intuition from an individual differences approach.

Beyler, J., & Schmeck, R. R. (1992). Assessment of Individual Differences in Preferences for Holistic-Analytic Strategies: Evaluation of Some Commonly Available Instruments. *Educational and Psychological Measurement, 52*(3), 709-719.

Blackburn, S. (2001). *Understanding project managers at work.* Brunel University.

Blindenbach-Driessen, F., Jan van den,E. (2006). Innovation in project-based firms: The context dependency of success factors. *Research Policy, 35*, 545–561.

Borman, W. C., Dorsey, D.W.,White, L. A. . (1995). Effects of Ratee Task Performance and Interpersonal Factors on Supervisory and Peer Performance Ratings. *Journal of Applied Psychology, 80*(1), 168-177.

Bourne, L., and Walker,H.T.D. (2004). Advancing project management in learning organizations. *The Learning Organization, 11*(3), 226-243.

Bowen, P. L., Ferguson, C.B., Lehmann, T.H.,Rohde,F.H. (2003). Cognitive style factors affecting database query performance. *International Journal of Accounting Information Systems, 4*, 251–273.

Bredin, K., & Söderlund, J. (2013). Project managers and career models: An exploratory comparative study. *International Journal of Project Management, 31*(6), 889-902.

Brewer, J. L. (2005). *Project managers: can we make them or just make them better?* Paper presented at the Proceedings of the 6th conference on Information technology education.

Brigham, K. H., De Castro, J.O., . (2003). Entrepreneurial fit: the role of cognitive misfit. In Jerome A. Katz and Dean A. Shepherd (ed.) *Cognitive Approaches to Entrepreneurship Research (Advances in Entrepreneurship, Firm Emergence and Growth, Volume 6)*, Emerald Group Publishing Limited, pp.37-71

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54*(1), 106-148.

Brill, J., Bishop, M.,Walker, A. (2006). The competencies and characteristics required of an effective project manager: A web based Delphi study. *Educational Technology, Research and Development, 54*(2), 115–140.

Brown, A., Maydeu-Olivares,A. (2013). How IRT can solve problems of ipsative data in forced-choice questionnaires. [doi:10.1037/a0030641]. *Psychological Methods, 18*, 36-52.

Brown, K. (2000). Developing project management skills: A service learning approach. . *Project Management Journal, 31*(4), 53-58.

Bryde, D. J., Robinson, L. (2005). Client versus contractor perspectives on project success criteria. *International Journal of Project Management, 23*, 622–629.

Bryman, A. (2004). *Social Research Methods*: Oxford University Press, Incorporated.

Bryman, A., & Bell, E. (2007). *Business Research Methods*: Oxford University Press.

Burke, L. A., & Miller, M. K. (1999). Taking the mystery out of intuitive decision making. *The Academy of Management Executive, 13*(4), 91-99.

Cassidy, S. (2004). Learning styles: An overview of theories, models, and measures. *Educational Psychology, 24*(4), 419-444.

Chan, A. P. C., & Chan, A. P. L. (2004). Key performance indicators for measuring construction success. *Benchmarking: An International Journal, 11*(2), 203-221.

Chan, A. P. C., Scott, D., & Chan, A. P. L. (2004). Factors Affecting the Success of a Construction Project. [Article]. *Journal of Construction Engineering & Management, 130*(1), 153-155.

Chan, D. (1996). Cognitive Misfit of Problem-Solving Style at Work: A Facet of Person-Organization Fit. *Organizational Behavior and Human Decision Processes, 68*(3), 194-207.

Cicmil, S. (2006). Understanding Project Management Practice Through Interpretative And Critical Research Perspectives. [Article]. *Project Management Journal, 37*(2), 27-37.

Clarke, N. (2010). Emotional intelligence and its relationship to transformational leadership and key project manager competences. [Article]. *Project Management Journal, 41*(2), 5-20.

Cofield, C., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Learning styles and pedagogy in post-16 learning : A systematic and critical review*. London: Learning and Skills Development Agency.

Cohen, D. J. (2007). The very separate worlds of academic and practitioner publications in human resource management: reasons for the divide and concrete solutions for bridging the gap. *Academy of Management Journal 50*, 1013–1019.

Coles, R., & Hodgkinson, G. P. (2008). A Psychometric Study of Information Technology Risks in the Workplace. *Risk Analysis, 28*(1), 81-93

Cook, D. A. (2005). Learning and cognitive styles in web-based learning: theory, evidence and application. *Academic Medicine, 83*, 266–278.

Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management, 20*(3), 185-190.

Cools, E. (2007). *The Influence of Cognitive Style on Managerial Behaviour and Attitudes.* Unpublished Degree of Doctor in Applied Economics Sciences, Ghent University, Belgium.

Cools, E., Armstrong, S. J., & Verbrigghe, J. (2013). Methodological practices in cognitive style research: Insights and recommendations from the field of business and psychology. [doi: 10.1080/1359432X.2013.788245]. *European Journal of Work and Organizational Psychology*, 1-15.

Cools, E., Van den Broeck, H. (2007). The Hunt For The Heffalump Continues: Can Trait And Cognitive Characteristics Predict Entrepreneurial Orientation? *Journal of Small Business Strategy, 18*(2), 23.

Cools, E., Van den Broeck,H. (2007). Development and Validation of the Cognitive Style Indicator. *The Journal of Psychology, 141*(4), 359-387.

Corporation, M. P. (2011). *Productivity Report 2010/2011* Selangor: Malaysia Productivity Council.

Crawford, L. (2005). Senior management perceptions of project management competence. *International Journal of Project Management, 23*, 7-16
.

Crawford, P., Bryce, P. (2003). Project monitoring and evaluation: a method for enhancing the efficiency and effectiveness of aid project implementation. *International Journal of Project Management, 21*(5), 363–373.

Crawford, L. W., Turner, J.R. (2007). *Developing the Project Management Competence of Individuals. Gower handbook of Project Management*. Aldershot, UK: Gower Publishing.

Creasy, T., & Anantatmula, V. S. (2013). From Every Direction—How Personality Traits and Dimensions of Project Managers Can Conceptually Affect Project Success. *Project Management Journal, 44*(6), 36-51.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2 ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Creswell, J. W. (2009). *Research Design :Quantitative, Qualitative and Mixed Method Approaches* (Third ed.). California: SAGE Publications,Inc.

Cserháti, G., & Szabó, L. (2014). The relationship between success criteria and success factors in organisational event projects. *International Journal of Project Management, 32*(4), 613-624.

Curry, L. (2000). *Review of learning style, studying approach, and instructional preference research in medical education.*In Cools, E. (2007). *The Influence of Cognitive Style on Managerial Behaviour and Attitudes*. Unpublished Degree of Doctor in Applied Economics Sciences, Ghent University, Belgium.

Dainty, A. R. J., Cheng, M.-I., Moore, D.R. (2005). A Comparison of the Behavioural Competencies of Client-Focused and Production-Focused Project Managers inthe Construction Sector. *ProjectManagementJournal, 36*(1), 39–48.

Dane, E., Pratt,M.G. (2007). Exploring Intuition and Its Role In Managerial Decision Making *Academy of Management Review, 32*(1), 33-54.

Dannels, D. P. (2000). Learning to be professional: Technical classroom discourse, practice, and professional identity construction. *Journal of Business and Technical Communication, 14*(1), 5.

Das, J. P., Misra,S. (1995). Aspects of Cognitive Competence and Managerial Behaviour. *Journal of Entrepreneurship, 4*(2), 145-163.

Davis, D. L., Grove, S. J., & Knowles, P. A. (1990). An experimental application of personality type as an analogue for decision-making style. [doi:10.2466/PR0.66.1.167-175]. *Psychological Reports, 66*(1), 167-175.

Davis, K. (2014). Different stakeholder groups and their perceptions of project success. *International Journal of Project Management, 32*(2), 189-201.

Dills, C. R., Romiszowski,A.J. (1997). *Instructional Development Paradigms*. New Jersey, USA: Educational Technology Publications Inc

De Wit, A. (1988). Measurement of project success. *International Journal of Project Management, 6*.

de Vries, K. (2004). Organizations on the couch: A clinical perspective on organizational dynamics. *European Management Journal, 22*(2), 183–200.

Denzin, N., Lincoln,Y. (2000). *Handbook of Qualitative Research* Thousands Oak:Sage.

Doktor, R. (1983). Some Tentative Comments On Japanese And American Decision Making. *Decision Sciences, 14*(4), 607-612.

Doloi, H., Iyer, K. C., & Sawhney, A. (2011). Structural equation model for assessing impacts of contractor's performance on project success. *International Journal of Project Management, 29*(6), 687-695.

Driver, M. J. (1979). *Cognitive Psychology : An interactionist View*. In Thunholm, P. (2004). Decision-making style: habit, style or both? *Personality and Individual Differences 36,* 931-944

Dulaimi, M. F., Y.Ling, F. Y., Ofori, G., & Silva, N. D. (2002). Enhancing integration and innovation in construction. [doi: 10.1080/09613210110115207]. *Building Research & Information, 30*(4), 237-247.

Dulewicz, V., Higgs, M. (2005). Assessing leadership dimensions, styles and organizational context. *Journal of Managerial Psychology, 20*(2), 105-123.

Duncan, R. B., Weiss, A. . (1979). Organizational learning: Implications for organizational design. In Franco, M., & Almeida, J. (2011). Organisational learning and leadership styles in healthcare organisations : An exploratory case study. *Leadership & Organization Development Journal, 32*(8), 782-806.

Dutta, D. K., & Thornhill, S. (2008). The evolution of growth intentions: Toward a cognition-based model. *Journal of Business Venturing, 23*(3), 307-332.

Dyett, V. (2011). *Roles and Characteristics of the Project Manager in Achieving Success across the Project Life Cycle.* Unpublished Ph.D., Lynn University, Ann Arbor.

Edum-Fotwe, F. T., & McCaffer, R. (2000). Developing project management competency: perspectives from the construction industry. *International Journal of Project Management, 18*(2), 111-124.

Elattar, S. M. S. (2009). Towards developing an improved methodology for evaluating performance and achieving success in construction projects. *Scientific Research and Essay, 4*, 549-554

El-Sabaa, S. (2001). The skills and career path of an effective project manager. *International Journal of Project Management, 19*(1), 1-7.

Evgeniou, T., Cartwright, P. (2005). Barriers to information management. *European Management Journal 23*(3), 293–299.

Eweje, J., Turner, R., & Müller, R. (2012). Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. *International Journal of Project Management, 30*(6), 639-651.

Field, A. (2009). *Discovering Statistics Using SPSS* (Third ed.). London: SAGE Publications.

Filbeck, G., Hatfield, P., & Horvath, P. (2005). Risk Aversion and Personality Type. [doi: 10.1207/s15427579jpfm0604_1]. *Journal of Behavioral Finance, 6*(4), 170-180.

Finch, P. (2003). Applying the Slevin-Pinto project implementation profile to an information systems project. *Project Management Journal, 34*(3), 32-39.

Fiol, C. M., & Lyles, M. A. (1985). Organizational Learning. *The Academy of Management Review, 10*(4), 803-813.

Fisher, E. (2011). What practitioners consider to be the skills and behaviours of an effective people project manager. *International Journal of Project Management, 29*(8), 994-1002.

Flannes, S. W., Levin, G. . (2005). *Essential people skills for project managers*. Vienna: Management Concepts.

Ford, N., & Chen, S. Y. (2001). Matching/mismatching revisited: an empirical study of learning and teaching styles. *British Journal of Educational Technology, 32*(1), 5-22.

Foxall, G. R. (1994). Consumer initiators: both adaptors nd innovators. *British Journal of Management, 5*, 3–12.

Foxall, G. R., & Hackett, P. M. W. (1992). The factor structure and construct validity of the Kirton adaption-innovation inventory. *Personality and Individual Differences, 13*(9), 967-975.

Framingham, J. (2011). What is Psychological Assessment? *Psych Central* Retrieved 25 November, 2013, from http://psychcentral.com/lib/what-is-psychological-assessment/0005890

Frank, T. (2002). *The superior project manager*. New York: Marcel Dekker.

Fry, P. S. (1991). Fostering Children's Cognitive Competence through Mediated Learning Experiences: Frontiers and Futures in Sun, R. C. F., & Hui, E. K. P. (2012). Cognitive Competence as a Positive Youth Development Construct: A Conceptual Review. *The Scientific World Journal, 2012*, 7.

Frodell, M. (2008). Swedish construction clients' views on project success and measuring performance. *Journal of Engineering, Design and Technology, 6*, 21–32.

Gaddis, P. O. (May-June 1959). The Project Manager. *Harvard Business Review*.

Gale, A. (1999). *How to know what: Setting the project management competency agenda*. Paper presented at the PM Days '99: Projects and Competencies, Vienna, Austria.

Gale, A., & Brown, M. (2003). Project management professional development: An industry led programme. *Journal of Management Development, 22*(5), 410-425.

Gallén, T. (2006). Managers and strategic decisions: does the cognitive style matter? *The Journal of Management Development, 25*(2), 118-133.

Gangestad, S., Synder, M. . (2000). Selfmonitoring: Appraisal and reappraisal. *Psychological Bulletin, 126,* 530–555.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management, 19*(2), 110-132.

Gardiner, P. D., & Stewart, K. (2000). Revisiting the golden triangle of cost, time and quality: the role of NPV in project control, success and failure. *International Journal of Project Management, 18*(4), 251-256.

Gardner, W. L., & Martinko, M. J. (1996). Using the Myers-Briggs Type Indicator to Study Managers: A Literature Review and Research Agenda. *Journal of Management, 22*(1), 45-83.

Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management, 31*(5), 663-669.

Garfield, M. J., Taylor, N.J., Dennis, A.R. and Satzinger, J.W. (2001). Research Report : Modifying paradigms – individual differences, creativity techniques, and exposure to ideas in group idea generation. *Informational Systems Research, 12*, 322–333.

Gareis, R., Huemann, M. . (2007). Maturity models for the project oriented company. in Turner, J. R., Anbari,F.,Bredillet,C. (2013). Perspectives on research in project management: the nine schools. *Global Business Pespective, 1*, 3-28.

Gehring, D. R. (2007). Applying Traits Theory of Leadership to Project Management. *Engineering Management Review, IEEE, 35*(3), 109-109.

Gelade, G. A. (2006). But what does it mean in practice?The Journal of Occupational and Organizational Psychology from a practitioner perspective. *Journal of Occupational and Organizational Psychology, 79*, 153–160.

Gellatly, I. R., Irving,R.G. . (2001). Personaltiy, automony and contextual performance of managers. *Human Performance, 14*(3), 231-245.

Geoghegan, L., Dulewicz,W. (2008). Do Project Managers' Leadership Competencies Contribute to Project Success? *Project Management Journal,, 39*(4), 58–67.

Gill, C. M., & Hodgkinson, G. P. (2007). Development And Validation Of The Five-Factor Model Questionnaire (FFMQ): An Adjectival-Based Personality Inventory For Use In Occupational Settings. *Personnel Psychology, 60*(3), 731-766.

Ginn, C. W., & Sexton, D. L. (1990). A comparison of the personality type dimensions of the 1987 Inc. 500 company founders/CEOs with those of slower-growth firms. *Journal of Business Venturing, 5*(5), 313-326.

Gioia, D. A., & Kumar, C. (1991). Sensemaking and Sensegiving In Strategic Change Initiation. *Strategic Management Journal (1986-1998), 12*(6), 433.

Goldsmith, R. E. (1986). Adaption-Innovation and cognitive complexity. *The Journal of Psychology: Interdisciplinary and Applied*(119), 461-467.

Gridley, M. C. (2007). Differences in thinking styles of artists and engineers. *Career Development Quarterly, 56,* 177–182.

Grigorenko, E. L., & Sternberg, R.J. (1997). Styles of thinking, abilities, and academic performance. *Exceptional Children, 63,* 295-312.

Grigorenko, E. L., Sternberg, R.J. . (1995). Thinking Style.In Sternberg, R. J., & Grigorenko, E. L. (1997). Are cognitive styles still in style? [doi:10.1037/0003-066X.52.7.700]. *American Psychologist, 52*(7), 700-712.

Grigorenko, E. L., Sternberg, R.J. . (1997). Styles of thinking, abilities, and academic performance. *Exceptional Children, 63,* 295-312.

Groves, K. S., Vance, C. M., Choi, D. Y., & Mendez, J. L. (2008). An Examination Of The Nonlinear Thinking Style Profile Stereotype Of Successful Entrepreneurs. [Article]. *Journal of Enterprising Culture, 16*(2), 133-159.

Gryskiewicz, N. D., & Tullar, W. L. (1995). The relationship between personality type and creativity style among managers. *Journal of Psychological Type, 32,* 30-35.

Gul, F. A. (1983). A Note on the Relationship between Age, Experience, Cognitive Styles and Accountants' Decision Confidence. *Accounting and Business Research, 14*(53), 85-88.

Haibach, P., Reid,G.,Collier,D. (2011). *Motor Learning and Development*. New York: Sheridan Books.

Hair, J. F., Jr. Black, W. C., Babin, B. J., Anderson, R. E.,Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). New Jersey: Prentice Hall.

Halilah Haron. (2010). Research Methodology [Power Point Slides]. Universiti Teknologi MARA.

Halstead, S. (1999). *Soft options [project management]*. Paper presented at the The Management of Soft Projects: The People Issues, IEEE Afternoon Seminar.

Hanisch, B., Wald, A. (2011). A project management research framework integrating multiple theoretical perspectives and influencing factors. *Project Management Journal, 42*(3), 4-22.

Hansen, M. T., Birkinshaw, J. (2007). The innovation value chain. *Harvard Business Review, June,* 121-130.

Hartman, F. T. (2000). *The role of trust in project management*. Paper presented at the PMI Research Conference.

Hartmann, A. (2006). The context of innovation management in construction firms. [doi: 10.1080/01446190600790629]. *Construction Management and Economics, 24*(6), 567-578.

Hayes, J., and Allinson, W. C. (1994). Cognitive Style and its Relevance for Management Practice. *Human Relations;, 5*, 53-71.

Hayes, J., and Allinson, W. C. (1998). Cognitive style and the theory and practice of individual and collective learning in organization. *Human Relations, 51*(7), 847-871.

Hergenhahn, B. R., Olson,M.H. (2001). *An Introduction to theories of learning* (6th ed. ed.). New Jersey,USA: Prentice-Hall Inc.In Eric, M. S. O. (2008). *Trust, Commitment, Satisfaction and Learning in Construction Project Teams.* The University of New South Wales, Sydney,Australia.

Huemann, M., Turner, J.,Keegan, A. (2004). *The role of human resource management in project-oriented organizations.* Paper presented at the PMI Research Conference, London, UK.

Hill, J., Puurula, A., Sitko-Lutek; A., and Rakowska, A. (2000). Cognitive Style and Socialisation: An exploration of learned sources of style in Finland, Poland and the UK. *Educational Psychology, 20*(3), 285-305.

Hodgkinson, G. P., Herriot, P., & Anderson, N. (2001). Re-aligning the Stakeholders in Management Research: Lessons from Industrial, Work and Organizational Psychology. *British Journal of Management, 12*, S41-S48.

Hodgkinson, G. P. (2006). The role of JOOP (and other scientific journals) in bridging the practitionerresearcher divide in industrial, work and organizational (IWO) psychology. *Journal of Occupational and Oganizational Psychology, 79*, 173-178.

Hodgkinson, G. P. (2003). The interface of cognitive and industrial, work and organizational psychology. *Journal of Occupational and Organizational Psychology, 76*, 1-26.

Hodgkinson, G. P., & Rousseau, D. M. (2009). Bridging the rigour-relevance gap in management research: it's already happening! *Journal of Management Studies, 46*(3), 534-546.

Hodgkinson, G. P., Sparrow,P.R. (2002). The Competent Organization: A Psychological Analysis of the Strategic Management Process.In Armstrong, S. J., Cools,E. and Sadler-Smith,E. (2012). Role of Cognitive Styles in Business and Management: Reviewing 40 Years of Research. *International Journal of Management Reviews, 14*, 238–262.

Hodgkinson, P. G., and Sadler-Smith,E. (2003). Complex or unitary? A critique and empirical re-assessment of the Allison-Hayes cognitive Style Index. *Journal of Occupational and Organizational Psychology, 76*, 243-268.

Hodgkinson, P. G., Sadler-Smith, E., Burke, A.L., Claxton, G., and Sparrow,P.R. (2009(a)). Intuition in Organizations: Implications for Strategic Management. *Long Range Planning, 42*, 277 - 297.

Holland, J. (1985). Making Vocational Choices: A Theory of Vocational Personalities and Work Environments.In Zhang, L.-f., & Sternberg, R. (2005). A Threefold Model of Intellectual Styles. *Educational Psychology Review, 17*(1), 1-53.

Holland, J. L. (1996). Exploring careers with a typology: What we have learned and some new directions. [doi:10.1037/0003-066X.51.4.397]. *American Psychologist, 51*(4), 397-406.

Hölzle, K. (2010). Designing and implementing a career path for project managers. *International Journal of Project Management, 28*(8), 779-786.

Hough, J. R., & Ogilvie, D. T. (2005). An empirical test of cognitive style and strategic decision outcomes. *Journal of Management Studies, 42*(2), 417-448

Hough, L.M., and D.S. Ones. 2001. The structure, measurement, validity, and use of personality variables in industrial, work, and organisational psychology. In Thal, A. E., & Bedingfield, J. D. (2010). Successful project managers: an exploratory study into the

impact of personality. [doi: 10.1080/09537320903498587]. *Technology Analysis & Strategic Management, 22*(2), 243-259.

Howard, A. (2001). Software engineering project management. *Communications of the ACM, 44*(5), 23-24.

Howsawi, E. M., Eager,D., and Bagi,R. (2011). *Understanding Project Success: the Four-Level Project Success Framework.* Paper presented at the International Conference on Industrial Engineering and Engineering Management.

Hunt, D. E., Butler, L.F., Noy, J.E., & Rosser, M.E. (1989). Cognitive style and decision making. *Organizational Behavior and Human Decision Processes, 44*, 436-453.

Hussein, J. (8-9 September, 2003). *Emerging Challenges of Project Management in Malaysia.* Paper presented at the International Conference of Project Management, Kuala Lumpur, Malaysia.

Hwang, B. G., Ng,W.J. (2012). Project management knowledge and skills for green construction: Overcoming challenges. *International Journal of Project Management*.

Hyväri, I. (2006). Success Of Projects In Different Organizational Conditions *Project Management Journal, 37*(4), 31-41.

Ika, L. A. (2009). Project Success as a Topic in Project Management Journals. *Project Management Journall,, 40*(4), 16-19.

Ives, M. (2005). Identifying the contextual elements ofproject management within organisations and their impact on project success. *Project Management Journal 36*(1), 37-50.

Iwaro, J., Mwasha,A. (2012). The Effects of ISO Certification on Organization Workmanship Performance. *Quality Management Journal, 19*(1), 53-67.

Jacobson, C. M. (1993). Cognitive styles of creativity: relations of scores on the Kirton Adaption-Innovation Inventory and the Myers-Briggs Type Indicator among managers in the USA. *Psychological Reports, 72*, 1131-1138.

Jiang, J. J., Klein, G.,Margulis, S. (1998). Important behavioral skills for IS project managers: The judgments of experienced IS professionals. *Project Management Journal, 29*(1), 39-43.

Johnson, W. L. M., Edward; Johnson, Annabel M.; Murphy, Stanley D.; Zimmerman, Kurt J. (2001). A Higher Order Analysis of the Factor Structure of the Myers-Briggs Type Indicator. *Measurement & Evaluation in Counseling & Development 34*(2), 96.

Jones, W. P. (1994). Computer use and cognitive style. *Journal of Research on Computing in Education, 26* (4), 514.

Jugdev, K., & MÜller, R. (2005). A Retrospective Look At Our Evolving Understanding Of Project Success. [Article]. *Project Management Journal, 36*(4), 19-31.

Karn, J. S., Syed-Abdullah, S., Cowling, A. J., & Holcombe, M. (2007). A study into the effects of personality type and methodology on cohesion in software engineering teams. [doi: 10.1080/01449290500102110]. *Behaviour & Information Technology, 26*(2), 99-111.

Kaufmann, G. (1979). The explorer and the assimilator: a cognitive style distinction and its potential implications for innovative problem solving. *Scandinavian Journal of Educational Research, 23*, 101-108.

Keller, T., Brandt, R. . (2005). *Management skills: a Jossey-Bass reader*. In Cools, E., Van Den Broeck,H. (2007). *Managing with style : what does it mean in practice having a knowing, planning, or creating style?* Belgium: Ghent University.

Kendra, K., Taplin,L.J. (2004). Project success: A cultural framework. *Project Management Journal, 35*(1), 30-45.

Keraminiyage, K. P., Amaratunga, R.D.G,Haigh, R.P (2005, April 13th-15th). *A capability maturity approach for construction projects improvement: use of case studies approach, 5th Poasgraduate research conference*, University of Salford.

Kettelhut, M. C., & Schkade, L. L. (1991). Programmers, Analysts and Human Service Workers. *Computers in Human Services, 8*(2), 57-79.

Keraminiyage, K. P., Amaratunga, R.D.G,Haigh, R.P (2005, April 13th-15th). *A capability maturity approach for construction projects improvement: use of case studies approach, 5th Poasgraduate research conference*, University of Salford.

Khatri, N., & Ng, H. A. (2000). The Role of Intuition in Strategic Decision Making. *Human Relations, 53*(1), 57-86.

Kieser, A., & Leiner, L. (2009). Why the Rigour–Relevance Gap in Management Research Is Unbridgeable. *Journal of Management Studies, 46*(3), 516-533.

Kirton, M. (1976). Adaptors and innovators: A description and measure. [doi:10.1037/0021-9010.61.5.622]. *Journal of Applied Psychology, 61*(5), 622-629.

Kirton, M. J. (1994). A theory of cognitive style.In In M. J. Kirton (Ed.), *Adaptors and innovators: Styles of creativity and problem solving* (pp. 1‑33). New York: Routledge.

Kirton, M. J., de Ciantis, S.M. (1994.). Cognitive style in organizational climate.In In M.J. Kirton (Ed.), *Adaptors and innovators: styles of creativity and problem solving* (pp.72‑90). New York: Routledge.

Kirton, M. J., DeCiantis, S.M. (1986). Cognitive style and personality: the Kirton adaption–innovation inventory and Cattell's sixteen personality factor inventories. *Personality and Individual Differences*(7), 141-1466.

Kirton, M. J., & McCarthy, R. M. (1988). Cognitive climate and organizations. *Journal of Occupational Psychology, 61*(2), 175-184.

Kloppenborg, T. J., & Opfer, W. A. (2002). The current state of project management research: trends, interpretations, and predictions. *Project Management Journal, 33*(2), 5-18.

Ko, S. (2008). Do Thinking Styles Of Entrepreneurs Matter In Innovation? *Journal of Global Business and Technology, 4*(2), 24-33.

Kozhevnikov, M. (2007). Cognitive Styles in the Context of Modern Psychology: Toward an Integrated Framework of Cognitive Style. *Psychological Bulletin, 33*(3), 464-481.

Kumar, R. (2005). *Research Methodology: A Step-by-Step Guide for Beginners*: SAGE Publications.

Kreitner, R., Kinicki, A.,Buelens, M. . (2002). *Organizational behaviour*.

Laerd Dissertation. (2012). Research Strategy : Purposive Strategy. Retrieved 29 December, 2013, from http://dissertation.laerd.com/purposive-sampling.php

Langer, E. (1998). The Power of Mindful Learning. In Sadler-Smith, E., and Shefy, E. (2007). Developing Intuitive Awareness in Management Education. *Academy of Management Learning & Education, 6*(2), 186-205.

Larson, R. J., Buss, M. (2005). *Personality Psychology: Domians of Knowledge about Human Nature*. New York: McGraw-Hill International edition.

Larose, D. T. (2006). *Data mining methods and models*. Hoboken, New Jersey: John Wiley and Sons.

Latham, G. P. (2007). A speculative perspective on the transfer of behavioral science findings to the workplace: "The times they are a-changing". *Academy of Management Journal, 50*, 1027-1032.

Le, K. N., & Tam, V. W. Y. (2008). On generic skill development: An engineering perspective. *Digital Signal Processing, 18*(3), 355-363.

Leban, W., & Zulauf, C. (2004). Linking emotional intelligence abilities and transformational leadership styles. *Leadership & Organization Development Journal, 25*(7), 554-564.

LeBlanc, D. C. (2008). *The Relationship Between Information Technology Project Manager Personality Type And Project Success.* University Of Phoenix, USA.

Lechler, T. (1998). *When it comes to project management, it's the people that matter* Pinto, J. K., Slevin,D.P. (2006). *Project Critical Success Factors: The Project-Implementation Profile*: Global Project Management Handbook

Lechler, T. G., & Dvir, D. (2010). An Alternative Taxonomy of Project Management Structures: Linking Project Management Structures and Project Success. *Engineering Management, IEEE Transactions on, 57*(2), 198-210.

Leedy, P. D., Ormrod, J. E. (2005). *Practical research: Planning and design* (8 ed.). Upper Saddle River,NJ: Prentice-Hall, Inc.

Leonard, D., Straus, S. (1997). Putting your company's whole brain to work. *Harvard Business Review, 75*, 110-121.

Leybourne, S., and Sadler-Smith,E. (2006). The role of intuition and improvisation in project management. *International Journal of Project Management, 24*, 483-492.

Liamputtong, P., Ezzy, D. (2005). *Qualitative research methods* (2nd ed.). South Melbourne, Australia.

Lim, C. S., Mohamed, M.Z. (1999). Criteria of project success: an exploratory reexamination. *International Journal of Project Management, 17*, 243–248.

Liu, A., Walker,A. (1998). Evaluation of project outcomes. *Construction Management and Economics, 16*(2), 209–219.

Loewenstein, J., Thompson, L. and Gentner, D. (2003). Analogical learning in negotiation teams: comparing cases promotes learning and transfer. *Academy of Management Learning and Education, 2*(119-27).

Loo, R. A. (2003). Multi-level causal model for best practices in project management benchmarking. *American International Journal 10*(1), 29–36.

Loprest, P., Mitchell,J. (2012). *Labor Market and Demographic Analysis: A National Picture of Short-term Employment Growth by Skill*. Washington,DC: Urban Institute.

Lovell, R. J. (1993). Power and the project manager. *International Journal of Project Management, 11*(2), 73-78.

Lovelock, C. H., Stiff, R., Cullwick, D., & Kaufman, I. M. (1976). An Evaluation of the Effectiveness of Drop-off Questionnaire Delivery. *Journal of Marketing Research, 13*(4), 358-364.

Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization *Scandinavian Journal of Management,, 11*, 437–455.

Power, M. (2008). *Organized Uncertainty: Designing a World of Risk Managemen*. London: Oxford University Press.

Madter, N., Bower, A.D.,Aritua,B. (2012). Projects and personalities: A framework for individualising project management career development in the construction industry. *International Journal of Project Management, 30*(3), 273-281.

Mango, A. (2009). The inspired Project Manager. *Project Management World Journal, 11*(1).

Mantel Jr SJ, Meredith JR, Shafer SM, & Sutton, M. (2004). *Core concepts: project management in practice (with CD).* (second ed.). New York: John Wiley and Sons.

Markoczy, L. (2006). Book Review: G. P. Hodgkinson and P. R. Sparrow: The Competent Organization: A Psychological Analysis of the Strategic Management Process. *Organization Studies, 27*(1), 154-157.

Maslach, C. (2003). Job burnout new directions in research and introvention. *Current Directions in Psychological Science, 12*(5), 189–192.

Mazur, A., Pisarski, A., Chang, A., & Ashkanasy, N. M. (2014). Rating defence major project success: The role of personal attributes and stakeholder relationships. *International Journal of Project Management, 32*(6), 944-957.

Maznevski, M. L., Distefano, J. J. (2000). Global leaders are team players: Developing global leaders through membership on global teams. *Human Resource Management, 39*(2-3), 195-208.

McCloy, A. R., Campbell, J. P.,Cudeck R. (1994). A Confirmatory Test of a Model of Performance Determinants. *Journal of Applied Psychology, 71*(2), 493-505.

McElroy, T., & Seta, J. J. (2003). Framing effects: An analytic–holistic perspective. *Journal of Experimental Social Psychology, 39*(6), 610-617.

McKenna, P. J. (1998). Play nice, partners. *The American Lawyer 12*(40).

Mclntosh, M. J. (2005). Personality Typology and Thinking Styles: Their Role in Framing and Prospect Theory. *Advances in Consumer Research, 32*(1), 253.

Mei, I. C., Dainty, A. R. J., & Moore, D. R. (2005). What makes a good project manager? [Article]. *Human Resource Management Journal, 15*(1), 25-37.

Melymuka, K. (2000). Born to Lead Projects. Retrieved 22 August, 2013, from http://www.computerworld.com/s/article/44218/Born_to_Lead_Projects

Meneely, J., & Portillo, M. (2005). The Adaptable Mind in Design: Relating Personality, Cognitive Style, and Creative Performance. *Creativity Research Journal, 17*(2-3), 155-166.

Merriam-Webster. (2013). Paradigm. Retrieved 19 December, 2013, from http://www.merriam-webster.com/dictionary/paradigm

Messick, S. (1976). Personality consistencies in cognition and creativity. In Messick, S. (ed.), *Individuality in Learning*. San Francisco, CA: Jossey Bass, pp. 4–22.

Messick, S. (1994). The matter of style: manifestations of personality in cognition, learning, and teaching. *Educational Psychologist, 29* 121-136.

Might, R. J., Fisher,W.A. (1985). The role of structural factors in determining project management success. *IEEE Trans Eng Manage, 32*(2), 121-124.

Miller, A. (1987). Cognitive styles: an integrated model. . *Educational Psychology, 7*, 251-268.

Miller, A. L. (2007). Creativity and cognitive style: The relationship between field-dependence-independence, expected evaluation, and creative performance. *Psychology of Aesthetics, Creativity, and the Arts, 1*(4), 243-246.

Miller, R., Lessard,D. (2001). *The strategic management of large engineering project : Shaping risks, institutions and governance*. Cambridge: MIT Press.

Miles, M. B., Huberman, M.A. (2002). *The Qualitative Researcher's Companion*. London, U.K.: Sage Publications.

Mintzberg, H. (1976). Planning on the left side and managing on the right. *Harvard Business Review, 54*, 49-58.

Mintzberg, H. (1994). Rounding out the manager's job. *Sloan Management Review, 36*, 11-26.

Miron, E., Erez, M., & Naveh, E. (2004). Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other? *Journal of Organizational Behavior, 25*(2), 175-199.

Mitchell, R. J., Shepherd, D. A., & Sharfman, M. P. (2011). Erratic strategic decisions: when and why managers are inconsistent in strategic decision making. *Strategic Management Journal, 32*(7), 683-704.

Moore, S. D. (2006). *The Basic Practice of Statistics* (4 ed.). USA: W. H. Freeman.

Moore, D. R., Cheng, M.-I., Dainty, A.R.J. (2003). What makes a Superior Management Performer: The Identification of Key Behaviours in Superior Construction Managers. *Construction Information Quarterly, 5*(2), 6–9.

Moorhead, G., Griffin, R.W. (2004). *Organizational behavior: managing people and organizations* (Seven ed.). New York: Houghton Mifflin.

Morris, P. W. G., Crawford, L., Hodgson, D., Shepherd, M. M., & Thomas, J. (2006). Exploring the role of formal bodies of knowledge in defining a profession – The case of project management. *International Journal of Project Management, 24*(8), 710-721.

Mohamad Noorman Masrek. (2011). The Research Process. Retrieved 22 December, 2013, from http://noormanmasrek.blogspot.com/2011/09/research-process.html

Morris, P. W. G. (2010). Research and the future of project management. *International Journal of Managing Projects in Business, 3*(1), 139-146.

Motowidlo, S. T., Borman, W.C., Schmit, M.K. (1997). A Theory of Individual Difference in Task and Contextual Performance. *Human Performance, 10*(2), 71-83.

Mullaly, M. E. (2004). *PM Success in Organizations, Trends, Best Practices and Next Steps.* Paper presented at the IPMA 2004.

Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott – the elucidation of project success. *International Journal of Managing Projects in Business, 5*(4), 757-775.

Muller, R., Turner, R.D. (2010a). Attitudes and leadership competences for project success. *Baltic Journal of Management, 5*(3).

Muller, R., Turner, R.D. (2010b). Leadership competency profiles of successful project managers. *International Journal of Project Management, 28*(5), 437-448.

Muller, R., Turner, R.D. (2007). Matching the project manager's leadership style to project type. *International Journal of Project Management, 25*, 21-32.

Muneera Esa, Anuar Alias, & Zulkiflee Abdul Samad. (27-28 February,2013). *Preparing Project Managers to Achieve Project Success - Human Management Perspective.* Paper presented at the International Conference on Innovation and Management, Barcelona, Spain.

Munns, A. K., Bjeirni,B.F. (1996). The role of Project Managemen in Achieving Project Success. *International Journal of Project Management, 14*(2), 81-82.

Muñoz-Doyague, M. F., González-Álvarez, N., & Nieto, M. (2008). An Examination of Individual Factors and Employees' Creativity: The Case of Spain. *Creativity Research Journal, 20*(1), 21-33.

Murphy, K. R. (1996). Individual differences and behavior in organizations: much more than g. In K.R. Murphy (Ed.), *Individual differences and behaviour in organizations* (pp. 3-30). San Francisco, CA: Jossey-Bass.

Murphy, K. R., Garcia, M., Kerkar, S., Martin, C., Balzer, K. (1982). Relationship between Observational Accuracy and Accuracy in Evaluating Performance. *Journal of Applied Psychology, 67*(3), 320-325.

Myers, I. B., McCaulley, M.H., Quenk, N.L., Hammer,A.L. . (2003). *MBTI Manual: A Guide to the Development and Use of the Myers–Briggs Type Indicator*. In Armstrong, S. J., Cools,E. and Sadler-Smith,E. (2012). Role of Cognitive Styles in Business and Management: Reviewing 40 Years of Research. *International Journal of Management Reviews, 14*, 238–262.

Nafees Ahmed Memon, Qazi Muhammad Moinuddin Abro, & Zubair Ahmed Memon. (2011). ISO in the Construction and Manufacturing Companies: A Case Study from the Construction Industry of Hyderabad and Karachi, Pakistan. *Mehran University Research Journal Of Engineering & Technology, 13*(2), 339-348.

Navarre, C., Schaan,J.L. . (1990). Design of Project Management Systems from Top Management's Perspective *Project Management Journal, XXI*(2).

Neuman, W. L. (2003). *Social research methods: Qualitative and quantitative approaches* (5 ed.). Boston: MA: Allyn & Bacon.

Nguyen, L. D., Ogunlana, S. O., & Lan, D. T. X. (2004). A study on project success factors in large construction projects in Vietnam. *Engineering, Construction and Architectural Management, 11*(6), 404-413.

Natrella, M. (2012). e-Handbook of Statistical Methods. Retrieved 20 November, 2013, from http://www.itl.nist.gov/div898/handbook/

Nixon, P., Harrington, M., & Parker, D. (2012). Leadership performance is significant to project success or failure: a critical analysis. *International Journal of Productivity and Performance Management, 61*(2), 204-216.

Noppe, L. D., & Gallagher, J. M. (1977). A Cognitive Style Approach to Creative Thought. *Journal of Personality Assessment, 41*(1), 85-90.

Nordin, F. (2006). Identity in intraorganizational and interorganizational alliance conflicts—a longitudinal study of an alliance pilot project in the high technology industry. *Industrial Marketing Management 35*(2), 116-127.

Nunnally, J. C. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

Nutt, P. C. (1990). Strategic Decisions Made By Top Executives And Middle Managers With Data And Process Dominant Styles. *Journal of Management Studies, 27*(2), 173-194.

Olson, P. D. (1985). Entrepreneurship: process and abilities. *Entrepreneurship Theory and Practice, 10*, 25-32.

Packendorff, J. (1995). Inquiring into the temporary organization: new directions for project management research. *Scandinavian Journal of Management, 11*(4), 319-333.

Palmquist, R. A., & Kim, K.-S. (2000). Cognitive style and on-line database search experience as predictors of Web search performance. *Journal of the American Society for Information Science, 51*(6), 558-566.

Pant, I., Boroudi,B. (2008). Project management education: The human skills imperative. *International Journal of Project Management, 26*, 124–128.

Papke-Shields, K. E., Beise, C., & Quan, J. (2010). Do project managers practice what they preach, and does it matter to project success? *International Journal of Project Management, 28*(7), 650-662.

Pariff, M. K., Sanvido,V.E. (1993). Checklists of critical success factors for building projects. *Journal of Management in Engineering, 9*(3), 243-248.

Parker, S. K., & Skitmore, M. (2005). Project management turnover: causes and effects on project performance. *International Journal of Project Management, 23*(3), 205-214.

Pedler, M., J. Burgoyne,T. Boydell. (1996). The Learning Company. A strategy for sustainable development.

Pheng, L. S., & Chuan, Q. T. (2006). Environmental factors and work performance of project managers in the construction industry. *International Journal of Project Management, 24*(1), 24-37.

Pines, A. M., Dvir,D.,Sadeh,A. (5–9 August,2007). *Project manager-project (Pm-P) fit and project success.* Paper presented at the Portland International Conference on Management and Technology, Portland, OR.

Pinto, J. K. (1986). *Project implementation: a determination of its critical success factors, moderators, and their relative importance across the project life cycle*: In Dyett, V. (2011). *Roles and Characteristics of the Project Manager in Achieving Success across the Project Life Cycle.* Unpublished Ph.D., Lynn University, Ann Arbor

Pinto, J. K., Kharbanda, O.P. (1995). *Successful PMs.* In Powl, A., & Skitmore, M. (2005). Factors hindering the performance of construction project managers. *Construction Innovation: Information, Process, Management, 5*(1), 41-51.

Pinto, J. K., & Prescott, J. E. (1990). Planning And Tactical Factors In The Project Implementation Process. *Journal of Management Studies, 27*(3), 305-327.

Pinto, J. K., Slevin, D. P. (1987). Balancing strategy and tactics in project implementation. *Sloan Management Review*, 33-41.

Podsakoff, P. M., Organ, D.W. (1986). Self reports in organizational reports: problems and prospects. Journal of Management. *12*, 531-544.

Pollack, J. (2007). The changing paradigms of project management. *International Journal of Project Management, 25*, 266-274.

Powl, A., & Skitmore, M. (2005). Factors hindering the performance of construction project managers. *Construction Innovation: Information, Process, Management, 5*(1), 41-51.

Prabhakar, G. P. (2005). Switch Leadership In Projects: An Empirical Study Reflecting The Importance Of Transformational Leadership On Project Success Across Twenty-Eight Nations. [Article]. *Project Management Journal, 36*(4), 53-60

Prabhakar, G. P. (2008). What is Project Success: A Literature Review. *International Journal of Business and Management, 3*(9).

Project Management Institute. (2008). *Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Fourth Edition*. Pennsylvania, USA: Project Management Institute, Inc.

Project Management Institute. (2013). *Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Fifth Edition*. Pennsylvania, USA: Project Management Institute, Inc.

Punch, M. (1998). *Introduction to Social Research : Quantitative and Qualitative Approaches*. London: Sage.

Puccio, G. J., Treffinger, D. J., & Talbot, R. J. (1995). Exploratory Examination of Relationships Between Creativity Styles and Creative Products. *Creativity Research Journal, 8*(2), 157-172.

Pulakos, E. D. (2005). *Selection Assessment Methods: A Guide to Implementing Formal Assessments to Build a High-Quality Workforce*. Alexandria, VA: Society for Human Resource Management Foundation.

Rad, P., Anantatmula, V. (2010). *Successful project management practices*. Bingley, UK: Emerald Group Publishing.

Radford, J. (2008). *Learning Soft Skills: Why will a Project Manager Decide to Pursue Soft Skills Training?* Canada: Athabasca University.

Rahim, M. A., Psenicka, C. (2002). A model of emotional intelligence and conflict management strategies: a study in seven countries. . *International Journal of Organizational Analysis, 10*(4), 302-326.

Rämö, H. (2002). Doing things right and doing the right things Time and timing in projects. *International Journal of Project Management, 20*(7), 569-574.

Ramnarayan, S., Nilakant, S. . (2006). Dynamics of reinvention. *Vikalpa: The Journal for Decision Makers, 31*(1), 31-47.

Rayner, S., & Riding, R. (1997). Towards a Categorisation of Cognitive Styles and Learning Styles. [doi: 10.1080/0144341970170101]. *Educational Psychology, 17*(1-2), 5-27.

Rayner, S. J., Cools, E. (2011). *Style differences in cognition, learning, and management: Theory, research and practice*. New York: Routledge.

Remenyi, D. W., B., Money, A.,Swatz,E. . (1998). *Doing research in business and management*. London: Sage.

Reynolds, M. (1997). Learning styles: a critique. *Management Learning, 28*, 115-133.

Riding, R., & Agrell, T. (1997). The Effect of Cognitive Style and Cognitive Skills on School Subject Performance. [doi: 10.1080/0305569970230213]. *Educational Studies, 23*(2), 311-323.

Riding, R., Rayner,S. (1998). *Cognitive styles and learning strategies: Understanding style differences in learning and behaviour*. London: Fulton.

Riding, R. J. (2000). *Cognitive style: a review*. In In R. J. Riding, & S. G. Rayner (Eds.), *International perspectives on individual differences. Vol. 1: Cognitive styles* (pp. 315-344). Stamford, CT: Ablex.

Riding, R. J., & Pearson, F. (1994). The Relationship between Cognitive Style and Intelligence. *Educational Psychology, 14*(4), 413-425.

Riding, R. J., & Wright, M. (1995). Cognitive Style, Personal Characteristics and Harmony in Student Flats. [doi: 10.1080/0144341950150308]. *Educational Psychology, 15*(3), 337-349.

Ritchie, W. J., Kolodinsky, R. W., & Eastwood, K. (2007). Does Executive Intuition Matter? An Empirical Analysis of Its Relationship With Nonprofit Organization Financial Performance. *Nonprofit and Voluntary Sector Quarterly, 36*(1), 140-155.

Rodrigues, A., & Bowers, J. (1996). System dynamics in project management: A comparative analysis with traditional methods. *System Dynamics Review, 12*(2), 121-139.

Roshana Takim, & Hamimah Adnan. (July 2008). Analysis of Effectiveness Measures of Construction Project Success in Malaysia. *Asian Social Science, 4*(7).

Rubin, I., Seeling, W. (1967). Experience as a factor in the selection and performance of project managers. *IEEE Trans Eng Manage, 14*(3), 131-134.

Runeson, G. (1997). The role of theory in construction management research: comment. [doi: 10.1080/014461997373033]. *Construction Management and Economics, 15*(3), 299-302.

Rynes, S. L., Bartunek, J. M.,Daft, R. D. . (2001). Across the great divide: knowledge creation and transfer between practitioners and academics. *Academy of Management Journal, 44*, 340-355.

Sackett, P. R., Larson, J.R.,. (1990). Research strategies and tactics in industrial and organizational psychology. In In M. D. Dunnette & L. M. Hough (Eds.), Handbook of industrial and organizational psychology (2nd ed., Vol. 1, pp. 419–489). Palo Alto, CA: Consulting Psychologists Press.

Sadler-Smith, E. (1996). Learning styles: a holistic approach. *Journal of European Industrial Training, 20*(7), 29-36.

Sadler-Smith, E. (2004). Cognitive Style and the Management of Small and Medium-Sized Enterprises. *Organization Studies, 25*(2), 155-181.

Sadler-Smith, E., and Badger, B. (1998). Cognitive style, learning and innovation. *Technology Analysis & Strategic Management, 10*(2), 247-266.

Sadler-Smith, E., and Burke,A. L. (2009). Fostering Intuition in Management Education. *Journal of Management Education, 33*(22), 239-262.

Sadler-Smith, E., and Riding, R. (1999). Cognitive style and instructional preferences. *Instructional Science, 27*, 355-371.

Sadler-Smith, E., and Shefy, E. (2007). Developing Intuitive Awareness in Management Education. *Academy of Management Learning & Education, 6*(2), 186-205.

Sadler-Smith, E., and Smith, J.P. (2004). Strategies for accommodating individual styles and preferences in flexible learning programmes. *British Journal of Educational Technology, 35*(4), 395-412.

Sadler-Smith, E., David P.,Spicerm P.D.,Tsang,F. (2000(b)). Validity of the Cognitive Style Index: Replication and Extension. *British Journal of Management, 11*(2), 175–181.

Salkind, N. J. (2003). *Exploring research* (5 ed.). Upper Saddle River, NJ: Prentice Hall.

Saracho, O. N. (1998). Research directions for cognitive style and education. *International Journal of Educational Research, 29*(3), 287-290.

Savvas, M., El-Kot,G., and Sadler-Smith, E. (2001). Comparative study of cognitive styles in Egypt, Greece, Hong Kong and the UK. *International Journal of Training & Development, 5*(1), 64-73.

Scandura, T. A., & Williams, E. A. (2000). Research Methodology In Management: Current Practices, Trends, And Implications For Future Research. *Academy of Management Journal, 43*(6), 1248-1264.

Schloemer, P. G., Schloemer, M.S. . (1997). The personality types and preferences of CPA firm professionals: an analysis of changes in the profession. *Accounting Horizons, 11*, 24-39.

Schwalbe, K. (2004). *Information Technology Project Management* (3rd ed.). Boston: MA.

Schlick, J. (1988). Developing project management skills. *Training and Development Journal, 42*(5), 20-28.

Scott, B., Barnes, C.,Wagner, D. (2012). Chameleonic or consistent? A multi-level investigation of emotional labor variability and self-monitoring. *Academy of Management Journal, 55*(4), 905-926.

Scott, S. G., & Bruce, R. A. (1995). Decision-Making Style: The Development and Assessment of a New Measure. *Educational and Psychological Measurement, 55*(5), 818-831.

Sense, A. J. (2007). Learning within project practice: Cognitive styles exposed. *International Journal of Project Management, 25*, 33-40.

Seymour, D., Crook, D., & Rooke, J. (1997). The role of theory in construction management: a call for debate. [doi: 10.1080/014461997373169]. *Construction Management and Economics, 15*(1), 117-119.

Sekaran, U., & Bougie, R. (2010). *Research Methods for Business: A Skill Building Approach*: John Wiley & Sons.

Shafir, E., LeBoeuf,R.A. (2002). Rationality. *Annual Review of Psychology, 53*, 491-517.

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project Success: A Multidimensional Strategic Concept. *Long Range Planning, 34*(6), 699-725.

Shenhar, A. J., Dvir, D. (2007). *Reinventing Project Management: The Diamond Approach to Successful Growth & Innovation*. Cambridge, MA: Harvard Business School Press.

Shenhar, A. J., Wideman,R.M. (2001). *Improving Project Management: Linking Success Criteria to Project Type.* Paper presented at the Southern Alberta Chapter, Project Management Institute Symposium 'Creating Canadian Advantage through Project Management', Calgary, Canada.

Shenhar, A., Dvir, D. (1996), "Toward a typological theory of project management", Research Policy, Vol. 25 No. 4, pp. 607-32

Shiloh, S., Salton, E., & Sharabi, D. (2002). Individual differences in rational and intuitive thinking styles as predictors of heuristic responses and framing effects. *Personality and Individual Differences, 32*(3), 415-429.

Shipman, K. S., Shipman, V. C. . (1985). Cognitive styles: Some conceptual, methodological and applied issues. In Cools, E., Van den Broeck,H. (2007). Development and Validation of the Cognitive Style Indicator. *The Journal of Psychology, 141*(4), 359-387.

Sick, J. (2010). Rasch measurement in language education Part 5: Assumptions and requirements of Rasch measurement. *SHIKEN: JALT Testing & Evaluation SIG Newsletter, 14*(2), 23-29.

Singer, M. (1990). Individual Differences in Adaption-Innovation and the Escalation of Commitment Paradigm. [doi: 10.1080/00224545.1990.9924620]. *The Journal of Social Psychology, 130*(4), 561-563.

Skulmoski, G. J., & Hartman, F. T. (2010). Information systems project manager soft competencies: A project-phase investigation. *Project Management Journal, 41*(1), 61-80.

Smith, L. (2001). *The effects of project manager personality profiles on projects.* Paper presented at the PMI Annual Seminars & Symposium, Nashville, Tennessee.

Smith, P. (2003). Workplace learning and flexible delivery. *Review of Educational Research, 73*(1), 53-88.

Smithers, G. L., & Walker, D. H. T. (2000). The effect of the workplace on motivation and demotivation of construction professionals. [doi: 10.1080/014461900433113]. *Construction Management and Economics, 18*(7), 833-841.

Söderlund, J. (2004). Building theories of project management: past research, questions for the future. [doi: 10.1016/S0263-7863(03)00070-X]. *International Journal of Project Management, 22*(3), 183-191.

Söderlund, J. (2011). Pluralism in Project Management: Navigating the Crossroads of Specialization and Fragmentation. *International Journal of Management Reviews, 13*(2), 153-176.

Sommerville, J., Craig, N., & Hendry, J. (2010). The role of the project manager: All things to all people? *Structural Survey, 28*(2), 132-141.

Spicer, D. (February 2004). The impact of approaches to learning and cognition on academic performance in business and management. Bradford University School of Management.

Staw, B. M. (1997). The escalation of commitment: An update and appraisal.In Z. Shapira (Ed.), *Organization decision making* (pp. 191–215). New York: Cambridge University Press.

Sternberg, R. J., & Grigorenko, E. L. (1997). Are cognitive styles still in style? [doi:10.1037/0003-066X.52.7.700]. *American Psychologist, 52*(7), 700-712.

Stewart Jr, W. H., Watson, W. E., Carland, J. C., & Carland, J. W. (1999). A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers. *Journal of Business Venturing, 14*(2), 189-214.

Stock, N., Zacharis, R. (2011). Patterns and performance outcomes of innovation orientation. *Journal of the Academy of Marketing Science, 39*, 870–888.

Strang, K. (2003). *Achieving organizational learning across projects*. Paper presented at the PMI North America global congress 2003.

Streufert, S., & Nogami, G.Y. (1989). Cognitive Style and Complexity: Implications for I/O Psychology. In In Cooper, E.L. and Robertson, I. (eds), *International Review of Industrial and Organisational Psychology*. Chichester: Wiley, pp. 93–143.

Stumpf, S. A., & Dunbar, R. L. M. (1991). The Effects of Personality Type on Choices Made in Strategic Decision Situations. *Decision Sciences, 22*(5), 1047-1072.

Sun, R. C. F., & Hui, E. K. P. (2012). Cognitive Competence as a Positive Youth Development Construct: A Conceptual Review. *The Scientific World Journal, 2012*, 7.

Sumner, M., Bock, D.,Giamartino, G. (2006). Exploring the linkage between the characteristics of IT project leaders and project success. *Information Systems Management, 23*(4), 43-49.

Symon, G. (2006). Academics, practitioners and the Journal of Occupational and Organizational Psychology: reflecting on the issues. *Journal of Occupational and Organizational Psychology, 79*(167-71).

T.Bendell, L. B., and J.Kelly. (1998). *Benchmarking for Competitive Advantage*. London: Pitman Publishing.

Taggart, W., & Valenzi, E. (1990). Assessing Rational And Intuitive Styles: A Human Information Processing Metaphor. *Journal of Management Studies, 27*(2), 149-172.

Teddlie, C., & Yu, F. (2007). Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research, 1*(1), 77-100.

Tett, R. P., Guterman, H. A., Bleier, A., & Murphy, P. J. (2000). Development and Content Validation of a "Hyperdimensional" Taxonomy of Managerial Competence. [doi: 10.1207/S15327043HUP1303_1]. *Human Performance, 13*(3), 205-251.

Thamhain, H. J. (1991). Developing project management skills. *Project management Journal, 22*(3), 39-44.

Thamhain, H. J. (2004). Linkages of Project Environment to Performance: Lessons for Team Leadership. *International Journal of Project Management, 22*.

Thiry, M. (2002). Combining value and project management into an effective program management model. *International Journal of Project Management, 20*(3), 221–227.

Thomas, J., Mengel,T. . (2008). Preparing project managers to deal with complexity – Advanced project management education. *International Journal of Project Management, 26*, 304–315.

Tiedemann, J. (1989). Measures of cognitive styles: a critical review. *Educational Psychologist, 24*, 261-275.

Tinajero, C., & Páramo, M. F. (1997). Field dependence-independence and academic achievement: a re-examination of their relationship. *British Journal of Educational Psychology, 67*(2), 199-212.

Trochim, W., Donnelly, J. (2007). *The Research Methods Knowledge Base*. Mason,OH: Thompson Custom Solutions.

Tullett, A. D., & Davies, G. B. (1997). Cognitive style and affect: A comparison of the Kirton adaption-innovation and Schutz's fundamental interpersonal relations orientation-behaviour inventories (KAI and FIRO-B). *Personality and Individual Differences, 23*(3), 479-485.

Turner, J. (1999). *A Handbook of Project-based Management*. In Zhang, W. (2009). *The Relationship Between The Relationship Between Project Manager Leadership Style And Project Success* Wisconsin: University of Wisconsin-Platteville.

Turner, J. R., Müller,R. (2005). The Project Manager's Leadership Style As A Success Factor On Projects: A Literature Review. *Project Management Journal, 36*(1), 49-61.

Turner, J., Müller, R. (2006). Choosing appropriate project managers: Matching their leadership style to the type of project. *Project Management Institute*.

Turner, J. R., Anbari,F.,Bredillet,C. (2013). Perspectives on research in project management: the nine schools. *Global Business Pespective, 1*, 3-28.

Vaaland, T. I., & Håkansson, H. (2003). Exploring interorganizational conflict in complex projects. *Industrial Marketing Management, 32*(2), 127-138.

Van de Ven, A. H., Johnson, P. E. (2006). Knowledge for theory and practice. *Academy of Management Review, 31*, 902–921.

Verma, K. (1996). *Human Resource Skills for the Project Manager—the Human Aspects of Project Management*.

Vygotsky, L. S. (1962). *Thought and Language*. Cambridge,Mass, USA: MIT Press.

Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Process. *Harvard University Press*.

W. T. Grant Consortium on the School-Based Promotion of Social Competence. (1992). Drug and alcohol prevention curricula. In J. David Hawkins, Richard F. Catalano Jr., et al. (Ed.), *Communities that care: Action for drug abuse prevention* (pp. 129-148). San Francisco: Jossey-Bass.

Waite, M. (Ed.) (2013) Paperback Oxford English Dictionary (Seventh ed.). Oxford University Press.

Wall, T. (2006). Is JOOP of only academic interest? *Journal of Occupational and Organizational Psychology, 79*, 161-165.

Walliman, N. (2001). *Your Research Project: a step-by –step guide for the first time researcher*: Sage Publications.

Wan Maimun Wan Abdullah. (2010). *Critical factors in project success : a study of public sector construction projects in Malaysia*. University Malaya, Kuala Lumpur.

Wang, Q., Ceci, S. J., Williams, W. M. & Kopko, K. A. (2004). Culturally situated cognitive competence: A functional framework. In R. Sternberg, Grigorenko,E.L. (Ed.), *Culture and competence* (pp. 225-249). Washington, DC: American Psychological Association.

Webb, A. (2000). Project management for successful product innovation. *International Journal of Project Management, 20*, 456.

Wells, W. G. (1998). From the editor. *Project Management Journal, 29*(4), 4-6.

Whetten, D. A. (1989). What Constitutes a Theoretical Contribution? *Academy of Management Review, 14*(4), 490-495.

William Dow, P., & Taylor, B. (2010). *Project Management Communications Bible*: Wiley.

Willis, S. L. (1996). Everyday Cognitive Competence in Elderly Persons: Conceptual Issues and Empirical Findings. *The Gerontologist, 36*(5), 595-601.

Winch, G. (1998). Zephyrs of creative destruction: understanding the management of innovation in construction. [doi: 10.1080/096132198369751]. *Building Research & Information, 26*(5), 268-279.

Wing, C. K., Raftery, J., & Walker, A. (1998). The baby and the bathwater: research methods in construction management. [doi: 10.1080/014461998372637]. *Construction Management and Economics, 16*(1), 99-104.

Winter, M., Smith,C.,Morris,P.,Cicmil,S. (2006). Directions for future research in project management: The main findings of a UK government-funded research network. [doi: 10.1016/j.ijproman.2006.08.009]. *International Journal of Project Management, 24*(8), 638-649.

Winter, M., Szczepanek, Tony. (2008). Projects and programmes as value creation processes: a new perspective and some practical implications. *International Journal of Project Management, 26*(1), 95–103.

Wirth, I. (1992). Project-management education: current issues and future trends. *International Journal of Project Management, 10*(1), 49-54.

Witkin, H. A., Moore,C.S., Goodenough,D.R. and Cox,P.W. (1977). Field-dependent and field-independent conitive styles and their educational implications *Review of Educational Research,* 1-64.

Wong, K. F. E., Kwong, J. Y. Y., & Ng, C. K. (2008). When Thinking Rationally Increases Biases: The Role of Rational Thinking Style in Escalation of Commitment. *Applied Psychology, 57*(2), 246-271.

Wong , S. P. P., Lam,K.Y. (2011). Facing Turbulence—A Driving Force for Construction Organizations to Regain Unlearning and Learning Traction. *Journal of Construction Engineering and Management*

Wooten, K. C., & Earner, B. O. (1994). The Influence Of Cognitive Style Upon Work Environment Preferences. *Perceptual and Motor Skills, 79*(1), 307-314.

Yang, L.-R., Huang, C.-F., & Hsu, T.-J. (2014). Knowledge leadership to improve project and organizational performance. *International Journal of Project Management, 32*(1), 40-53.

Yen, H. J., Krumwiede, D. W., & Sheu, C. (2002). A cross-cultural comparison of top management personality for TQM implementation. *Total Quality Management, 13*(3), 335-346.

Yong, Y. C., & Mustaffa, N. E. (2013). Critical success factors for Malaysian construction projects: an empirical assessment. [doi: 10.1080/01446193.2013.828843]. *Construction Management and Economics, 31*(9), 959-978.

Young, D. (2013). Detecting multicollinearity using variance inflation factors. Retrieved 12 August, 2013, from https://onlinecourses.science.psu.edu/stat501/node/83

Zhang, F., Zuo, J., & Zillante, G. (2013). Identification and evaluation of the key social competencies for Chinese construction project managers. *International Journal of Project Management, 31*(5), 748-759.

Zhang, L.-F. (1999). Further Cross-Cultural Validation of the Theory of Mental Self-Government. *The Journal of Psychology, 133*(2), 165-181.

Zhang, L.-f., & Sternberg, R. (2005). A Threefold Model of Intellectual Styles. *Educational Psychology Review, 17*(1), 1-53.

Zhang, L., & Fan, W. (2013). Improving performance of construction projects: A project manager's emotional intelligence approach. *Engineering, Construction and Architectural Management, 20*(2), 195-207.

Zhao, F. (2005). Exploring the synergy between entrepreneurship and innovation. *International Journal of Entrepreneurial Behaviour & Research, 11*(1), 25-41.

Zimmerer, T. W., & Yasin, M. M. (1998). A leadership profile of American project managers. [Article]. *Project Management Journal, 29*(1), 31.

APPENDIX A: SURVEY QUESTIONNAIRE

UNIVERSITY OF MALAYA
The Leader in Research & Innovation

FACULTY OF BUILT ENVIRONMENT

Dear Sir/ Madam,

RE: PhD Research Survey on Construction Project Managers in Malaysia

Description

I truly appreciate your kind participation in this survey and all the information gathered will be used solely for academic purposes only and will be treated with the utmost **confidentiality.**

This survey is part of a PhD research which seeks to understand project managers' soft skill towards efficient project success outcomes. This questionnaire asks your views on the human management context which tapping into the concept of cognitive style (thinking style) and unlearning approach in achieving project success by project managers. Throughout this questionnaire, you will see statements referring to COGNITIVE STYLES and PROJECT SUCCESS which defined as :

Cognitive Style (thinking style): Individual differences in how people perceive, think, solve problems, learn and relate to other.

Project Success : The success of a project that can be achieved through time, cost, quality, and stakeholders' appreciation.

Participation

A. Your response to this survey is highly valued. It will take about 15 minutes for you to complete the survey. There is no right or wrong answers for this survey so please attempt **all** questions to the best of your knowledge.

This survey comprises of the following sections:

- Section 1: Background Information
- Section 2: Measurement on Cognitive Style
- Section 3: Measurement on Project Success

B. It is expected that the desired outcomes from this research will recommend a workable Project Success framework from Human Management context for project managers that may help them to position themselves in the professionalism of project management.

Consent of Participate

The return of the completed questionnaire is accepted as an indication of your consent to participate in this project. Please kindly complete the questionnaire and mail them back to me in the self-addressed stamped envelope as soon as possible.

Thank you very much in making this research a successful one.

Your sincerely,

MUNEERA ESA
PhD Candidate,
Faculty of Built Environment,
University of Malaya, Kuala Lumpur

Please answer the following questions based on your own experiences and judgments by ticking(/) the appropriate box. There is no right or wrong answer.

SECTION 1: RESPONDENT'S BACKGROUND

1. Gender : ☐ Male ☐ Female

2. Age :

☐ 21- 30 yrs ☐ 31- 40 yrs ☐ 41- 50 yrs ☐ 51- 60 yrs ☐ > 60 yrs

3. What is the position/work title you hold in your firm?

☐ Supervisor

☐ Project Manager

☐ Programme Manager (Directing programme / Project Integration)

☐ Organizational Manager

Others (*please specify)*: …….

4. How many years of work experience do you have in the construction industry?

☐ < 5 yrs ☐ 5- 10 yrs ☐ 11-15 yrs ☐ 16-20 years ☐ > 20years

5. With reference to one construction project that you have been (either fully or partly) involved at least 1 year, please provide the following particulars:

Project Nature :

☐ 1).Residential

☐ 2) Office

☐ 3) Hotel

☐ 4) Shopping centre and /or car park

☐ 5) Infrastructure

☐ Complex: comprising 1) and 4)

☐ Complex: comprising 2) and 4)

☐ Complex: comprising 3) and 4)

☐ Others (Please specify): ……

SECTION 2: MEASUREMENT OF CONGNITIVE STYLE

The next part of this questionnaire is concerned with your cognitive style (thinking style) in which you use within your role in project- based decision making. Simply choose the one response which comes closest to your own opinion. There are no right or wrong answers. Please make sure that you respond to every statement.

1= Strongly Disagree
2= Disagree
3=Neutral
4= Agree
5= Strongly Agree

2.1 : Knowing Style : People with a knowing style look for facts and data. They want to know exactly the way things are and tend to retain many facts and details. They like complex problems if they can find a clear and rational solution.

1. I make detailed analyses	1	2	3	4	5
2. I study each problem until I understand the underlying logic	1	2	3	4	5
3. I like to analyze problems	1	2	3	4	5
4. I want to have a full understanding of all problems.	1	2	3	4	5

2.Planning Style : People with a planning style are characterized by a need for structure. Planners like to organize and control and prefer a well-structured work environment. They attach importance to preparation and planning to reach their objectives

6. Developing a clear plan is very important to me	1	2	3	4	5
7. I always want to know what should be done when.	1	2	3	4	5
8. I like detailed action plans.	1	2	3	4	5
9. I prefer clear structures to do my job.	1	2	3	4	5
10. I prefer well-prepared meetings with a clear agenda and strict time management.	1	2	3	4	5
11. I make definite engagements, and I follow up meticulously.	1	2	3	4	5
12. A good task is a well-prepared task	1	2	3	4	5
13. I try to keep to a regular routine in my work.	1	2	3	4	5

3. Creating Style : People with a creating style tend to be creative and like experimentation. They see problems as opportunities and challenges, and they like uncertainty and freedom.

15. I like to contribute to innovative solutions	1	2	3	4	5
16. I prefer to look for creative solutions.	1	2	3	4	5
17. I am motivated by ongoing innovation..	1	2	3	4	5
18. I like much variety in my life.	1	2	3	4	5
19. New ideas attract me more than existing solutions..	1	2	3	4	5
20. I like to extend boundaries.	1	2	3	4	5
21. I try to avoid routine	1	2	3	4	5

22. I generally rely on " hunches" gut feeling and other non-verbal cues to help me in the problem solving process.	1	2	3	4	5

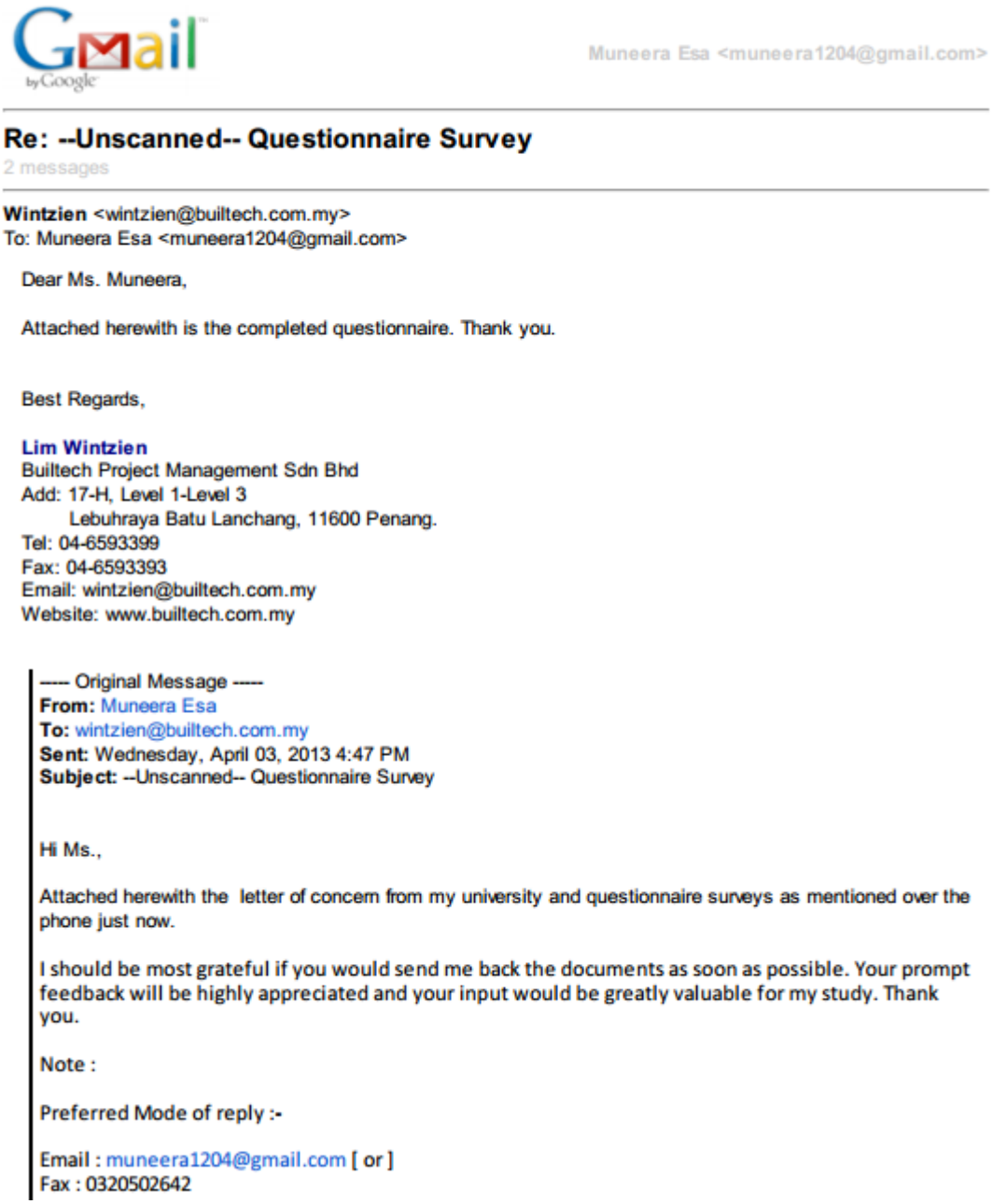
SECTION 3: MEASUREMENT ON PROJECT SUCCESS

This section is concerned with the way in which you and other stakeholders judge the success of projects. It is generally agreed that most projects are judged on the basis of **timely delivery**, achievement within **budget**, **the** meeting of **scope or quality** criteria, and internal or external **customer satisfaction.** The following questions reflect those criteria.

1= Strongly Disagree
2= Disagree
3=Neutral
4= Agree
5= Strongly Agree

1.The project will come in one **schedule**	1	2	3	4	5
2.The project will come in on **budget**	1	2	3	4	5
3.The project that has been developed works (or if still being developed, looks as if it will work) (Example: Deliverable works on **quality**)	1	2	3	4	5
4. The project is **used by its intended clients**	1	2	3	4	5
5. This project will directly **benefit the intended users**: either through increasing efficiency or employee effectiveness.	1	2	3	4	5
6.Given the problem for which it was developed, this project seems to **do the best job of solving that problem**, i.e. it was the best choice among the set of alternatives	1	2	3	4	5
7.Important clients, directly affected by this project, **will make use of it**	1	2	3	4	5
8. I am satisfied with the process by which this project is being completed. **(Good project success)**	1	2	3	4	5
9. We are confident that nontechnical start-up problems will be minimal, because the project will be readily **accepted by its intended users.**	1	2	3	4	5
10. Use of this project will directly lead to improved or more effective decision making or performance for the clients**. (Benefit users)**	1	2	3	4	5
11.The project will have a **positive impact** on those who make use of it.	1	2	3	4	5
12.The results of a project represent a definite improvement in performance over the way clients used to perform these activities. **(Provides improvement)**	1	2	3	4	5

APPENDIX B: INVITATION TO PARTICIPATE IN THE STUDY



Gmail by Google

Muneera Esa <muneera1204@gmail.com>

Re: --Unscanned-- Questionnaire Survey

2 messages

Wintzien <wintzien@builtech.com.my>
To: Muneera Esa <muneera1204@gmail.com>

Dear Ms. Muneera,

Attached herewith is the completed questionnaire. Thank you.

Best Regards,

Lim Wintzien
Builtech Project Management Sdn Bhd
Add: 17-H, Level 1-Level 3
Lebuhraya Batu Lanchang, 11600 Penang.
Tel: 04-6593399
Fax: 04-6593393
Email: wintzien@builtech.com.my
Website: www.builtech.com.my

----- Original Message -----
From: Muneera Esa
To: wintzien@builtech.com.my
Sent: Wednesday, April 03, 2013 4:47 PM
Subject: --Unscanned-- Questionnaire Survey

Hi Ms.,

Attached herewith the letter of concern from my university and questionnaire surveys as mentioned over the phone just now.

I should be most grateful if you would send me back the documents as soon as possible. Your prompt feedback will be highly appreciated and your input would be greatly valuable for my study. Thank you.

Note :

Preferred Mode of reply :-

Email : muneera1204@gmail.com [or]
Fax : 0320502642

- **Example : By email**

APPENDIX C: PERMISSION TO USE AN EXISTING SURVEY

Gmail by Google

Muneera Esa <muneera1204@gmail.com>

Permission to use CoSI in dissertation

2 messages

Muneera Esa <muneera1204@gmail.com>
To: Eva.Cools@vlerick.be

Muneera Esa

Faculty of Built Environment,

University of Malaya,

Kuala Lumpur,Malaysia.

Dr. Eva Cools,

Research Manager and Academic Research Coordinator,

Research Dean's Office of Vlerick Business School,

Belgium.

Dear Dr. Eva Cools,

My name is Muneera Esa. I am doctoral candidate in the PhD program at Department of Project Management, Faculty of Built Environment, University of Malaya, Kuala Lumpur. My dissertation focuses on project management and the topic is "Exploring the value of Science and Practise: Linking Project Manager Cognitive Style and Project Success". I would like to test the relationship between project manager's Cognitive Styles and Project Success. The literature on Project Management shows that, in spite of advancement in PM processes, tools and systems, project success has not significantly improved. Thus this study would like to identify how cognitive style (from personality traits perspective) of project managers can affect Project Success.

This is a request for permission to use and adapt the Cognitive Style Indicator (CoSI) in my dissertation. If permission is granted, I will include any statement of authorization for use that you request, or provide an APA note of permission. The copyright holder will be given full credit. I am referencing the instrument from the following:

Cools, E., & Van den Broeck, H. (2007). Development and validation of the Cognitive Style Indicator. Journal of Psychology: Interdisciplinary and Applied, 141(4), 359-387. doi: 10.3200/JRLP.141.4.359-388

The measure: Cools & Van den Broeck (2007) CoSI.doc Scoring key: Cools & Van den Broeck (2007) CoSI Scoring Key.doc

I would greatly appreciate your consent to my request. If you require any additional information, please do not hesitate to contact me. I can be reached at the e-mail address of muneera1204@gmail.com. My dissertation Supervisors can be reached at the following address:

1. Sr Dr. Associate Professor Anuar Alias : anuar_a@um.edu.my
2. Sr Dr. Zulkiflee Abdul Samad : zulkiflee1969@um.edu.my

Thank you for your consideration.

Shari De Baets <shari.debaets@vlerick.com>
To: "muneera1204@gmail.com" <muneera1204@gmail.com>

Dear Muneera Esa,

Thank you for your e-mail. I am currently following up for Dr. Cools on the requests for using the CoSI. We are always open to share our instrument for research purposes and give our permission to interested researchers.

I have attached the latest version of our documents. As you can see, the logo of our institution has changed. Please use the updated version (content-wise it remained the same).

Our goal is to further validate the CoSI in different countries. Should you be using the CoSI for your own research, we would really appreciate receiving the completed sample description form and raw data to further establish the cross-cultural validation of our instrument. Can you keep us posted about your plans with the CoSI (when and with which sample do you plan to use it, if any)?

Thank you in advance for sharing your data afterwards,

And best of luck with your research!

Do let me know if you need anything else.

Kind regards,

Shari & Eva

APPENDIX D : SPSS OUTPUT

Mean and Standard Deviations for Cognitive Styles

Item	N	Mean	s.d
Knowing Style			
I make detailed analyses	183	4.30	.772
I study each problem until I understand the underlying logic	183	4.27	.620
I like to analyze problems	183	4.37	.658
I want to have a full understanding of all problems	183	4.30	.648
Planning Style			
Developing a clear plan is very important to me	183	4.40	.575
I always want to know what should be done when	183	4.35	.610
I like detailed action plans	183	4.25	.726
I prefer clear structures to do my job	183	4.38	.617
I prefer well-prepared meetings with a clear agenda and strict time management.	183	4.24	.732
I make definite engagements, and I follow up meticulously.	183	4.20	.709
A good task is a well-prepared task	183	4.31	.668
Creating Style			
I like to contribute to innovative solutions	183	4.06	.697
I prefer to look for creative solutions.	183	4.08	.659
I am motivated by ongoing innovation..	183	4.09	.693
I like much variety in my life..	183	4.15	.733
New ideas attract me more than existing solutions	183	4.14	.747
I like to extend boundaries.	183	4.05	.751
I try to avoid routine	183	3.92	.818

Mean and Standard Deviations for Project Success

Item	N	Mean	s.d
Usability			
The project is used by its intended clients	183	4.03	.718
This project will directly benefit the intended users: either through increasing efficiency or employee effectiveness	183	4.04	.773
Given the problem for which it was developed, this project seems to do the best job of solving that problem, i.e. it was the best choice among the set of alternatives	183	4.08	745
Important clients, directly affected by this project, will make use of it	183	4.18	.692
I am satisfied with the process by which this project is being completed.	183	4.20	.685
Value of Project Outcome to Users			
This project will directly benefit the intended users: either through increasing efficiency or employee effectiveness.	183	4.14	.670
Use of this project will directly lead to improved or more effective decision making or performance for the clients**.**	183	4.02	.770
The project will have a positive impact on those who make use of it.	183	4.16	.659
The results of a project represent a definite improvement in performance over the way clients used to perform these activities.	183	4.16	.735
Project Delivery			
The project will come in one schedule	183	3.90	.911
The project will come in on budget	183	3.90	.890
Confident that nontechnical start-up problems will be minimal, because the project will be readily accepted by its intended users.	183	4.06	.718

Results of linear regression for independent variables with Project Success

a) Cognitive Styles with Project Success

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	COGNITIVE_STYLE[b]	.	Enter

a. Dependent Variable: PROJECT_SUCCESS

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.649[a]	.421	.418	.34281	1.439

a. Predictors: (Constant), COGNITIVE_STYLE

b. Dependent Variable: PROJECT_SUCCESS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.478	1	15.478	131.701	.000[b]
	Residual	21.271	181	.118		
	Total	36.749	182			

a. Dependent Variable: PROJECT_SUCCESS

b. Predictors: (Constant), COGNITIVE_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.922	.275		3.350	.001
	COGNITIVE_STYLE	.757	.066	.649	11.476	.000

b) Knowing Styles with Project Success

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	KNOWING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.506[a]	.256	.252	.45387	1.755

a. Predictors: (Constant), KNOWING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.821	1	12.821	62.239	.000[b]
	Residual	37.286	181	.206		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), KNOWING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.714	.300		5.712	.000
	KNOWING_STYLE	.555	.070	.506	7.889	.000

c) Planning Styles with Project Success

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PLANNING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.476[a]	.226	.222	.46276	1.767

a. Predictors: (Constant), PLANNING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.346	1	11.346	52.985	.000[b]
	Residual	38.760	181	.214		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), PLANNING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.687	.329		5.132	.000
	PLANNING_STYLE	.559	.077	.476	7.279	.000

d) Creating Styles with Project Success

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CREATING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.413[a]	.170	.166	.47924	1.642

a. Predictors: (Constant), CREATING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.536	1	8.536	37.165	.000[b]
	Residual	41.571	181	.230		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), CREATING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.573	.248		10.397	.000
	CREATING_STYLE	.378	.062	.413	6.096	.000

Results of linear regression for independent variables with individual variables of Project Success

a) Linear regression of Knowing style with Usability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	KNOWING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.506[a]	.256	.252	.45387	1.755

a. Predictors: (Constant), KNOWING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.821	1	12.821	62.239	.000[b]
	Residual	37.286	181	.206		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), KNOWING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.714	.300		5.712	.000
	KNOWING_STYLE	.555	.070	.506	7.889	.000

b) Linear regression of Planning style with Usability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PLANNING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.476[a]	.226	.222	.46276	1.767

a. Predictors: (Constant), PLANNING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.346	1	11.346	52.985	.000[b]
	Residual	38.760	181	.214		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), PLANNING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.687	.329		5.132	.000
	PLANNING_STYLE	.559	.077	.476	7.279	.000

c) Linear regression of Creating style with Usability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CREATING_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.413[a]	.170	.166	.47924	1.642

a. Predictors: (Constant), CREATING_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.536	1	8.536	37.165	.000[b]
	Residual	41.571	181	.230		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), CREATING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.573	.248		10.397	.000
	CREATING_STYLE	.378	.062	.413	6.096	.000

d) Linear regression of Cognitive Style with Usability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	COGNITIVE_STYLE[b]	.	Enter

a. Dependent Variable: USABILITY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.599[a]	.359	.355	.42127	1.764

a. Predictors: (Constant), COGNITIVE_STYLE

b. Dependent Variable: USABILITY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.985	1	17.985	101.345	.000[b]
	Residual	32.121	181	.177		
	Total	50.107	182			

a. Dependent Variable: USABILITY

b. Predictors: (Constant), COGNITIVE_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.677	.338		2.003	.047
	COGNITIVE_STYLE	.816	.081	.599	10.067	.000

Linear regression of Knowing Styles with Value of Project Outcome to Users

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	KNOWING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECTOUTCOME_USERS

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.397[a]	.158	.153	.52013	1.696

a. Predictors: (Constant), KNOWING_STYLE

b. Dependent Variable: PROJECTOUTCOME_USERS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.183	1	9.183	33.943	.000[b]
	Residual	48.967	181	.271		
	Total	58.150	182			

a. Dependent Variable: PROJECTOUTCOME_USERS

b. Predictors: (Constant), KNOWING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.965	.344		5.715	.000
	KNOWING_STYLE	.469	.081	.397	5.826	.000

e) Linear regression of Planning Styles with Value of Project Outcome to Users

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PLANNING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECTOUTCOME_USERS

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.480[a]	.230	.226	.49724	1.845

a. Predictors: (Constant), PLANNING_STYLE

b. Dependent Variable: PROJECTOUTCOME_USERS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.398	1	13.398	54.187	.000[b]
	Residual	44.752	181	.247		
	Total	58.150	182			

a. Dependent Variable: PROJECTOUTCOME_USERS

b. Predictors: (Constant), PLANNING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.370	.353		3.880	.000
	PLANNING_STYLE	.607	.082	.480	7.361	.000

f) Linear regression of Creating Styles with Value of Project Outcome to Users

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CREATING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECTOUTCOME_USERS

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.415[a]	.172	.168	.51565	1.647

a. Predictors: (Constant), CREATING_STYLE

b. Dependent Variable: PROJECTOUTCOME_USERS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.023	1	10.023	37.694	.000[b]
	Residual	48.128	181	.266		
	Total	58.150	182			

a. Dependent Variable: PROJECTOUTCOME_USERS

b. Predictors: (Constant), CREATING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.338	.266		8.779	.000
	CREATING_STYLE	.409	.067	.415	6.140	.000

g) Linear regression of Cognitive Styles with Value of Project Outcome to Users

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	COGNITIVE_STYLE[b]	.	Enter

a. Dependent Variable: PROJECTOUTCOME_USERS

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.556[a]	.310	.306	.47096	1.674

a. Predictors: (Constant), COGNITIVE_STYLE

b. Dependent Variable: PROJECTOUTCOME_USERS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.004	1	18.004	81.169	.000[b]
	Residual	40.147	181	.222		
	Total	58.150	182			

a. Dependent Variable: PROJECTOUTCOME_USERS

b. Predictors: (Constant), COGNITIVE_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.565	.378		1.495	.137
	COGNITIVE_STYLE	.817	.091	.556	9.009	.000

h) Linear regression of Knowing Styles with Project Delivery

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	KNOWING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECT_DELIVERY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.452[a]	.205	.200	.39982	1.379

a. Predictors: (Constant), KNOWING_STYLE

b. Dependent Variable: PROJECT_DELIVERY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.442	1	7.442	46.553	.000[b]
	Residual	28.934	181	.160		
	Total	36.376	182			

a. Dependent Variable: PROJECT_DELIVERY

b. Predictors: (Constant), KNOWING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.385	.264		9.022	.000
	KNOWING_STYLE	.422	.062	.452	6.823	.000

i) Linear regression of Planning Style with Project Delivery

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PLANNING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECT_DELIVERY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.467[a]	.218	.214	.39645	1.488

a. Predictors: (Constant), PLANNING_STYLE

b. Dependent Variable: PROJECT_DELIVERY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.928	1	7.928	50.438	.000[b]
	Residual	28.448	181	.157		
	Total	36.376	182			

a. Dependent Variable: PROJECT_DELIVERY

b. Predictors: (Constant), PLANNING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.188	.282		7.770	.000
	PLANNING_STYLE	.467	.066	.467	7.102	.000

j) Linear regression of Creating Style with Project Delivery

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CREATING_STYLE[b]	.	Enter

a. Dependent Variable: PROJECT_DELIVERY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.369[a]	.136	.131	.41675	1.290

a. Predictors: (Constant), CREATING_STYLE

b. Dependent Variable: PROJECT_DELIVERY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.940	1	4.940	28.442	.000[b]
	Residual	31.436	181	.174		
	Total	36.376	182			

a. Dependent Variable: PROJECT_DELIVERY

b. Predictors: (Constant), CREATING_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.041	.215		14.129	.000
	CREATING_STYLE	.287	.054	.369	5.333	.000

k) Linear regression of Cognitive Styles with Project Delivery

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	COGNITIVE_STYLE[b]	.	Enter

a. Dependent Variable: PROJECT_DELIVERY

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.551[a]	.304	.300	.37404	1.460

a. Predictors: (Constant), COGNITIVE_STYLE

b. Dependent Variable: PROJECT_DELIVERY

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.053	1	11.053	79.006	.000[b]
	Residual	25.323	181	.140		
	Total	36.376	182			

a. Dependent Variable: PROJECT_DELIVERY

b. Predictors: (Constant), COGNITIVE_STYLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.520	.300		5.063	.000
	COGNITIVE_STYLE	.640	.072	.551	8.889	.000

APPENDIX E: LIST OF PRESENTATIONS AND PUBLICATIONS

List of Presentations at Conferences

1. Muneera Esa, Individual Learning Styles : An Overview of Cognitive Styles Approach for Construction Project Managers, presentation at the *5th Asean Post Graduate Seminar*, University of Malaya, Kuala Lumpur, 1-2November 2010.

2. Muneera Esa, Anuar Alias, Zulkiflee Abdul Samad, Preparing Project Managers to Achieve Project Success - Human Management Perspective, presentation at *ICIM 2013 : International Conference on Innovation and Management,* Barcelona, Spain, 27-28 February 2012.

List of Publications

1. Muneera Esa, Anuar Alias, Zulkiflee Abdul Samad, Project Manager's Cognitive Styles in Decision Making : A Perspective from Construction Industry, *International Journal of Psychological Studies*, Vol 6, No. 2, June 2014.

2. Muneera Esa, Anuar Alias, Zulkiflee Abdul Samad, Preparing Project Managers to Achieve Project Success - Human Related Factor, *International Journal of Research in Management and Technology*, Vol 4, No. 4, April 2014.