

How Iranian Constructions' Project Success Impact by Project Managers' Cognitive Styles

Amirreza Salehipour^{1*}, Abdollah Ahmand²

¹ Department of Project Management, Postgraduate Studies Centre,
Limkokwing University of Creative Technology, Malaysia

² Department of Economics, Faculty of Economics and Management,
University Kebangsaan Malaysia, Malaysia

Abstract: Various researches have been conducted to investigate the factors that influence the level of success in a project. Accordingly, the findings identified the project managers' performance which is soft skills of individuals, significantly impact the result of project and project success. This study critically reviews the cognitive of project managers' effect on construction project success in Iran. Quantitative research method is employed and data was collected from Iranian construction project managers. Finding illustrates that construction project manager's Knowing, Planning and Creating impact the final outcome of the project. Results of study highlights the significance of human related skills that effect project success in construction projects in Iran, also identifies the requirement of critical consideration and attention to project managers' cognitive styles in this field. Thus, Iranian project managers by generating this framework would be able to increase their performance and represent outstanding function toward successfully completing a project. Finally, educating and training project managers on the subject of Cognitive Styles and make the topic more understandable will assist project managers to effectively manage their soft skills to approach and achieve the desired outcome.

Keywords: Cognition, Cognitive, Project Manager, Construction, Success

1. Introduction

Normally project managers output can be judged based on their performance, efficiency, cost regulating and their general beneficiary to the project, which are the required elements to achieve success in every complex mission. So far many investigations conducted regarding intricate problems as they are simply more spottable, easy to estimate and referable.

Complex soft issues are important because; they apparently based on reality and accurate factors which enable researchers to demonstrate an actual project success. Hence, soft issues have been often found to be the reason of hard issues, based on knowledge of project managers (Eweje et al. 2012). According to Creasy and Anantatmula (2013), soft issues defined as characteristic related issues which are basic mind-set of individuals in the organization. Human related issues formed on intangible facts which are more dependent on the way that every individual thinks, behaves and makes decisions so the evaluation of soft issues would not be that easy. Everyone's performance has direct relation with the condition of one's mind which is a soft issue.

Similarly, Rayner and Cools (2011) defined cognitive styles "diversified directions that each person operates, comprehends and organizes the information", which specifies primary elements in defining organizational and personal manner (Armstrong et al. 2012). To make the issues more tangible, a perspective of Iran construction will be reviewed as the key factor in economic that influence the country development.

In fact, improvement of construction projects intensifies and strengthens domestic economy in both private and public sections. The research goal is to provide experimental prove in affecting cognitive styles on prosperous project by Iranian project managers. Additionally, Creasy and Anantatmula (2013) indicated the significance of project managers' characteristics which is leading the wide range of talents and accurate actions against unexpected situations. In this case, Cognitive Styles are recognized as significant probability of human-related element that contributes to project managers in finding the perfect style for the whole procedure. In addition, Creasy and Anantatmula (2013) indicated the signification of project leaders and manager's characteristics (thinking ability as a based) effects on success in a project but there is no evidence if personality and characteristic have efficiency on improving the level of project success in theory.

Thus, it is necessary to associate scientific management criteria with project management function to measure if they coincide in individuals as a main personality variable in aspects of human-related factors. Managers would be able to influence employee's perfection, organization and improve their behaviour through efficiency of cognitive competence (Sun, R. C. F. and Hui, E. K. P. 2012). Applying cognitive competency attitude will improve knowledge, duty accomplishment, finding solution for problems and making proper decisions (Sun and Hui 2012).

1.2 Research Questions

This study tries to answer the following questions;

1. Which cognitive styles variable more properly stimulate the project manager's performing towards success in projects?
2. How is the relationship between managerial behaviour cognitive (Eva Cools and Herman Van den Broeck 2007a) and success in construction project?
3. What is the relation between cognitive styles as explanatory variable and success in construction projects as responsive variable?
4. How success in construction projects influenced by cognitive styles of project managers?

1.3 Research Objectives

Objectives of this study are like following;

1. To measure soft skills of project managers by linking science and practitioner.
2. To diagnose appropriate scale for cognitive styles and construction project success measurement.
3. To recognize cognitive styles and construction project success relations to improve the project managers' performance.
4. To generate a structure that allows the Iranian construction project managers to evaluate success prospectation.

2. Literature Review

2.1 Cognitive Style

Cognitive styles or thinking styles identified as a concept to describe a person attitude, comprehend and utilize the information and accordingly behave and reflects to complications (Witkin et al. 1977). The subject has been perfectly explored and developed in theoretical approaches from every dimension by Zhang L and Fan W. (2013). Some believes researches in psychological constructs are overlapping and replicating (Coolset al. 2007a). Therefore, expressing the relation between cognitive styles model and other related theories would be critical. In this case, comprehending precedent of cognitive styles through appropriate methods must be crucial to generate its relation with project management context. Thus, conduction of this subject is based on Cools et al. (2007a) theories that raised and developed the cognitive styles from management point of view.

2.1.1 Bridging the Science of Management and Practise

This research tries to connect the elements of cognitive styles to scientific management or on the other word, bridging psychological perspective of project managers toward project success. It must be true while basic behavioural scientific achieved based on scientific-education-focused which involves active mind learning features. Also Hodgkinson, G. P and Rousseau D. M. (2009) proved the existence of collaborate between practise and science where successfully valid and reliable findings were generated on some specified factors. Latham (2017) declared, it is vital to educate managers and executives based on sciences to make them successful.

2.2 Cognitive and Success

Efficient management's cognitive competency leads people to operate and organize their experience toward accurate behaviour (Sun and Hui 2012). Basically, cognitive competence applies to solving problems, completing tasks, making decision and simplifying knowledge construction (Sun and Hui 2012). The finding of a study by Davis K (2014) related to the effect of project managers' emotional quotient on their competency explored variables show significant relation to interpersonal competency and emotional ability toward project managers' performance. Similarly, Creasy et al. (2013) highlighted the significant of project managers' personality and its effect on success in project, however there is no evidence that characteristics contribute to success in construction projects. In the light of mentioned findings, author tries to explore the existence of correlation among cognitive and success in construction projects in Iran.

2.3 Human-Related Factor and Project Management

According to Ives (2005), Project management contributes flexibility and power to organizations. By more exploring in this subject area, researcher amazed to discover that project managers' human skills have the greatest impact on project management practice (El Sabaa 2001) which has direct effect on achieving project success as project managers directly affect (34%–47%) project success (Frank 2001). Also Hwang, B. G. and Ng, W.J (2012) recently found that focusing on project managers' competency results achieving success in construction industries.

2.4 Project Management Body of Knowledge

Since 1987 Project Management Book of Knowledge “PMBOK” has been exist, but recently it receives more attention from the researchers of project manager’s industry as its structure vastly changed and there is not a formal program to form PMBOK (2006). The idea has been blamed as it is more focusing on hard conceptual of project managers (scientific management principles, technical information, usage of tools and etc...) and soft skills received less and inadequate attention (Pant, I and B. Baroudi2008). The theory supported by Bourne, L. and Derek H.T. Walker(2004) findings, who noted the PMBOK highly concentrates on hard skills that needed in a project than soft skills.

2.5 Project Manager

2.5.1 The role of Project Manager

Project manager is a person who responsible to execute the project and meet the desired project goals with the power of knowledge and skills (Brewer 2005). Another finding by Brewer(2005) indicates project managers by developing the skills they possess will influence and improve those skills toward impacting and leading others. Liphadzi et al. (2015) explored relationship amongst leadership styles and project success. Also, human component emerged in multi-cultural environment (Ozguler I.S 2016) and even in the intercede role of team-buildings. Similarly, Melymuka(2000) mentioned that, it is not easy to find people who have the ability of influencing others and create a win-win situation. Meanwhile, project managers are considered as a principal actor in a successful project execution and required to possess the ability of adding value to the project while playing significant role in affecting other stakeholders who involves toward completing and achieving objectives (Lovell 1993).

3. The idea of Cognitive and Success

3.1 Cognitive Styles

Definition of Cognition is a manner that individuals obtain, accumulate and apply their knowledge. And style is defined as the quality of different methods toward processing and organizing information (Hayes and Allison 1998). “Cognitive styles” forms stable foundation for individual’s behaviour with providing different level of heuristic approaches. “Cognitive styles” has no relation to intellectual abilities as the improvement of intellectual abilities will result in individual’s better performance (Kozhevnikov 2007; Riding, 1997). While, cognitive styles effects positive or negative forms of individual’s performance depend on the nature of function (Riding 1997).

3.1.1 Cognitive in theory

Cognitive styles or thinking styles identified as a concept to describe a person attitude, comprehend and memorize the information, believes, learns, reflects to complications and behave (Witkin et al.1977). This area suffers from shortage of a reliable theory (Rayner S. J and Cools E. 2006). Also, it has been blamed for being uncompleted and fragment, as a result cognitive science received low level of interest among researchers (Kozhevnikov 2007).

3.1.1.1 Definition of Cognitive Styles

Researchers have built many definitions on this stream. Fundamental concept of cognitive style has been comprehensively described by Cools et al. (2007a) which is used to influence this research. Cools et al. (2007a) defined thinking styles as various ways that individuals perceive, stimulate and use the information to improve their behaviour.

3.1.1.2 Positioning Cognitive Styles

3.1.1.2.1 Cognitive and Capability

In a comprehensive review, Coolset al (2007a) discussed the relation theory of individual’s ability with cognitive styles which results people’s ability in general has no relation with cognitive styles. According to other studies, although both ability and cognitive classified in a same category of task performance, but no relation have been found between them. Cognitive styles more considered as the manner of function while ability represents level of efficiency (Cools et al2007a).

3.1.1.2.2 Cognitive and Strategy

Coolset al(2007a)has conducted several studies to better understand whether cognition have comprehensive and stable behaviour among various aspects of cognitive performance or shifts according to condition and time. Cools E (2007a) indicates that a style is generally stabilized characteristic whereas strategies more referred to a plan which deals with specific task or condition. Riding and Cheema(1991) defined styles as individual’s embedded while strategies can be changed, improved and learned.

3.2 Project success

Some people agreed project managers have had significant impact on success in a project, but stakeholders relating the success of project to project management success (Müller Ralf J. and Turner R. 2010). As result, the researcher considers various factors related to success criteria in the area of project success. As a definition for project success, the researcher selected project success questionnaire (PSQ) that relies on Pinto J K et al. (1986) the founder of project implementation profile (PIP). As the author aims to cover common evaluation of project success, the PIP model was applied to measure: "Schedule, Budget and Quality of Performance" in the direction of developing a general project success measurement (Pinto et al. 1986).

3.2.1 Definition of Success in Project

Success in project is the top duty of project managers and considers as the heart of project management (Müller and Jugdev 2012). While, project success is defined as an intangible factor that varies in management perspective, individuals and project steps (Pariff and Sanvido 1993). Recently Muller et al (2012) expressed that success is based on the performance level of organizations, teams and individuals. Although, project success has common dimensions (Beringer et al. 2013), which are "cost, time and quality". Despite the fact that various researches have been conducted in this field, still there is no agreed reference for project success definition since the nature of this subject is pragmatic.

3.2.2 Project success Concept

Success in project has been described strategically leading project objectives to the direction of short term and long term of firms' targets (Al Tmeemy et al 2011). Although project success impacts by competences and quality of teamwork, cost, and time management, but strategic project management was discovered to be a vital issue in project success (Rodrigues and Bowers 1996). Meanwhile, Muller et al (2012) introduced appropriate combination of judgment toward measuring project success in a dynamic business environment, based on the finding of "Jeffrey et al (1990)".

3.2.3 Success Measures

Success would be measurable by two different aspects: successful project manager's activity and succeeding in project (Munns and Bjeirmi 1996). This writing is based on Standish Group Study, which founded "project can have failed while management succeed" and vice versa (Munns et al 1996). Traditionally, project success known as completion of a project in budget, on time and according to schedule (Pinto et al 1987). However, "customer satisfaction" has been added to project success evaluation, since late 1980's. Similarly, Pinto et al (1987), introduced a concept of project success that contains internal and external elements (elements related to project and customer respectively). On the other hand, success was classified into three vary of measures such as; traditional, evolving and new measures. Meanwhile, from Iran perspective, researcher explored five elements to measure project success; customer satisfaction, operation and learning, exploitation assurance, stakeholder targets and end user satisfaction. Predicting and defining success specifically could be done with a set of well-considered and customized tools that adopts with the given project. So a professional form its opinions about the possible success of a project based on such a set (Sebestyen and Zoltan 2017).

3.3 Project Manager and Project success

Construction industry suffers from the lack of appropriate resources to measure knowledge of behavioural performance and managerial skills project manager efficiency on project success. Recently, in developing countries for construction projects, Critical Success Factors have been sustainable into consideration (Banihashemi et al 2017). Obviously, project manager is a critical factor in success of project and nominating accurate project manager is vital element of project success. Accordingly, Zhang et al (2013), clarified that previous researches have been centralized on technical skills of project managers toward their performance while social competencies have been ignored. Management skills, behaviour and knowledge of a project manager, are crucial required elements for improving performance and achieving project success. Similarly, Creasy et al (2013) reviewed personality features and relations between project managers and success which comes to a theoretical pattern that integrates characteristics dimension and their influence on project success.

3.4 Linking Cognitive and Success

Following part divided in three parts; independent variable, dependent variable and framework. The three independent variables that demonstrating "Styles of Cognitive" are as follows; knowing, planning and creating. While the dependent variables are related to project success and theoretical framework illustrates the complex of explanatory relationship between dependent and independent variables.

According to literature review, the field of project management have been in the centre of attention due to the fact that human related elements significantly influenced project success in construction industry (Yong and Mustaffa 2013). Generally, human related elements which also known as “soft issues” are naturally difficult to measure, while identified as significant cause of construction problems (Yong et al 2013). Therefore, styles of cognitive are selected as possible soft skill element in measuring project success due to its significant relation to individual’s performance.

As result, “cognitive styles” is an appropriate method to measure, evaluate and improve the performance of project managers. Variables of this study have been taken from Cognitive Styles Indicator (CoSI) founded by Cools et al(2007b) which is the most recent theory to evaluate construction project success (Cools et al 2014).

Generally, individuals with knowing style can be characterized as who tends to find rational and logical answers for complex issues (Coolset al 2007a). Similarly,Armstrong et al. (2012), defined planning style to indicatesystematic and effective method of processing information. Accordingly, creativity has described as people who are expert and high skilled in anticipating and converting problems into opportunities.

3.5 Conceptual Research Model

According to literature review of this research, competencies (human related elements) have more effect on project success compared to technical skills. Also, refer to the theory of cognitive styles; the efficiency of project manager’s human related elements on evaluating project success has been approved. Various types of duties are dealing with diversified types of projects outcome which ranked according to the degree of success. Many of researches have been conducted based on technical performances in relation with project managers but recently converted from technical to soft skill of project managers.This study formed a complemented model include contingency factors, influencing factors and outcomes factors which are the basics of project management theory. In this case, thinking styles as the responsive variables taken from (CoSI) Cools and Van de Broeck (2007b). Cognitive contains three following variables: Planning, Knowing and Creating.



4. Research Methodology

4.1 Methodology and measures

Sampling is crucial process in every research, regardless it is quantitative or qualitative. The logic of this approach is to fine the most regular processes for recognizing behavioural types, such as personage, social tendency and psychiatry, depending on the ranking criterion (Brown and Maydeu Olivares 2013). Therefore, the chosen method for this research is quantitative. Conduction of this study explores the relation between styles of cognitive (explanatory variable) and success in project (responsive variable) to find out the degree cognitive styles and its related valuables impacting project success by professional construction project manager. The researchers involved with the normal process of project manager's routine.

The sampling process involves selecting the right number of appropriate individuals in the population, so exploration of the sample and understanding its features (Sekaran and Bougie 2016). Cools and Prof Van Den (2007b) created "CoSI" instrument rely on cognitive styles theory: Planning, Creating and Knowing. In this light, multidimensional instrument deals with various dimensions in instrument's measurement. The CoSI demonstrates reliable, valid and convenient result which is multidimensional equipment for manager and professional use among various instruments (Coolset al. 2007b). Also, business and management are the main area of focuses by this instrument which applied on validity, scoring and reliability. The questionnaire covers the general measurement of success in project which identified; estimated financially, stay according to the plan, and outcome value to end users. It also covers the degree of satisfactory of customers toward the efficiency, purpose of the project and the provided benefits of project to the end users.

Questionnaires were distributed to the targeted subjects who are project managers and the data collected once. Researchers have collected data from project managers of ISO companies who are qualified to increase the value of knowledge. In the first stage, all the respondents were clarified about the questions and then respond it from a position that effects on factual practitioner which recognized and applied to the issue. In this case 200 project managers were nominated from different organizations and the questionnaires were distributed. The respond rate was about 92% from targeted companies (183 project managers). Three divided dissimilar aspects were designed in the questionnaire to cover respondent's socio-demographic characteristic, explanatory variables and responsive variables. The first part of the questionnaire includes demographic information to classify the participants such as; Age, Gender, Position, exposure and the nature of project that they have been involved recently.

5. Results and analysis

The Statistical Package for Social Sciences (SPSS) version 20 was used to analyse the collected data. This chapter starts with presenting the background of the responders and followed by factors that analyse validation of the evaluation method utilized in this research. Afterward, concluded by statistics that answer the research hypothesis and questions.

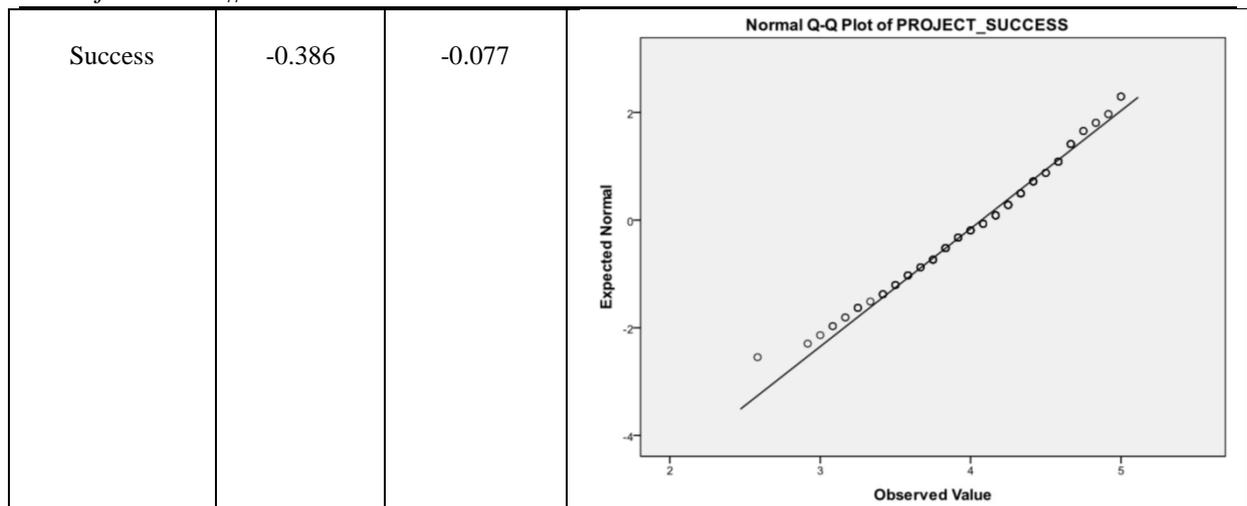
Evaluate the psychometric attribute of measurement that utilized in this study, reliability analysing and factors analysing were generated. To investigate the validity of the structure, exploratory factor analysis was used as principal components analysis. Generally, a minimum of 0.70 Cronbach's alpha-value is sufficient and 0.80 or more of alpha-value is evaluated as good standing. Estimated result indicates these calculations have a good reputation for this study. The assumption of normality was tested by applying descriptive statistics. The information of Skewness, Kurtosis statistics and Normal Q-Q plot was gathered to achieve the normality assumption. In the range of ± 2.0 the value of Skewness and Kurtosis is distributed normally. Refer to below tables (Table 1 and 2), the variables have been normally distributed.

Table 1: Skewness and Kurtosis of data

ITEM	Skew	kurtos	PLOT
Knowing	-0.597	-0.093	
Planning	-0.594	-0.163	

Table 2: Skewness and Kurtosis of data

ITEM	Skew	kurtos	PLOT
Cognitive Style	-0.357	0.116	



Fundamental structure of the success in project was confirmed by conducting Principal Component Factor Analysis (PCA) with varies max rotation. Factor loadings of 0.50 were used to perform factor analysis (according to Hair Jr et al 2010). “SPSS” evaluate the twelve project success elements from PSQ. Kaiser–Meyer–Olkin Sampling Adequacy Test and Bartlett’s Test of Sphericity applied to the variables. The outcome of this test can be reach in table 3. As result, the associated significance level was 0.000 and the Bartlett Test of Sphericity was 827.92, “the violation of sphericity occurs when there are no differences between all combinations which are in equal conditions.

Also, the amount of KMO evaluation of samples’precision was 0.832, which is admissible (Hair et al., 2010). According to the result, the sample data were adequate for factor analysis. Afterward, the factor analyses (loading values) were inspected by applying Hair et al.2010. This instruction revealed a loading value of ± 0.3 means the element is less important, ± 0.4 represents the importance of factor and above ± 0.5 demonstrates the significance of component. Table 4 illustrates the twelve factors of project success categorized in three sections and the majority are between 0.5 and 0.8 that confirms the validation and stabilization study’s theory. Table 4 manifests the success measurement of project by applying Varimax rotation and Kaiser Normalization. All the elements captured from the Loading Values and Eigen values were more than 1.0

Table 3: Kaiser–Meyer–Olkin Sampling Adequacy Test and Bartlett's Test of Sphericity

KMO	0.832
Bartlett’s Test Chi-Square	827.92
df	66
Sig.	0.000

Table 4: Varimax rotation and Kaiser Normalization

Element			
Item	1	2	3
<i>Usable</i>			
Tasks Delivered	-.013	.571	.549
Problem Solved	.132	.753	.238
Utilized by Client	.246	.702	.193
Utilized by Important users	.403	.536	.079
Accepted by users	-.157	.799	.296
<i>Outcome Value to Users</i>			
Performance Developed	.687	.237	.282
Users Satisfaction	.635	.312	-.136
Development Provides	.587	.378	-.051
Affirmative effect on users	.665	.352	-.006
<i>Delivery</i>			
On Time	.029	.205	.887
On Estimated Financial	.052	.234	.863
Satisfactory Project operation	.068	.161	.787
Eigenvalues	2.743	2.635	2.112
Variance's Percentage	22.867	21.982	17.633
Variance's Cumulative percentage	22.867	44.848	62.483

To find the reliability of the measurement that assess the quality of the research tools used in this study Cronbach's Alpha Coefficient was conducted. Some researchers believe the alpha value might be above 0.70 for a set of variables to accept it as scale. While some moderate accept from 0.60 to 0.75 or even 0.80. In this study the Cronbach's Alpha values reduced to below 0.60 which make it more adequate to story the average correlation inter-items. The cognitive styles' Cronbach alpha coefficients in this research planning 0.79, knowing 0.77 and creating style 0.80. The result for project success's internal consistency evaluation was 0.85, which illustrates a good internal consistency between different dimensions of success. According to Cronbach's Alpha value which is above 0.70, the comprehension would be the whole applied instruments are standing as a good internal consistency in this evaluation and the suggested method of measurement is qualified for conducting this research.

Demographics of respondents displayed in (Tables 5) they have been selected carefully by reviewing their background and experiences. The sampling included 37 (20%) females and 146(80%) males, total of 183 participants. The majority of responders (46%) were amongst 31-40 years' old who followed by 41 to 50 and 21-30 years old (25% and 18% respectively). The participants also categorized into 82% project managers, 14% Programme managers and 4% organizational managers.

Table 5: Demographics of respondents

Classification	Item	No. Responders	Percentage
Sexuality	Male	146	79.78
	Female	37	20.22
Age	21-30	33	18.03
	31-40	85	46.44
	41-50	46	25.13
	51-60	13	7.10
	More than 60 years old	6	3.28
Work Position	Project Manager	149	81.42
	Programme Manager	26	14.20
	Organizational Manager	8	4.38
Working Experience	Less than 5 years	48	26.22
	5-10	61	33.33
	11-15	34	18.58
	16-20	22	12.02
	More than 20 years	18	9.80
Project Nature	Residential	106	57.93
	Office	43	23.50
	Shopping Centre	7	3.82
	Infrastructure	5	2.73
	Complex	13	7.10
	Others	9	4.92

Research hypothesis assumed to find appropriate result for RQ1 and RQ2. In this case several analyses carried to explore the answer.

RQ1. How is the relationship between “Eva Cools 2007a” managerial behaviour cognitive and success in construction project?

H1: Cognitive styles and project success statistically have positive relations.

RQ2. What is the relation between cognitive styles as explanatory variable and success in construction projects as responsive variable?

H2.1: Planning and project success have considerable affirmative relationship.

H2.2: Creating and project success have substantial relations.

H2.3: Knowing and Success in project has significant affirmative relations.

To evaluate the relation between variables, they were examined by applying bi-variate correlation analysis. Also Pearson’s Correlation was used to test the hypotheses. The result of test illustrates that there is significant linkage amongst cognitive styles and success in projects (table 6).

Table 6: Variable's correlations

		Cognitive Variables	Success
Cognitive Variables	Correlation	1.000	0.659
	Sig.		0.000
	N	183	183
Success	Correlation	0.659	1.000
	Sig.	0.000	
	N	183	183

5.4.1 Hypothesis 1

Pearson coefficient between the variables stands 1%, which means all of the factors from cognitive styles have significant effect on project success. This correlation illustrates the existence of remarkable connection among cognitive styles of construction project manager and success in project ($p < 0.01$). Therefore, since outcome is significant, the null hypothesis will be rejected.

5.4.2 Hypothesis 2

Three sub-hypotheses were examined to find if explanatory variables are in relation with success in project. Pearson's evaluated relation between the variables ($n=183$). The outcome clearly illustrates there are significant relations between cognitive styles of construction project managers' variables and success in project ($p < 0.01$).

A high co-efficient value exists between Knowing, Planning and Creating Style (0.762, 0.775 and 0.774 respectively) and project success construct. Thus, the conducted evaluation rejects null hypothesis to support the assumptions. Also, there are high correlations coefficients among each of cognitive variables and success variables (Table 7).

Table 7: Explanatory and Responsive Variables Correlation

	Knowing	Planning	Creating
Utilizable	.508	.475	.414
Outcome	.396	.481	.416
Delivery.453	.468	.367	

Linear regression was applied to this study because; firstly, finding out if the correlation of collected data are confirmed and secondly, (research question 4) finding the level of influence on project success.

RQ2: How succession in construction projects influenced by cognitive styles of project managers?

P-P plot test normality confirms no pattern existence for research question four, so linear assumption met.

Passing the assumptions is essential to conduct a linear regression test and generate a validate result. The Figure 1 indicates that explanatory variables having linear relation with responsive variable which means no pattern exist in this study, so assumption of linearity has been met. Also diagnostic outlier of explanatory variables and responsive variable conducted to investigate the existence of any outlier in assumptions, which indicated no problem in measurement or no experimental error in statistical analyses.

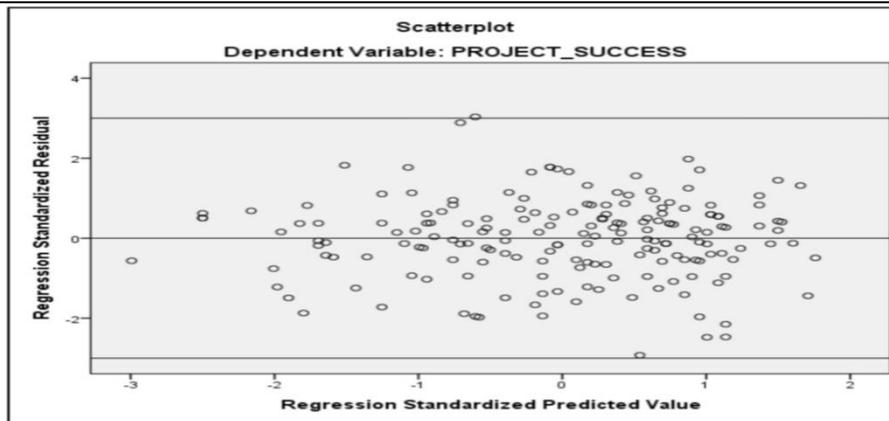


Figure 1: Linear regression

In Figure 1 diagnostic outlier on dependent variable (y) was conducted, the result confirms no existence of outlier standard deviation (± 3.0) is met by plot dots distribution rate. A psychological method was conducted to evaluate plots which don't fit the prospect norm of data set. The result illustrates no existence of outlier and assumption of linear regressions was met, as highest rate of Mahalanobis Distances was 7.867 that considered below critical value test.

Also VIF test consequences for the influence rate of explanatory variables succession construction project, was less than 10 with tolerance level of higher than 0.2, therefore multicollinearity would not be an issue in data sets for regression, according to Field (2013) finding. Durbin-Watson measurement applied to investigate existence of autocorrelations among residuals. Table 1 reports Durbin-Watson statistics' value around '2' which is admissible (Field, 2013).

To perform assumption, by reviewing residual scatterplot value cross line with standard predicted value (Figure 2), according to the figure's demonstration no serious pattern displayed. Therefore, this graphical method confirms that the residual of this model is homoscedasticity. To complete the final phase of assumption's linear regression tested by the p-p plot and confirmed the normality of distributed regression as the majority of observed values situated on the straight line (Figure 2). Table 8 and 9 presents the linear regression results for research question.

Table 8: Linear regression for KPC

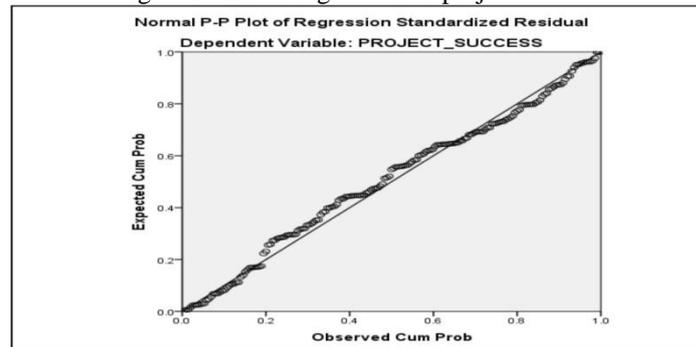
Variable	VIF	TOL
Knowing	1.348	.743
Planning	1.410	.712
Creating	1.121	.836

Table 9: Linear result

Explanatory variables	R Sq	Adjusted R Sq	Std. error	Responsive variables
Knowing	0.256	0.252	0.454	Usable
Planning	0.226	0.222	0.463	
Creating	0.170	0.166	0.479	
Cognitive Style	0.371	0.367	0.421	
Knowing	0.158	0.153	0.520	Outcome Value to Users
Planning	0.230	0.226	0.497	
Creating	0.172	0.168	0.516	
Cognitive Style	0.319	0.314	0.471	
Knowing	0.205	0.200	0.400	Delivery
Planning	0.218	0.214	0.396	
Creating	0.136	0.131	0.417	
Cognitive Style	0.312	0.309	0.374	

The findings and results in table 8 can be tested by cross tabulation to produce an overview of the interrelatedness and interplay between variables. It designates that linear regression analysis confirms the result of correlation tests.

Figure 2: Linear regression of project success



To better explore the effectiveness of explanatory variables on responsive variables, the linear regression method was conducted on cognitive styles and its variables (Explanatory) upon project success variables (Responsive). This process highlights project success's factors that influenced by cognitive styles. Result of table 9 illustrates the effectiveness of explanatory variables on project success with utilizable of (36.7%) and outcome value to users (32%) and delivery of project efficiency of (31%).

6. Discussion

6.1 Relationship between Variables

Statistically explanatory variables have positive relation with responsive variables in this research. According to Linear regression results, cognitive styles demonstrates (44%) impacts on project success, with remarkable relationship ($B= 0.648$, $F= 135.704$ & $p<0.001$). Its explaining how organizing cognitive styles increases the chance of success in construction projects. Organizing cognitive styles can be defined as directing mental skills into a proper channel to achieve project success. Meanwhile the finding shows, when project managers disregard traditional approaches and apply their mental skills, the performance of project will increase toward project success.

Mazur(2013)explored cognitive skills improve the chance of success in projects from cognitive flexibility perspective. Also three types of associate between leadership and success (managerial, emotional and intellectual competence) were identified by Dulewicz et al 2005. "Cognitive styles" contains intellectual and managerial which have direct relation and efficiency on project success (Muller et al. 2010). Thus, project success affected by human behaviour and performance which are the key elements in project success (Muller et al 2010). Similarly, cognitive style is known as a basic factor of evaluating individual's characteristic (Armstrong et al 2012).

Additionally, "cognitive styles" is defined as vital variable which impacts management performance (Armstrong et al 2012). As a result, cognitive style is the key driver of project managers' skill which directly and indirectly effects on the success of project and performance. For example, problem solving skills, making proper decision skill and social skills have been identified as the personal attitudes that influence project success. Thus, by comprehending the uniqueness of "Cognitive" and its efficiency on success in construction projects, orientation in the study of human-factor-related is recommended. In fact, it addresses managerial abilities as behavioural factors that empower project managers to perform their responsibilities (due to the nature of their position) toward superior performance. As a result, the definition covers other goal-oriented aspect or customer-oriented aspect.

This research is more focused on the goal-oriented factors by linking experimental to decision-making as managerial behaviour factor toward project success. The value of thinking in the field of project manager is undeniable, as they need to think about every aspects of project prior start performing. In this case, the significance of cognitive styles in behaviour of organization is based on the operating information in the process of decision making.

6.1.1 Planning Style

Referred to the result of Linear regression and Pearson's correlation, the findings of this research clearly demonstrate that project success enhanced by considering Knowing, Planning and Creating as explanatory variables of "cognitive styles". According to the result of this study, planning style variable has the highest efficiency on project success and defined as structuring, organizing and processing information in effective way (Armstrong et al 2012). It can be simplified in other word as 'planning before acting' (Cools 2007).

Respectively, Dvir D and Lechler T. (2004) explored the relation amongst planning variables (plan-changes, plan's quality and changes of goal) toward success in projects. They found that planning has significant

effect and positive relation to project success enhancement. During the whole life cycle of project, planning style is a crucial element to attain success. In the project planning stage, breaking down the projects into detailed would be required prior execution. As a result of statistical analysis of this research, project managers must consider, improve and develop planning style skill toward decision-making in strategic operations and achieving project success (Cserháti and Szabó 2014).

6.1.2 Knowing Style

The next identified important individual variable that contributes to project success is “knowing style” which describes analytical skills of individuals, also known as rational, logical and impersonal ways of processing information toward decision-making (Cools and Van den Broeck 2007; Cools E et al. 2009). Knowing style can be simplified as “thinking before acting” based on facts and details (Cools et al. 2007a).

Also Thomas in 2008 confirmed the fact that Logical and analytic knowledge improve the competency of project managers toward appropriate performance. Additionally, Muller et al (2010) has identified analytical thinking as the most significant abilities of project managers toward attaining project success. In fact, logical and rational thinking improves project managers’ understanding skills toward finding proper solution for raised issues. As a result, developing knowing style in project managers is suggested to achieve required success in projects.

6.1.3 Creating Style

Creating Style is ranked as the lowest variable that effect on project success and addressed as converting threat and problems into opportunities (Cools et al. 2007a). However, project managers have miner involve with creativity (William Dow and Taylor 2010) but, it is the key component of motivating employees, solving project problems and decision making. Regret, routine tasks like collecting updates via emails and meetings (William Dow and Taylor 2010) slowing down project managers to experience creative style. Creativity is one of the most significance skills in project managers’ daily tasks (Hölzle 2010).

Generally, project managers must follow the given procedures by analysing the inputs and generate outputs but in fact not much improvement and innovation have been identified in the output of project managers. However, findings of this study illustrate the significances of creating in project management. Additionally, Sun et al(2012) clarified how creating style benefits improving project managers’ performance and activities also dedicate to finding innovative solutions for arisen problems.

7. Conclusion and Recommendations

7.1 Conclusion

This study endeavours to establish a substructure by relating cognitive styles approach to project success which supplementing human related elements in project managers. The suggested structure of cognitive styles confirms the efficiency of project managers’ attitude and attribute with other human skills on attaining success in project. This study is focused on project success by project managers in construction industry and its approach to cognitive styles. Also, the value of science and performance was evaluated by relating individual characteristics and features to project success relied on cognitive styles approaches. The finding demonstrates significant relation between cognitive styles variables and project success. Planning style has the highest influence on success in project and followed by knowing and creating. This research would contribute to Iranian project managers’ performance in complex construction projects.

7.2 Recommendations and Future Research

The research was conducted in the area that still required more psychological investigations in human related aspect that influencing construction industry. Therefore, further studies must be conducted in the following areas:

Specifically investigating other elements that effect on cognitive styles such as; individual’s characteristics features, gender, ethnicity and religion would be proper inputs.

Longitudinal study into enhancement of cognitive styles approaches (Planning Style, Knowing Style and Creating Style) during construction project. Although, it would take time and required resources but it will draw valuable intuition.

According to the finding of this study, 44% cognitive styles influence project success while 56% of variance remains. So, other internal and external factors that influence project success shall be reviewed.

References

- [1]. Aga, D.A. & Noorderhaven, N. & Vallejo, B. (2016) Transformational Leadership and Project Success: The Mediating Role of Team-Building, *International Journal of Project Management*,34,(1),806–818.
- [2]. Al-Tmeemy, S. M. H. M. and Abdul-Rahman, H.,and Harun, Z. (2011). Future criteria for success of building projects in Malaysia.*International Journal of Project Management*29(3), 337-348.
- [3]. Armstrong, S. J. and 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(3), 238-262.
- [4]. Banihashemi, Saeed M. & Hosseini, Reza &Golizadeh, Hamed & Sankaran, Shankar(2017) Critical Success Factors (CSFs) for Integration of Sustainability into Construction Project Management Practices in Developing Countries.*International Journal of Project Management*, 35(6), 1103-1119.
- [5]. Beringer, C. And Jonas, D., and 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.
- [6]. Bourne, L. and Derek H.T. Walker, (2004). Advancing Project Management in Learning Organizations. *The Learning Organization*, 11 (3),226-243
- [7]. 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,2005.
- [8]. Brown, Anna and Maydeu-Olivares, Alberto (2013). How IRT can solve problems of ipsative data in forced-choice questionnaires.*Psychol Methods*. 18(1), 36-52.
- [9]. Cools Eva, Armstrong, Steven and Verbrigghe, Jasmijn (2014). Methodological practices in cognitive style research: Insights and recommendations from the field of business and psychology. *European Journal of Work and Organizational Psychology* , 23(4) ,627-641.
- [10]. Cools, E and [Broeck, H. V. D.](#) (2007a). The Influence of Cognitive Style on Managerial Behaviour and Attitudes. *Degree of Doctor in Applied Economics Sciences, Ghent University, Belgium*.
- [11]. Cools, E., Van den Broeck H. (2007b). Development and Validation of the Cognitive Style Indicator. *The Journal of Psychology, Interdisciplinary and Applied*,141(4), 359-387.
- [12]. Cools, E. and Herman Van den Broeck and Dave Bouckenoghe (2009) Cognitive styles and person–environment fit: Investigating the consequences of cognitive (mis)fit, *European Journal of Work and Organizational Psychology*, 18(2), 167-198.
- [13]. Cserhádi, G and Szabó, L. (2014). The Relationship between Success Criteria and Success Factors in Organizational Event Projects. *International Journal of Project Management*,32(1),613-624.
- [14]. Davis, K. (2014). Different stakeholder groups and their perceptions of project success. *International Journal of Project Management*, 32(2),189-201.
- [15]. Dulewicz, Victor and Higgs, Malcolm (2005) "Assessing leadership styles and organisational context", *Journal of Managerial Psychology*, 20(2), 105-123.
- [16]. Dvir D and Lechler T (2004) Plans Are Nothing, Changing Plans Is Everything: The Impact of Changes on Project Success. *Research Policy*, 33(1), 1-15.
- [17]. El-Sabaa S (2001). The skills and career path of an effective project manager. *International Journal of Project Management*, 19(1),1-7.
- [18]. Eweje, J. Turner, R.and Müller, R. (2012). Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. *Emerald Group Publishing Limited*.
- [19]. Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics*. 4th Edition, Sage Publications Ltd.
- [20]. Frank, T. (2001). *The superior project manager: Global Competency Standards and Best Practices*.PM Solutions Research (Book 1) New York: Marcel Dekker
- [21]. Hair Jr., Black, W., Babin, B. and Anderson, R.E. (2010) *Multivariate Data Analysis: A Global Perspective*. 7th Edition, Pearson Education, Upper Saddle River.
- [22]. Hayes, J., and Allinson, W. (1998). Cognitive style and the theory and practice of individual and collective learning in organization. *Human Relations*, 51(7),847-871.
- [23]. Hodgkinson, G. and Rousseau, D. (2009). Bridging the rigour-relevance gap in management. *Journal of Management Studies* 46(3):534-546.
- [24]. Hwang, B. and NgW. (2012). Project management knowledge and skills for green construction: Overcoming challenges. *International Journal of Project Management*,31(2):272-284.
- [25]. Ives M. (2005). Identifying the contextual elements of project management within organizations and their impact on project success: worst practices in project management within the television production industry. *Project Management Journal*, 36(1), 37–50.

- [26]. Jeffrey K, Pinto John E. and Prescott (1990), planning and tactical factors in the project implementation process. *Journal of Management Studies*, 27(3), 305-327.
- [27]. Kozhevnikov M. (2007). Cognitive styles in the context of modern psychology: Toward an integrated framework of cognitive style. *Psychological Bulletin*, 133(3), 464-481.
- [28]. Latham, G. P. (2017). A Speculative Perspective on the Transfer of Behavioural Science Findings to the Workplace: "The Times They are A-Changin'." *Academy of Management Journal*, 50(1)51027-51032.
- [29]. Liphadzi, M. C. Aigbavboa, W. Thwala, (2015) Relationship between leadership styles and project success in the South Africa construction industry, *Procedia Engineering*, 123, 284–290.
- [30]. Lovell R. J. (1993). Power and the project manager. *International Journal of Project Management*, 11(2), 73-78.
- [31]. Mazur, Alicia K., Pisarski, Anne, Chang, Artemis and Ashkanasy, Neal (2013) Rating defense mega-project success : the role of personal attributes and stakeholder relationships. In Toombs, L. (Ed.) *73rd Annual Meeting of the Academy of Management: Capitalism in Question*, 9-13.
- [32]. Melymuka K. (2000). Born to Lead Projects. Some people have innate talents for managing projects. Here's how to recognize them. Retrieved 22.
- [33]. Muller, R. and Kam Jugdev, (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.
- [34]. Muller Ralf J and Turner, Rodney. D. (2010) "Attitudes and leadership competences for project success", *Baltic Journal of Management*, 5(3), 307-329.
- [35]. Munns A. K., Bjeirni, B.F. (1996). The role of Project Management in Achieving Project Success. *International Journal of Project Management*, 14 (2), 81-87.
- [36]. Ozguler, I. Saha. (2016) Increase the projects' success rate through developing multi-cultural project management process, *Procedia - Social and Behavioral Sciences*, 226(1), 236–242.
- [37]. Pant, I and B. Baroudi, 2008. "Project Management Education: The Human Skills Imperative," *International Journal of Project Management*, 26(1), 124-128.
- [38]. Pariff, M. K, Sanvido, V.E. (1993). Checklists of critical success factors for building projects. *Journal of Management in Engineering*, 9(3), 243-278.
- [39]. Pinto J. K, Slevin, D. P and Jeffrey K. (1987). Balancing strategy and tactics in project implementation. *Sloan Management Review*, 33-41.
- [40]. Project Management Institute (2017). Project Management Body of Knowledge. (6th Ed). Pennsylvania, USA: Project Management Institute, Inc.
- [41]. Rayner, S. J. and Cools, E. (2011). Style differences in cognition, learning, and management. Routledge, Taylor & Francis group (UK & New York).
- [42]. Riding, R., and Agrell, T. (1997). The Effect of Cognitive Style and Cognitive Skills on School Subject Performance, *Educational Psychology*, 23(2), 311-323.
- [43]. Riding, Richard J.; Cheema, Indra (1991), "Cognitive styles: an overview and integration", *Educational Psychology*, 11(3), 193–215.
- [44]. Sebestyen, Zoltan (2017). Further Considerations in Project Success. Creative Construction Conference 2017, CCC 2017, 19-22 June 2017.
- [45]. Sekaran, Uma and Bougie Roger (2016). Research methods for business : a skill-building approach. Chichester, West Sussex, United Kingdom: John Wiley & Sons.
- [46]. Sun, R. C. F., & Hui, E. K. P. (2012). Cognitive Competence as a Positive Youth Development Construct. *The Scientific World Journal*.
- [47]. Rodrigues, A and Bowers, J. (1996). System dynamics in project management: A comparative analysis with traditional methods. *System Dynamics Review*, 12(2) , 121-139.
- [48]. William Dow, P and Taylor, B. (2010). Project Management Communications Bible. Chichester, United Kingdom. John Wiley and Sons Ltd.
- [49]. Witkin, H. A., Moore, C. S Goodenough, D. R and Cox, P. W. (1977). Field-dependent and field independent cognitive styles and their educational implications.
- [50]. YongCheong and Mustaffa Nur Emma (2013). Critical success factors for Malaysian construction projects: an empirical assessment. *Journal Construction Management and Economics*, 9(31), 959-978.
- [51]. 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.