THE CRITICAL SUCCESS FACTORS FOR RENOVATION PROJECTS

FOONG SWEE PENG

A dissertation submitted in partial fulfilment of the requirements for the award of Master of Project Management

Lee Kong Chian Faculty of Engineering and Science

Universiti Tunku Abdul Rahman

January 2017

DECLARATION

I hereby declare that this dissertation is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree or award at UTAR or other institutions.

Signature : _____

Name : _____

ID No. : _____

Date : _____

APPROVAL FOR SUBMISSION

I certify that this dissertation entitled "**THE CRITICAL SUCCESS FACTORS FOR RENOVATION PROJECTS**" was prepared by FOONG SWEE PENG has met the required standard for submission in partial fulfilment of the requirements for the award of Master of Project Management at Universiti Tunku Abdul Rahman.

Approved by,

Signature : _____

Supervisor : Assistant Professor Ir. Dr. LEE WAH PENG

Date : _____

ACKNOWLEDGEMENTS

I wish to express my special thanks and appreciation to my research supervisor, Ir. Dr. Lee Wah Peng for his support, patience and guidance throughout the preparation of my final year research project.

I am also grateful to the following lecturers for their dedication to the Master of Project Management programme: Dr. Chia Fah Choy, Prof. Sr. Omar bin Munir, Dr. Liang Meng Suan, Dr. Wong Hong Chou, Dr. Tan Hai Chen, Dr. Chong Heap Yih and Mr. Lim Chai Chai,

Finally, I would like to take this opportunity to thank UTAR and everyone who had contributed to the successful completion of this dissertation.

ABSTRACT

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Foong Swee Peng

In project management triple constraint model, a project is considered successful when it is completed on time, within budget and to performance specification. Project management techniques play a vital role in project success. However, the literature indicates that project success should be distinguished from project management success and suggests that there are other dimensions influencing the success of a project. The primary objective of the research is evaluating the perception of industry practitioners into the critical success factors that contributing to the success of renovation projects. A total of 15 critical success factors of four factor groups (People, Organization, Project and Process) is assessed by 49 respondents through a questionnaire. The result demonstrates the similarity with previous studies from literature where factors related to people are ranked first and third in the list. Project leader's / managers' performance and project team's competency became apparent in the study. The findings also suggest that there is a significant relationship between risk management and, monitoring and feedback factors toward time / schedule criteria. In addition, a significant difference is found in respondents with different educational background and exposure to formal project management

toward top management support and, planning and controlling factors respectively.

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LIST OF ABBREVIATIONS

CSFs	Critical Success Factors
ID	Interior Design
MEP	Mechanical, Electrical and Plumbing
M+E	Mechanical and Electrical
PMI	Project Management Institute
PSC	Project Success Criteria
SPSS	Statistical Package for the Social Sciences

CHAPTER 1.0

INTRODUCTION

1.1 Overview

This chapter shows rationale for the overall research and gives a general description of the previous studies which relevant to the problem. It provides guideline to conduct research in a systematic manner toward achieving the aim and objectives of the research.

1.2 Research Background

Worldwide is now keen on promoting development to improve the quality of life (IHS Consulting, 2012). This encourages the growth of the construction sector, which involving residential, commercial, industrial, infrastructure, amenities and other aspects of development (Harold, 2009).

In the broad construction sector, projects with which they share very similar business activities are categorized further into building and engineering projects. Building projects also can be further sub-categorized into various and more specific projects, one of them where this research investigating is renovation project.

Generally, building and renovation projects are also complex process and involve a multidisciplinary approach such as project management, architecture, engineering, interior design, quantity survey, accounting and much more. According to Attalla et al. (2003), renovation can be defined as a process of restoring or improving a built structure that includes modifications, conversion or phased complete replacement (cited by Singh, 2007).

A project can be considered to be the achievement of a specific objective, which involves a series of activities and tasks which consume resources. It has to be completed within a set specification, having definite start and end dates (Munns and Bjeirmi, 1996). According to Shao et al. (2012), project is a pre-schedule activity plan and execute with a systematic manner in order to achieve specific objectives.

By the year of 2020, Malaysia aspires to become a developed nation. Since decades ago, Malaysia has experienced rapid development and became one of the Southeast Asian region economic power. The construction sector is one of the main contributors to Malaysia economic growth.

Rapid growth experienced by the construction sector suggests the need to conduct an assessment of factors contributing to the success of all projects. There has been concern that renovation project is running behind schedule and many have failed, resulting in a loss of money.

According to Mobey and Parker (2002), in order to increase the chances of a project successfully, it is necessary for organizations to have an understanding of what are the success factors, to systematically and quantitatively assess these factors, anticipating possible causes and effects, and then choose appropriate methods of dealing with them. Once identified, the success of the project can be achieved. Therefore, it is a need to identify a specific set of critical success factors for renovation projects.

1.3 Problem Statement

Despite there are growing literatures associate with the critical success factors that affect project success or failure, in which most are concentrating on general construction projects, the initial survey of literature reveals no specific study of critical success factors for renovation projects.

As referred to the ten critical success factors developed by Pinto and Slevin (1988), suggest that "these critical success factors were found to be generalizable to a wide variety of project types and organizations". However a single set of project success factors may not be suitable for all industries (Lim et al., 1999)

To determine the success or failure of a project, in fact, there are many factors outside the control of project management. All these factors are referred as critical success / failure factors. Only a few studies have been done to assess,

clarify, or analyse these factors. Most of the early studies in the area focused on the reasons for project failure rather than project success (Belassi and Tukel, 1996).

Previous researches (Krizek et al., 1996; Mitropoulos et al., 2002; Attalla et al., 2003) concluded that renovation project, unlike new build project, involves considerable risks and uncertainty in existing conditions that adversely impact the project performance (cited by Singh, 2007). Therefore, it is important for the industry practitioners whom involve in renovation projects to equip themselves with the knowledge of critical success factors that contributing to their project success.

Despite the importance, industry experts and practitioners find that more researches and studies involving the field of construction sector are needed to improve understanding of current development scenario (Abdullah et al., 2010).

Renovation industry plays a vital role in supporting the growth of the construction sector. Studies by Al-Tmeemy et al. (2011) indicates that successful completion of a project is determined based on numerous factors depending upon objectives. According to Ozorhon et al. (2011), the practice of project management dictates success completion of a project. Past researches focused on identifying the general context dictating progress of renovation projects (Mistry and Davis, 2009). As such, the need to conduct concise analysis on critical success factors contributing to the success of renovation projects is vital particularly in this globalization era.

1.4 Aim and Objectives

The research aims to offer an insight to renovation industry in Malaysia with regards to critical success factors that contribute to the success of projects.

The objective of the research is primarily evaluating the perception of industry practitioners into the critical success factors that contributing to the success of renovation projects. There are three objectives formulated for the research as follows:

1. To identify critical success factors (CSFs) that contributing to the success of renovation projects.

2. To examine the relationship between critical success factors (CSFs) and project success criteria (PSC).

3. To examine the difference between critical success factors (CSFs) and respondents' demographic profiles.

Based on the objectives stated above, three research questions are formed to as follows:

i. What are the critical success factors (CSFs) contributing to the success of renovation projects?

ii. Is there a significant relationship between critical success factors (CSFs) and project success criteria (PSC)?

iii. Is there a significant difference between critical success factors (CSFs) and respondents' demographic profiles?

1.5 Scope of Research

The research concentrates on private organizations which engaging with renovation projects within Klang Valley in Malaysia. They are representing all the three principal groups of project stakeholders, namely clients, consultants and contractors.

It involves a mixture of professionals from project managers, construction managers, engineers, architects, interior designers, MEP consultants and etc. for the survey. They are selected because of their hand on experiences and experts in handling renovation projects. Hence, the data collected will be more relevant and convincing to the research.

1.6 Significance of Research

Industry practitioners, particularly project managers and professionals involve in renovation projects are expected to gain significant advantage from

this study. Analysis of this research provides precise and concise findings on actual development scenario happening in Malaysian renovation industry. This newly updated research can help professionals to better understand the critical success factors for renovation projects. Realizing factors affecting the success of a project are vital for professionals to avoid performing actions leading to catastrophe effects.

The study helps to establish renewed understanding of renovation projects. This information is vital for students, lecturers and researchers studying the subjects. It can help to provide industry perspective which is critical for the thorough understanding process. Moreover, the research provides basis guideline and recommendations for future study which is considered as significant for students and academicians alike.

Information derived from the findings of the study is significant for understanding of renovation projects. In times of globalization and rapid technological advancement, ensuring successful completion of a project is critical for organizations to remain competitive.

1.7 Research Methodology

The research begins with a comprehensive literature review of the identification of the success factors in general construction projects. Most of the information discussed in the research is survey of scholarly articles,

dissertations, books and internet sources relevant to the area of investigation. Previous research theories and concepts on the subject are focused for better understanding of the particular issues. A list of 15 critical success factors (CSFs) is adopted for respondents' evaluation.

The strategy for the study is quantitative research. The survey approach is used to gather data from respondents within a limited time frame. The questionnaire is selected for conducting the survey. Both descriptive and analytical surveys are included in the questionnaire that consisting of two sections. The objective of the research is about evaluating the perception of industry practitioners into the critical success factors that contributing to the success of renovation projects in Malaysia.

The data is gathered through a questionnaire survey which is distributed to a total of 100 industry practitioners among the three principal groups of project stakeholders within Klang Valley in Malaysia. They are private owners / clients, consultants and contractors who represent a mixture of professionals. In total, 49 respondents completed the questionnaire, resulting in a sample size of 49. The questions in the first section of the questionnaire are designed to investigate the facts of respondents' demographic profiles. Whereas, second section questions are used to subjectively evaluate the perception of respondents toward critical success factors and project success criteria for their renovation projects.

The results are analyzed using IBM SPSS Statistics software package. Both descriptive statistics and inferential statistics methods are applied for data analysis. The statistical analysis is first deals with the frequency and mean values of responses, then ranks them based on their categories and level of agreement. There are two tests involved in the second stage of analysis which are Spearman's rank-order correlation and Kruskal-Wallis H tests. Spearman's rank correlation is used to examine the significant relationship between critical success factors and project success criteria at the 5% significance level. The non-parametric method of Kruskal-Wallis H test is for examining the significant difference in opinions of individual critical success factors among the five respondents' demographic profiles at the 5% significance level.

1.8 Structure of Dissertation

The dissertation is structured into five chapters with an overview about the content of each chapter is provided as follows:

Chapter 1.0 : **INTRODUCTION**

This chapter shows rationale for the overall research and gives a general description of the previous studies which relevant to the problem. It provides guideline to conduct research in a systematic manner toward achieving the aim and objectives of the research.

Chapter 2.0 : LITERATURE REVIEW

This chapter involves reading and appraising previous studies relating to the area of investigation for the research. The important area regarding the study is to assess the critical success factors that have contributed to project performance in local renovation industry. Critical review of literature can help to understand of the current issues and problems facing in the context of the research.

Chapter 3.0 : RESEARCH METHODOLOGY

This chapter describes systematically the research design and methodology road map used to achieve the research aim and objectives. The research approach, procedure of data gathering and method of analysis are explained in detail here.

Chapter 4.0 : RESULTS AND DISCUSSION

This chapter presents and interprets the results of the research, and discusses the findings of the research. The data collected through questionnaire are analysed by using IBM SPSS Statistics software package. Descriptive, inferential and reliability statistics are applied to the data to produce the most relevant and acceptable results.

Chapter 5.0 : CONCLUSIONS AND RECOMMENDATIONS

This is the final chapter draws the conclusions of the entire research. It provides an evaluation of the objective achievements. Limitations of the research and recommendations to improve future research on similar topics are also included.

CHAPTER 2.0

LITERATURE REWIEW

2.1 Overview

This chapter involves reading and appraising previous studies relating to the area of investigation for the research. The important area regarding the study is to assess the critical success factors that have contributed to project performance in local renovation industry. Critical review of literature can help to understand of the current issues and problems facing in the context of the research.

2.2 Definition of Renovation Project

As defined by Attala et al. (2003), renovation is a process of restoring or improving a built structure that includes modifications, conversion or phased complete replacement (cited by Singh 2007). A renovation project involves actions of restoring, modifying and improving the structure of buildings (Al-Tmeemy et al., 2011).

The most distinguishing between renovation and new build project is the former always take place at existing building or structure. A new built project

often referring new project build from empty ground. That is why sometime a renovation project can be more complicated and unpredictable, especially when there is facility still in operation during the implementation stage.

According to Gibson et al. (2007), renovation project as endeavour that primarily focus on an existing facility. The process of renovating the facility may include repairing and restoring building features, adding or removing structures and systems, and overall improvements that increase profitability, safety, security, performance, durability, and code compliance. Outside of this study, renovation projects may be referred to as retrofit, reconstruction, rehabilitation, refurbishment, remodelling and redevelopment projects, these are all aliases for renovation projects and shall be considered the same process of improving an existing facility (cited by Cattano, 2010) .

Sometime, renovation of an operational facility imposes additional constraints on its construction process, which if not considered during project planning and controlling processes, could lead to project underperformance.

2.3 Project Management Success vs. Project Success

Before going into success factors and criteria, it is important to first understand what does the actual meaning of success for a project. It is essential that a distinction must be made between the success of the project management effort and project success. De Wit (1988) seems to be among the first to

distinguish between project management success and project success. According to him, project management success is measured against the widespread and traditional measures of performance against cost, time and quality.

Project management has been recognized as an efficient tool to handle projects. Munns and Bjeirmi (1996) define project management as "The process of controlling the achievement of the project objectives. Utilising the existing organizational structures and resources, it seeks to manage the project by applying a collection of tools and techniques, without adversely disturbing the routine operation of the company". PMI (2000) states that project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

Over the last 60 years, the iron triangle of time, cost and quality have become inextricably linked with the measuring the success of project management (Atkinson, 1999). According to Baccarini (1999), project management success focuses upon the project process and the successful accomplishment of time, cost and quality objectives. It also considers the manner in which the project management process is conducted.

Pinto and Slevin (1988) conclude that project success is something much more complex than simply meeting cost, schedule and performance specifications. In fact client satisfaction with final result has great deal to do with the perceived success of failure of projects.

Research undertaken by Munns and Bjeirmi (1996) suggest that project management and its techniques are only a subset of the wider context of project. Project management plays a role in project success but that role is affected by many other factors outside the direct control of the project manager. This can explain why projects can be succeed or fail independently of project management process. Successful project management techniques will contribute to the achievement of projects, but project management will not stop a project from failing to succeed.

In late 1980s, further studies begun to discuss other dimensions that could possibly effect the success or failure of a project apart from the iron triangle of time, cost and quality. The term project stakeholders start to emerge in defining project success. Pinto and Slevin (1988) advocate project success not only evolves from technically correct project but also effectively interfacing with clients and stakeholders.

De Wit (1988) concludes that when measuring project success, one must consider the objectives of all stakeholders in a project, throughout each major phase in the project life cycle and at all levels in the management hierarchy of an organization. The degrees to which these objectives have been met determine the success of the project.

2.4 Success Factor vs. Success Criteria

A review of the literature further reveals that the second distinction between success factors and success criteria is also important to be noted. Generally, the factor that contribute to success of projects are known as success factors and success on project is judged by success criteria.

The subject of success factors or critical success factors (CSFs) that influence project success has generated a vast amount of literature not only in construction sector but also others, over the past two decades. According to Belassi and Tukel (1996), many of these studies generate lists of critical success factors with varies scope and purpose. Only a few studies in project management literature focus on the critical factors that affect project success or failure.

The definition of critical success factors has been widely discussed in the past. One of the earlier widely accepted definition if from Boynton and Zmud (1984) which describes:

> Critical success factors are those few things that must go well to ensure success for a manager or an organization, and, therefore, they represent those managerial or enterprise area, that must be given special and continual attention to bring about high performance. Critical success factors include issues vital to an organization's current operating activities and to its future success.

Lim and Mohamed (1999) define success factor as the set of circumstances, facts or influences which contribute to the result or the achievement of the success criteria. They further define success factors as the influential forces which either facilitate or impede project success, but the success factors do not form the basis of judgment. Studies by Cooke-Davies (2002) indicates that success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business. Westerveld (2003) refers success factors as the organizational areas which he terms as the "How". According to De Wit (1988), presence of success factors does not guarantee success but their absence is likely to lead to failure.

Critical success factors should not be confused with success criteria, those are outcomes of a project or achievements of an organization that are needed to consider the project a success or to esteem the organization successful. Success criteria are defined with the objectives and may be quantified by KPIs (Takim and Akintoye, 2002).

According to De Wit (1988), the most appropriate criteria for success are project objectives. It is the measures by which success or failure of a project or business will be judged. However, objectives are vary by different type of projects, throughout the project life cycle, the levels of management in client's organization and the stakeholders involved.

2.5 Critical Success Factors Adopted for the Research

After conducting a comprehensive review of literature, a list of 15 critical success factors of project management is adopted for the purpose of this research. They are Realistic cost and time estimation, Planning and controlling, Effectiveness of communication, Project leader's / manager's performance, Clear project objectives, Project size and value, Available of resources, Quality management, Project team's competency, Goal commitment, Scheduling, Project uniqueness and complexity, Risk Management, Monitoring and feedback and Top management support as per Table 2.1 below. Industry practitioners are invited to evaluate these success factors to determine which are critical to their success of renovation projects.

Table 2.1: List of Critical Success Factors

CSFs	
Realistic cost and time estimation	CSF01
Planning and controlling	CSF02
Effectiveness of communication	CSF03
Project leader's / manager's performance	CSF04
Clear project objectives	CSF05
Project size and value	CSF06
Available of resources	CSF07
Quality management	CSF08
Project team's competency	CSF09
Goal commitment	CSF10
Scheduling	CSF11
Project uniqueness and complexity	CSF12
Risk Management	CSF13
Monitoring and feedback	CSF14
Top management support	CSF15

Realistic Cost and Time Estimation (CSF01)

Cost and time are the two key elements in the iron triangle of project management besides quality. Ability to estimate a realistic cost and time before project implementation stage will avoid project delay and over budget. It is definitely impact other constrains if one of these elements are out of the initial estimation as the project progresses.

Planning and Controlling (CSF02)

When project activities are increasing and getting complex, it is time to look into the planning and controlling processes seriously in order for the successful implementation of project. The absence of critical planning and controlling for a novel project can lead to disastrous effects. An active planning and controlling by project team will enable project manager to maneuver the project back to the right track when something unforeseen issues occurred.

Effectiveness of Communication (CSF03)

Effective integration among personnel regardless professions is critical to ensure smooth progress on each stage of development (Ozorhon et al., 2011). Globalization encourages the creation of multi-racial organization (Philippe et al., 2010). Differences between culture and barrier of language might cause

ineffective communication between employees. On the other hand, a renovation project is managed by different professionals at different stage of development. Giving example, surveyors work involve during initial stage of development while contractors work initiate after acquiring approvals from local authority (Yang et al., 2009). There is close relations between works perform between one professional to another despite conducting at different stage of development. This requires effective communication channel to facilitate the transfer of information between project stakeholders. Research by Liu et al. (2011) indicates that good integration and effective communication practice among personnel help organization gaining competitive advantage.

Project Leader's / Manager's Performance (CSF04)

Project leader or project manager of a project is playing a very important role to make sure the project goals are met. Hence, their performance will has direct influence to the project success or failure. Knowledges and industry experiences defines capability of project leader / manager and therefore dictating decision of a project management. Individual with high level of leadership, skills and competencies is having profound impact on project success.

Clear Project Objectives (CSF05)

Clear project objectives among project stakeholders is important. It help to synergy the project team and resolve misunderstanding. Changes are common situation facing by professionals working in the construction sector. However, high frequency of change affects final outputs. Initial agreement on specific factors might not be in placed upon completion. Moreover, the absence of effective integration among personnel further escalates the issue (Liu et al., 2011). The natures of renovation project require professionals from different backgrounds to corporate producing one output. In some cases, changes of plan are made by selected professionals without acquiring advice from others which cause numerous technical issues (Duncan, 2013).

Project Size and Value (CSF06)

The project size and value are often associate with its complexity. Project activities are increased for bigger project size and higher project value. Thus required more effort and coordination from the project team.

Available of Resources (CSF07)

Human resources are organization most precious commodity determining outcomes and productivity of company. Mistakes perform by

personnel in charged for specific project might delay operation and threat success completion of a project (McDowell, 2009). Similarly, research by Ozorhon et al. (2011) indicates that failure to perform specific task assigned by company might cause delay to entire operation.

Quality Management (CSF08)

Globalization facilitates the growth of numerous sectors including construction. The pressure of globalization pushes organizations to provide services and products at international standards (Philippe, et. al., 2010). This pressure is a major challenge particularly to small size companies. Nevertheless, it the near future, globalization is expected to connect worldwide creating one world. This challenge every construction companies in this world to provide quality of workmanship at international level.

Project Team's Competency (CSF09)

A competent project team is refer to their professional expertise, skills techniques and capabilities in order to manage a project effectively. The level of competency the project team managing a renovation project influence the quality of work produced and performed.

Goal Commitment (CSF10)

Project objectives are vary by different projects, it is also change for each major phase in project life cycle. Project teams with goal commitment will able to adhere the goals and objectives set in the beginning when carry out their works.

Scheduling (CSF11)

Scheduling is the process of arranging and optimizing work activities in given timeframe. Scheduling is used to allocate resources and to make sure the work is completed without delay.

Project Uniqueness and Complexity (CSF12)

Generally in renovation project, a unique and complex project is more difficult to manage compare to a conventional project.

Risk Management (CSF13)

Risk Management is a means of dealing with uncertainty. Risk assessment can help organization mitigating and avoiding probable issues or

problems (Duncan, 2013). A study by Oren, (2009) indicates that the practice of risk management is essential to help project manager and his team members identifying internal and external issues. Early identification of issues and problems provide time for company to prepare mitigation plan.

Monitoring and Feedback (CSF14)

In order to ensure success completion of renovation projects, it is vital for management of the construction company to conduct constant monitoring and feedback actions (Shao et al., 2012). This can help to ensure the project progress as earlier planned and projected. Failure to conduct thorough assessment on monitoring stage lead to acquiring unconstructive feedback which influence the decision making process. As such, it is considered as one of the critical success factors involving renovation projects.

Top Management Support (CSF15)

Top management support is important for every project. It is directly influence the project funding and securing project resources.

2.5.1 Factor Groups

There are some studies categorize success factors into several groups for analysis (Belassi and Tukel, 1996; Chan et al., 2002). Therefore, this research also categorized the 15 individual critical success factors accordance with its nature, namely People, Organization, Project and Process, to create four factor groups for further analysis, as per Table 2.2 below.

Table 2.2: List of Factor Groups and their Individual Factors

Factor Group	CSFs	
People	Effectiveness of communication	CSF03
	Project leader's / manager's performance	CSF04
	Project team's competency	CSF09
	Goal commitment	CSF10
Organization	Clear project objectives	CSF05
	Available of resources	CSF07
	Scheduling	CSF11
	Top management support	CSF15
Project	Realistic cost and time estimation	CSF01
	Project size and value	CSF06
	Project uniqueness and complexity	CSF12
Process	Planning and controlling	CSF02
	Quality management	CSF08
	Risk Management	CSF13
	Monitoring and feedback	CSF14

2.6 Project Success Criteria Adopted for the Research

Five project success criteria are adopted for the research following the literature review above. They are Cost / Budget, Time / Schedule, Quality, Client / Customer satisfaction and Organization's strategic goals as per Table 2.3 below.

Table 2.3: List of Project Success Criteria

PSC	
Cost / Budget	PSC01
Time / Schedule	PSC02
Quality	PSC03
Client / Customer satisfaction	PSC04
Organization's strategic goals	PSC05

Cost / Budget (PSC01)

Capital budgeting is one of the vital aspects determining success implementation of a project. Miscalculation on overall budget and costing involved might lead to delay and incompletion of project (Love et al., 2010). In Malaysia, typical scenarios experience by industry players are running out of capital to sustain and continue implementation of the construction project (Abdullah et al., 2010). This issue happens as a result of poor management on allocating and budgeting resources. In the event of miscalculates actual cost, the project is at risk of stopping.

Time / Schedule (PSC02)

Each project is scheduled for completion within stipulate time period. This process is typically done thorough evaluation on activities involved to complete the project by preparing comprehensive Gantt chart (Liu et al., 2011). Due to capital limitation, include with pressure from clients for fast completion project, contractors tend to promise on early completion date. Success implementation of a project is significant influence by the period of completion (Shao et al., 2012). In practicality, most renovation projects face challenge of time constraint which forces companies to operate on long hours ensuring completion of the project within schedule (Oren, 2009). Early promise on delivery time can affect productivity and quality of work. Poor quality is one of the indicators that constitute as a failed project. Therefore, it is significant to conduct assessment on time and schedule continuously.

Quality (PSC03)

Renovation works involve actions of refurbishment, alteration, adjustment and modification on existing building. It is a challenging technical work which performance is measured based on quality level upon completion of renovation projects (Zheng and Larimo, 2010). Finishing is the terminology typically used by contractor to indicate that the work is currently at final stage (Duncan, 2013). Similarly, Certificate of Completion and Compliance (CPC) grant by client to contractor signifies completion of construction projects.

Assessment on the quality of work in term of interior and exterior perspective defines the performance level of a renovation project. Nevertheless, increase competitiveness forces company to improve productivity by providing high workmanship quality.

Client / Customer Satisfaction (PSC04)

Increase competitors of the renovation industry provide opportunity for clients / customers to demand high quality workmanship at best prices. Moreover, with the advent usage of the internet, consumers tend to compare the quality of work based on international standards. As such, it is vital for organization to improve productivity meeting rising consumer's expectation.

Satisfaction on products and services delivery influence clients' loyalty. Competitive market encourages organization emphasizing on clients' satisfaction as priority number one. Moreover, sustainability of business is depending upon the ability to retain and attract new consumers (Khang and Moe, 2008). Recommendations by existing users influence market perception and therefore it is vital for organization conducting renovation projects to ensure clients feel satisfied with the quality of work.

Organization's Strategic Goals (PSC05)

It is pointed by many researches and studies that regardless of industry, organization main goal is to acquire profits through trading of products and services (Deitz et. al., 2010). Every organization formulates and defines strategic goals according to vision and mission of the company. Such example is to be specialized in renovations projects involving commercial buildings. In order to achieve this, the company needs to acquire specific number of renovation projects on commercial buildings within stipulate time period. Upon completion of a project, the company evaluates strategic goal achievements.

CHAPTER 3.0

RESEARCH METHODOLOGY

3.1 Overview

This chapter describes systematically the research design and methodology road map used to achieve the research aim and objectives. The research approach, procedure of data gathering and method of analysis are explained in detail here.

3.2 Research Framework

The research began with reviewing critical success factors for all kinds of projects. Research on numerous past studies are conducted to assess current scenario of the renovation industry. The researcher managed to identify aspects require further studies based on Malaysian context and perspective. The literature studies are derived from trusted and reliable sources that include journals, conference papers, websites, dissertations and books.

A research framework is being developed as a guide for the study as illustrated in Figure 3.1 below.

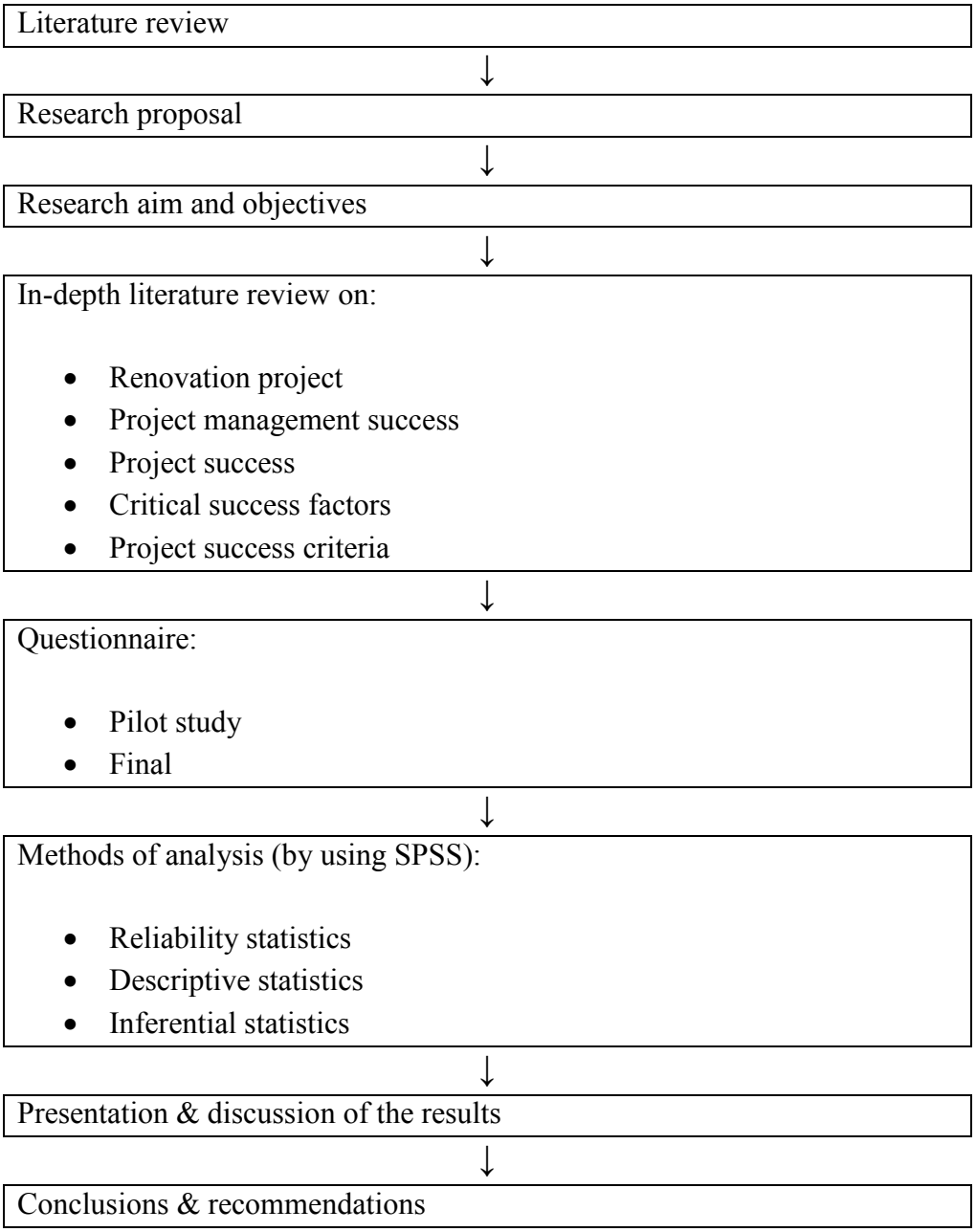

Figure 3.1: Research Framework

3.3 Research Design

The strategy adopted for this study is quantitative research. The survey approach is used to gather data from respondents within a limited time frame.

The research is established to evaluate the perception of industry practitioners into the critical success factors (CSFs) that contribute to the success of renovation projects as its objectives.

The following three research questions are to be answered at the end of the study:

i. What are the critical success factors (CSFs) contributing to the success of renovation projects?

ii. Is there a significant relationship between critical success factors (CSFs) and project success criteria (PSC)?

iii. Is there a significant difference between critical success factors (CSFs) and respondents' demographic profiles?

3.4 Questionnaire

The selection of the technique for gathering data depends largely on the research approach. Since the study seeks to survey the perception of industry practitioners within in Klang Valley in Malaysia, a structured questionnaire survey is conducted to elicit data and information from respondents. This is because the speed of receiving responses, as limited time frame is given for completing the research.

The questionnaire survey is distributed to a total of 100 industry practitioners among the three groups of project stakeholders. They are private owners / clients, consultants and contractors who represent a mixture of professionals. In total 49 respondents completed the questionnaire, resulting in a sample size of 49.

The principle in constructing questionnaire is to ask specific questions that related to the research aim and objectives. 'Closed ended' type of questions are provided in the questionnaire for its easy to ask and quick to answer. The questionnaire is consisting of two sections with total of seven questions (refer to **Appendix A**). A total of five questions in first section are created to investigate the facts of respondents' demographic profiles. Respondents are asked to choose the best answer represented their organization, education background, work experiences, typical project value and formal project management exposure as per Table 3.1 below.

Table 3.1: List of Respondents' Demographic Profiles

Respondents' Demographic Profiles
Q1. Organization
Q2. Education background
Q3. Work experiences
Q4. Typical project value
Q5. Formal project management exposure

In second section of questionnaire, two questions are created to subjectively evaluate the perception of respondents into 15 critical success

factors (CSFs) and five project success criteria (PSC) by rating the five-point Likert scale.

The 15 critical success factors and five project success criteria are listed in Tables 3.2 and 3.3 below.

Table 3.2: List of Critical Success Factors

CSFs	
Realistic cost and time estimation	CSF01
Planning and controlling	CSF02
Effectiveness of communication	CSF03
Project leader's / manager's performance	CSF04
Clear project objectives	CSF05
Project size and value	CSF06
Available of resources	CSF07
Quality management	CSF08
Project team's competency	CSF09
Goal commitment	CSF10
Scheduling	CSF11
Project uniqueness and complexity	CSF12
Risk Management	CSF13
Monitoring and feedback	CSF14
Top management support	CSF15

Table 3.3: List of Project Success Criteria

PSC	
Cost / Budget	PSC01
Time / Schedule	PSC02
Quality	PSC03
Client / Customer satisfaction	PSC04
Organization’s strategic goals	PSC05

Five-point Likert scale is preferred for the analytical survey questions. It is designed to measure fixed choice responses such as attitudes or perceptions (Wikipedia). Respondents are required to rate on a scale of one to five, where one represented 'Strongly Disagree' and five represented 'Strongly Agree' for each of the identified factor and criteria as per Table 3.4 below.

Table 3.4: Five-Point Likert Scale

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3.4.1 Pilot Study

A pilot study is carried out before the questionnaire start being distributing to all the targeted respondents. It is conducted to test the validity of the questionnaire. It provides a trial run for the questionnaire, which involves testing the wording of the questions, identifying ambiguous questions and testing the technique that use to collect data.

The pilot study is first tested by five respondents. It is important to conduct pilot study with respondents who have high level of familiarization on the subject. The feedback from pilot study assists in finalizing the questionnaire.

3.5 Sampling Method

The method adopted for this research is based on a structured questionnaire survey of three target groups of project stakeholders within Klang Valley in Malaysia construction sector who involving renovation projects. The three groups are private owners / clients, consultants and contractors, representing a mixture of professionals including project managers, construction managers, engineers, architects, interior designers, MEP consultants, and etc.

The research sample attempts to capture the different perceptions from the respondents. Samples are randomly selected from listing directories by the respective professional institutions and Construction Industry Development Board (CIDB)

3.6 Statistical Analysis

It is no easy task to decide the most appropriate test to be used with the data. The level of measurement that is used to measure variable also has effect on the test to be conducted. Basically, there are two level of measurement collected from the questionnaire, which are nominal scale in first section and ordinal scale in second section. This is ideal for non-parametric test.

After making numerous references to literature, past year dissertations and consultation with supervisor, both descriptive statistics and inferential

statistics methods are decided. The statistical analysis is first deals with the frequency and mean values of responses, then ranks them based on their categories and level of agreement. There are two tests involved in the second stage of analysis which are Spearman's rank-order correlation and Kruskal-Wallis H tests. Spearman's rank correlation is used to examine the significant relationship between critical success factors and project success criteria at the 5% significant level. The non-parametric method of Kruskal-Wallis H test is for examine the significant difference in opinions of individual critical success factors among the five respondents' demographic profiles at the 5% significant level.

Once receiving a satisfactory number of questionnaire, the data is ready for analysis. It is started with summarize and transfer the collected information into a data summary form. Then IBM SPSS Statistics software package is used to obtain the analysis results for interpretation and discussion later.

3.6.1 Reliability Statistics

The data is first tested with Cronbach's Alpha (α) before any other statistical tests. The purpose is to measure the internal consistency of data (Dornyei and Taguchi, 2010). The minimum acceptance level for internal consistency is Cronbach's Alpha value equal or more than 0.7 for each variable.

Table 3.5: Range of Values of Cronbach's Alpha

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

3.6.2 Descriptive Statistics

Descriptive statistics provides a general overview of the results. It is the simplest method of analysis and analyze the responses in percentage. The results are represented in frequency distribution tables.

Descriptive statistics is conducted onto the first research question in order to determine frequency of responses. The analysis primarily deals with ranking the factors and criteria based on their mean score values to determine their level of influence. The statistic also conducted onto the respondents' demographic profiles' questions.

3.6.3 Inferential Statistics

Inferential statistics is used to compare, test or predict data. It is conducted onto the second and third research questions.

3.6.3.1 Spearman's Rank-Order Correlation

Spearman's rank-order correlation is used to identify and measure the strength of a relationship between two groups of attributes or factors. The magnitude of relationship is strong when close to 1 / -1, weak when close to 0 and moderate when somewhere between 0.3 / -0.3 to 0.6 / -0.6.Correlation can be positive where both variables move in the same direction and negative where both variables move in opposite directions (Laerd Statistics).

Spearman's rank correlation is performed to answer the second research question (Is there a significant relationship between critical success factors and project success criteria?) at the 5% significant level. If the statistical significance of the test shows $\rho < 0.05$, it is concludes that there is a significant relationship or correlation between the factors and criteria.

3.6.3.2 Kruskal-Wallis H Test

Kruskal-Wallis H test is a non-parametric test alternative to One-Way ANOVA test (Laerd Statistics). A non-parametric test must comply the assumption that the data must not be normally distributed and be nominal and ordinal scale.

The purpose of the test is to understand whether there is significant difference in opinions of individual critical success factors among the five

respondents' demographic profiles. It is performed to answer the third research question (Is there a significant difference between critical success factors and respondents' demographic profiles?). If the statistical significance of the test shows $\rho < 0.05$, it is concludes that there is a significant difference between them.

3.7 Conclusion

Based on the research objective, all the statistical tests explained above shall help to evaluate the perception of industry practitioners into critical success factors that contributing to the success of renovation projects. It will lead us to identify which success factors are critical in the renovation industry.

CHAPTER 4.0

RESULTS AND DISCUSSION

4.1 Overview

This chapter presents and interprets the results of the research, and discusses the findings of the research. The data collected through questionnaire are analysed by using IBM SPSS Statistics software package. Descriptive, inferential and reliability statistics are applied to the data to produce the most relevant and acceptable results.

4.2 Respondents' Demographic Profiles

A total of five questions in first section of questionnaire are created to investigate the respondents' demographic profiles. Respondents are asked to choose the best answer represented their organization, education background, work experiences, typical project value and formal project management exposure. Descriptive statistics is applied for data analysis here and their results are given in the frequency distribution Tables 4.1 to 4.6 below. A complete SPSS output for respondents' demographic profiles is shown in **Appendix B**.

4.2.1 Organization and their Organization Groups

Refer Table 4.1 below, we learnt that 13 (26.5%) respondents were came from interior design contractor firms. Interior design consultant firms and owner / client were in second and third with eight (16.3%) and seven (14.3%) respondents respectively.

Table 4.1: Organization

Organization	Frequency (N)	Percentage (%)
ID contractor	13	26.5
Interior design	8	16.3
Owner / Client	7	14.3
MEP contractor	6	12.2
Trade contractor	6	12.2
Architect	5	10.2
MEP consultant	4	8.3
Total	**49**	**100.0**

When these organizations are categorized into three groups of project stakeholders, 25 (51.0%) respondents were from contractors, followed by 17 (34.7%) from consultants and 7 (14.3%) from clients as per Table 4.2 below.

Table 4.2: Organization Groups

Organization Groups	Frequency (N)	Percentage (%)
Contractors	25	51.0
Consultants	17	34.7
Clients	7	14.3
Total	**49**	**100.0**

4.2.2 Education Background

In terms of education background, 11 (22.4%) respondents were from interior design at 22.4%. Architectural and building engineering / science background came in second and third with 10 (20.4%) and 9 (18.4%) respondents respectively as per Table 4.3 below.

Table 4.3: Education Background

Education Background	Frequency (N)	Percentage (%)
Interior design	11	22.4
Architectural	10	20.4
Building engineering / science	9	18.4
Civil engineering	7	14.3
M+E engineering	5	10.2
Others	5	10.2
Project management	1	2.0
QS	1	2.0
Total	**49**	**100.0**

4.2.3 Work Experiences

Table 4.4 below shown that there were 15 (30.6%) respondents with work experiences less or equal to five years, and from six to 10 years respectively. Followed by 12 (24.5%) respondents with 11 to 15 years.

Table 4.4: Work Experiences

Work Experiences	Frequency (N)	Percentage (%)
$x \leq 5$ years	15	30.6
$5 < x \leq 10$ years	15	30.6
$10 < x \leq 15$ years	12	24.5
$x > 15$ years	7	14.3
Total	**49**	**100.0**

4.2.4 Typical Project Value

From Table 4.5 below, 14 (28.6%) respondents indicated their typical project value was in the range of RM300,001 to RM600,000. Followed by 10 (20.4%) from RM600,001 to RM1,000,000 and 9 (18.4%) from RM100,001 to RM3000,000 in second and third places.

Table 4.5: Typical Project Value

Typical Project Value	Frequency (N)	Percentage (%)
RM300k < $x \leq$ RM600k	14	28.6
RM600K < $x \leq$ RM1mil	10	20.4
RM100k < $x \leq$ RM300k	9	18.4
RM1mil < $x \leq$ RM2mil	6	12.2
RM2mil < $x \leq$ RM3mil	4	8.2
RM50k < $x \leq$ RM100k	3	6.1
RM3mil < $x \leq$ RM4mil	3	6.1
Total	**49**	**100.0**

4.2.5 Formal Project Management Exposure

Table 4.6 below shown that 28 (57.1%) respondents mentioned that they have exposed to formal project management in the study.

Table 4.6: Formal Project Management Exposure

Formal PM Exposure	Frequency (N)	Percentage (%)
Yes	28	57.1
No	21	42.9
Total	**49**	**100.0**

4.3 Cronbach's Alpha Result

Before proceeding to statistical tests, data in second section of questionnaire is required to go for reliability test by using Cronbach's Alpha. The Cronbach's Alpha results for critical success factors (CSFs) and project success criteria (PSC) are shown in Table 4.7 below.

Cronbach's Alpha value for critical success factors and project success criteria are 0.744 and 0.782 respectively. Both values indicate an acceptable level of internal consistency for further analysis.

Table 4.7: Cronbach's Alpha Value

Variables	Cronbach's Alpha	N of Items
CSFs	0.744	15
PSC	0.782	5

4.4 Project Success Criteria

There are total five project success criteria (PSC) to be assessed in second section of questionnaire. It is important to understand which criteria is most widely used by respondents in measuring their project success.

The ranking of project success criteria chosen by respondents is summarized as per Table 4.8 below. The criteria of Quality is topped at the rank, followed by Client / Customer satisfaction, Cost / Budget, Time / Schedule and Organization's strategic goals. A complete SPSS output for project success criteria is shown in **Appendix C**.

Table 4.8: Ranking of Project Success Criteria

Ranking	PSC	
1	Quality	PSC03
2	Client / Customer satisfaction	PSC04
3	Cost / Budget	PSC01
4	Time / Schedule	PSC02
5	Organization's strategic goals	PSC05

4.5 Critical Success Factors and their Factor Groups

The objective of the research is to evaluate the perception of industry practitioners into the critical success factors (CSFs) that contributing to the success of renovation projects. Therefore, the first research question (What are

the critical success factors (CSFs) contributing to the success of renovation projects?) is formulated. Descriptive statistics is applied here.

The ranking is done by sorting the factors according to the frequency of the responses received. The factor which is rated the highest score will be ranked as first, followed by second most frequently chosen factor and so forth. If more than one factor has the same frequency of responses, they are ranked the same.

Table 4.9 shown the ranking of critical success factors from the frequency analysis. Project leader's / manager's performance is ranked the top, followed by Planning and controlling in second. Project team's competency and Available of resources shared the third place with the same scores. A complete SPSS output for critical success factors is shown in **Appendix D**.

Table 4.9: Ranking of Critical Success Factors

Ranking	CSFs	
1	Project leader's / manager's performance	CSF04
2	Planning and controlling	CSF02
3	Project team's competency	CSF09
	Available of resources	CSF07
5	Monitoring and feedback	CSF14
	Scheduling	CSF11
	Goal commitment	CSF10
8	Project size and value	CSF06
	Top management support	CSF15
	Quality management	CSF08
11	Effectiveness of communication	CSF03
12	Risk Management	CSF13
	Realistic cost and time estimation	CSF01
14	Clear project objectives	CSF05
15	Project uniqueness and complexity	CSF12

The 15 individual critical success factors are then categorized in accordance with its nature for further analysis. There are People, Organization, Project and Process, to create four Factor groups that they belong to. The purpose for this analysis is to find out which factor group has the most influences in contributing to success of renovation projects.

Tables 4.10 and 4.11 below shown factor group related to People has the highest ranking, followed by Process and Organization group. Factor group related to Project is found to be least critical.

Table 4.10: Ranking of Factor Groups

Ranking	Factor Groups
1	People
2	Process
3	Organization
4	Project

Table 4.11: Ranking of Factor Groups (with individual factors)

Ranking	Factor Groups	CSFs	
1	People	Project leader's / manager's performance	CSF04
2	Process	Planning and controlling	CSF02
3	People	Project team's competency	CSF09
	Organization	Available of resources	CSF07
5	Process	Monitoring and feedback	CSF14
	Organization	Scheduling	CSF11
	People	Goal commitment	CSF10
8	Project	Project size and value	CSF06
	Organization	Top management support	CSF15
	Process	Quality management	CSF08
11	People	Effectiveness of communication	CSF03
12	Process	Risk Management	CSF13
	Project	Realistic cost and time estimation	CSF01

14	Organization	Clear project objectives	CSF05
15	Project	Project uniqueness and complexity	CSF12

The analysis is continued to rank the individual critical success factors in each factor group. Project leader's / manager's performance, Planning and controlling, Available of resources and Project size and value were found to be most critical in their factor groups respectively as per Table 4.12 below.

Table 4.12: Ranking of Individual Critical Success Factors in each Factor Group

Factor Group	CSFs		Ranking
People	Project leader's / manager's performance	CSF04	1
	Project team's competency	CSF09	2
	Goal commitment	CSF10	3
	Effectiveness of communication	CSF03	4
Process	Planning and controlling	CSF02	1
	Monitoring and feedback	CSF14	2
	Quality management	CSF08	3
	Risk Management	CSF13	4
Organization	Available of resources	CSF07	1
	Scheduling	CSF11	2
	Top management support	CSF15	3
	Clear project objectives	CSF05	4
Project	Project size and value	CSF06	1
	Realistic cost and time estimation	CSF01	2
	Project uniqueness and complexity	CSF12	3

4.6 The Relationship of Critical Success Factors and Project Success Criteria

In order to find out the answer for the second research question (Is there a significant relationship between critical success factors and project success criteria?), Spearman's rank-order correlation test is applied. It is used to determine if there is a significant relationship between critical success factors and project success criteria. The number at column *Sig. (2-tailes)* of the test shows the statistical significant of relationship when ρ value is less than point zero five (0.05).

The analysis shown that there was a statistically significant relationship between Risk management (CSF13) and Time / Schedule (PSC02) where ρ = 0.016 (< 0.05) as per Table 4.13 below. With correlation coefficient, $r_s = 0.342$, this indicated a moderate positive relationship between CSF13 and PSC02.

The result also indicated that there was a statistically significant relationship between Monitoring and feedback (CSF14) and Time / Schedule (PSC02) where ρ = 0.001 (< 0.05). With correlation coefficient, $r_s = 0.450$, this indicated a moderate positive relationship between CSF14 and PSC02.

A complete SPSS output for the Spearman's rank-order correlation analysis is shown in **Appendix E**.

Table 4.13: Relationship between Critical Success Factors and Project Success Criteria

			CSF13	CSF14
Spearman's rho	**PSC02**	Correlation Coefficient	.342*	.450**
		Sig. (2-tailed)	.016	.001
		N	49	49

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

*. Correlation is significant at the 0.05 level (2-tailed).

4.7 The Difference of Critical Success Factors and Respondents' Demographic Profiles

Kruskal-Wallis H test was applied to answer the third research question (Is there a significant difference between critical success factors and respondents' demographic profiles?). It is used to understand whether there is significant difference in opinions of individual critical success factors among the five respondents' demographic profiles.

Refer Tables 4.14 and 4.15 below, the analysis shown that there was a statistically significant difference in Top management support (CSF15) factor between the different Education background, $\chi^2(2) = 15.200$, $\rho = 0.034$ (< 0.05), with a mean rank CSF15 of 18.50 for respondent with education background of project management, 36.00 for civil engineering, 20.73 for mechanical & electrical engineering, 18.50 for quantity surveyor, 21.22 for architectural, 20.95 for interior design, 28.30 for building engineering / science and 33.20 for others.

Table 4.14: Difference between Top Management Support and Education Background

	CSF15
Chi-Square	15.200
df	7
Asymp. Sig.	.034

a. Kruskal Wallis Test

b. Grouping Variable: Education background

Table 4.15: Mean Rank of Top Management Support and Education Background

Education Background		N	Mean Rank
CSF15	Project management	1	18.50
	Civil engineering	7	36.00
	M+E engineering	11	20.73
	QS	1	18.50
	Architectural	9	21.22
	Interior design	10	20.95
	Building engineering/science	5	28.30
	Others	5	33.20
	Total	**49**	

Refer Tables 4.16 and 4.17 below, the analysis shown that there was a statistically significant difference in Planning and controlling (CSF02) factor between the different exposures to Formal project management, $\chi^2(2) = 5.421$, $\rho = 0.020$ (< 0.05), with a mean rank CSF02 of 28.59 for respondents who have exposure to formal project management and 20.21 for those without.

Table 4.16: Difference between Planning and Controlling and Formal Project Management Exposure

	CSF02
Chi-Square	5.421
df	1
Asymp. Sig.	.020

a. Kruskal Wallis Test

b. Grouping Variable: Formal Project Management Exposure

Table 4.17: Mean Rank of Planning and Controlling and Formal Project Management Exposure

Formal Project Management Exposure		N	Mean Rank
CSF02	Yes	28	28.59
	No	21	20.21
	Total	49	

However, there were no statistically significant difference between critical success factors toward other profiles, organization groups, work experiences or typical project value. A complete SPSS output for the Kruskal-Wallis H test is shown in **Appendix F**.

4.8 Findings of Research

To summarize the research findings on respondents' demographic profiles in the study, there are more than half of the respondents (51%) were from the group of contractors. Interior design contractors are being the majority (26.5%). The majority (67.4%) project value is within the mid-range from

RM100,001 to RM1,000,000. This can conclude that the companies conducted in the survey are majority of medium size contracting organizations.

In terms of respondents' education background, almost half (42.8%) being from interior design and architectural background. For work experiences wise, most respondents were from the two groups with less or equal five years (30.6%) and six to 10 years (30.6%) which represented a total of 61.2%. More than half (57.1%) of the respondents revealed that they have been exposed to formal project management. This is a good sign that the importance of project management is getting recognized in the local project environment. Based on education background, work experience and exposure to project management, it is reasonable infer that they have reasonable knowledge of the activities associated with renovation project performance.

It is not surprising to note that Quality and Client / customer satisfaction criteria were most widely used by respondents to determine the success of a renovation project. As renovation works are usually referred to the final finishing touch of a building. The works can be seen and feel closely with the users of the building. A shoddy workmanship will be rejected by client instantly.

The results of the survey indicate factors related to people were most critical for successful implementation in renovation projects. The critical success factor of Project leader's / manager's performance and Project team's competency in People factor group were ranked top and third respectively from

the total 15 individual factors. It demonstrates that human management is the main critical success factors above all others to ensure project success.

Project leader's / manager's performance, Planning and controlling, Available of resources and Project size and value were found to be most critical in their respective factor groups of People, Process, Organization and Project.

Out of the 15 factors, the top four critical success factors were Project leader's / manager's performance, Planning and controlling, Project team's competency and Available of resources. The remaining 11 factors are also classified as ‘critical’ with Project uniqueness and complexity at the bottom.

The correlation analysis found that only Risk management, and Monitoring and feedback factors have a significant relationship with Time / schedule criteria. This means that when the time is used to measure project success, then risk management, and process of monitoring and feedback practising by team members become critical.

Kruskal-Wallis H test explained that respondents with different education background are having different opinions on Top management support factor. Similarly, the different exposure to formal project management of respondents will have different opinions on Planning and controlling factor.

CHAPTER 5.0

CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

This is the final chapter draws the conclusions of the entire research. It provides an evaluation of the objective achievements. Limitations of the research and recommendations to improve future research on similar topics are also included.

5.2 Objective Achievements

The research is undertaken based on three objectives of study. The first objective (To identify critical success factors that contributing to the success of renovation projects) is achieved by evaluating the perception of industry practitioners into the success factors through a questionnaire. A total of 15 factors is adopted through carefully review of previous literature for this purpose. The result of hierarchical important of critical success factors that contributing to the success of renovation projects is obtained by frequency analysis on the factors individually and in groups. It reveals that factors related to people are most critical. The critical success factor of Project leader's / manager's performance and Project team's competency in People factor group

were ranked top and third respectively from the total 15 individual factors. It demonstrates that human management is the main critical success factors above all others to ensure project success.

For second research objective (To examine the relationship between critical success factors (CSFs) and project success criteria) is achieved through correlation analysis. Through the same literature review process, five project success criteria are identified and to be tested against critical success factors. The result shows that Risk management, and Monitoring and feedback factors have a significant relationship with Time / schedule criteria.

The third research objective (To examine the difference between critical success factors and respondents' demographic profiles) is achieved through Kruskal-Wallis H test. The result reveals that respondents with different education background and exposure to formal project management are having different opinions toward Top management support and, Planning and controlling factors respectively.

In conclusions, the research has produced detailed analyses of critical success factors in order to unveil empirical findings with regards to Malaysia renovation industry. It tend to offers an insight strategies and guidelines with regards to critical success factors that contribute to the success of renovation projects.The findings of the research demonstrate similarity with previous studies (Belassi and Tukel, 1996; Scott-Young and Samson, 2004) where people or project manager-related factors are found to be critical to project performance.

5.3 Research Implications

The establishment of precise critical success factors for meeting company's mission and vision is vital for the management to meet company's objectives (Chan et al., 2002). Future success, expansion and growth of an organization are significant influenced by the standard of measurements implement to evaluate company's performance. Failure to distinguish and implement proper elements of success factors can lead to catastrophe effects.

With the increase market competition nowadays, renovation industry is facing the threat of losing profits and failure completing project within stipulate time period. Since there is no specific study of critical success factors for renovation projects before, the empirical findings of the research could offer an insight to the industry practitioners of renovation for future strategies and guidelines.

The research will also beneficial to project stakeholders in the renovation industry as a whole to understand the hierarchy of important of critical success factors that contributing project success in renovation projects. Apart from that, it is useful as a reference to the future researchers who pursuing the similar topic.

5.4 Limitations of Research

Time constraint is one of the primary limitations of research. With professional occupation in place, the researcher left a short period of time to conducts studies as the study need to be completed within stipulate time period. This forces the researcher to conduct study on limited scopes specifically to attain research objectives. Nevertheless, the amount of resources synthesized and analyzed for this study is considered as sufficient since it involve every scope of study. However, availability of time can help the researcher to conduct thorough evaluation based on various studies.

Due to time and resource constraints, the study has to confine in Klang Valley. It is unable to cover more geographical location throughout Malaysia, Sample size of 49 is rather small for the research. The findings may not accurately represent the entire population of the renovation industry in Malaysia due to limited number of responses. For this particular study, only respondents from professional background who have identified problems during the course of their work in handling renovation projects are invited. This may be one of the reasons affecting the sample size.

5.5 Recommendations for Future Research

In future research, further work is needed to explore in more detail and to understand how the factors interact with each other in renovation projects. A

case study approach is to be recommended for a similar research topic. It can be used to support arguments by an in-depth analysis of a person, a group of persons, an organization or a particular project. As the nature of the case study, the conclusion drawn will not be generalised but rather be more relevant to the renovation industry environment.

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APPENDICES

Appendix A

Questionnaire

Appendix B

SPSS Output (Frequency Analysis)

for Respondents' Demographic Profiles

Q1. Which group below represents your organization (and organization groups)?

Frequencies

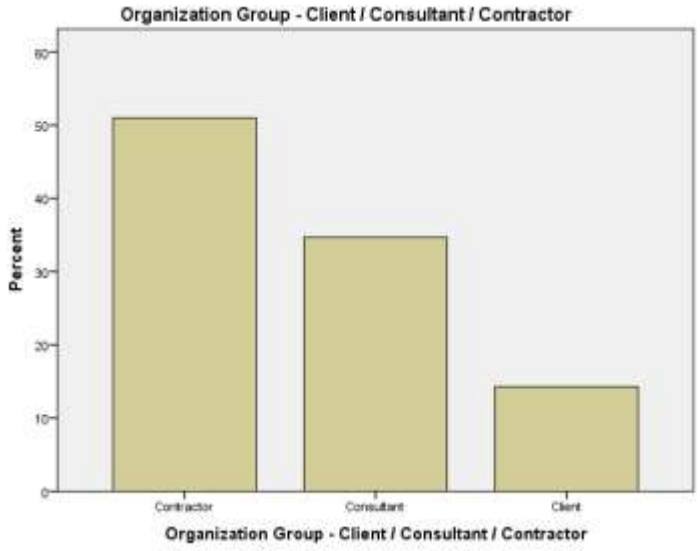
Statistics

Organization Group - Client / Consultant / Contractor

N	Valid	49
	Missing	0
Mode		2

Organization Group - Client / Consultant / Contractor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Contractor	25	51.0	51.0	51.0
	Consultant	17	34.7	34.7	85.7
	Client	7	14.3	14.3	100.0
	Total	49	100.0	100.0	



Frequencies

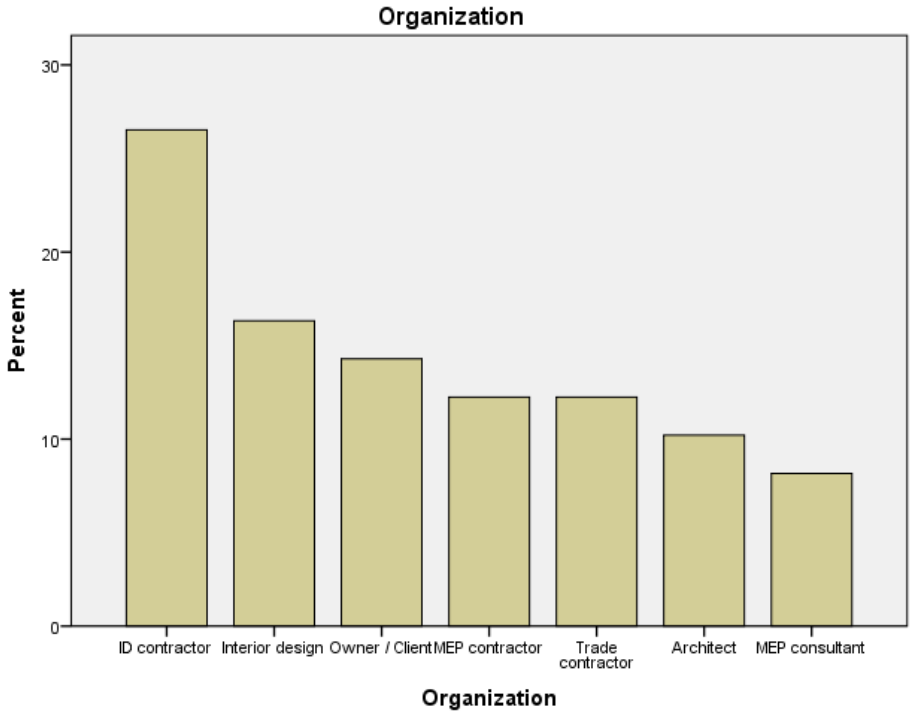
Statistics

Organization

N	Valid	49
	Missing	0
Mode		2

Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ID contractor	13	26.5	26.5	26.5
	Interior design	8	16.3	16.3	42.9
	Owner / Client	7	14.3	14.3	57.1
	MEP contractor	6	12.2	12.2	69.4
	Trade contractor	6	12.2	12.2	81.6
	Architect	5	10.2	10.2	91.8
	MEP consultant	4	8.2	8.2	100.0
	Total	49	100.0	100.0	



Q2. What is your education background?

Frequencies

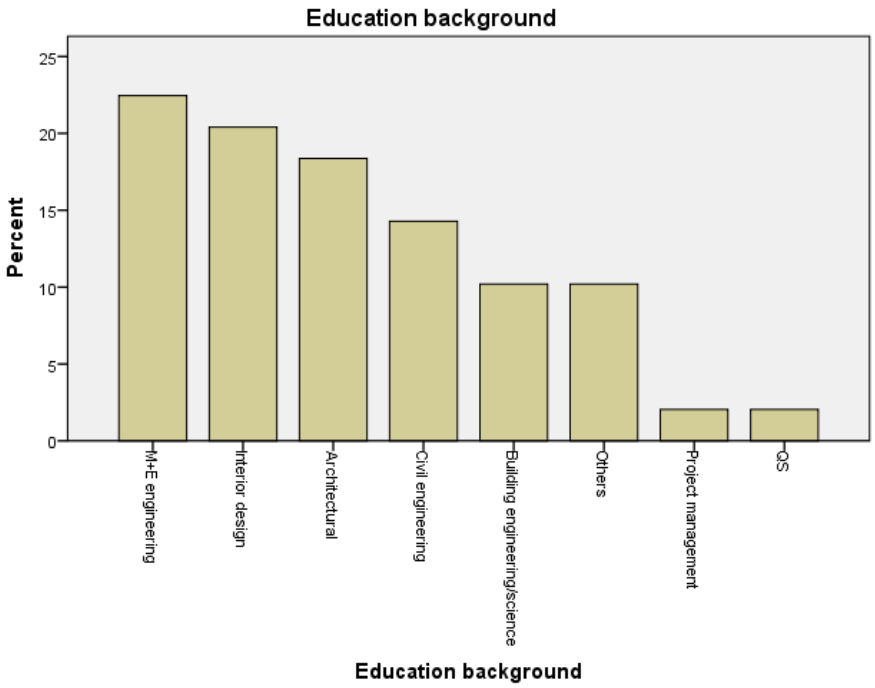
Statistics

Education background

N	Valid	49
	Missing	0
Mode		3

Education background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	M+E engineering	11	22.4	22.4	22.4
	Interior design	10	20.4	20.4	42.9
	Architectural	9	18.4	18.4	61.2
	Civil engineering	7	14.3	14.3	75.5
	Building engineering/science	5	10.2	10.2	85.7
	Others	5	10.2	10.2	95.9
	Project management	1	2.0	2.0	98.0
	QS	1	2.0	2.0	100.0
	Total	49	100.0	100.0	



Q3. How long have you been involved in renovation projects?

Frequencies

Statistics

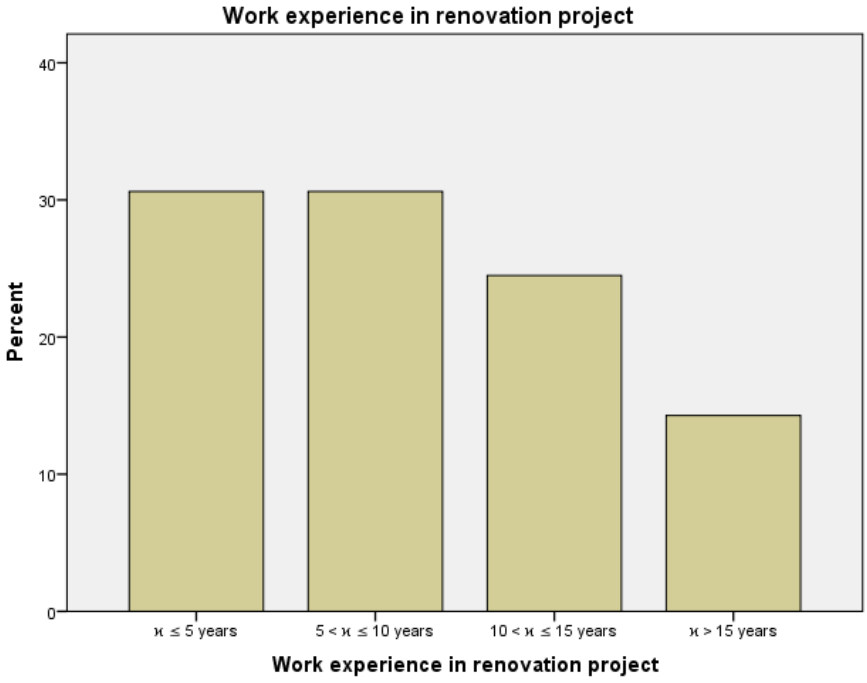
Work experience in renovation project

N	Valid	49
	Missing	0
Mode		1[a]

a. Multiple modes exist. The smallest value is shown

Work experience in renovation project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ɤ ≤ 5 years	15	30.6	30.6	30.6
	5 < ɤ ≤ 10 years	15	30.6	30.6	61.2
	10 < ɤ ≤ 15 years	12	24.5	24.5	85.7
	ɤ > 15 years	7	14.3	14.3	100.0
	Total	49	100.0	100.0	



Q4. What is the average value for your typical renovation projects?

Frequencies

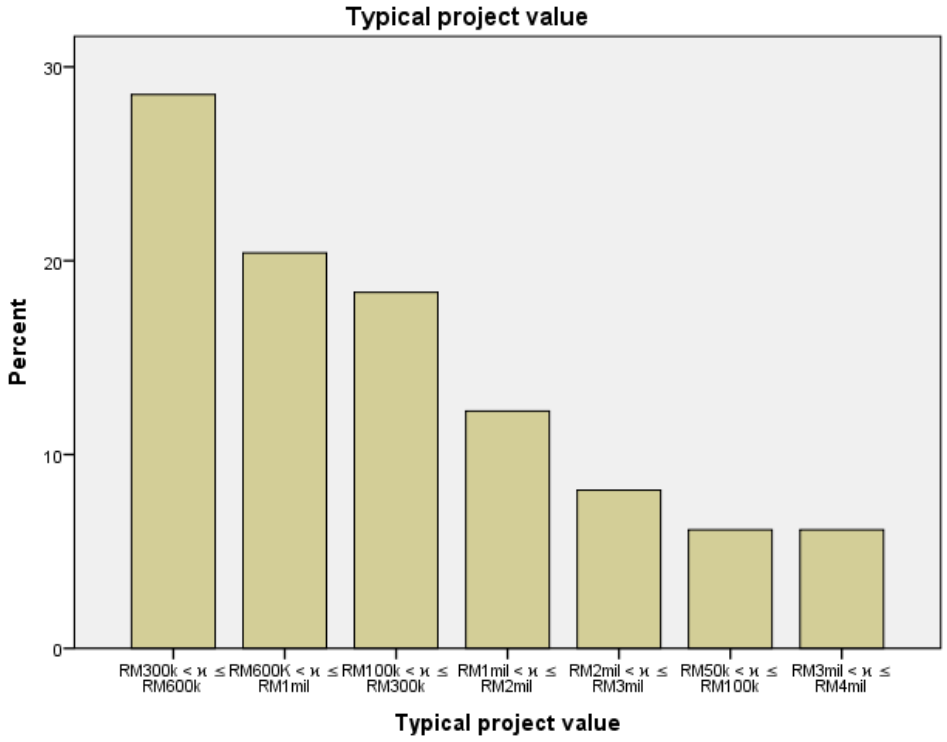
Statistics

Typical project value

N	Valid	49
	Missing	0
Mode		4

Typical project value

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RM300k < ж ≤ RM600k	14	28.6	28.6	28.6
	RM600K < ж ≤ RM1mil	10	20.4	20.4	49.0
	RM100k < ж ≤ RM300k	9	18.4	18.4	67.3
	RM1mil < ж ≤ RM2mil	6	12.2	12.2	79.6
	RM2mil < ж ≤ RM3mil	4	8.2	8.2	87.8
	RM50k < ж ≤ RM100k	3	6.1	6.1	93.9
	RM3mil < ж ≤ RM4mil	3	6.1	6.1	100.0
	Total	49	100.0	100.0	



Q5. Have you been exposed to formal project management?

Frequencies

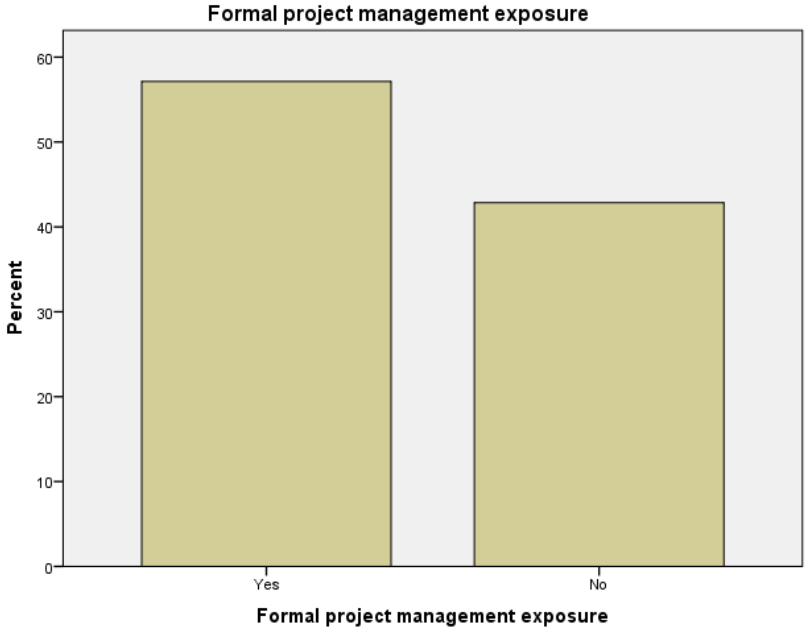
Statistics

Formal project management exposure

N	Valid	49
	Missing	0
Mode		1

Formal project management exposure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	57.1	57.1	57.1
	No	21	42.9	42.9	100.0
	Total	49	100.0	100.0	



Appendix C

SPSS Output (Frequency Analysis) for Project Success Criteria

Q6. Listed below are project success criteria (PSC) that associate to the success of renovation projects. Kindly indicate your most appropriate answer by rating the scale from 1 to 5.

Descriptives

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
PSC03	49	2	3	5	4.22	.743
PSC04	49	2	3	5	4.08	.672
PSC01	49	2	3	5	4.02	.692
PSC02	49	2	3	5	4.00	.677
PSC05	49	2	3	5	3.90	.714
Valid N (listwise)	49					

Frequency Table

PSC01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	11	22.4	22.4	22.4
	Agree	26	53.1	53.1	75.5
	Strongly Agree	12	24.5	24.5	100.0
	Total	49	100.0	100.0	

PSC02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	11	22.4	22.4	22.4
	Agree	27	55.1	55.1	77.6
	Strongly Agree	11	22.4	22.4	100.0
	Total	49	100.0	100.0	

PSC03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	9	18.4	18.4	18.4
	Agree	20	40.8	40.8	59.2
	Strongly Agree	20	40.8	40.8	100.0
	Total	49	100.0	100.0	

PSC04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	9	18.4	18.4	18.4
	Agree	27	55.1	55.1	73.5
	Strongly Agree	13	26.5	26.5	100.0
	Total	49	100.0	100.0	

PSC05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	15	30.6	30.6	30.6
	Agree	24	49.0	49.0	79.6
	Strongly Agree	10	20.4	20.4	100.0
	Total	49	100.0	100.0	

Appendix D

SPSS Output (Frequency Analysis) for Critical Success Factors

Q7. Listed below are critical success factors (CSFs) that associate to the success of renovation projects. Kindly indicate your most appropriate answer by rating the scale from 1 to 5.

Descriptives

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
CSF04	49	2	3	5	4.47	.649
CSF02	49	2	3	5	4.43	.540
CSF09	49	2	3	5	4.35	.597
CSF07	49	2	3	5	4.35	.522
CSF14	49	2	3	5	4.33	.555
CSF11	49	2	3	5	4.33	.591
CSF10	49	2	3	5	4.33	.591
CSF06	49	2	3	5	4.27	.670
CSF15	49	1	4	5	4.27	.446
CSF08	49	2	3	5	4.27	.638
CSF03	49	2	3	5	4.24	.630
CSF13	49	2	3	5	4.22	.550
CSF01	49	2	3	5	4.22	.654
CSF05	49	2	3	5	4.20	.645
CSF12	49	2	3	5	4.10	.549
Valid N (listwise)	49					

Frequency Table

CSF01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	12.2	12.2	12.2
	Agree	26	53.1	53.1	65.3
	Strongly Agree	17	34.7	34.7	100.0
	Total	49	100.0	100.0	

CSF02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	2.0	2.0	2.0
	Agree	26	53.1	53.1	55.1
	Strongly Agree	22	44.9	44.9	100.0
	Total	49	100.0	100.0	

CSF03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	10.2	10.2	10.2
	Agree	27	55.1	55.1	65.3
	Strongly Agree	17	34.7	34.7	100.0
	Total	49	100.0	100.0	

CSF04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	4	8.2	8.2	8.2
	Agree	18	36.7	36.7	44.9
	Strongly Agree	27	55.1	55.1	100.0
	Total	49	100.0	100.0	

CSF05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	12.2	12.2	12.2
	Agree	27	55.1	55.1	67.3
	Strongly Agree	16	32.7	32.7	100.0
	Total	49	100.0	100.0	

CSF06

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	12.2	12.2	12.2
	Agree	24	49.0	49.0	61.2
	Strongly Agree	19	38.8	38.8	100.0
	Total	49	100.0	100.0	

CSF07

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	2.0	2.0	2.0
	Agree	30	61.2	61.2	63.3
	Strongly Agree	18	36.7	36.7	100.0
	Total	49	100.0	100.0	

CSF08

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	10.2	10.2	10.2
	Agree	26	53.1	53.1	63.3
	Strongly Agree	18	36.7	36.7	100.0
	Total	49	100.0	100.0	

CSF09

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	3	6.1	6.1	6.1
	Agree	26	53.1	53.1	59.2
	Strongly Agree	20	40.8	40.8	100.0
	Total	49	100.0	100.0	

CSF10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	3	6.1	6.1	6.1
	Agree	27	55.1	55.1	61.2
	Strongly Agree	19	38.8	38.8	100.0
	Total	49	100.0	100.0	

CSF11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	3	6.1	6.1	6.1
	Agree	27	55.1	55.1	61.2
	Strongly Agree	19	38.8	38.8	100.0
	Total	49	100.0	100.0	

CSF12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	10.2	10.2	10.2
	Agree	34	69.4	69.4	79.6
	Strongly Agree	10	20.4	20.4	100.0
	Total	49	100.0	100.0	

CSF13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	3	6.1	6.1	6.1
	Agree	32	65.3	65.3	71.4
	Strongly Agree	14	28.6	28.6	100.0
	Total	49	100.0	100.0	

CSF14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	4.1	4.1	4.1
	Agree	29	59.2	59.2	63.3
	Strongly Agree	18	36.7	36.7	100.0
	Total	49	100.0	100.0	

CSF15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	36	73.5	73.5	73.5
	Strongly Agree	13	26.5	26.5	100.0
	Total	49	100.0	100.0	

Appendix E

SPSS Output for Spearman's Rank-Order Correlation Analysis

2nd Research Question: Is there a significant relationship between critical success factors (CSFs) and project success criteria (PSC)?

Nonparametric Correlations

Correlations

			CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Spearman's rho	PSC 01	Correlation Coefficient	.267	-.225	-.261	.108	.001	.183	.018
		Sig. (2-tailed)	.063	.120	.070	.458	.995	.207	.901
		N	49	49	49	49	49	49	49
	PSC 02	Correlation Coefficient	.090	.033	.092	.163	.028	-.015	.000
		Sig. (2-tailed)	.539	.820	.529	.263	.850	.916	1.000
		N	49	49	49	49	49	49	49
	PSC 03	Correlation Coefficient	-.030	-.189	-.122	.124	-.026	.113	-.042
		Sig. (2-tailed)	.837	.194	.405	.395	.857	.439	.775
		N	49	49	49	49	49	49	49
	PSC 04	Correlation Coefficient	.018	-.134	-.210	.162	-.049	-.019	.009
		Sig. (2-tailed)	.903	.360	.148	.268	.739	.899	.949
		N	49	49	49	49	49	49	49
	PSC 05	Correlation Coefficient	.177	-.072	.154	.240	.279	-.121	-.193
		Sig. (2-tailed)	.223	.625	.291	.097	.052	.409	.183
		N	49	49	49	49	49	49	49

			CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Spearman's rho	PSC 01	Correlation Coefficient	.090	-.184	-.183	-.185	-.060	.043	.211	-.086
		Sig. (2-tailed)	.541	.207	.208	.204	.684	.772	.146	.555
		N	49	49	49	49	49	49	49	49
	PSC 02	Correlation Coefficient	-.016	-.056	-.132	.130	.110	.342*	.450**	.000
		Sig. (2-tailed)	.915	.702	.365	.374	.451	.016	.001	1.000
		N	49	49	49	49	49	49	49	49
	PSC 03	Correlation Coefficient	.118	-.227	-.113	.055	.188	.032	-.145	.191
		Sig. (2-tailed)	.419	.117	.439	.706	.196	.826	.319	.190
		N	49	49	49	49	49	49	49	49
	PSC 04	Correlation Coefficient	.079	-.199	-.129	-.022	.140	-.009	.146	.065
		Sig. (2-tailed)	.589	.170	.378	.881	.339	.950	.316	.655
		N	49	49	49	49	49	49	49	49
	PSC 05	Correlation Coefficient	.129	.033	-.206	.099	.233	.236	.216	-.171
		Sig. (2-tailed)	.378	.823	.156	.497	.106	.103	.136	.241
		N	49	49	49	49	49	49	49	49

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

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix F

SPSS Output for Kruskal-Wallis H Test Analysis

3rd Research Question: Is there a significant difference between critical success factors and respondents' demographic profiles?

Organization Groups

Kruskal-Wallis Test

Ranks

	Organization Groups - Client / Consultant / Contractor	N	Mean Rank
CSF01	Client	7	20.29
	Contractor	25	25.32
	Consultant	17	26.47
	Total	49	
CSF02	Client	7	28.21
	Contractor	25	24.10
	Consultant	17	25.00
	Total	49	
CSF03	Client	7	25.29
	Contractor	25	27.40
	Consultant	17	21.35
	Total	49	
CSF04	Client	7	23.14
	Contractor	25	26.56
	Consultant	17	23.47
	Total	49	
CSF05	Client	7	23.79
	Contractor	25	27.28
	Consultant	17	22.15
	Total	49	

CSF06	Client	7	21.57
	Contractor	25	26.16
	Consultant	17	24.71
	Total	49	
CSF07	Client	7	23.36
	Contractor	25	27.40
	Consultant	17	22.15
	Total	49	
CSF08	Client	7	22.57
	Contractor	25	23.42
	Consultant	17	28.32
	Total	49	
CSF09	Client	7	27.57
	Contractor	25	24.78
	Consultant	17	24.26
	Total	49	
CSF10	Client	7	23.57
	Contractor	25	25.28
	Consultant	17	25.18
	Total	49	
CSF11	Client	7	33.43
	Contractor	25	23.76
	Consultant	17	23.35
	Total	49	
CSF12	Client	7	26.00
	Contractor	25	27.10
	Consultant	17	21.50
	Total	49	
CSF13	Client	7	29.36
	Contractor	25	25.24
	Consultant	17	22.85
	Total	49	
CSF14	Client	7	27.07
	Contractor	25	26.40
	Consultant	17	22.09
	Total	49	
CSF15	Client	7	29.00
	Contractor	25	27.32
	Consultant	17	19.94
	Total	49	

Test Statistics[a,b]

	CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Chi-Square	1.182	.596	2.298	.780	1.714	.699	2.046
df	2	2	2	2	2	2	2
Asymp. Sig.	.554	.742	.317	.677	.424	.705	.360

	CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Chi-Square	1.784	.355	.106	3.680	2.428	1.492	1.470	5.707
df	2	2	2	2	2	2	2	2
Asymp. Sig.	.410	.837	.948	.159	.297	.474	.479	.058

a. Kruskal Wallis Test

b. Grouping Variable: Organization Group - Client / Consultant / Contractor

Education Background

Kruskal-Wallis Test

Ranks

	Education background	N	Mean Rank
CSF01	Project management	1	3.50
	Civil engineering	7	26.43
	M+E engineering	11	20.50
	QS	1	19.50
	Architectural	9	27.28
	Interior design	10	30.25
	Building engineering/science	5	23.80
	Others	5	24.90
	Total	49	
CSF02	Project management	1	38.50
	Civil engineering	7	24.79
	M+E engineering	11	21.05
	QS	1	14.50
	Architectural	9	23.67
	Interior design	10	26.50
	Building engineering/science	5	28.90
	Others	5	28.90
	Total	49	
CSF03	Project management	1	41.00
	Civil engineering	7	25.29
	M+E engineering	11	22.09
	QS	1	19.00
	Architectural	9	24.56
	Interior design	10	21.80
	Building engineering/science	5	32.20
	Others	5	29.00
	Total	49	
CSF04	Project management	1	36.00
	Civil engineering	7	26.36
	M+E engineering	11	26.82
	QS	1	2.50
	Architectural	9	21.06
	Interior design	10	29.25

	Building engineering/science	5	22.50
	Others	5	22.50
	Total	49	
CSF05	Project management	1	20.00
	Civil engineering	7	26.14
	M+E engineering	11	28.27
	QS	1	3.50
	Architectural	9	19.28
	Interior design	10	28.60
	Building engineering/science	5	28.60
	Others	5	21.00
	Total	49	
CSF06	Project management	1	18.50
	Civil engineering	7	30.79
	M+E engineering	11	21.64
	QS	1	40.00
	Architectural	9	22.33
	Interior design	10	27.10
	Building engineering/science	5	28.40
	Others	5	19.80
	Total	49	
CSF07	Project management	1	40.50
	Civil engineering	7	33.64
	M+E engineering	11	19.45
	QS	1	16.50
	Architectural	9	24.50
	Interior design	10	23.70
	Building engineering/science	5	21.30
	Others	5	30.90
	Total	49	
CSF08	Project management	1	40.50
	Civil engineering	7	27.93
	M+E engineering	11	27.09
	QS	1	3.00
	Architectural	9	21.67
	Interior design	10	31.70
	Building engineering/science	5	19.80
	Others	5	15.40
	Total	49	
CSF09	Project management	1	39.50
	Civil engineering	7	19.79

	M+E engineering	11	24.86
	QS	1	16.50
	Architectural	9	24.44
	Interior design	10	28.00
	Building engineering/science	5	21.10
	Others	5	30.30
	Total	49	
CSF10	Project management	1	17.00
	Civil engineering	7	23.57
	M+E engineering	11	21.18
	QS	1	17.00
	Architectural	9	23.89
	Interior design	10	33.90
	Building engineering/science	5	21.60
	Others	5	26.20
	Total	49	
CSF11	Project management	1	40.00
	Civil engineering	7	23.57
	M+E engineering	11	21.91
	QS	1	17.00
	Architectural	9	29.00
	Interior design	10	21.60
	Building engineering/science	5	30.80
	Others	5	26.20
	Total	49	
CSF12	Project management	1	22.50
	Civil engineering	7	31.93
	M+E engineering	11	26.95
	QS	1	3.00
	Architectural	9	20.33
	Interior design	10	26.90
	Building engineering/science	5	26.90
	Others	5	18.60
	Total	49	
CSF13	Project management	1	19.50
	Civil engineering	7	29.36
	M+E engineering	11	26.27
	QS	1	19.50
	Architectural	9	20.72
	Interior design	10	24.10
	Building engineering/science	5	28.70

	Others	5	24.10
	Total	49	
CSF14	Project management	1	17.00
	Civil engineering	7	33.79
	M+E engineering	11	23.41
	QS	1	17.00
	Architectural	9	21.39
	Interior design	10	24.05
	Building engineering/science	5	26.40
	Others	5	26.40
	Total	49	
CSF15	Project management	1	18.50
	Civil engineering	7	36.00
	M+E engineering	11	20.73
	QS	1	18.50
	Architectural	9	21.22
	Interior design	10	20.95
	Building engineering/science	5	28.30
	Others	5	33.20
	Total	49	

Test Statistics[a,b]

	CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Chi-Square	6.425	4.222	5.139	6.629	7.278	5.520	9.747
df	7	7	7	7	7	7	7
Asymp. Sig.	.491	.754	.643	.468	.401	.597	.203

	CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Chi-Square	12.101	4.895	7.405	5.334	9.870	3.202	5.549	15.200
df	7	7	7	7	7	7	7	7
Asymp. Sig.	.097	.673	.388	.619	.196	.866	.593	.034

a. Kruskal Wallis Test

b. Grouping Variable: Education background

Work Experiences

Kruskal-Wallis Test

Ranks

	Work experience in construction industry	N	Mean Rank
CSF01	ɤ ≤ 5 years	8	25.56
	5 < ɤ ≤ 10 years	13	29.42
	10 < ɤ ≤ 15 years	17	21.74
	ɤ > 15 years	11	24.41
	Total	49	
CSF02	ɤ ≤ 5 years	8	24.81
	5 < ɤ ≤ 10 years	13	27.42
	10 < ɤ ≤ 15 years	17	24.38
	ɤ > 15 years	11	23.23
	Total	49	
CSF03	ɤ ≤ 5 years	8	26.00
	5 < ɤ ≤ 10 years	13	25.77
	10 < ɤ ≤ 15 years	17	22.29
	ɤ > 15 years	11	27.55
	Total	49	
CSF04	ɤ ≤ 5 years	8	24.81
	5 < ɤ ≤ 10 years	13	23.04
	10 < ɤ ≤ 15 years	17	20.79
	ɤ > 15 years	11	33.95
	Total	49	
CSF05	ɤ ≤ 5 years	8	24.56
	5 < ɤ ≤ 10 years	13	24.08
	10 < ɤ ≤ 15 years	17	26.62
	ɤ > 15 years	11	23.91
	Total	49	
CSF06	ɤ ≤ 5 years	8	27.38
	5 < ɤ ≤ 10 years	13	22.31
	10 < ɤ ≤ 15 years	17	23.44
	ɤ > 15 years	11	28.86
	Total	49	
CSF07	ɤ ≤ 5 years	8	22.50
	5 < ɤ ≤ 10 years	13	22.69
	10 < ɤ ≤ 15 years	17	27.79

	ɤ > 15 years	11	25.23
	Total	49	
CSF08	ɤ ≤ 5 years	8	20.13
	5 < ɤ ≤ 10 years	13	25.27
	10 < ɤ ≤ 15 years	17	25.74
	ɤ > 15 years	11	27.09
	Total	49	
CSF09	ɤ ≤ 5 years	8	30.88
	5 < ɤ ≤ 10 years	13	25.54
	10 < ɤ ≤ 15 years	17	20.56
	ɤ > 15 years	11	26.95
	Total	49	
CSF10	ɤ ≤ 5 years	8	25.63
	5 < ɤ ≤ 10 years	13	28.85
	10 < ɤ ≤ 15 years	17	24.24
	ɤ > 15 years	11	21.18
	Total	49	
CSF11	ɤ ≤ 5 years	8	28.50
	5 < ɤ ≤ 10 years	13	23.54
	10 < ɤ ≤ 15 years	17	24.24
	ɤ > 15 years	11	25.36
	Total	49	
CSF12	ɤ ≤ 5 years	8	15.19
	5 < ɤ ≤ 10 years	13	25.88
	10 < ɤ ≤ 15 years	17	27.97
	ɤ > 15 years	11	26.50
	Total	49	
CSF13	ɤ ≤ 5 years	8	22.38
	5 < ɤ ≤ 10 years	13	25.65
	10 < ɤ ≤ 15 years	17	22.53
	ɤ > 15 years	11	29.95
	Total	49	
CSF14	ɤ ≤ 5 years	8	22.88
	5 < ɤ ≤ 10 years	13	25.46
	10 < ɤ ≤ 15 years	17	22.53
	ɤ > 15 years	11	29.82
	Total	49	
CSF15	ɤ ≤ 5 years	8	24.63
	5 < ɤ ≤ 10 years	13	24.15
	10 < ɤ ≤ 15 years	17	27.15

ɤ > 15 years	11	22.95
Total	49	

Test Statistics[a,b]

	CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Chi-Square	2.681	.758	1.311	7.714	.432	2.053	1.715
df	3	3	3	3	3	3	3
Asymp. Sig.	.443	.860	.727	.052	.934	.561	.634

	CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Chi-Square	1.520	4.113	2.313	.867	7.125	3.048	2.623	1.129
df	3	3	3	3	3	3	3	3
Asymp. Sig.	.678	.250	.510	.833	.068	.384	.454	.770

a. Kruskal Wallis Test

b. Grouping Variable: Work experience in construction industry

Typical Project Value

Kruskal-Wallis Test

Ranks

	Typical project value	N	Mean Rank
CSF01	RM50k < ж ≤ RM100k	3	26.67
	RM100k < ж ≤ RM300k	9	20.11
	RM300k < ж ≤ RM600k	14	23.75
	RM600K < ж ≤ RM1mil	10	24.35
	RM1mil < ж ≤ RM2mil	6	31.17
	RM2mil < ж ≤ RM3mil	4	24.88
	RM3mil < ж ≤ RM4mil	3	33.83
	Total	49	
CSF02	RM50k < ж ≤ RM100k	3	22.50
	RM100k < ж ≤ RM300k	9	23.67
	RM300k < ж ≤ RM600k	14	26.50
	RM600K < ж ≤ RM1mil	10	21.70
	RM1mil < ж ≤ RM2mil	6	30.50
	RM2mil < ж ≤ RM3mil	4	26.50
	RM3mil < ж ≤ RM4mil	3	22.50
	Total	49	
CSF03	RM50k < ж ≤ RM100k	3	21.00
	RM100k < ж ≤ RM300k	9	24.56
	RM300k < ж ≤ RM600k	14	27.29
	RM600K < ж ≤ RM1mil	10	28.40
	RM1mil < ж ≤ RM2mil	6	19.00
	RM2mil < ж ≤ RM3mil	4	24.50
	RM3mil < ж ≤ RM4mil	3	21.00
	Total	49	
CSF04	RM50k < ж ≤ RM100k	3	36.00
	RM100k < ж ≤ RM300k	9	18.56
	RM300k < ж ≤ RM600k	14	24.79
	RM600K < ж ≤ RM1mil	10	24.75
	RM1mil < ж ≤ RM2mil	6	24.75
	RM2mil < ж ≤ RM3mil	4	30.38
	RM3mil < ж ≤ RM4mil	3	28.50
	Total	49	
CSF05	RM50k < ж ≤ RM100k	3	27.17

	RM100k < ɤ ≤ RM300k	9	25.89
	RM300k < ɤ ≤ RM600k	14	21.07
	RM600K < ɤ ≤ RM1mil	10	28.60
	RM1mil < ɤ ≤ RM2mil	6	20.83
	RM2mil < ɤ ≤ RM3mil	4	30.75
	RM3mil < ɤ ≤ RM4mil	3	27.17
	Total	49	
CSF06	RM50k < ɤ ≤ RM100k	3	25.67
	RM100k < ɤ ≤ RM300k	9	24.00
	RM300k < ɤ ≤ RM600k	14	21.43
	RM600K < ɤ ≤ RM1mil	10	23.45
	RM1mil < ɤ ≤ RM2mil	6	32.83
	RM2mil < ɤ ≤ RM3mil	4	25.50
	RM3mil < ɤ ≤ RM4mil	3	32.83
	Total	49	
CSF07	RM50k < ɤ ≤ RM100k	3	32.50
	RM100k < ɤ ≤ RM300k	9	21.83
	RM300k < ɤ ≤ RM600k	14	21.64
	RM600K < ɤ ≤ RM1mil	10	22.15
	RM1mil < ɤ ≤ RM2mil	6	36.50
	RM2mil < ɤ ≤ RM3mil	4	28.50
	RM3mil < ɤ ≤ RM4mil	3	24.50
	Total	49	
CSF08	RM50k < ɤ ≤ RM100k	3	18.50
	RM100k < ɤ ≤ RM300k	9	19.94
	RM300k < ɤ ≤ RM600k	14	25.71
	RM600K < ɤ ≤ RM1mil	10	23.55
	RM1mil < ɤ ≤ RM2mil	6	36.83
	RM2mil < ɤ ≤ RM3mil	4	24.00
	RM3mil < ɤ ≤ RM4mil	3	25.83
	Total	49	
CSF09	RM50k < ɤ ≤ RM100k	3	39.50
	RM100k < ɤ ≤ RM300k	9	26.72
	RM300k < ɤ ≤ RM600k	14	24.29
	RM600K < ɤ ≤ RM1mil	10	24.25
	RM1mil < ɤ ≤ RM2mil	6	24.17
	RM2mil < ɤ ≤ RM3mil	4	16.50
	RM3mil < ɤ ≤ RM4mil	3	24.17
	Total	49	
CSF10	RM50k < ɤ ≤ RM100k	3	17.00
	RM100k < ɤ ≤ RM300k	9	23.00

	RM300k < ɤ ≤ RM600k	14	24.71
	RM600K < ɤ ≤ RM1mil	10	23.90
	RM1mil < ɤ ≤ RM2mil	6	36.17
	RM2mil < ɤ ≤ RM3mil	4	22.75
	RM3mil < ɤ ≤ RM4mil	3	24.67
	Total	49	
CSF11	RM50k < ɤ ≤ RM100k	3	12.00
	RM100k < ɤ ≤ RM300k	9	34.89
	RM300k < ɤ ≤ RM600k	14	21.43
	RM600K < ɤ ≤ RM1mil	10	26.20
	RM1mil < ɤ ≤ RM2mil	6	20.83
	RM2mil < ɤ ≤ RM3mil	4	28.50
	RM3mil < ɤ ≤ RM4mil	3	24.67
	Total	49	
CSF12	RM50k < ɤ ≤ RM100k	3	29.83
	RM100k < ɤ ≤ RM300k	9	23.06
	RM300k < ɤ ≤ RM600k	14	22.86
	RM600K < ɤ ≤ RM1mil	10	27.15
	RM1mil < ɤ ≤ RM2mil	6	22.50
	RM2mil < ɤ ≤ RM3mil	4	33.50
	RM3mil < ɤ ≤ RM4mil	3	22.50
	Total	49	
CSF13	RM50k < ɤ ≤ RM100k	3	27.17
	RM100k < ɤ ≤ RM300k	9	24.61
	RM300k < ɤ ≤ RM600k	14	23.57
	RM600K < ɤ ≤ RM1mil	10	33.30
	RM1mil < ɤ ≤ RM2mil	6	19.50
	RM2mil < ɤ ≤ RM3mil	4	15.13
	RM3mil < ɤ ≤ RM4mil	3	27.17
	Total	49	
CSF14	RM50k < ɤ ≤ RM100k	3	24.83
	RM100k < ɤ ≤ RM300k	9	24.83
	RM300k < ɤ ≤ RM600k	14	23.18
	RM600K < ɤ ≤ RM1mil	10	24.05
	RM1mil < ɤ ≤ RM2mil	6	32.67
	RM2mil < ɤ ≤ RM3mil	4	17.00
	RM3mil < ɤ ≤ RM4mil	3	32.67
	Total	49	
CSF15	RM50k < ɤ ≤ RM100k	3	18.50
	RM100k < ɤ ≤ RM300k	9	26.67

RM300k < ɤ ≤ RM600k	14	23.75
RM600K < ɤ ≤ RM1mil	10	23.40
RM1mil < ɤ ≤ RM2mil	6	26.67
RM2mil < ɤ ≤ RM3mil	4	36.88
RM3mil < ɤ ≤ RM4mil	3	18.50
Total	49	

Test Statistics[a,b]

	CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Chi-Square	4.319	2.476	3.121	5.573	3.797	4.561	9.109
df	6	6	6	6	6	6	6
Asymp. Sig.	.634	.871	.794	.473	.704	.601	.168

	CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Chi-Square	7.535	6.042	6.387	10.963	4.176	9.250	5.540	7.591
df	6	6	6	6	6	6	6	6
Asymp. Sig.	.274	.419	.381	.090	.653	.160	.477	.270

a. Kruskal Wallis Test

b. Grouping Variable: Typical project value

Formal Project Management Exposure

Kruskal-Wallis Test

Ranks

	Formal project management exposure	N	Mean Rank
CSF01	Yes	28	24.13
	No	21	26.17
	Total	49	
CSF02	Yes	28	28.59
	No	21	20.21
	Total	49	
CSF03	Yes	28	23.57
	No	21	26.90
	Total	49	
CSF04	Yes	28	24.38
	No	21	25.83
	Total	49	
CSF05	Yes	28	23.02
	No	21	27.64
	Total	49	
CSF06	Yes	28	24.80
	No	21	25.26
	Total	49	
CSF07	Yes	28	25.38
	No	21	24.50
	Total	49	
CSF08	Yes	28	27.84
	No	21	21.21
	Total	49	
CSF09	Yes	28	24.80
	No	21	25.26
	Total	49	
CSF10	Yes	28	26.07
	No	21	23.57
	Total	49	
CSF11	Yes	28	25.79
	No	21	23.95
	Total	49	

CSF12	Yes	28	22.77
	No	21	27.98
	Total	49	
CSF13	Yes	28	22.36
	No	21	28.52
	Total	49	
CSF14	Yes	28	24.29
	No	21	25.95
	Total	49	
CSF15	Yes	28	26.38
	No	21	23.17
	Total	49	

Test Statistics[a,b]

	CSF01	CSF02	CSF03	CSF04	CSF05	CSF06	CSF07
Chi-Square	.303	5.421	.826	.160	1.579	.015	.062
df	1	1	1	1	1	1	1
Asymp. Sig.	.582	.020	.363	.689	.209	.902	.803

	CSF08	CSF09	CSF10	CSF11	CSF12	CSF13	CSF14	CSF15
Chi-Square	3.223	.016	.474	.255	2.428	3.201	.220	1.034
df	1	1	1	1	1	1	1	1
Asymp. Sig.	.073	.900	.491	.614	.119	.074	.639	.309

a. Kruskal Wallis Test

b. Grouping Variable: Formal project management exposure

APPENDICES

Appendix A

Questionnaire

THE CRITICAL SUCCESS FACTORS FOR RENOVATION PROJECTS

Dear Sir / Madam,

DISSERTATION - MSc PROJECT MANAGEMENT

I am a final year part-time student currently undertaking Master of Science in Project Management at Universiti Tunku Abdul Rahman (UTAR). In partial fulfilment of the programme, I am required to research a topic area and produce a dissertation. My research title is 'The Critical Success Factors for Renovation Projects'. The objective for the research is primarily evaluating perception of industry practitioners into the critical success factors that contributing to the success of renovation projects.

Based on the objective above, 3 research questions are formed as follows:

1. What are the critical success factors (CSFs) contributing to the success of renovation projects?

2. Is there a significant relationship between critical success factors (CSFs) and project success criteria (PSC)?

3. Is there a significant difference between critical success factors (CSFs) and respondents' demographic profiles?

Please answer truthfully the following questionnaire which consisting of 2 sections. It is very important for the renovation industry to learn your views and experiences. Your responses will be strictly confidential.

Thank you.

Yours faithfully,

Foong Swee Peng

*Required

Section 1 : Demographic Profiles

Q1. Which group below represents your organization? *

Mark only one oval.

- ◯ Owner / Client
- ◯ ID contractor
- ◯ MEP contractor
- ◯ Interior design
- ◯ MEP consultant
- ◯ Architect
- ◯ Other:

Q2. What is your education background? *

Mark only one oval.

- ◯ Project management
- ◯ Civil engineering
- ◯ M+E engineering
- ◯ Quantity survey
- ◯ Architectural
- ◯ Interior design
- ◯ Building engineering / science
- ◯ Other:

Q3. How long have you been involved in renovation projects? *

Mark only one oval.

- ◯ $x \leq 5$ years
- ◯ $5 < x \leq 10$ years
- ◯ $10 < x \leq 15$ years
- ◯ $x > 15$ years

Q4. What is the average value for your typical renovation projects? *

Mark only one oval.

- ◯ $x \leq$ RM50k
- ◯ RM50k < $x \leq$ RM100k
- ◯ RM100k < $x \leq$ RM300k
- ◯ RM300k < $x \leq$ RM600k
- ◯ RM600k < $x \leq$ RM1mil
- ◯ RM1mil < $x \leq$ RM2mil
- ◯ RM2mil < $x \leq$ RM3mil
- ◯ RM3mil < $x \leq$ RM4mil
- ◯ RM4mil < $x \leq$ RM5mil
- ◯ $x >$ RM5mil

Q5. Have you been exposed to formal project management? *

Mark only one oval.

- ◯ Yes
- ◯ No

Section 2 : Project Success Criteria & Critical Success Factors

Generally, the factors that contribute to the success of projects are known as success factors. The success on projects is judged by success criteria.

Q6. Following project success criteria (PSC) are used to measure the success of renovation projects.

Kindly indicate your most approriate answer by rating the scale from 1 to 5 (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree).

(i). PSC01 - Cost / Budget *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(ii). PSC02 - Time / Schedule *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(iii). PSC03 - Quality *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(iv). PSC04 - Client / Customer satisfaction *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(v). PSC05 - Organization's strategic goals *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Q7. Following critical success factors (CSFs) are associated to the success of renovation projects.

Kindly indicate your most approriate answer by rating the scale from 1 to 5 (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree).

(i). CSF01 - Realistic cost and time estimation *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(ii). CSF02 - Planning and controlling *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(iii). CSF03 - Effectiveness of communication *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(iv). CSF04 - Project leader's / manager's performance *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(v). CSF05 - Clear project objectives *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(vi). CSF06 - Project size and value *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(vii). CSF07 - Available of resources *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(viii). CSF08 - Quality management *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(ix). CSF09 - Project team's competency *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(x). CSF10 - Goal commitment *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(xi). CSF11 - Scheduling *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(xii). CSF12 - Project uniqueness and complexity *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(xiii). CSF13 - Risk Management *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(xiv). CSF14 - Monitoring and feedback *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

(xv). CSF15 - Top management support *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Thank you very much for your valuable time and support.