

**THE EFFECTS OF PROJECT MANAGER'S SOFT SKILLS ON SUCCESS
OF THE PROJECT IN THE MALAYSIAN CONSTRUCTION INDUSTRY**

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**A project report submitted in partial fulfilment of the
requirements for the award of Master of Project Management**

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April 2023

DECLARATION

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

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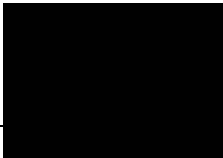
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APPROVAL FOR SUBMISSION

I certify that this project report entitled “**THE EFFECTS OF PROJECT MANAGER’S SOFT SKILLS ON SUCCESS OF PROJECT IN THE MALAYSIAN CONSTRUCTION INDUSTRY**” was prepared by **WEN BAO JUN** 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.

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ABSTRACT

THE EFFECTS OF PROJECT MANAGER'S SOFT SKILLS ON SUCCESS OF THE PROJECT IN THE MALAYSIAN CONSTRUCTION INDUSTRY

This study is aimed to explore the effectiveness of soft skills (SK) in the Malaysia construction industry (CI) and the objectives of this study are threefold. The first is to identify the scope of soft skills required in the Malaysian construction industry, the second is to examine the awareness of soft skills among Malaysian construction industry practitioners and to investigate the impact of soft skills on project managers in contributing to project success, and the third is to assess the most effective methods of acquiring and improving soft skills. To obtain accurate findings, Specific 200 questionnaires were distributed to project managers in the Malaysian construction industry practitioners within Kuala Lumpur, Klang, Johor Bahru regions, and the data collected was analysed through Statistical Package for Social Science (SPSS) analysis software. Cronbach's Alpha reliability test was used for examining the internal consistency and the mean was used for assessing the effectiveness of the SK. The findings show that effective communication, teamwork, and trust building were identified as the most significant soft skills; The three most effective soft skills are effective communication, resolving conflict and crisis, and personal attitude. The most effective methods of acquiring and improving soft skills are self-development, peer development, and coaching and Mentoring. These findings identifying the most effective soft skills and ways to acquire and improve them will contribute to the construction practitioners improving SK level and project performance, thereby reducing the risk of project failure due to cost and time overruns. As well as the study enriches the Malaysian soft skills system and will be useful for future investigations.

TABLE OF CONTENTS

DECLARATION	i
APPROVAL FOR SUBMISSION	ii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF SYMBOLS / ABBREVIATIONS	xi
LIST OF APPENDICES	xii
CHAPTER 1	1
INTRODUCTION	1
1.1 Background	1
1.2 Problem statement	2
1.3 Research Aim	4
1.4 Research Objectives	4
1.5 Research Questions	4
1.6 Research Hypothesis	5
1.7 Research Scope	5
1.8 Significance of the Research	5
1.9 Structure of the research	6
CHAPTER 2	7
LITERATURE REVIEW	7
2.1 Overview	7
2.2 Project success and failure	7
2.2.1 Project success	7
2.2.2 The definition of the project failure and the analysis of the causes.	9
2.3 Introduction of SK and HK.	10
2.3.1 Soft skills	10
2.3.2 Hard skills	11
2.3.3 The relationship of soft skills and hard skills.	12
2.4 Develop the scope of the soft skills.	13

2.4.1	The soft skills of the project management professionals.	13
2.4.2	The soft skills from non- construction management professionals.	15
2.4.3	Compare the soft skills about the project and non-construction management industry.	17
2.4.4	Soft skills classification and definition.	17
2.5	The effect of the project's soft skills on project success.	19
2.6	Methods to acquire and improve SK.	20
2.7	Summary	21
CHAPTER 3		23
METHODOLOGY		23
3.1	Overview	23
3.2	Research Method and process	23
3.3	Survey Instrument	25
3.4	Survey Sample	25
3.5	Survey Questionnaire	26
3.5.1	Respondent's background information.	27
3.5.2	Awareness of soft skills in construction industry.	27
3.5.3	Soft skills elements used to project management.	27
3.5.4	The best effective approaches to acquire and improve the soft skills.	27
3.6	Analysis of Data.	28
3.6.1	Frequency Distribution	28
3.6.2	Cronbach's Alpha Test	28
3.6.3	Spearman's Rank-Order Correlation Coefficient.	29
3.6.4	Kruskal-Wallis Test	29
3.6.5	Mean Ranking	30
3.7	Pilot test	31
3.8	Summary	32
CHAPTER 4		33
RESULTS AND DISCUSSIONS		33
4.1	Introduction	33
4.2	Duration of Data Collection and Response Rate.	33
4.3	Demographics of Respondents	33
4.3.1	Organization type of Respondents.	34
4.3.2	The largest project (based on contract value) undertaken of Respondents.	34
4.3.3	The years of working experience of Respondents.	34

4.3.4	Academic Qualifications of Respondents.	34
4.3.5	Job responsibility of Respondents.	34
4.4	Cronbach's Alpha Reliability Analysis.	36
4.5	Awareness of SK in Construction Industry.	36
4.6	Soft skills were used to project management in the construction industry.	38
4.6.1	Ranking the SK elements used in the Malaysian construction industry.	38
4.7	Ranking of the Effectiveness of SK elements in the Malaysian construction industry.	44
4.7.1	The Effectiveness of SK elements.	44
4.7.2	Spearman's Rank Correlation for SK elements.	49
4.7.3	Kruskal-Wallis Test the effectiveness of the SK.	49
4.7.4	Ranking the effectiveness from the different managerial level.	50
4.8	Ranking of the best effective approaches to acquire and improve the SK.	52
4.8.1	The best effective approaches to acquire and improve the SKs.	52
4.8.2	Spearman's Rank Correlation for acquire an improve the SK.	54
4.8.3	Kruskal-Wallis Test the effectiveness of the SK.	54
CHAPTER 5		55
CONCLUSION AND RECOMMENDATIONS		55
5.1	Overview	55
5.2	Research Findings and Conclusions.	55
5.3	Contributions of this Study.	57
5.4	Limitations.	58
5.5	Recommendations for future work.	59
5.6	Implications of study.	60
REFERENCES		61
APPENDICES		66

LIST OF TABLES

Table 2.1 Summary the SK in the construction industry from previous study conducted.	14
Table 2.2: Summary the SK in the Non-construction management industry from previous study conducted.	16
Table 2.3 Summary the scope and the definition of the SK.	17
Table 3.1: Type of five-point Likert scale used in the questionnaire.	28
Table 3.2: Range of Cronbach's Alpha Reliability Coefficient .	29
Table 3.3: Summary of Cronbach's Alpha Coefficient for Pilot Test.	31
Table 4.1 Data Distribution and Collection.	33
Table 4.2: Demographic Profile of Respondents.	35
Table 4.3: Summary of Cronbach's Alpha Coefficient	36
Table 4.4: Respondents to Indicate Their Level of Agreement on the Following Statements:	37
Table 4.5: The overall ranking SK elements Used.	38
Table 4.6: Ranking of contractor's SK elements Used.	39
Table 4.7: Ranking of consultant's SK elements Used.	39
Table 4.8: Ranking of developer's SK elements Used.	40
Table 4.9: Summary and Ranking of SK elements Used in Construction Industry (based on number of 'yes' response)	43
Table 4.10: Ranking overall effectiveness of SK elements.	44
Table 4.11: Ranking effectiveness of SK elements from a subcontractor's perspective.	45
Table 4.12: Ranking effectiveness of SK elements from a consultant's perspective.	45
Table 4.13: Ranking effectiveness of SK elements from a developer's perspective.	45
Table 4.14: Mean and Ranking of the Perception Towards the Effectiveness of	45

soft skills elements.	48
Table 4.15: Summary of Spearman's Rank Correlation Coefficient	49
Table 4.16: Ranking the effectiveness from the different managerial level.	51
Table 4.17: Mean and Ranking of the effective approaches to acquire and improve the SK.	53
Table 4.18: Summary of Spearman's Rank Correlation Coefficient.	54

LIST OF SYMBOLS / ABBREVIATIONS

SK	Soft skill
HK	Hard Skill
C I	Construction Industry
SSK	Social soft skill
PSK	Personal soft skill
HR	Human Resources
COVID-19	Corona Virus Disease 2019
SD	Standard Deviation

LIST OF APPENDICES

APPENDIX A: Questionnaire

66

CHAPTER 1

INTRODUCTION

1.1 Background

The Malaysian construction industry experienced rapid growth from 1991 to 2020, with an average annual growth rate of 7.2% and an annual national gross domestic product (GDP) share of 3.9%. Although it is not a high proportion compared to other industry sectors, the construction industry is linked to other components and plays a vital role in economic development, for example, the development of the construction industry is beneficial to local employment and benefit to the development of the materials and machinery industries. As a result, as a developing country, the sector's contribution to ensuring long-term economic growth remains significant (Asila Jalil, 2022).

The COVID-19 pandemic caused a decrease in Malaysia's gross domestic product of RM196.8 billion, or 6.3 percent, to RM2,907.1 billion in 2020. The services sector experienced an RM115.9 billion (-9.1%) drop in gross output value. The construction sector brought in RM39.2 billion (-18.5%), followed by the mining and quarrying sector at RM40.4 billion (-24.9%). The findings show that COVID-19 is affecting operations and finances and these consequences necessitate financial support (Zamani et al. 2021). This article investigated and assessed the COVID-19 pandemic's effect on the construction industry, both public and private. According to statistics, the most affected elements are time and cost overruns, job suspensions and losses, and financial effects (Riza and Idris, 2022). The soft skills acquired by project managers, such as effective communication, teamwork, solve conflict and crisis can reduce the impact of the COVID-19 on project time and cost overrun.

As more and more foreign construction companies enter the construction industry in Malaysia, the competition among construction practitioners is increasing.

In, summary, the Malaysian construction industry has made a significant contribution to economic expansion, but at a lower growth rate than in the past because of the effects of COVID-19. In addition, the COVID-19 has extended project delivery times and raised project costs, while an increasing number of international construction firms have entered the market, making the construction industry more competitive and lowering its profitability. It is crucial for project managers to apply SK successfully to enhance project management, and eventually contribute to project success.

1.2 Problem statement

The project manager plays a vital role in the success of the project. Project managers are typically chosen and trained by businesses to be technical managers with an emphasis on their hard skills. SK training for project managers is attracting more and more attention. Project scheduling, evaluation, auditing, and risk management are often cited as hard skills for project managers, while SK include leadership, interpersonal skills, stress management, conflict resolution and risk management skills, which are also gaining significance in modern project management (Robles, 2012). The reality is that SK are intangible, and it is difficult to define their characteristics and measurements, and the SK involve a connection to the project or organization in which they are involved (Kirsch, 2000).

It is not enough for project managers to have technical skills, effective communication, and collaboration play an important role in contributing to the success of a project. Inefficient communication and teamwork often result in project time or cost overruns that do not allow the project to reach its intended success goals (Emmitt, 2010). Project managers need to have the technical skills to select experienced projects, develop budgets, manage the mechanical and material resources of people, as well as plan projects properly, and use project management software. In addition, project managers also encounter difficulties in managing interpersonal relationships with external people and organizations Ika and Pinto (2022). According to Emmitt (2010), project failure is often not due to the complexity of the project, unqualified project members, organizational structure, lack of good leadership, and effective

communication are the main factors that lead to project failure. From previous research, even though we have found many benefits in enhancing the SK of project managers, lacking effective communication, interpersonal skills, leadership, and conflict resolution skills of managers in construction projects can cause project schedule and cost overruns and ultimately lead to project failure.

The results of a research study on the contribution of project managers' knowledge of SK to project success showed that company decision-makers tend to use civil engineers as top project managers, who often have specialist technical knowledge and skills and lack mastery of soft skills. The lack of soft skills may lead to the failure of the project by the top project managers (Tahir,2019).

The research gap is “Even though many benefits have been found in the implementation of SK to the construction project from past studies, however, the problem of low-level project managers are aware of or using soft skills, the lack of effective communication, interpersonal skills, leadership, and conflict resolution skills of managers which can cause project schedule and cost overruns and ultimately lead to project failure are still found to be prevalent in construction projects. This study found was that not much research was being done and published regarding the soft skills and project success in Malaysian construction industry. Hence, this study should gather more information related to SK scope, importance, effectiveness, and acquire and improve SK approach. These represent the gaps in the literature that this study aims to fill.

According to the literature review, it is found that although there are many previous investigations on SK in the construction industry, the limitation of these investigations is that the scope of soft skills in the construction industry in Malaysia is narrow. For example, the previous research mainly emphasized the application of social soft skills in the construction industry, such as effective communication, teamwork, and leadership, while the lack of critical thinking working under pressure and empathy surveys for project managers. Some surveys list only a few important soft skill elements, without a comparison of the importance of soft skills. At the same

time, the methods of acquiring and improving skills are not comprehensive enough. Therefore, expanding the application scope of SK in the Malaysian construction industry, comparing the effectiveness of soft skills in the construction industry, and comprehensively summarizing the methods of acquiring and improving SK can help project managers to understand and acquire soft skills, thus effectively promoting the success of projects.

1.3 Research Aim

This major aim of this study is to investigate how the SK of the project manager affect the project's success in the Malaysian construction industry.

1.4 Research Objectives

- i. To identify the SK scope of project manager in the construction industry.
- ii. To examine the awareness level in the Malaysian construction industry.
- iii. To investigate the influence of soft skills for project managers to project success.
- iv. To appraise the effective methods in acquiring and improving soft skills for project managers in the construction industry.

1.5 Research Questions

The following issues are the focus of this study's investigation.

- i. What is the scope of the essential SK of project manager according to the literature review?
- ii. What is the awareness level of SK in the Malaysia construction industry?
- iii. Is there a relationship between the SK and project success?
- iv. What's the effective methods in acquiring and improving SK for project managers in the CI?

1.6 Research Hypothesis

H₀ = There is no statistically significant relationship between SK and project success.

H_a = There is the statistically significant relationship between SK and project success.

1.7 Research Scope

The scope of the study consists of a questionnaire to collect responses from management level who work or have worked in the construction industry in Malaysia and data collection will also be conducted in Kuala Lumpur, Klang, and Johor Bahru regions.

1.8 Significance of the Research

With its higher growth rate and share in the country's GDP, Over the years, the Malaysian CI has contributed greatly and significantly to the economic growth of the nation, therefore, improving the hard and soft skills management of project managers to increase the probability of project success will enable the construction industry to better contribute to Malaysia's economic development.

On the identification of the scope and importance level of SK: it will enable project managers to know the importance and scope of SK and the importance of various SK elements in project developer, supervisors, and subcontractors, which will enable different project managers to raise awareness of soft skills, know their own soft skills deficiencies, and use SK such as communication, teamwork, sociability, and resolve problem to improve project management.

The results of the study on soft skills acquisition and improvement: can be used as a reference for construction companies in recruiting engineering industry practitioners, and as a basis for recruitment and later skills trainers according to the SK required for different positions. It is also beneficial for project managers to acquire effective soft skills learning approaches.

1.9 Structure of the research

The five chapters that make up this research are set out as follows:

Chapter 1 – Introduction

Providing an extensive summary of this research and laying the foundation for the following segments.

Chapter 2 – Literature Review

A preliminary analysis of the scholarly literature, Analyze, compile, and contrast both known and undiscovered research. Literature from past studies on: Project success and failure, introduction soft skills and hard skills, develop soft skills scope, the effect of the project's soft skills on project success, acquire and improve soft skill approaches.

Chapter 3 – Research Methodology

Quantitative research methods are used. Survey instrument, survey questionnaire, data analysis methods will be explained in detail.

Chapter 4 – Results and Discussions

Feedback from construction industry managers was collected through a questionnaire, and the data was analyzed using quantitative analysis methods to draw conclusions and to discuss and illustrate them.

Chapter 5 – Conclusion and Recommendation

This relates to the conclusion and advice. This chapter will also analyze research's limitations and offer suggestions for further studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter, each of the five sections of the literature review will be described.

The first section presents the criteria and factors of project success through literature review, followed by definition, and causes of the project failure.

The second section provides a brief introduction to the definition and the importance of soft skills and hard skills (HS). In general, soft skills will be clearly defined in this part, and the difference between SK and HS will be presented.

The third section, literature research is used to identify soft skill required by engineering and non-engineering industries and to classify, define, and rank the importance of these soft skills.

The fourth section discusses the impact of implementing SK on the success of the project.

The last part of this chapter briefly discusses the methods to acquire and improve SK, which will find the best effective methods to let the construction manager get SK.

2.2 Project success and failure

2.2.1 Project success

2.2.1.1 The definition of project success.

Müller and Turner (2007) defined project success factors and project success criteria as two components of project success. Mertens et al. (2018) stated that project success is related to the goals and benefits that are provided in a project.

2.2.1.2 Project success criteria and factors

What criteria are used, who reviews the project, when it is evaluated, and many other aspects determine whether a project is deemed successful. There are two basic

concepts of project success that are differentiated in project management literature. Project success criteria and determinants are discussed in Müller and Jugdev (2012). The set of guidelines or standards used to determine whether a project is successful or unsuccessful are known as project success criteria. The question of "how do we judge whether a project is a success?" is answered by success criteria. Dependent variables are success criterion. On the other hand, project success factors are a group of characteristics or components that can raise the likelihood of success (Müller & Jugdev, 2012).

The so-called triple or iron triangle, which was once the standard, is claimed to act as a constraint on how project managers can manage their projects. Budget, time, and requirements were three restrictions. As they work on projects, researchers have now discovered the fourth constraint. The client acceptance is one of the new quadruple constraints. According to the client acceptance theory, projects are developed with customers or clients in mind, meaning that their goal is to fulfil consumers' needs by Ika and Pinto (2022). The top five project success criteria—meeting cost, meeting time, customer satisfaction, meeting quality, and business success—were chosen from a list of 13 that were commonly discussed in literature. (Moradi et al. 2020).

In the context of significant government projects in Thailand, key performance indicators (KPIs) were examined by Toor and Ogunlana (2010). The classic steel triangle indicators (on-time, under-budget, and in accordance with specifications) were proven to be insufficient for evaluating project performance. Other performance metrics including safety, resource efficiency, effectiveness, stakeholder satisfaction, and lesser conflicts and disagreements are increasingly important. They recommended considering the new performance measurement on significant construction projects.

Communication, top management support, the project manager's competence, clear objectives, and realistic obligation, monitoring and feedback, and risk management are the most important project success factors. (Moradi et al. 2020).

2.2.2 The definition of the project failure and the analysis of the causes.

2.2.2.1 The definition of project failure

Construction project failure is defined as the inability of a project to meet specific time, cost, quality, or other stated objectives. In other words, a project that does not meet the expectations of its stakeholders is defined as a failure (Yap, 2013). Projects failing to meet the original scope, budget, or schedule as a definition of project failure (PMI, 2017).

2.2.2.2 Failure causes analysis of the project.

The top 10 reasons why construction projects are abandoned in Malaysia are: (1) financial difficulties faced by the owner; (2) financial difficulties faced by the contractor; (3) unexpected bad economic conditions; (4) inappropriate mode of project financing; (5) delays in interim payments; (6) inadequate project feasibility studies; (7) unreliable contractors or subcontractors; (8) project control issues; (9) inappropriate project planning and scheduling; and (10) bureaucratic issues (Yap, 2013).

The findings demonstrated that the indicators of construction project failure provided by Thailand and Malaysian engineers were similar. Failure indicators were ranked in importance from most important to least important as follows: (1) negative impact on safety, health, and the environment (18.83%); (2) cost overrun (18.44%); (3) time overrun (17.41%); (4) quality defects (16.43%); (5) stakeholders' dissatisfaction (15.36%); and (6) dispute and litigation (13.54%). (Gomarn and Pongpeng, 2018).

Six key elements were determined to be influencing project completion in Malaysia by SambaSivan and Soon (2007). These included delays, cost overruns, arguments, arbitration, court cases, and total abandonment.

The top ten reasons for delays were as follows: (1) improper planning by the contractor; (2) poor site management by the contractor; (3) lack of contractor experience; (4) inadequate client funding and payment for completed work; (5) issues with subcontractors; (6) material shortages; (7) labor shortages; (8) equipment failure;

(9) lack of communication between parties; and (10) mistakes made during the construction stage (Sambasivan and Soon, 2007).

Several researchers have defined project failure. There are some common points, e.g., inability of a project to meet specific time, cost, quality, safety, stakeholder satisfaction, or other stated objectives.,

2.3 Introduction of SK and HK.

2.3.1 Soft skills

2.3.1.1 The definition and the characteristic of the soft skills

According to Robles (2012), soft skills are opposed to technical ability or knowledge, soft skills are personality traits, attitudes, and behaviors. SK are intangible, nontechnical, personality-specific abilities that can be used to identify one's capabilities in negotiation, facilitation, and leadership. However, Deepa and Seth (2013), these abilities refer to character traits, attributes, and high levels of commitment to the profession that would set the applicant stand out ahead his contemporaries. The writers go on to say that SKs also refer to personal qualities that people may have, such as teamwork, communication, leadership, customer service, and problem-solving abilities.

Literature offers numerous definitions of SK. First, self-oriented/intra psychic and other-oriented/interpersonal skills can be distinguished from one another. Personal SK primarily emphasize the need for individuals to understand and develop personally, while social SK emphasize personal development through relationships with other people. Social SKs are primarily concerned with communication with others, and personal soft skills are primarily concerned with cognitive skills related to knowledge and thinking skills (Ahmed, 2019).

The fact that soft abilities are intangible and challenging to measure is one of their defining characteristics. They are more closely related to issues of organizational behaviour and interacting with those involved in a given project (Kirsch, 2000).

2.3.1.2 The importance of the soft skills

Between acceptable and ideal applicants, a soft skill makes the difference. When it comes to highly competitive job markets, when companies are selecting senior management, candidates with excellent soft skills are often selected because technical skills and relevant technical experience are less significant in this context.

According to the Carnegie foundation and Stanford research centre, the ratio of soft skills to hard skills contribution to project success found that technical skills and knowledge contributed 15% to success, while soft skills contributed 85% to project success (Ibrahim, 2017). The results of the study strongly suggest that soft skills can play a very important role in project success.

2.3.2 Hard skills

2.3.2.1 The definition and the characteristic of the hard skills.

Hard skills are relative to soft skills and refer to the professional and technical skills used in project management, such as civil engineers develop project schedules and quality control methods. Within the project management knowledge area, the main areas covered are project human resources management, schedule, quality, and planning management, which are hard skills that need to be applied to project management. Some soft skills of project management are also covered, such as communication management (PMI 2002, 2008).

The PMBOK describes nine knowledge domains (project integration, scope, time, cost, quality, human resource, communications, risk and procurement management), and five essential processes for efficient management of the majority of projects (initiating, planning, executing, monitoring, and controlling, and closing). This relevant engineering management knowledge relates to the technical skills of the project manager and is a hard skill for the project manager to acquire.

2.3.2.2 The importance of the hard skills

Currently, although soft skills are becoming more and more important in project management, there are some specialist areas where hard skills must be clearly listed in project staffing requirements, such as work experience, acquired qualifications and certified credentials, which are criteria for judging whether hard skills are available. This is because a wide range of hard skills are required for general managers or technical professionals in the engineering industry to carry out work on site.

One person can successfully do the job and carry out its tasks by having the necessary hard skills. Hard skills are necessary to ensure a company's financial success for many professions in many companies, but in some situations, a worker's hard skills are essential to avoid disastrous outcomes.

2.3.3 The relationship of soft skills and hard skills.

According to Sampson (2007), The skills required for project management are now often divided 50/50 into traditional 'hard' skills, such as risk management and scheduling, and 'soft', people Oriented skills, such as interpersonal communication.

According to VanIngen (2007), effective project management is a balance of organizational and people skills; however, Zielinski (2005) notes that "if you asked project-management gurus five years ago to name the most important competencies project managers should have, most would have said technical skills." Today, they would be more likely to prioritize communication or negotiation skills.

The PMBOK guide focuses on the application of hard skills in project management, but the importance of soft skills should be addressed in university project management education and training, emphasizing the human skills aspect of communication and collaboration (Pant and Baroudi, 2008).

Project management skills, as well as the project manager's role and the need for skills to be effective. Whereas hard skills are thought to include contracting, business finance, integrated cost, and schedule control, measuring work performance, quality monitoring, and risk analysis, SK are thought to include negotiation, change

management, understanding and dealing with the needs of customers, peers, staff, and managers (Frame, 2002).

Project management skills can be described as the ability of a project manager to complete a specific task on a project. Typically, hard skills include contracting, financing methods, cost control and schedule development, evaluation of work performance, quality control, and management of various project risks. Soft skills include negotiating, resolving conflicts and crises, and meeting the requirements of stakeholders such as internal staff, peers, owners and supervisors (Robles, 2012).

2.4 Develop the scope of the soft skills.

2.4.1 The soft skills of the project management professionals.

According to El-Sabaa (2001), the competencies of project managers include resolving conflicts and crises in complex environments, building trust with colleagues and empowering them to work together, motivating project colleagues to work towards project goals, and having a strong self-esteem and passion for their work. according to Shi and Chen (2006), the project management process requires project managers to have a variety of management skills, including the ability to communicate effectively, solve problems, resolve conflicts and crises, manage relationships with other stakeholders and collaborate with team members to get the job done. The demand for and significance of soft skills in the workplace would grow, according to Salleh (2010), who defined them as including communication, technology, and interpersonal skills.

Some of the main SK required by managers by reviewing the literature on soft skills in the construction industry. According to the frequency of soft skills in the literature (Table 2.1), teamwork, effective communication, cognitive skills, managerial motivation, conflict resolution, and leadership are important soft skills for those working in the engineering industry to acquire. The details are provided below

Table 2.1 Summary the SK in the construction industry from previous study conducted.

Item	Soft skills	Literatures																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	N
Personal skills																		
1	Flexibility/Adaptability								✓				✓					2
2	Critical thinking																	0
3	EI (emotional Intelligence)												✓					1
4	Personal attitude									✓		✓		✓				3
5	Empathy								✓									1
6	Self-reflection and self-management		✓		✓			✓										3
7	Personal integrity and reliability														✓			1
8	Work under pressure								✓									1
9	Cognitive Ability	✓	✓	✓					✓	✓								5
10	Motivation	✓		✓	✓	✓			✓	✓			✓		✓	✓		9
Social skills																		
1	Effective Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	15
2	Relationships and Engagement/Interpersonal										✓	✓	✓					3
3	Leadership			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		14
4	Teamwork	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓					✓	11
5	Resolve Conflict and crisis				✓	✓	✓	✓					✓		✓			6
6	Negotiation			✓		✓	✓			✓			✓		✓	✓		7
7	Influencing				✓		✓										✓	3
8	Decision making															✓		1
9	Trust building			✓			✓											2
10	Problem Solving										✓	✓	✓			✓	✓	5
11	Delegation						✓			✓	✓		✓					4

Note: (1) Musa et al. (2012), (2) Zaharim et al. (2012), (3) Edum-Fotwe and McCaffer (2000), (4) Fisher (2011), (5) PMI (2008), (6) IPMA (2006), (7) Jian Zuo et al. (2018), (8) Jena and Satpathy (2017), (9) Davies et al. (2015), (10) Tahir. (2019), (11) Seetha (2014), (12) José Magano et al. (2020), (13) Stevenson and Starkweather (2010), (14) Stevenson and Starkweather (2010), (15) Marando (2012), (16) Dogara et al. (2019).

2.4.2 The soft skills from non- construction management professionals.

Non- construction management professionals are about other industries and organizations mainly contain schools, companies. Such as teachers and student groups for research purposes, or a building information modeling service team who are not building-related owners, subcontractors, supervisors, or designers, but who also need to use SK in their daily work. Some of these subjects are in Malaysia, others are in Asia, Africa, or Europe internationally, such as Thailand and Cameroon.

Although these industries are not construction related or are not based in Malaysia, the frequent and relatively important SK in our study to expand the scope of this thesis on SK and to better demonstrate that soft skills can contribute to the success of a project. Examples include emotional intelligence, critical thinking, personal attitude, flexibility, decision making, and problem-solving.

During the soft skills statistics in the literature, some soft skills elements were found to occur less frequently, such as judgement, entrepreneurship, innovation and creativity, self-learning skills, openness and adaptability, professional ethics and morality, self-confidence, time management skills, ability to work independently, which were not included as part of our scope for this study

Table 2.2: Summary the SK in the Non-construction management industry from previous study conducted.

Item	Soft skills	Literatures										N
		1	2	3	4	5	6	7	8	9	10	
Personal skills												
1	Flexibility/Adaptability	✓							✓			2
2	Critical thinking	✓		✓	✓	✓		✓				5
3	EI (emotional Intelligence)			✓				✓				2
4	Personal attitude		✓				✓		✓			3
5	Empathy	✓										1
6	Self-reflection and self-management							✓				1
7	Personal integrity and reliability								✓			1
8	Work under pressure			✓		✓						2
9	Cognitive Ability											0
10	Motivation										✓	1
Social skills												
1	Effective Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
2	Relationships and Engagement/Interpersonal		✓	✓					✓			3
3	Leadership	✓	✓	✓	✓	✓	✓	✓		✓		8
4	Teamwork	✓	✓	✓	✓	✓		✓	✓	✓		8
5	Resolve Conflict and crisis	✓					✓			✓	✓	4
6	Negotiation						✓					1
7	Influencing											0
8	Decision making	✓		✓						✓	✓	4
9	Trust building			✓								1
10	Problem Solving	✓	✓	✓				✓		✓		4
11	Delegation						✓					1

Note: (1) Nazaré and Almendra (2021), (2) Seetha (2014), (3) Naiem et al. (2015), (4) Pachauri and Yadav (2014), (5) Shafie et al. (2014), (6) Davies et al. (2015), (7) Pezer (2015), (8) Robles (2012), (9) Succi and Canovi (2020), (10) Deshpande and Munshi (2020).

2.4.3 Compare the soft skills about the project and non-construction management industry.

By comparing the frequency of occurrence of SK in project and non-construction sectors. The results show that effective communication, teamwork, leadership, resolve conflict and crisis, and problem-solving skills are the most important social soft skills for both project and non-project industries. For personal soft skills, there are differences between project and non- construction sectors, e.g., non- construction industry likes schools and companies focus on critical thinking, personal attitude, emotional intelligence, flexibility, working under pressure for managers. In construction industry, the important skills are on motivation, cognitive ability, self-reflection and self-management, personal attitude, flexibility.

2.4.4 Soft skills classification and definition.

There are numerous definitions of soft skills in literature. Self-oriented/intra psychic and other-oriented/interpersonal skills can be divided initially. The first category emphasizes the intrinsic soft skills that practitioners possess, such as emotional intelligence, personal motivation, and attitudes, while the second category emphasis's skills for relating to others, such as effective communication and teamwork. Personal and social soft skills can also be classified according to the above descriptions. In addition, knowledge skills require the ability to interpret issues and to make decisions about the rightness or wrongness of occurrences through critical thinking. Listening, negotiation, problem solving, and decision making are representatives of social soft skills. (Engelberg, 2015).

In this research, SK are divided into personal skills and social skills.

Table 2.3 Summary the scope and the definition of the SK.

Item	Skill element	Definition
Personal skills		
1	Flexibility/Adaptability	the capacity to generate ideas from various viewpoints or to switch up problem-solving methods (Kaya, 2020,).
2	Critical thinking	Create and assess numerous arguments, facts, reasoning, and inferences in order to reason effectively (Paul & Elder, 2007).

3	EI (emotional intelligence)	EI is the capacity to keep track of one's own and other people's emotions, to recognize differences between them, and to utilize that knowledge to inform one's decisions and actions. and Mayer, Salovey (1990).
4	Personal attitude	before making decisions that result in conduct, people consider their mental states toward others and the current situation.
5	Empathy	The capacity to assume another person's position and consider the situation from their point of view (OECD, 2005).
6	Self-reflection and self-management	Self-reflection is the capacity to recognize, consider, and comprehend one's own feelings, actions, preferences, and values as well as their implications. The ability to define personal goals, monitor and modify progress, and organize daily tasks is known as self-management. It entails adapting to shifting circumstances and resolving challenging circumstances, according to PMI (2008).
7	Personal integrity and reliability	Personal integrity means the individual is acting in accordance with his or her own moral and ethical values and principles. Reliability is acting dependably, according to expectations and/or agreed behavior, PMI (2008).
8	Work under pressure	Dealing with constraints that are frequently out of your control, such as resource or time limitations, the difficulty of the task or a lack of knowledge needed to execute it, or unforeseen changes or issues, is a necessary skill for working under pressure.
9	Cognitive Ability	Cognitive ability is the ability of the human brain to process, store, and extract information. It refers to the ability to learn, study, understand, generalize, and analyze.
10	Motivation	Motivation is commonly defined as what explains why people or animals initiate, continue, or terminate a certain behavior at a particular time

Social skills

1	Effective Communication	Proper information must be exchanged, presented precisely and consistently to all people involved, and PMI (2008).
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2	Relationships and engagement/Interpersonal	Personal relationships build the foundation for the productive collaboration, personal engagement, and commitment of others. The ability to form strong relationships is primarily driven by social competencies such as empathy, trust, confidence, and communication skills. Sharing visions and goals with individuals and the team drives others to engage in tasks and to commit to the common goals, PMI (2008).
3	Leadership	Leadership means providing direction and guidance to individuals and groups. It involves the ability to choose and apply appropriate styles of management in different situations.
4	Teamwork	Teamwork is about bringing people together to realize a common objective, PMI (2008).
5	Conflict and crisis	Conflict and crisis include moderating or solving conflicts and crises by being observant of the environment and by noticing and delivering a remedy for dis- agreements, PMI (2008).
6	Negotiation	Negotiation is the process between two or more parties that aims to balance different interests, needs and expectations to reach a common agreement and commitment while maintaining a positive working relationship, PMI (2008).
7	Influencing	Influencing is about using your relationship with team members effectively to ensure they collaborate and cooperate well on making right decisions and achieving project goals, PMI (2008).
8	Decision-making	Decision-making is about how does a project manager goes about handling issues on the project, PMI (2008).
9	Trust building	The activity of developing trust between people so that they can work more effectively.
10	Problem Solving	To overcome obstacles and move from an initial state to a target state (Chicago State University, 2020).
11	Delegation	The act of delegating a particular job, duty, right, etc. to someone.

2.5 The effect of the project's soft skills on project success.

It is increasingly clear that success in the role of project manager cannot be reached with a technical skill set alone as the area of research into project management continues to expand. Technical proficiency is now seen as one of the essential qualifications for a project manager. The requirement for success is the necessity for excellent interpersonal, or soft skills (Shalett Gillard, 2009). The study's empirical findings indicated that project managers' SK played a key role in the elements that determined project success in the Vietnamese construction industry (Jian Zuo et al. 2018).

The research concentrates on organizational dynamics, internal communication, and individual motivation as the three main sources of project complexity. Only until these causes are recognized and fully comprehended will it be possible to manage and affect the outcomes, increasing the likelihood that the project will succeed (Foss, 2020). Emotional intelligence and work ethic can contribute effectively to project success in complex projects (Azadeh Rezvani, 2018).

2.6 Methods to acquire and improve SK.

Depending on the needs of the individual and the business, there are numerous ways to improve SK, including self-development, peer-development, education and training, coaching and mentoring, simulation, and gaming (IPMA, 2008).

SK are difficult to learn and are a result of a person's personality, life experiences, and training or education. It is argued that mentoring is a particularly effective strategy for developing SK, and that the interactions and procedures involved also help develop SK. It has clear benefits in bringing together new graduates with strong computer skills and more experienced professionals who can share their practical knowledge of the sector (Davies et al. 2015).

The most common methods include observation, reading, training, experience, and practice. Interaction with others is also very beneficial for developing SK. Applying SK differs from reading. SK can identify and learn the best ways to obtain them by participating in workshops and training programs (Rao, 2022). The greatest ways to teach your staff SK are through coaching, live interactive seminars, peer learning, online learning, augmented reality, and virtual reality (Helen Colman, 2022).

Improve SK through trying to be understood, making eye contact, watching body language, speaking more, writing more, practicing active listening, and paying attention to others' body language (Devin jones, 2022).

2.7 Summary

After reading from many different sources, it became clear that the traditional "iron triangle" of time, cost, and quality was no longer the best method to judge a project's success. New project success criteria have been added to measure project success, such as owner satisfaction, commercial success, personal development of staff, and reduction of conflict and disputes. At the same time, effective communication, senior leadership support, project manager competence, clear objectives, and achievable obligations, monitoring and feedback, and risk management are the main factors for project success.

Hard skills and soft skills: Hard and SK have different definitions, and they contain different skill elements, hard skills in the construction engineering industry contain elements of schedule, cost, and risk management skills, while SK mainly contains elements of communication, teamwork, and conflict resolution skills. In this study, the SK were divided into personal skills and social skills to facilitate the later research study.

The scope and importance of the SK. A summary of the literature on SK in engineering and non-engineering industries lists 10 personal SK and 11 social soft skills based on the importance of SK. The literature shows that the range and importance of SK are required to vary by country, industry, and project size. However, effective communication, leadership, teamwork, and conflict resolution are important SK that are required in both engineering and non-engineering industries.

Many significant results and outcomes are showing there is a clear distinction between soft and hard skills. Furthermore, some studies showed that project management requires not only hard skills but also SK if you want to promote project success. Specifically, teamwork and collaboration, leadership, effective communication, conflict skills, cognitive skills, and achievement motivation SK as the important SK to promote the project's success.

Also, some studies resulted that Self-study and training are important methods to acquire soft knowledge. Meanwhile, some new methods are emerging, such as augmented and virtual reality.

In the nutshell, there has been some research done focused on SK's effects on the construction industry, but there has not been researched done on the Malaysian construction industry, and soft skill scope, acquisition, and promotion methods are also incomplete. Therefore, this study intends to identify the effect of a project manager's SK on the success of the project in the CI and extends the scope of soft skills and ranks the effectiveness of acquiring and improving them in the Malaysian construction industry.

CHAPTER 3

METHODOLOGY

3.1 Overview

The survey instrument, sample, questionnaire, and method used to analyze the data gathered will all be covered in this chapter. This study will use the Frequency Distribution, Cronbach's Alpha tests, Correlation analysis, Kruskal-Wallis Test, and ranking of factors by mean to achieve the research objectives.

3.2 Research Method and process

Research methodology is a tool and technique for deriving the characteristics of what is being studied through the collection and analysis of data. Research is a term for discovering new facts through the investigation of various things (Walliman, 2011).

One approach to developing a research methodology is based on the theoretical "research onion" concept put forth by Saunders et al (2016). The exhausting description of the primary layers or phases that must be accomplished to create an effective technique is provided by the research onion (Raithatha, 2017). The research process is organized into six layers, starting with the definition of the main philosophy, and moving on to the selection of approaches, methods, and strategies as well as the setting of time horizons. These steps together move the research logic to the research design, which includes the primary methods and processes for collecting and analyzing data.

In this research, positivism paradigm, induction method, quantitative research, survey study, cross-sectional study and collect data at a specific time point, apply secondary data and develop questionnaire to collect and analysis the data.

The positivism paradigm, which is a methodological philosophy in quantitative research where we will use the methods of natural sciences to discover the study of social science, is based on objectivism epistemology (Crotty, 1998). In this regard, comprehension of actual phenomena must be measured and supported by evidence (Hammersley, 2013). By using empirical tests and techniques including sampling, measurement, questionnaires, and focus group discussions, this paradigm aids positivist researchers in having a thorough understanding of the things under study.

This means that the conclusions reached by positivist researchers may be highly reliable and true, and they may also be generalizable to a large population (Cohen, 2007).

Quantitative research was used to analyze the soft skills according to related data. Quantitative analysis methods are suitable for large scale sample data analysis and are economical and time-efficient compared to other analysis methods. At the same time, this approach facilitates the researcher to use statistical techniques to analyze the questions answered and data collected by the respondents. Therefore, quantitative research approach is selected for this study to get research objectives. As the data can be collected through structured questionnaire survey within a limited time frame and the data collected can be analyzed using statistical techniques. Meanwhile, the study will be compiled and summarized through a collection of previous literature on soft skills as secondary data for this study. The sources of literature include books, magazines, internet articles and previously available papers on soft skills. Questionnaires will be used to collect key soft skills related data and information.

The research process adopted for this study is as outlined below:

- 1) Intense literature review of past research related to this study will be carried out on:
 - Project success and failure: including project success criteria, the project failure and analysis of the causes.
 - Introduce the soft and hard skill and the importance.
 - Develop the scope of the soft skills in the construction industry and non-construction industry.
 - The effect of project SK on project success.
 - The methods to acquire and improve the soft skills.
- 2) Identify variables and compile secondary data from creditable literatures and textbooks.
- 3) Prepare survey questionnaire based on the variables identified from the literature review.
- 4) Identify and distribute questionnaire to the targeted response group.
- 5) Collect and analyses data using statistical techniques.
- 6) Present and discuss findings.
- 7) Derive conclusions and recommendations.

3.3 Survey Instrument

This is a tool to obtain the raw data that needs to be analyzed and measured through various forms of survey methods, and the variables are tested by means of test, scale, rating. Basically, there are two types of questions: open-ended questions and closed-ended questions (Reja et al., 2003). In contrast to open-ended questions, which allow respondents to express their opinions without being constrained by the question itself, close-ended questions will confine respondents to the set of possibilities being presented (Reja et al., 2003). Closed-ended questions will be used in the questionnaires for this study. Open-ended questions will also result in more missing data and uncertainty than closed-ended questions, according to some studies. In summary, close-ended questions are simpler for respondents to respond to, involve less writing, and can clear analysis (Fellows and Liu, 2008).

3.4 Survey Sample

The sample is a statistical process of selecting a group of people relevant to the research study, surveying the population on relevant questions, collecting data, and analyzing it (Bhattacharjee, 2012). There are basically two distinct sorts of samples: probability sampling and non-probability sampling. Every unit in the population has a possibility of being chosen as a sample when using probability sampling, which allows for accurate assessment (Bhattacharjee, 2012). Non-probability sampling, on the other hand, refers to a sampling strategy where only some units of the population have a (zero) chance of selection or where it is impossible to precisely calculate the probability of selection (Bhattacharjee, 2012). Convenience sampling and snowball sampling will be used in this study, both of which are based on the non-probability sampling method. This sampling technique is used because it can quickly obtain responses from sample components chosen at random from a large population. The convenience of identifying the target respondents for this survey will be used. And students, friends, and coworkers in the construction industry will all receive surveys. The questionnaire is disseminated to construction industry practitioners, including the contractor, consultant, and developer firm. This sampling technique is used because it is affordable and effective in gathering many samples in a short amount of time (Sambasivan and Soon, 2007).

The population composition of this study was mainly from Malaysian construction industry practitioners, as the target population of this study was practitioners working in the Malaysian construction industry, in line with the objective of this study to explore the impact of soft skills of construction project managers on project success. The construction industry includes the railway, road, residential, port, design, and consultant company. The respondents will cover developers, consultant, and contractors in the Malaysian construction industry, covering different positions and levels. including owner, architect, site engineering, quantity surveyor, purchaser. A comparison of previous studies shows that a minimum of 30 respondents are required to implement a reliable sample distribution analysis to achieve study data reliability. Therefore, in the current study, obtaining 100 valid survey results was the underlying goal and the accuracy and reliability of the results has been established. which meets the sample size criteria of between 30 to 500 respondents determined by Roscoe (1975). To ensure the validity, reliability, and consistency of the survey results, ensure the contribution to the research topic. The response rate for research that collected data from individuals was 52.7% (Baruch and Holtom, 2009). This research will get the data from individuals. Assuming a 50% response rate, 200 sets of questionnaires were developed and distributed to the construction industry to gather 100 responses.

3.5 Survey Questionnaire

The questionnaire was used to collect data and information related to soft skills in the construction industry and quantitative analysis methods will be used to analyze the data obtained from the questionnaire. The questionnaire will also cover the awareness of project managers about soft skills, the significance and effectiveness of soft skills, and the most effective ways of acquiring soft skills.

The questionnaire will be sent to employers in the construction industry by email, WeChat, and Google survey link. The questionnaire includes four parts which are respondent's background information, Awareness of soft skills in construction industry, soft skills elements used to project management, the best effective approaches to acquire and improve the soft skills.

3.5.1 Respondent's background information.

In section A. Background information on those working in the construction industry will be collected and collated, this information contains academic qualification, contract sum, job position, experience, and type of organization. This background information will be used to establish the demographic profile of the respondents for this study.

3.5.2 Awareness of soft skills in construction industry.

In section B, the importance of soft skills in the Malaysian construction industry will be investigated, whether soft skills can improve project competitiveness and organizational performance, whether lack of soft skills can be detrimental to a project and if skills can contribute to project success.

3.5.3 Soft skills elements used to project management.

In section C, the respondents are required to select from the soft skills elements used to the project management, and the effectiveness of soft skills elements in engineering projects from the five-point Likert scale.

3.5.4 The best effective approaches to acquire and improve the soft skills.

In section D, the respondents are required to select the best effective approaches to acquire and improve soft skills from the five-point Likert scale.

The most popular tool for measuring attitudes is the Likert scale. The survey's questions are formatted using a Likert scale with a five-point scale, from 1 to 5. Where 1 stand for the most negative response and 5 for the most positive reaction. When respondents were asked to rate how strongly they agreed or disagreed with a statement, for instance, 1 meant "Strongly Disagree," and 5 meant "Strongly Agree." According to Table 3.1, a Likert scale was used for the questionnaire.

Table 3.1: Type of five-point Likert scale used in the questionnaire.

Question Category	Likert Scale				
	5	4	3	2	1
Level of Agreement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Level of Effectiveness	Extremely effective	Very effective	Moderately effective	Slightly effective	Not at all effective

3.6 Analysis of Data.

SPSS and Microsoft Excel were used to analyze the data collected from the questionnaire survey. Frequency test on the demographic of respondents, Statistical Analysis such as Frequency Distribution, Cronbach's Alpha tests, Correlation analysis, Kruskal-Wallis Test, ranking of factors by mean will be applied in analyzing the data.

3.6.1 Frequency Distribution

The frequency distribution is a count of the occurrences of each attribute of a variable in a sample of observations; the analysis' findings are typically displayed as tables, graphs, and pie charts (McClendon, 2004). The patterns and relationships between the variables can be analyzed through the examination of such presentation.

In this study, frequency distribution will be used to analyze the respondent's background information (question 1 to 5) in section A. Awareness of soft skills in construction industry (question 6) in section B, and the soft skills elements were used in the project (question 7) in section C. Both the percentage distribution and actual number of the frequency of observations will be tabulated according to their category.

3.6.2 Cronbach's Alpha Test

The internal consistencies from keyed-in data and an index of consistencies will be examined using an adaptation of Cronbach's Alpha reliability test. The most often used indicator of internal consistency is Cronbach's alpha. In addition, Cronbach's Alpha is used to assess the reliability of surveys that contain several Likert questions. Utilizing Cronbach's Alpha reliability analysis helps reduce measurement errors that are inevitable and boosts the trustworthiness of results. The data must have a value of 0.700 or higher to demonstrate its reliability, with a number closer to 1 being more reliable (Laerd Statistics, n.d.). And the test was applied in section C and D (question

8 and 9) of the questionnaire. The range of Cronbach’s Alpha reliability coefficient is as shown in Table 3.2.

Table 3.2: Range of Cronbach’s Alpha Reliability Coefficient .

Cronbach’s Alpha	Reliability on 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

Source: George and Mallery (2006).

3.6.3 Spearman’s Rank-Order Correlation Coefficient.

According to Faridi and El-Sayegh (2006), Spearman's Rank-Order correlation coefficient is frequently used to assess how strongly two sets of rankings agree or disagree. The value of the Spearman's rank correlation coefficient (r_s) ranges from -1 to 1. The closer to 1 or -1 the value of r_s , the stronger the correlation between the two sets of rankings (Odeh and Battaineh, 2002).

In this study, the strength of the relationship between the three respondent groups—developers, consultants, and contractors—on the soft skills elements to the project success in construction projects based on the respondents' perception (question 8) in section C and the effectiveness of the SK in section D of the questionnaire—will be assessed using Spearman's rank correlation coefficient using SPSS.

3.6.4 Kruskal-Wallis Test

This test is a non-parametric factual test that evaluates differences on a solitary, irregularly distributed constant variable between at least three independent sampling groups (McKight and Najab, 2010). The H test and U test are two popular rank sum tests that are frequently employed in research, according to Kothari (2004). While the U test is referred to as the Mann-Whitney test, the H test is known as the Kruskal-Wallis test.

The Kruskal-Wallis test was used in this study to see whether there are any significant differences in respondents' assessments of the variables (question 8) in section C and question 9 in section D of the questionnaire. The result of 0.05 (0.05) or less suggests that there are significant perception differences between the respondent groups. The null hypothesis (H0) shall be rejected, and the alternative hypothesis (H1) accepted if there is a significant difference between the response groups (Chua, 2013). According to Kothari (2004), the formula of Kruskal-Wallis test is shown as below:

$$H = \left[\frac{12}{n(n+1)} \sum_{i=1}^k \frac{R_i^2}{n_i} \right] - 3(n+1)$$

where

n = total sample size ($n_1 + n_2 + \dots + n_k$)

k = the number of samples

n_i = the number of observations in the i th sample

R_i = the sum of the ranks assigned to n_i values of the i th sample

3.6.5 Mean Ranking

The mean will be computed in the research study in order to rank the variables according to the respondents' perceptions of importance. The mean, or mathematical average, is a measurement of the data's central tendency. Measures of central tendency are used to describe where a distribution of the research study's data lies. Mean is typically used to examine relationships between various research study variables and to determine whether have a significant difference about the samples (Rajasekar, Pitchai and Cinnathambi, 2013). Most of the causes in Low and Wang's investigations have mean scores above 3.0, which is important on the ratings scale. Each variable's mean can be computed, and the variables can then be ranked based on the computed means.

Mean will be used in this study to assess the effectiveness of the SK (question 8) in section C and the efficient methods for acquiring and enhancing soft skills (question 9) in section D.

Based on the studied of Wan et al. (2014), the formula of mean and standard deviations is shown as below:

$$\text{Mean, } \bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

$$\text{Standard Deviation, } s = \left[\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{(n-1)}} \right]$$

where,

n = number of observations in the sample

$X_i = (x_1, x_2, \dots, x_n)$, the observed values of the sample

3.7 Pilot test

Before conducting the full-scale research study, the pilot test, according to Chua (2016), is a small-scale exploratory research study to assess the viability of the produced questionnaire. Pilot testing is a useful strategy that aids in enhancing and improving a research instrument prior to gathering and measuring data, according to Topp et al. (2006). Prior to conducting a large-scale research study, the pilot test's goal is to guarantee the validity and reliability of the questionnaire.

Prior to the pilot test, the questionnaire underwent a trial run by being given to five participants. This was done to review the wording, spot any unclear questions, and evaluate the data collection method. After the trial run was over, a pilot test was carried out by giving the survey questionnaire to 30 specific responders.

After gathering the necessary information, the internal consistency of questions 8 and 9 in the survey questionnaire which used a 5-point Likert scale was examined using Cronbach's Alpha testing. The result is showed in Table 3.3.

Table 3.3: Summary of Cronbach's Alpha Coefficient for Pilot Test.

Category of variables	Number of variables	Cronbach's Alpha
Question 8		
Effectiveness of SK elements	21	0.963
Question 9		
Effectiveness of acquiring and improving SK	5	0.818

The results from the test show that the Cronbach's Alpha coefficient value for question 8, and 9 are 0.963, and 0.818 are all higher than 0.7 which indicate that there is a high

level of internal consistency in the data collected from the survey and can carry out full-scale research to larger population.

3.8 Summary

The research approach to be used is quantitative research, which has been identified and explored in this chapter. Through a questionnaire survey, the data were gathered. Developers, contractors, and consultants are all members of the construction sector in Malaysia, which accounts for all of the responses. To aid readers in understanding the methodology utilized, the sample design and research design are also thoroughly covered. Before formally disseminating the questionnaire to the professionals in the construction industry, a pilot test is conducted to enhance the reliability and accuracy of the created questionnaire. Frequency distribution, Cronbach's alpha, correlation analysis, Kruskal-Wallis test, and factor ranking by mean are all used in the data analysis to examine the survey data. All tests that have been performed can be evaluated, including the accuracy of the data and its usage to assess the outcomes and discuss them later in Chapter 4.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

In this chapter, the data collected from the questionnaire survey were analyzed using methods and techniques mentioned in chapter 3. Based on the results from the data analysis the findings will be discussed and presented in this chapter.

4.2 Duration of Data Collection and Response Rate.

A total of 200 questionnaires were sent to project owners, consultant, and subcontractors via email, WeChat, and Google survey links. 119 valid questionnaires were obtained to support the reliability of the research, and testing. A survey period of more than one month from 10th Jan 2023 until 14th Feb 2023. Analysis of Table 4.1 shows that the survey achieved a response rate of 59.5%, which is considered as a satisfactory response rate.

Table 4.1 Data Distribution and Collection.

Distributed	Collected	Rate of return of the valid survey
200 sets	119 sets	59.5%

4.3 Demographics of Respondents

By applying frequency analysis to the data from 119 valid questionnaires, the analysis contained 5 background information about the project managers, which are:

- i. The type of your organization of Respondents
- ii. The largest project (based on contract value) undertaken of Respondents.
- iii. The years of working experience of Respondents
- iv. Academic Qualifications of Respondents
- v. Job responsibility of Respondents

4.3.1 Organization type of Respondents.

The demographic profile of the respondents is presented in Table 4.2. A total of 119 fully completed responses were collected from the survey. Out of the 119 responses, 79 numbers (66.4%) from contractors, 20 numbers (16.8%) from consultants and 20 numbers (16.8%) from developers.

4.3.2 The largest project (based on contract value) undertaken of Respondents.

As for the largest project (based on contract value) undertaken by the respondent's company, 72 numbers (60.5%) of respondents' company have undertaken projects more than RM 500 million; 26 numbers (21.9%) of respondents exceeding RM 100 million but less than RM 500 million; 15 numbers (12.6%) of respondents exceeding RM10 million but less than RM 100 million; and only 10 numbers (5%) of respondents less than RM 10 million.

4.3.3 The years of working experience of Respondents.

Table 4.2 shows the number of years worked by project managers, through the data shows that the majority of managers have worked in the construction industry for 10 to 15 years at 37.8%, in second place is 6-10 years at 30.2%, in third place are practitioners who have worked for less than 10 years with 13.5%, The fourth and fifth places are occupied by those who have worked for more than 20 years and 16-20 years, with 10.9% and 7.6% respectively.

4.3.4 Academic Qualifications of Respondents.

The majority of construction managers have a bachelor's degree (66.4%), followed by postgraduates, and PhDs (26.9%), thirdly by Certificate/Diploma (4.2%) and lastly by Secondary/High school (2.5%).

4.3.5 Job responsibility of Respondents.

About the job responsibility of respondents, the majority of the respondents are managerial, and which consists of 47%. Next, there are 28.6% of the respondents are executive. Thirdly, the respondents are non-executive, and which consist of 12.6% only. And finally, senior management/Principal make up only 11.8% of the

respondents.

Table4.2: Demographic Profile of Respondents.

Demographic profile	Frequency	Percent
Type of organization		
Contractors	79	66.4
Consultants	20	16.8
Developers/Owners	20	16.8
Largest project undertaken (based on contract value)		
Less than RM10 million	6	5
Exceeding RM10 million -100 million	15	12.6
Exceeding RM100 million - RM 500 million	26	21.9
More than RM 500 million	72	60.5
Working experience		
Less than 5 years	16	13.5
6 -10 years	36	30.2
11 - 15 years	45	37.8
16 - 20 years	9	7.6
More than 20 years	13	10.9
Education level		
Secondary/High school	3	2.5
Certificate/Diploma	5	4.2
Bachelor's degree	79	66.4
Postgraduate (Master/PhD)	32	26.9
Occupational level		
Non-Executive	15	12.6
Executive	34	28.6

Manager	56	47
Senior Management /Principal	14	11.8

4.4 Cronbach’s Alpha Reliability Analysis.

Prior to conducting any statistical analysis, Cronbach’s Alpha test was carried out to analyze the internal consistency of data collected for question 8, and 9 in the questionnaire. The summary of the Cronbach’s Alpha coefficient values is presented in Table 4.3.

The Cronbach’s Alpha coefficient value ranges from 0.0 to 1, where the higher value shows greater internal consistency (George and Mallery, 2006). The results from the test show that the Cronbach’s Alpha coefficient value for question 8, and 9 are 0.958, and 0.832 respectively which indicate that there is a high level of internal consistency from the survey.

Table 4.3: Summary of Cronbach’s Alpha Coefficient

Category of variables	Number of variables	Cronbach’s Alpha
Question 8		
Effectiveness of SK elements	21	0.958
Question 9		
Effectiveness of acquiring and improving SK	5	0.832

4.5 Awareness of SK in Construction Industry.

To examine the awareness level of SK in the construction industry, four strategic statements related to the importance knowledge management were asked in section B of the questionnaire. The respondents were required to indicate their level of agreement on the statements based on the Likert scale provided in the questionnaire. The results of the survey are presented in Table 4.4 below:

Table 4.4: Respondents to Indicate Their Level of Agreement on the Following Statements:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Statement 1						
Soft skills are important in Malaysian construction industry						
Frequency	0	1	12	50	56	4.35
Percent	0.0%	1.0%	10.0%	42.0%	47.0%	
Statement 2						
Implement effective soft skills that can improve project competitiveness and organizational performance						
Frequency	0	1	12	60	46	4.27
Percent	0.0%	1.0%	10.0%	50.4%	38.6%	
Statement 3						
Lack of or incorrect use of soft skills leading to project failure						
Frequency	3	8	46	49	13	3.51
Percent	2.5%	6.7%	38.7%	41.2%	10.9%	
Statement 4						
Soft skills can contribute to project success						
Frequency	0	2	14	56	47	4.42
Percent	0.0%	1.7%	11.8%	47.0%	39.5%	

The results of the survey show that there is high level of awareness of SK in the Malaysian construction industry as nearly all of the respondents agreed that SK is important in construction industry with a mean score of 4.35 for question 1 which indicates that the score is high based on the 5-point rating scale. Besides, nearly all the respondents have recognized that effective management of organization's SK is a critical factor to enhance the company's competitive edge and organizational performance with mean score of 4.27 for question 2.

Furthermore, 62 numbers or 52.1% of the respondents agreed with the statement that SK are important for construction company, and 46 numbers or 38.7% of respondents hold a neutral view in the construction projects (question 3). 103 numbers or 86.5% of the respondents agreed with the SK can contribute to project success (question 4) with a mean score of 4.42.

The results from the survey have suggested that there is high level of awareness on the importance of SK from the construction industry practitioners and most of them

agreed that effective SK can enhance the competitive and organizational performance to contribute the project success.

4.6 Soft skills were used to project management in the construction industry.

4.6.1 Ranking the SK elements used in the Malaysian construction industry.

In section C, the respondents were required to identify 21 SK elements used in their company, the SK elements included personal SK and social SK listed in question 7.

The ranking of SK elements used in the construction industry was analyzed based on the total number of respondents (frequency) responded ‘yes’ in the questionnaire in descending order from largest number to smallest number. In addition, the perspective of contractors, consultants, and developers on the use of SK elements are analyzed and the results are summarized in Table 4.5.

The overall ranking of the results reveals that the top ten most significant SK elements used in the construction industry are listed below:

Table 4.5: The overall ranking SK elements Used.

	SK elements	Type	Percent	Rank
1)	Effective Communication	SSK	98.3	1
2)	Teamwork	SSK	98.3	1
3)	Trust building	SSK	98.3	1
4)	Relationships and engagement/Interpersonal	SSK	96.6	2
5)	Problem-Solving	SSK	96.6	2
6)	Leadership	SSK	95.0	3
7)	Solve Conflict and crisis	SSK	95.0	3
8)	Personal attitude	PSK	94.0	4
9)	Personal integrity and reliability	PSK	94.0	4
10)	Decision-making	SSK	94.0	4

While the top ten most significant SK elements identified by the contractors are listed below:

Table 4.6: Ranking of contractor's SK elements Used.

	SK elements	Type	Percent	Rank
1)	Trust building	SSK	100.0	1
2)	Teamwork	SSK	98.7	2
3)	Problem-Solving	SSK	98.7	2
4)	Solve Conflict and crisis	SSK	98.7	2
5)	Effective Communication	SSK	97.5	3
6)	Flexibility/Adaptability	PSK	97.5	3
7)	Relationships and engagement/Interpersonal	SSK	96.2	4
8)	Leadership	SSK	96.2	4
9)	Decision-making	SSK	96.2	4
10)	Negotiation	SSK	94.9	5

As for the consultants, the top twelve most significant SK elements are listed below:

Table 4.7: Ranking of consultant's SK elements Used.

	SK elements	Type	Percent	Rank
1)	Effective Communication	SSK	100.0	1
2)	Problem Solving	SSK	100.0	1
3)	Leadership	SSK	100.0	1
4)	Teamwork	SSK	95.0	2
5)	Trust building	SSK	95.0	2
6)	Relationships and engagement/Interpersonal	SSK	95.0	2
7)	Personal attitude	PSK	95.0	2
8)	Personal integrity and reliability	PSK	90.0	3
9)	Motivation	PSK	90.0	3
10)	Decision-making	SSK	85.0	4
11)	Negotiation	SSK	85.0	4
12)	EI (emotional intelligence)	PSK	85.0	4

Whereas from the developers' view, the top eleven most significant SK elements are listed below:

Table 4.8: Ranking of developer’s SK elements Used.

	SK elements	Type	Percent	Rank
1)	Effective Communication	SSK	100	1
2)	Teamwork	SSK	100	1
3)	Relationships and engagement/Interpersonal	SSK	100	1
4)	Personal attitude	PSK	100	1
5)	Personal integrity and reliability	PSK	100	1
6)	Trust building	SSK	95.0	2
7)	Solve Conflict and crisis	SSK	95.0	2
8)	Decision-making	SSK	95.0	2
9)	Flexibility/Adaptability	PSK	95.0	2
10)	Motivation	PSK	95.0	2
11)	Cognitive Ability	PSK	95.0	2

According to the Table 4.5 reveals that the highest ranked SK elements using personal SK and social skills is “Effective Communication” (98.3%); Teamwork (98.3%); Trust building (98.3%); Relationships and engagement/Interpersonal (96.6%); Problem Solving (96.6%); Leadership (95%); Resolve Conflict and crisis (95%). The above finding agrees with the result conducted by Table 2.1 and Table 2.2 that Effective communication, leadership, teamwork, resolve conflict and crisis, Interpersonal and problem solving are among the most important SK for both engineering and non-engineering industries. The top 7 SK elements in the overall ranking of all SK are all social soft skills elements, and the top 10 SK in the overall ranking include only two personal soft skills elements, personal attitude and personal integrity and reliability, ranking 8th and 9th respectively, indicating that the most important SK elements in the Malaysian construction industry are predominantly social soft skills.

The subcontractor rankings reveal that trust building, teamwork, problem solving, solve conflict and crisis and effective communication are the most important soft skill elements for subcontractors. Nine of the top ten soft skill elements for subcontractors are social soft skills and only one personal soft skill, resilience/adaptability, is an important soft skill element, indicating that social soft

skills are more important in the daily project management of subcontractors and are more widely used than personal soft skills.

Through the analysis of the ranking of the SK elements of consultants, effective communication, problem solving, and leadership were identified as the most important SK elements of the consultant management team. At the same time teamwork, trust building, interpersonal and personal attitude were ranked as the second most important SK. Among the top ten important SK for the consultant, including personal attitude, personal integrity and reliability, motivation as three personal soft skills and ranked seventh, eighth and ninth respectively, against the score pack, indicating that supervisors attach more importance to personal soft skills.

Effective communication, teamwork, interpersonal, personal attitude and personal integrity and reliability were ranked as the 5 most important SK for developers. Of the top 5 soft skill elements, personal attitude and personal integrity and reliability, ranked 4th and 5th respectively. Comparing subcontractors and consultants, only developers ranked personal soft skills in the top 5 in terms of importance, and among the top 10 SK, adaptability and motivation ranked 9th and 10th respectively, comparing subcontractors and consultants, four personal soft skills were in the top 10, more than subcontractors and consultants. This indicates that developers consider personal soft skills to be more important than subcontractors and supervisors.

The ranking of subcontractors, consultants, and developers revealed that effective communication was the most important soft skill element ranked highest by consultants and developers, with developers ranking trust building as the most important soft skill element. Subcontractors, consultants, and developers all ranked trust building, teamwork, effective communication, interpersonal skills, leadership, decision making and negotiation as the top 5 soft skill elements. Also, all the top five SK are social soft skills elements, indicating that all three groups of stakeholders in the Malaysian construction industry consider social soft skills to be more important than individual soft skills in improving project management and contributing to project success.

The results reveal that “Personal attitude”, and “Personal integrity and reliability” has been identified by all the three groups of respondents (contractors, consultants, and developers) as the highest ranked personal soft skill element due to the high percentage of respondents (94%) to promote the project success. Adaptability

and motivation are the second highest ranked personal soft skill identified by the respondents, due to the high percentage of respondents (93.3%). The above finding is not agreeing with the result conducted by Table 2.1 and Table 2.2 that Motivational skills as the most important SK in the engineering industry, with critical thinking and cognitive skills as the second and third most important SK. Motivation is the internal manifestation and attitude is the external manifestation. Motivation often determines attitude, but it is not determined. The importance of motivation over personal attitudes indicates that in the Malaysian construction industry, personal soft skills are more focused on the internal motivation of project managers. For example, project managers who strive to improve project management with consistent internal motivation and external actions can increase project and organizational performance levels.

Table 4.9: Summary and Ranking of SK elements Used in Construction Industry (based on number of ‘yes’ response)

SK elements	Type	Overall (119)			Contractor (79)			Consultants (20)			Developers (20)		
		No	Percent	Rank	No	Percent	Rank	No	Percent	Rank	No	Percent	Rank
Effective Communication	SSK	117	98.3	1	77	97.5	3	20	100.0	1	20	100.0	1
Teamwork	SSK	117	98.3	1	78	98.7	2	19	95.0	2	20	100.0	1
Trust building	SSK	117	98.3	1	79	100.0	1	19	95.0	2	19	95.0	2
Relationships and engagement/Interpersonal	SSK	115	96.6	2	76	96.2	4	19	95.0	2	20	100.0	1
Problem Solving	SSK	115	96.6	2	78	98.7	2	20	100.0	1	17	85.0	4
Leadership	SSK	113	95.0	3	76	96.2	4	20	100.0	1	17	85.0	4
Solve Conflict and crisis	SSK	113	95.0	3	78	98.7	2	16	80.0	5	19	95.0	2
Personal attitude	PSK	112	94.0	4	73	92.4	7	19	95.0	2	20	100.0	1
Personal integrity and reliability	PSK	112	94.0	4	74	93.7	6	18	90.0	3	20	100.0	1
Decision-making	SSK	112	94.0	4	76	96.2	4	17	85.0	4	19	95.0	2
Flexibility/Adaptability	PSK	111	93.3	5	77	97.5	3	15	75.0	6	19	95.0	2
Motivation	PSK	111	93.3	5	74	93.7	6	18	90.0	3	19	95.0	2
Negotiation	SSK	110	92.4	6	75	94.9	5	17	85.0	4	18	90.0	3
Cognitive Ability	PSK	109	91.6	7	74	93.7	6	16	80.0	5	19	95.0	2
EI (emotional intelligence)	PSK	107	89.2	8	73	92.4	7	17	85.0	4	17	85.0	4
Self-reflection and self-management	PSK	106	89.1	9	73	92.4	8	16	80.0	5	17	85.0	4
Critical thinking	PSK	101	84.9	10	73	92.4	7	12	60.0	7	16	80.0	5
Empathy	PSK	101	84.9	10	71	89.9	9	12	60.0	7	18	90.0	3
Influencing	SSK	100	84.0	11	70	88.6	10	12	60.0	7	18	90.0	3
Work under pressure	PSK	99	83.2	12	68	86.1	11	15	75.0	6	16	80.0	5
Delegation	SSK	99	83.2	12	67	84.8	12	15	75.0	6	17	85.0	4

Note: SSK (Social soft skill), PSK (Personal soft skill).

4.7 Ranking of the Effectiveness of SK elements in the Malaysian construction industry.

4.7.1 The Effectiveness of SK elements.

To investigate the effectiveness of SK elements being used in the construction industry, the respondents were asked to indicate their perception of the effectiveness of SK elements used by their company based on a 5-point Likert scale provided in question 8 of the questionnaire.

The Mean method is used to analyze and rank the results from the questionnaire result. The overall Mean and ranking of the respondents' perception towards the effectiveness of SK elements have been sorted in ascending order according to the mean results and the comparison against the Mean for the three groups of respondents namely contractors, consultants, and developers is summarized in Table 4.6.

A list of the top five most effective SK elements in the Malaysian construction industry, as tallied by the three groups of respondents (including the contractor, consultants, and developer), is shown below.

Table 4.10: Ranking overall effectiveness of SK elements.

Soft skills elements	Type	Mean	SD	Rank
Effective Communication	SSK	4.40	0.679	1
Resolve Conflict and crisis	SSK	4.36	0.842	2
Personal attitude	PSK	4.34	0.757	3
Teamwork	SSK	4.32	0.655	4
Problem Solving	SSK	4.30	0.823	5

A list of the top five most effective SK elements, considered from a subcontractor's perspective, is as follows.

Table 4.11: Ranking effectiveness of SK elements from a subcontractor's perspective.

Soft skills elements	Type	Mean	SD	Rank
Effective Communication	SSK	4.37	0.718	2
Resolve Conflict and crisis	SSK	4.39	0.839	1
Personal attitude	PSK	4.35	0.744	3
Teamwork	SSK	4.27	0.621	5
Problem Solving	SSK	4.29	0.781	4

While the top five most effective SK elements from the consultants' perspective are as listed below:

Table 4.12: Ranking effectiveness of SK elements from a consultant's perspective.

Soft skills elements	Type	Mean	SD	Rank
Effective Communication	SSK	4.50	0.605	1
Resolve Conflict and crisis	SSK	4.25	0.945	4
Personal attitude	PSK	4.35	0.826	2
Teamwork	SSK	4.35	0.745	2
Problem Solving	SSK	4.30	0.940	3
Leadership	SSK	4.30	0.826	3

Whereas for the developers, SK elements are as listed below:

Table 4.13: Ranking effectiveness of SK elements from a developer's perspective.

Soft skills elements	Type	Mean	SD	Rank
Effective Communication	SSK	4.50	0.587	1
Resolve Conflict and crisis	SSK	4.35	0.686	2
Personal attitude	PSK	4.25	0.759	4
Teamwork	SSK	4.50	0.716	1
Problem Solving	SSK	4.35	0.852	2

Leadership	SSK	4.35	0.571	2
Negotiation	SSK	4.20	0.718	5
Trust building	SSK	4.20	0.826	5
Relationships and Engagement/Interpersonal	SSK	4.35	0.550	2

By looking at the SK effectiveness statistics of the three main groups of respondents regarding the Malaysian construction market, with the results above, it shows that “effective communication” (Mean=4.4) is considered the most effective soft skill. It agrees with study conducted by Zaharim et al. (2012) which reveals that “effective communication” is the strongest effect on the project managers. The second ranking was conflict resolution and crisis (Mean=4.36), while the third, fourth and fifth were personal attitude (Mean=4.34), teamwork (Mean=4.32) and problem solving (Mean=4.30) respectively. Which agrees with study conducted by Seetha (2014), which reveals that positive attitude, teamwork, and problem solving are the very effective SK. Four of the top five soft skill elements are social SK, with personal attitude being the only personal soft skill element, this finding has supported the result in Table 4.5 above where “personal attitude” was identified as most used personal soft skill tool in construction industry,

For personal SK, personal attitude is the most important personal soft skill, ranking third in the overall soft skill ranking, and all three groups of key respondents also ranked personal attitude as a top five soft skill. So, it can be inferred that personal attitude is most effectiveness personal soft skill in the construction industry. Personal integrity and reliability, adaptability and cognitive ability were also ranked as effective SK, in the second, third and fourth place respectively.

A comparison of the overall SK element ranking, and the three groups of key respondents ranking data reveals that the five SK elements considered most effective by Malaysian construction industry practitioners are, in descending order, effective communication, resolve conflict and crisis, personal attitude, teamwork and problem-solving skills. This same to the most effective SK by subcontractors, consultants, and developers. In addition, both consultants and developers ranked effective communication as the number one soft skill, with subcontractors ranking effective communication second.

The results of the subcontractor ranking on the effectiveness of SK elements show that the top five SK of subcontractors are in line with the overall SK ranking, but “conflict resolution and crisis ranking” (Mean=4.39) over “effective communication” (Mean=4.39), while consultants and developers still ranked effective communication as the most effective soft skill, the finding can infer that the COVID-19 has been to increase project costs, extend schedules and even close down companies. The number of conflicts and crises between subcontractors and consultants and owners has increased. The SK element of resolve conflict and crisis exceeds even the previous SK element of effective communication as the primary SK element.

When analyzing the effectiveness of SK from a consultant perspective, a total of nine soft skill elements were ranked in the top five, five of which were ranked in line with the top five overall SK. Effective communication, motivation, interpersonal, teamwork and personal attitude were ranked in the top five SK by the consultants. This indicates that the consultants also identify effective communication, teamwork and problem solving as the most important social soft skills, as well as emphasizing the two personal soft skills of motivation and personal attitude of project managers.

From a developer's perspective, effective communication and teamwork are tied for first place as the most effective SK; interpersonal, leadership, resolve conflict and crisis, and problem-solving effectiveness are tied for second place; self-reflection and self-management, personal attitude, and cognitive skills are ranked as the third and fourth most important personal soft skills; and negotiation and trust building are tied for fifth place. Overall, the ranking of the effectiveness of SK for developers is dominated by social soft skills, while the effectiveness of personal soft skills such as cognitive skills and personal attitudes are emphasized.

Table 4.14: Mean and Ranking of the Perception Towards the Effectiveness of soft skills elements.

Soft skills elements	Type	Overall			Contractor			Consultant			Developer			Chi square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
Effective Communication	SSP	4.4	0.679	1	4.37	0.718	2	4.5	0.605	1	4.5	0.587	1	2.118	0.347
Resolve Conflict and crisis	SSP	4.36	0.842	2	4.39	0.839	1	4.25	0.945	4	4.35	0.686	2	4.664	0.097
Personal attitude	PSP	4.34	0.757	3	4.35	0.744	3	4.35	0.826	2	4.25	0.759	4	1.138	0.566
Teamwork	SSP	4.32	0.655	4	4.27	0.621	5	4.35	0.745	2	4.5	0.716	1	0.373	0.83
Problem Solving	SSP	4.3	0.823	5	4.29	0.781	4	4.3	0.94	3	4.35	0.852	2	2.569	0.277
Leadership	SSP	4.24	0.748	6	4.2	0.759	7	4.3	0.826	3	4.35	0.571	2	3.334	0.189
Negotiation	SSP	4.22	0.776	7	4.24	0.8	6	4.15	0.768	6	4.2	0.718	5	0.238	0.888
Trust building	SSP	4.21	0.939	8	4.24	0.899	6	4.1	1.099	7	4.2	0.826	5	5.194	0.075
Interpersonal	SSP	4.2	0.768	9	4.13	0.8	9	4.35	0.826	2	4.35	0.55	2	1.513	0.469
Personal integrity and reliability	PSP	4.13	0.845	10	4.11	0.87	10	4.2	0.686	5	4.1	0.826	7	5.078	0.079
Flexibility/Adaptability	PSP	4.12	0.74	11	4.15	0.771	8	3.95	0.826	8	4.15	0.513	6	0.567	0.753
Cognitive Ability	PSP	4.11	0.829	12	4.15	0.911	8	3.95	0.671	8	4.25	0.587	4	1.059	0.589
Decision making	SSP	4.1	0.792	13	4.11	0.868	10	3.9	0.733	9	4.1	0.489	7	0.123	0.941
Motivation	PSP	4.08	0.823	14	3.99	0.873	13	4.35	0.745	2	4.05	0.688	8	1.234	0.539
EI (emotional Intelligence)	PSP	4.05	0.66	15	4.1	0.706	11	3.95	0.639	8	3.95	0.489	9	1.391	0.499
Self-reflection and self-management	PSP	4.02	0.772	16	3.96	0.804	14	3.95	0.671	8	4.3	0.768	3	0.644	0.725
Work under pressure	PSP	3.91	0.792	17	4.01	0.808	12	3.45	0.894	14	3.95	0.616	9	1.994	0.369
Influencing	SSP	3.91	0.858	17	3.96	0.893	14	3.8	0.852	10	3.8	0.718	11	2.014	0.365
Critical thinking	PSP	3.89	0.812	18	3.96	0.82	14	3.55	0.852	13	3.95	0.768	9	0.629	0.73
Empathy	PSP	3.87	0.765	19	3.92	0.803	15	3.6	0.733	12	3.9	0.671	10	0.025	0.988
Delegation	SSP	3.84	0.863	20	3.9	0.871	16	3.65	0.875	11	3.8	0.834	11	2.283	0.319

4.7.2 Spearman's Rank Correlation for SK elements.

To find out whether there is agreement or disagreement between the three groups of respondents, a correlation analysis using Spearman's rank correlation was performed and the results are illustrated in Table 4.7.

Table 4.15: Summary of Spearman's Rank Correlation Coefficient

	Contractors-Consultants	Contractors-Developers	Consultants-Developers
Spearman rank correlation coefficient	0.716**	0.807**	0.780**
Significant level	0.000	0.000	0.000
N	21	21	21

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

Since a high value of Spearman's rank correlation coefficient rho indicates that there is a strong agreement between the respondents and examination on Table 4.7 found that the value of Spearman's rank correlation coefficient rho calculated are all above 0.716, therefore, it can be inferred from the above results that there is a high degree of agreement between the three groups of respondents ranking the effectiveness of SK elements in the Malaysian construction industry. This indicates that all three groups of respondents identified effective communication, conflict and crisis resolution, personal attitude, teamwork, problem solving and leadership as the very important SK in the construction market.

4.7.3 Kruskal-Wallis Test the effectiveness of the SK.

Test subjects for Table 4.6 include the Contractor, Consultant, and Developer, there are no asymptotic significant value which is less than 0.05. Therefore, there is no statically significant difference presented in the table above. The results of the analysis indicate that the three different groups of responders have a consistent view of SK validity analysis.

4.7.4 Ranking the effectiveness from the different managerial level.

The Mean method is used to analyze and rank the results from the questionnaire result. The overall Mean and ranking of the respondents' perception towards the effectiveness of SK elements have been sorted in ascending order according to the mean results and the comparison against the Mean for the four groups of respondents namely Non-executive, Executive, Managerial, Senior manager, and the result is summarized in Table 4.16.

By looking at the SK effectiveness statistics of the four main groups of respondents regarding the Malaysian construction market, it shows that “effective communication” (Mean=4.4) is considered the most effective soft skill. The second ranking was personal attitude (Mean=4.37), while the third, fourth and fifth were Solve conflict and crisis (Mean=4.36), teamwork (Mean=4.32) and problem solving (Mean=4.30) respectively. Non-executive, Executive, Managerial take effective communication as the most important SK,

For personal SK, personal attitude is the most important personal soft skill, ranking second in the overall soft skill ranking, and all four groups of key respondents also ranked personal attitude as a top four soft skill.

Table 4.16: Ranking the effectiveness from the different managerial level.

Soft skills elements	Type	<u>Overall</u>			<u>Non-executive</u>			<u>Executive</u>			<u>Managerial</u>			<u>Senior manager</u>		
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank
Effective Communication	SSK	4.40	0.740	1	4.60	0.507	1	4.38	0.817	1	4.41	0.654	1	4.21	1.051	3
Personal attitude	PSK	4.37	0.655	2	4.40	0.632	3	4.29	0.719	2	4.32	0.664	4	4.43	0.514	1
Solve conflict and crisis	SSK	4.36	0.660	3	4.60	0.632	1	4.15	0.744	5	4.41	0.596	1	4.43	0.646	1
Teamwork	SSK	4.32	0.823	4	4.47	0.834	2	4.21	0.946	4	4.39	0.652	2	4.14	1.099	4
Problem-Solving	SSK	4.30	0.765	5	4.60	0.632	1	4.06	0.814	7	4.38	0.702	3	4.29	0.914	2
Leadership	SSK	4.24	0.792	6	4.40	0.632	3	4.15	0.857	5	4.30	0.685	5	4.07	1.141	5
Negotiation	SSK	4.22	0.772	7	4.47	0.516	2	4.21	0.729	4	4.23	0.763	7	3.93	1.072	7
Trust building	SSK	4.21	0.812	8	4.40	0.632	3	4.15	0.857	5	4.23	0.738	7	4.07	1.141	5
Interpersonal	SSK	4.20	0.829	9	4.33	0.724	4	4.12	1.008	6	4.23	0.687	7	4.14	1.027	4
Personal integrity and reliability	PSK	4.13	0.776	10	3.93	0.961	8	3.94	0.814	9	4.25	0.720	6	4.29	0.611	2
Flexibility/Adaptability	PSK	4.12	0.679	11	4.27	0.458	5	4.06	0.547	7	4.14	0.672	9	4.00	1.109	6
Cognitive Ability	PSK	4.11	0.768	12	4.07	0.704	7	3.94	0.814	9	4.25	0.667	6	4.00	1.038	6
Decision-making	SSK	4.10	0.858	13	4.13	0.834	6	4.00	0.816	8	4.16	0.848	8	4.07	1.072	5
Motivation	PSK	4.08	0.845	14	3.93	0.961	8	4.24	0.819	3	4.05	0.773	11	3.93	1.072	7
Emotional intelligence	PSK	4.05	0.757	15	4.13	0.834	6	3.91	0.753	10	4.05	0.773	11	4.29	0.611	2
Self-reflection and self-management	PSK	4.02	0.748	16	4.13	0.743	6	3.74	0.710	13	4.11	0.755	10	4.21	0.699	3
Work under pressure	PSK	3.91	0.939	17	3.73	0.884	10	3.91	0.965	10	4.02	0.842	12	3.64	1.277	9
Influencing	SSK	3.91	0.792	18	4.07	0.594	7	3.79	0.808	12	3.95	0.773	14	3.86	1.027	8
Critical thinking	PSK	3.89	0.842	19	3.67	1.113	11	3.85	0.702	11	3.95	0.796	14	4.00	1.038	6
Empathy	PSK	3.86	0.823	20	4.13	0.834	6	3.53	0.748	15	3.98	0.774	13	3.93	0.997	7
Delegation	SSK	3.84	0.863	21	3.80	0.862	9	3.68	0.912	14	3.91	0.769	15	4.00	1.109	6

4.8 Ranking of the best effective approaches to acquire and improve the SK.

4.8.1 The best effective approaches to acquire and improve the SKs.

The following conclusions can be drawn from an analysis of the mean effectiveness of the approaches used to acquire and improve SK. In a combined ranking of the three groups of respondents revealed that “self-development” (mean=4.25) as the first effective method of acquiring and improving SK element, with “Peer-Development” (mean=4.10), “Coaching and Mentoring” (mean=4.08), “Education and Training” (mean=4.01), “Simulation and Gaming” (mean=3.64) ranking second to fifth. It agrees with a study conducted by (Helen Colman, 2022) which reveals that the greatest ways to teach your staff SK are through coaching, peer learning, and virtual reality and study by (Rao, 2022) shows that “Take an online course” and “Practice with a friend” are important methods to acquire and improve SK.

Self-development to acquire and improve SK is through personal reading of books, industry standards, case studies and articles related to the profession, acquiring knowledge and skills through practice and reflection in the process of learning. Not only self-development rank first overall, but it was also ranked as the most effective method of acquiring and improving SK by subcontractors, consultants, and developers.

Simulation and gaming rank the least effective of the methods for acquiring and improving SK, which are developed through case-based simulation games, such as sand table simulation exercises or game methods. Generally, this method is used in combination with other methods of acquiring SK, for example in education and training methods, Trainers can arrange simulation exercises to enhance teamwork and communication skills.

Table 4.17: Mean and Ranking of the effective approaches to acquire and improve the SK.

Approaches to acquire and improve the SK	<u>Overall</u>		<u>Contractor</u>		<u>Consultant</u>		<u>Developer</u>		Chi-square	Asymptotic significance
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank		
Self-Development	4.25	1	4.22	1	4.45	1	4.20	1	1.972	0.373
Peer- Development	4.10	2	4.18	2	3.90	2	4.00	3	3.013	0.222
Coaching and Mentoring	4.08	3	4.16	3	3.75	4	4.10	2	0.840	0.657
Education and Training	4.01	4	4.05	4	3.85	3	4.00	3	5.365	0.068
Simulation and Gaming	3.64	5	3.75	5	3.25	5	3.60	4	3.629	0.163

Table 4.18: Summary of Spearman's Rank Correlation Coefficient.

	Contractors- Consultants	Contractors- Developers	Consultants- Developers
Spearman rank correlation coefficient	0.900**	0.821**	0.667**
Significant level	0.037	0.089	0.219
N	5	5	5

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

Since a high value of Spearman's rank correlation coefficient indicates that there is a strong agreement between the respondents and examination on Table 4.9 found that the value of Spearman's rank correlation coefficient rho calculated are all above 0.667, therefore, it can be inferred from the above results that there is a high degree of agreement between the three groups of respondents ranking the effectiveness of acquire and improve SK approaches in the construction industry.

4.8.2 Spearman's Rank Correlation for acquire an improve the SK.

The results of the study show that all three groups of respondents in the construction industry identified self-development, peer development, and Coaching and Mentoring as very important methods of acquiring and improving SK. These three methods were more effective in improving the SK of Malaysian construction workers than education and Education Training, Simulation and Gaming, thus improving project performance.

In contrast to previous studies in the literature, only methods of acquiring and improving SK are presented, and there is no ranking of the effectiveness of the methods, especially in the Malaysian construction industry, as the effectiveness of the methods of acquiring SK may vary from different industry. The results of this study will be useful for managers in the CI to learn the most effective methods to improve their SK, and for HR departments to develop training programs for project staff based on the results.

4.8.3 Kruskal-Wallis Test the effectiveness of the SK.

Table 4.8 is tested with different respondents including the Contractor, Consultant, Developer. Based on Table 4.8, there are no asymptotic significant value which is less than 0.05. Therefore, there is no statically significant difference presented in the above table. The results of the analysis indicate that the three different groups of responders have a consistent view of SK effectiveness analysis.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Overview

In this chapter, conclusions will be drawn from the data obtained from the questionnaire and the results of the analysis in the previous chapters. Also, the contributions of the thesis, the limitations and recommendations encountered during the research process will be summarized in this chapter.

5.2 Research Findings and Conclusions.

A summary of past literature reviews found that the acquisition and implementation of effective SK by project managers can improve project productivity and effectiveness. However, hard skills are often emphasized in the selection and training of project managers, especially in the light of COVID-19, leading to more projects facing time and cost overruns. Considering the above issues, the main objectives of this thesis research are as follows.

- i. To identify the essential SK of the project manager in the construction industry.
- ii. To examine the awareness level in the Malaysian construction industry.
- iii. To investigate the influence of SK on project managers to project success.
- iv. To appraise the effective methods in acquiring and improving SK for project managers in the construction industry.

To achieve the above objectives, more previous literature on SK for construction projects was collected and summarized, and based on a literature review and valid questionnaires from 119 respondents working in the construction industry in Malaysia, the results showed that:

Objective 1:

For attaining the first objective of this study, A summary of the literature on SK in engineering and non-engineering industries lists 10 personal soft skills and 11 social soft skills based on the importance of SK.

Personal SK includes Flexibility/Adaptability, Critical thinking, Emotional

intelligence, Empathy, Self-reflection and self-management, Personal integrity and reliability, Work under pressure, Cognitive Ability, and Motivation. Social SK includes Effective Communication, Relationships, engagement/Interpersonal, Leadership, Teamwork, resolve conflict and crisis, Negotiation, Influencing, Decision-making, Trust building, Problem-Solving, and Delegation.

Objective 2:

Apart from that, to accomplish the second objective of this study, In Section B. Respondents were asked to rank whether SK are important in the Malaysian construction industry, the implementation of effective SK can improve project competitiveness and organizational performance, the lack of soft skills leads to project failure and SK contribute to project success based on the 5-point rating scale, and the results showed that there is the high level of awareness of SK in the Malaysian construction industry. Most of the respondents agreed that SK can contribute to project success with a mean score of 4.42, SK is important in the construction industry with a mean score of 4.35, SK is a critical factor to enhance the company's competitive edge and organizational performance with a mean score of 4.27, Lack of or incorrect use of SK leading to project failure with a mean score of 3.51.

Objective 3:

Moreover, to accomplish the third objective of this study, In Section C. By ranking the use of 21 personal and social soft skills, the top 10 most significant SK elements used in the construction industry from highest to lowest, were effective communication (98.3%); teamwork (98.3%); building trust (98.3%); relationships and engagement/interpersonal (96.6%); problem-solving (96.6%); leadership (95%); conflict and crisis resolution (95%); personal attitude (94%); Personal integrity and reliability (94%); Decision-making (94%). Of the 10 most significant soft skill elements, eight of them are social soft skills, and only two personal soft skills elements, "personal attitude" and "personal integrity and reliability", indicate that the most significant soft skill elements in the Malaysian construction industry are social soft skills. The subcontractors, consultants, and developers revealed that effective communication was the most significant soft skill element ranked highest by consultants and developers, with developers ranking trust building as the most important soft skill element.

For the analysis of the effectiveness of the 21 soft skill elements, again using

the mean method, the results of the analysis revealed that "effective communication" (Mean=4.4) was the most effective soft skill. Conflict and crisis resolution (Mean=4.36) was ranked second, while the third, fourth, and fifth were personal attitude (Mean=4.34), teamwork (Mean=4.32), and problem-solving (Mean=4.30) respectively. Four of the top five soft skill elements were social soft skills, with personal attitude being the only personal soft skill element.

Which can be inferred that personal attitude is the most effective personal soft skill in the construction industry. About the three groups of key respondents ranking data reveals the top five SK from high to low are effective communication, resolving conflict and crisis, personal attitude, teamwork, and problem-solving skills. This same as the overall ranking. Effective communication is cited as the most important soft skill by developers and supervisors, and conflict and crisis resolution is cited as the most important soft skill by subcontractors.

Objective 4:

Lastly, to accomplish the fourth objective of this study, In Section D. Respondents were asked to rank the best effective approaches to acquiring and improving SK based on the 5-point rating scale. The results showed that Self-development was the most effective method of acquiring and improving SK with a mean score of 4.25, the second most effective method is peer-development with a mean score of 4.10, and the third for Coaching and Mentoring with a mean score of 4.08, Education and Training with a mean score of 4.01 and "Simulation and Gaming" with a mean score of 3.64 ranking from fourth to fifth.

5.3 Contributions of this Study.

Firstly, the contribution of this thesis is that identification of 21 important SK elements, examine the awareness of the project managers, rank of the importance and effectiveness of such skill elements, and the identification of effective ways to acquire and improve SK in Malaysian construction industry. Which can as a basis for future research on the performance of SK aspects.

Secondly, the findings help different managers (contractor, consultant, and developer) in the Malaysian construction industry to improve their SK levels based on their effectiveness and improve project performance levels, thereby reducing the risk of project failure due to cost and time overruns. For example, project subcontractors

reduced the negative impact of COVID-19 on projects by improving resolving conflict and risk skills.

Thirdly, sorting the SK of different practitioners in the Malaysian construction industry helps the HR departments of subcontracting, consultant, and developer companies to select more suitable candidates based on their SK acquisition. It also helps in selecting the most suitable SK for the different practitioners in SK training.

Lastly, this study will enrich the content of the SK knowledge management system in the Malaysian environment and provide a useful aid to current and future construction managers.

5.4 Limitations.

Several limitations need to be considered in this study.

Number of Respondents. Due to time and cost constraints, the survey focused on the Kuala Lumpur, Klang, and Johor Bahru regions and the sample size of 119 did not accurately reflect the SK situation in the construction industry in Malaysia as a whole.

About the survey Scope. The study only included subcontractors, supervisors, and developers in the construction industry and did not include stakeholders such as suppliers, designers, banks, and government agencies associated with the project, so it did not reflect the true picture of the industry stakeholders. The majority of respondents were subcontractors, accounting for 79 (66.4%) of the total number of surveys, while consultants and developers accounted for 20 respondents each. The accuracy of the survey results for the supervisors and developer's subgroup may not be as high as compared to the subcontractors. The survey was also focused on rail and LRT projects where the Malaysian Ministry of Transport was the owner, with 72 project respondents (60.5%) and a total project cost of over RM500 million. Therefore, the survey data is missing Malaysian private developers and small-scale project respondents and may not accurately reflect their conclusions on SK.

Lack of similar research and a serious investigative attitude. The literature review revealed that previous investigations on such skills focused on the SK required and the importance of different industry practitioners, lacking a categorical analysis of different practitioners in the Malaysian construction industry, making this thesis lack a comparison with previous studies. Also, some of the respondents were not able to

answer the questions carefully, for example, the 119 questionnaires had a tied time of 7 to 8 minutes (mean=461 seconds), and a small number of respondents took less than 3 minutes to answer the questions, they just completed the questionnaire but may not have looked at the details of the questionnaire.

A discussion of SK elements. A total of 21 soft skill elements are provided in this thesis. We can do in-depth analysis according to their importance, such as the tools and techniques needed to master the soft skill elements of effective communication, teamwork, and leadership, and the links between SK.

5.5 Recommendations for future work.

Expand the scope of the SK study. For example, by conducting a study of the challenges faced by project managers in acquiring SK and how they can be addressed to better contribute to project success; or by conducting a study of the effectiveness of SK in the construction industry in different countries, such as China, Indonesia, Thailand, etc., to capture changes in the effectiveness of SK in other countries in the context of different political, economic, cultural and construction standards.

Further research into the background information of the investigators. For example, dividing projects into large, medium, and small projects according to contract size to determine how the importance and effectiveness of SK vary by project size. Alternatively, SK could be studied by the respondent's working position to identify differences in the extent to which SK elements affect senior managers and executives.

Increase the sample size to 200-300 respondents and equalize the number of respondents across different organization types to obtain more accurate and valid data across different organization types.

Conduct SK research on other industries. Based on the SK study of the Malaysian construction industry, a SK study could be conducted on the Malaysian education industry, government departments, and companies to capture the differences in the importance and effectiveness of SK in different industries.

5.6 Implications of study.

In conclusion, this study identifies the scope of SK, ranks the importance and effectiveness of SK, and identifies the most effective ways to acquire and enhance SK in the Malaysian construction industry. The findings indicate that project implementation of effective communication, teamwork, and trust building can effectively contribute to project success, which is in line with the findings of the literature review. In addition, the findings show that effective implementation of personal and social soft skills by project managers can enhance project performance in the Malaysian construction market.

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APPENDICES

THE EFFECTS OF PROJECT MANAGER'S SOFT SKILLS ON SUCCESS OF PROJECT IN THE MALAYSIAN CONSTRUCTION INDUSTRY

Dear respondents:

I am Wen Bao Jun, a student from Universiti Tunku Abdul Rahman (UTAR). I am doing my Research Project with the title of "The Effects of Project Manager's Soft Skills on Success of Project in the Malaysian Construction Industry" to complete my Master of project management studies. This research focuses on the parties involved in the Malaysian construction industry.

There are three main objectives to be achieved:

1. To identify the essential soft skills of project manager in the construction industry.
2. To investigate the influence of soft skills for project managers to project success.
3. To appraise the effective methods in acquiring and improving soft skills for project managers in the construction industry.

This questionnaire consists of FOUR (4) sections, Section A, B, C and D. It should take around 5 to 10 minutes to complete. Please kindly answer all the questions as your responses are very important for my research.

Thank you for your time and participation. Your help is very much appreciated. All responses provided will be kept private and confidential and solely for academic purpose.

If you have any inquiries, please do not hesitate to contact me.

Best Regards,

Wen Bao Jun

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Universiti Tunku Abdul Rahman

Section A – Respondent’s background Information.

1. What is the type of your organization?

	Contractor
	Consultant
	Developer/Owner

2. What is the largest project (based on contract value) undertaken by your company?

	Less than RM10 million
	Exceeding RM 10 million but less than RM 100 million
	Exceeding RM 100 million but less than RM 500 million
	More than RM 500 million

3. How many years of working experience in the construction industry?

	Less than 5 years
	6 – 10 years
	11 – 15 years
	16 – 20 years
	More than 20 years

4. What is your highest academic qualification?

	Secondary/High school
	Certificate/Diploma
	Bachelor’s degree
	Postgraduate (Master/PhD)

5. Which of the following best describe your job responsibility?

	Non-executive
	Executive
	Managerial
	Senior Management /Principal

Section B –Awareness of soft skills in construction industry.

6. Do you agree with the following statement?

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6.1	Soft skills (SK) are important in Malaysian construction industry	5	4	3	2	1
6.2	Implement effective soft skills that can improve project competitiveness and organizational performance	5	4	3	2	1
6.3	Lack of or incorrect use of soft skills leading to project failure	5	4	3	2	1
6.4	Soft skills can contribute to project success	5	4	3	2	1

Section C –Soft skills elements used to project management.

7. Which of the following soft skills elements were used in your company?

	Personal soft skills	YES	NO
1	Flexibility/Adaptability	YES	NO
2	Critical thinking	YES	NO
3	EI (emotional intelligence)	YES	NO
4	Personal attitude	YES	NO
5	Empathy	YES	NO
6	Self-reflection and self-management	YES	NO
7	Personal integrity and reliability	YES	NO
8	Work under pressure	YES	NO
9	Cognitive Ability	YES	NO
10	Motivation	YES	NO
	Social soft skills		
1	Effective Communication	YES	NO
2	Relationships and engagement/Interpersonal	YES	NO
3	Leadership	YES	NO
4	Teamwork	YES	NO
5	Conflict and crisis	YES	NO
6	Negotiation	YES	NO
7	Influencing	YES	NO
8	Decision-making	YES	NO
9	Trust building	YES	NO

10	Problem Solving	YES	NO
11	Delegation	YES	NO

8. How effective are these soft skills elements being used on the project in your company?

	Soft skills elements	Extremel y effective	Very effectiv e	Moderate ly effective	Slightl y effectiv e	Not at all effectiv e
Personal soft skills						
1	Flexibility/Adaptability	5	4	3	2	1
2	Critical thinking	5	4	3	2	1
3	EI (emotional intelligence)	5	4	3	2	1
4	Personal attitude	5	4	3	2	1
5	Empathy	5	4	3	2	1
6	Self-reflection and self-management	5	4	3	2	1
7	Personal integrity and reliability	5	4	3	2	1
8	Work under pressure	5	4	3	2	1
9	Cognitive Ability	5	4	3	2	1
10	Motivation	5	4	3	2	1
Social soft skills						
1	Effective Communication	5	4	3	2	1
2	Relationships and engagement/Interpersonal	5	4	3	2	1
3	Leadership	5	4	3	2	1
4	Teamwork	5	4	3	2	1
5	Conflict and crisis	5	4	3	2	1
6	Negotiation	5	4	3	2	1
7	Influencing	5	4	3	2	1
8	Decision-making	5	4	3	2	1
9	Trust building	5	4	3	2	1
10	Problem Solving	5	4	3	2	1
11	Delegation	5	4	3	2	1

Section D – About acquiring and improving the soft skills.

9. What are the best effective approaches to acquire and improve the soft skills.

		Extremely effective	Very effective	Moderately effective	Slightly effective	Not at all effective
1	Self-Development	5	4	3	2	1
2	Peer-Development	5	4	3	2	1
3	Education and Training	5	4	3	2	1
4	Coaching and Mentoring	5	4	3	2	1
5	Simulation, and Gaming	5	4	3	2	1