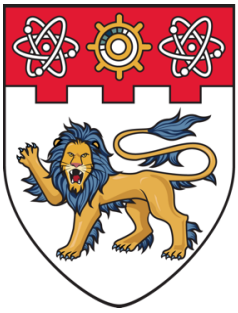

NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

RESEARCH ON CRITICAL SUCCESS FACTORS OF STAKEHOLDER MANAGEMENT IN CONSTRUCTION PROJECT

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SCHOOL OF MECHANICAL AND AEROSPACE ENGINEERING

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PROJECT MANAGEMENT

2023

Statement of Originality

I hereby certify that the work embodied in this thesis is the result of original research, is free of plagiarised materials, and has not been submitted for a higher degree to any other University or Institution.

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I have reviewed the content and presentation style of this thesis and declare it is free of plagiarism and of sufficient grammatical clarity to be examined. To the best of my knowledge, the research and writing are those of the candidate except as acknowledged in the Author Attribution Statement. I confirm that the investigations were conducted in accord with the ethics policies and integrity standards of Nanyang Technological University and that the research data are presented honestly and without prejudice.

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SYNOPSIS/ABSTRACT

The topic explores the **critical success factors (CSF) of stakeholder management in construction projects.**

Construction projects are complex, and project success has become difficult in today's turbulent economic environment. The literature review highlights crucial success elements for efficient stakeholder management and defines fundamental concepts, principles, and theories of stakeholder management. The study employed mixed-methods research, in addition to a systematic literature review and collecting questionnaire data for analysis.

It is important for academics and professionals to identify critical success factors in different sectors contexts. Thus, the data analysis provides a practical illustration of stakeholder management in action and identifies challenges and opportunities related to stakeholder management.

The study enhances the current understanding on stakeholder management by giving a complete framework for achieving efficient management of stakeholder in construction projects. The research findings can assist construction project managers in enhancing their stakeholder management tactics and ultimately improving the overall construction projects successful.

Keywords: stakeholder management, construction project, critical success factor.

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1. INTRODUCTION

This chapter presents a thorough examination of the research background, research purpose and objective, research question, as well as the extent and significance of the study.

1.1. Background

Increasing research indicates that stakeholder management is essential for guaranteeing the accomplished fulfilment of construction projects by effectively addressing the requirements and expectations of stakeholders (Yang. et al, 2009). It also **emphasizes the significance of stakeholder involvement in projects** (Agata & Joanna, 2021). Pulse of the Profession (PMI) 2021 found that 63 percent of businesses now use stakeholder engagement techniques (Neha, 2022). Facilitating productive strategic planning by translating stakeholder requirements into organisational objectives. Decisions can be made with greater ease, and risk is mitigated when stakeholder groups can identify a common goal or reason. (Crowe, 2017). Nevile and mengue (2006) stated a significant portion of the current body of research pertaining to the dynamics of relationships between businesses and their stakeholders has mostly concentrated on the strategies employed by top-level managers in addressing the multitude of divergent and confilcting claims. Thus, stakeholders can either be staunch advocates for the project or a roadblock to its completion (Van, 2020).

Stakeholder management helps projects identify, analysis, and prioritise the interests of individuals most likely to be impacted by their work. Management of relationships with both internal and external parties and building trust and enhancing communication

with a wide range of stakeholders requires taking proactive measures (Neha, 2022).

Many people believe that construction is a complex and labor-intensive field. Cost overruns on projects due to factors like a lack of available workers and competing business priorities have exacerbated stakeholder relations since the outbreak began and increase the challenge of stakeholder management. Due to social isolation, people avoid getting together in large groups or even talking to each other. Therefore, they avoid dismissing the value of stakeholder management and active participation. Xue and Jin et al. (2020) assert that researchers widely agree that the investigation of stakeholder management in the realm of building projects has been restricted. This was recognized as a deficiency in the current body of research literature.

Hence, this topic purpose to undertake a comprehensive examination of the aforementioned disparity and provide a structured framework for the effective advancement of the project.

1.2. Aim & Objectives

This study seeks to investigate the crucial aspects that facilitate the effective oversight of stakeholders. The aim is to efficiently oversee the project and facilitate the coordination among stakeholders, thereby ensuring the project's success.

The construction sector has perennially grappled with the efficient management of stakeholders, mostly due to the complicated and unpredictable nature of projects (Loosemore, 2006). Prior research has identified numerous difficulties associated with stakeholder management in building projects. The obstacles include a lack of involvement from stakeholders, project managers not having defined goals in managing stakeholders, the difficulty of identifying stakeholders who may not be easily noticeable, and

poor communication with stakeholders (Jing et al., 2010). Hence, the subject matter revolves around the essential elements that determine the effectiveness of managing stakeholders. The purpose of selecting this topic is to facilitate consensus and equilibrium among all project stakeholders by identifying crucial success criteria for coordinating and managing stakeholder relationships. The purpose of this is to provide a smoother execution of the project and to improve the efficiency of the management of project stakeholders.

Based on the findings of the survey conducted by Jing et al. (2010), it is evident that while there is a general agreement among respondents regarding the prioritisation of CSF, there are certain variations in their perspectives. Hence, the present study will concentrate on a comprehensive analysis of these elements and the strategies employed to effectively manage and coordinate stakeholders. In addition, each stakeholder defines project success differently and accepts it differently. Therefore, I will examine the key elements that contribute to the effectiveness of stakeholder management over the whole life cycle of the project of the same nature, considering three different viewpoints: client (consultant), general contractor, and subcontractors. Combining stakeholder perspectives, roles to provide a conceptual new approach to stakeholder management.

Construction projects are intricate, and achieving project success has grown challenging in the current volatile economic climate (RS Invest, 2023). The motivation of this study is to examine the key factors that contribute to the efficient supervision of stakeholders in construction projects, hence improving the efficacy of project stakeholder management and promoting smoother project execution.

These are the goals that this research aims to explore:

1. Identify Critical Success Factors (CSFs) affecting stakeholders;
2. Analyze and assess stakeholder relationships at three different perspectives;
3. Explore the factors that affect the success of stakeholder management to improve stakeholder communication and construction projects;
4. Provide relevant management recommendations.

1.3. Research questions

To comprehensively investigate this research subject, it is necessary to analysis as following questions -

- What are the CSFs that significantly influence stakeholder management?
- How to prove the credibility of these key factors?
- How can a comprehensive understanding of stakeholder perspectives and roles inform a novel approach to stakeholder management in construction projects at different stage?
- What specific recommendations can be provided to project management practitioners to enhance stakeholder coordination, communication?

These research questions aim to delve into various aspects of stakeholder management including identifying critical success factors, analysing stakeholder relationships, exploring influencing factors, and providing practical recommendations for improvement.

1.4. Research Scope

The scope of the research will involve the following sections:

Stakeholder management in construction project: the study will concentrate on analysing stakeholder management in building projects, taking into account their varied interests, functions, and interactions throughout the project's duration.

Critical Success Factors: The purpose of this study is to identify and investigate the critical success factors that have a substantial influence on the management of stakeholders in the context of construction projects. This will include involve exploring various elements, including stakeholder engagement, communication tactics, and alignment with project objectives.

Stakeholder Perspectives and Roles: The research will examine the attitudes and responsibilities of stakeholders from three distinct perspectives: clients (consultants), general contractors, and subcontractors. This analysis will offer valuable perspectives on how diverse stakeholders assess the achievement of a project and their differing expectations of the project.

Impact on Project Success: the purpose of this study is to assess the impact that effective stakeholder management has on the overall performance of the project, encompassing many aspects such as project completion and stakeholder satisfaction.

Recommendations for Improvement: The study's findings will offer practical advice for Professionals specialising in project management within the construction sector to improve stakeholder coordination, communication, and overall project success.

The study will thoroughly investigate stakeholder management, with the goal of identifying crucial factors for success, analysing stakeholder viewpoints, and offering practical suggestions for enhancing project results through efficient stakeholder engagement and management.

1.5. Research Significance

Analysing CSFs for stakeholder management is essential as it enables project managers to discover the pivotal variables that

contribute to the stakeholder management successful. In the realm of construction management, the management of stakeholders is a crucial component, as it entails the recognition, examination, and control of stakeholders' requirements and needs, expectations, and interests. Efficient stakeholder management guarantees the fulfilment of stakeholders' expectations, resulting in heightened contentment and improved relationships between stakeholders and the project team. Additionally, it aids in reducing disagreements and mitigating delays, thereby guaranteeing that the project is successfully accomplished within the predetermined timetable and budgetary constraints (PMI 2016).

By analysing the CSFs, project managers could be identified the factors that are of the utmost importance to the accomplishment of the project. This enables them to focus their efforts and resources on these factors, ensuring that they are adequately addressed throughout the project's whole life cycle. In construction sectors, some of the CSFs include effective communication, stakeholder engagement, stakeholder analysis, stakeholder prioritization, and conflict management (Yang et al, 2009). By analysing these factors, project managers can develop strategies and plans that address stakeholder needs and expectations, manage conflicts, and ensure effective communication throughout the project.

In summary, CSFs for stakeholder management analysis is significant because it helps project managers in order to determine the primary elements that contribute to the success, enabling them to focus their efforts and resources on these factors, leading to successful project outcomes (Freeman, 1984).

2. LITERATURE REVIEW

What are stakeholders? The Project Management Institute (1996) provides a concise and authoritative definition, stating that project stakeholders encompass both organizations and individuals who are actively engaged in the project process or are impacted by the project outcomes. According to a recent study conducted by Emerald Insight (2022), the examination of crucial success factors faced by key construction stakeholders has the potential to improve stakeholder management practises within the context of mega building projects.

2.1. Important of Stakeholder management

Stakeholder theorists perceive a firm as an assemblage of internal and external entities, such as shareholders, employees, consumers, and suppliers. That is, individuals who are impacted by and/or have the potential to shape the attainment of the company's objectives (Jones et al. 2007). At same time, Nguyen et al. (2019) stated understand impact of stakeholder is essential for project success, especially the external stakeholder which was confirmed by Curran and Albert (2004). In additional, Jones et al. argue that stakeholder culture is a significant organisational component that has a significant impact on how managers perceive, prioritise, and address stakeholder issues, as well as, for instance, how they determine stakeholder salience. Jones et al. introduce the concept of a framework to handle the ethical conflict that arises in managerial decision making between self-interest and the interests of stakeholders. Khalilzadeh et al. (2021) point out that during each stage of the project, the quantity and kind of stakeholders may differ and possess distinct interests that must be efficiently addressed. The presence of divergent interests might

potentially lead to conflicts, hence exacerbating the challenge of formulating effective stakeholder engagement techniques. It is impractical to ensure the satisfaction of all project stakeholders.

Contemporary literature asserts that stakeholder management is crucial for the successful execution of building projects (Agata & Joanna, 2021). According to Chan et al. (2004), the achievement of the construction project is contingent upon various aspects, including project relevance, procedures for the project, activities for project management, human aspects, and the circumstances of the external environment. Furthermore, numerous academics have highlighted that the assessment of success in every project is contingent upon the perspectives of multiple project stakeholders, including customers, employees, and managers. To effectively manage, project managers must comprehend the opportunities and risks posed by stakeholders, the social obligations that must be met, set shared objectives, and implement suitable tactics to enhance stakeholder satisfaction, so as to make the project successful which the view was confirmed by data collected by Poland company that run construction project. (Agata & Joanna, 2021).

However, Giacomo and Kamalesh (2016) indicated that there is a correlation between the attribution of stakeholder importance and the type of stakeholder engagement activities, with respect to the prevailing stakeholder culture within an organisation. Managers may encounter limitations in efficiently handling stakeholder interactions, irrespective of their personal principles and beliefs. As a result, they may need to make a deliberate effort to change the company culture. Furthermore, the existing literature emphasises the significance of leadership in effectively managing stakeholders. As stated in a 2022 blog post by Great Learning,

stakeholder management is important in leadership because it allows leaders to accurately identify, assess, and regulate the interests and expectations of individual or group who have a significant interest in the organization or project. Simultaneously, a separate study conducted by Emerald Insight (2022) has demonstrated that stakeholder management holds significant importance in the realm of leadership, as it facilitates the identification and evaluation of stakeholders' expectations by leaders who have a significant interest in a specific project. The research findings suggest that leadership has a crucial impact on effectively managing stakeholders. According to Cleland (1999), it is essential for project managers to have effective stakeholder management in order to assist them in the process of implementing strategies that are designed to maximise the value of a project for the stakeholders involved in the project. Stakeholder management involves the process of ensuring stakeholder satisfaction by actively involving them and effectively resolving any conflicts that may arise. The involvement of stakeholders is an essential component for achieving success in projects (Eyiah-Botwe et al., 2016). Early validation of the project and meeting customer expectations can be achieved through active stakeholder interaction and continuous assessment of project iterations (Stober & Hansmann, 2010).

Stober & Hansmann (2010) state that agile drive projects do not necessitate a pre-established and sequential stakeholder management process. This is because stakeholders must actively engage in the project in order to expeditiously furnish the requisite information and particulars to the project team.

2.2. The method of stakeholder analysis

According to Yang et al. (2018), building project teams have begun to employ advanced techniques for analysing stakeholders, examples include the snowball rolling technique and the approach for assessing stakeholder attributes. Nevertheless, project teams still show reluctance in embracing complex tools that necessitate the skills of experts.

However, the study conducted by Amadi et al. (2020) affirms the significance of internal stakeholders' skills and actions in the stakeholder management process. The researchers also critique the existing literature's suggestion of a one-time stakeholder identification approach, highlighting its shortcomings. Instead, they propose a dynamic approach to identifying the interests of external stakeholders. In addition, they highlight the fact that the management of stakeholders is a crucial component that must be taken into consideration within the context of the construction project. In projects of this nature, it is of the utmost importance to identify the strategy that would be most successful in managing stakeholders. According to Chen & Lvova (2011), the traditional method of stakeholder management involves strategic stakeholder planning, including channels of communication and other strategies that help develop and maintain relationships of the stakeholder. A comprehensive elucidation of seven daily activities that might be utilised to proficiently oversee stakeholder connections was presented by Freeman et al (2007). The strategies described above include evaluation of stakeholders, analysis of behaviour, understanding, assessing, developing, innovation and developing.

According to Haas (2007), the **Agile methodology** is a conceptual framework in management that utilises iterative development

techniques at regular intervals for review. An approach that places a significant emphasis on fostering stronger collaboration among the customer, stakeholders, and small independent development teams is something that is taken into consideration. This approach is characterised by its flexibility, facilitating the system's adaptation to the individual project requirements within a particular setting and temporal framework (Haas, 2007).

In contrast to the traditional approach, agile projects provide the advantage of not being constrained by the original requirements of stakeholders. The architecture of the project model is characterised by flexibility and extensibility, allowing the project team to incorporate additional features to accommodate new stakeholder requirements (Aguanno, 2005).

In additional, Mok et al. (2015) discovered that conventional stakeholder analysis approaches are frequently employed in large-scale construction projects, despite being recognized for their inherent shortcomings. The researchers argued that there is a necessity for a **social network approach** to effectively manage the interrelationships among stakeholders in such projects. Moreover, the research carried out by Singh et al. (2021) affirms that the adoption of **building information modeling** (BIM) has great potential in efficiently handling stakeholders in construction projects. BIM enables project teams to actively involve stakeholders in the first phases of the construction process, allowing for the early detection of solutions that can prevent or minimize delays and disputes, ultimately assuring stakeholder contentment (Singh el al., 2021).

2.3. CSFs of stakeholder management

Yang et al. (2009) pointed out that When it comes to gauging the success of a project, the management of stakeholders is an

extremely important factor. They proposed 15 factors for risk management item including **undertaking social responsibilities, defining project mission, stakeholder identify, analysis, understanding, accessing and predicting the influence, reconciling conflicts, fostering relationships, communicating effectively, formulating strategies**, and more. The results of the research show that among the above 15 CFSs, social responsibility is the key factor for project success. That is to say, stakeholder management should undertake social responsibility (Yang et al. 2009). In 2010, Yang et al. conducted an in-depth analysis of the above 15 CFSs and confirmed that CSFs are reliable and found that there was no significant difference among the 15 CSFs, but depended on the work priorities of stakeholders such as the nature of the project, costs and customers.

The study conducted by Park et al. (2017) shows that extended and intricate large-scale construction projects necessitate a heightened focus on adapting to environmental fluctuations and fostering social collaboration. The findings of the analysis, in conjunction with the Critical Success Factors (CSF) goals, underscore the imperative of adopting tailored strategies for managing long-term, intricate mega construction endeavours.

- **Communication**

Agata & Joanna (2021) stated stakeholder management/analysis in construction projects sometimes overlooks explicitly identifying critical success factors (CSF). However, CSF in this context primarily encompass elements such as good communication, cooperation, and clearly defined goals/objectives of the customer. In the literature review by Yang et al. (2009) also identified that efficient communication between the project and its stakeholders is among the three primary variables that impact the stakeholder

management process in building projects. According to PMI (2013), only 52% of projects completed by poor communicators succeeded in meeting their initial goals, while only 37% were completed on schedule and 48% were completed within budget. However, just 25% of companies were rated as highly effective communicators before COVID-19 (Van, 2020).

The Stakeholder Circle methodology proposed by Bourne & Lynda (2016) highlights a five-step process for effective stakeholder engagement: identification, prioritization, visualization, engagement through effective communication, and monitoring engagement effects. This approach emphasizes the need of comprehending the requirement of person or organization that has a financial stake in the outcome in order to facilitate effective communication and involvement. It is posited that every stakeholder and stakeholder community possess distinct and dynamic cultures, expectations, and perceptions, whether at the individual, group, or organizational level. An optimal communication strategy considers the intricacy of individuals involved in or impacted by project results, and effectively handles the dynamic group of individuals whose backing and involvement are vital for project triumph.

According to PMI's estimates, poor communication is responsible for the failure of one out of every five projects. It will be more challenging to communicate successfully in the present economic context because large group meetings and in-person discussions will be restricted. Because of this, **it's crucial to properly manage, engage, and communicate** with all relevant stakeholders (PMI, 2013).

- **Understanding stakeholder needs**

The issues associated with the identification of stakeholders and comprehension of their respective project requirements are examined in a scholarly article published by the Project Management Institute. This article elaborates on a methodical methodology designed to aid project managers in identifying stakeholders and analyzing their requirements. Understanding stakeholder needs is a vital component that greatly contributes to the success of a project (Smith, 2000).

The book pertaining to Construction Stakeholder Management provides a comprehensive examination of stakeholder mapping techniques and introduces a power/interest matrix. This matrix serves as an illustrative tool, highlighting the importance of comprehending stakeholder requirements in order to successfully involve them in construction endeavors (Chinyio et al, 2010).

Stakeholder management is considered highly significant in modern construction project management, as stated by Brian and Martin (2008). This necessitates practitioners to possess a comprehensive comprehension of the subject, underpinned by robust theories and concepts. The authors engage in a discourse regarding the essential competencies required to effectively manage stakeholders within construction project teams. Additionally, they emphasize the significance of comprehending and fulfilling stakeholder requirements as a crucial factor in achieving successful project execution.

It is challenging to prevent cost overruns in modern building projects due to their growing complexity and the participation of many stakeholders with varying interests (Doloi, 2011). To ensure a positive result for a project, it is crucial for the project team to accurately identify the stakeholders involved, determine their

specific needs and expectations, and efficiently handle their impact on these requirements (Othman & Abdellatif, 2011).

- **Transparency**

In research investigation pertaining to major construction projects in Qatar, it was discovered that the implementation of efficient stakeholder management, which essentially encompasses transparency, plays a pivotal role in enhancing project performance and guaranteeing timely and cost-effective completion of construction endeavours (Mashali et al, 2023). An essential aspect of building site management is establishing a work environment that facilitates efficient information dissemination. Enhanced process transparency facilitates the attainment of this objective by ensuring that All stakeholders participating in the project are sufficiently informed and actively engaged (Brady et al, 2018). The issue of insufficient process transparency in building projects frequently results in inadequate communication and coordination (Koskela and Howell, 2002). The study done by Brady et al. (2018) found that On-site communication challenges arose due to a deficiency in transparency pertaining to construction planning and control, a lack of focus on processes, and substantial wastage. Hence, a methodical framework was suggested with the aim of enhancing construction planning and promoting institutional transparency.

- **Stakeholder Engagement & Collaboration**

The construction sector is an intricate setting that requires the essential need for Cooperation and synchronisation among multiple parties involved (Olatunji et al., 2016). Design and implement adaptable engagement methods that effectively address the varied requirements and interests of stakeholders. It is imperative to acknowledge the diverse degrees of interest and

impact exhibited by stakeholders and thereafter customise engagement tactics in accordance with these variations (PMI, 2016).

In addition to the aforementioned information, a study undertaken by Molwus et al. (2017) focused on analyse the interconnections among crucial determinants of success pertaining to stakeholder management within the construction sector. The research findings suggest that the active participation and authorization of stakeholders directly and positively impact the overall achievement of a project. It is noteworthy to acknowledge that the study was conducted approximately one year after the start of the COVID-19 pandemic. The researchers emphasize that this event has caused a significant change in people's views on personal and societal values and norms (Sapasi et al., 2021). The attainment of project success is strongly tied to meeting the varied interests of different stakeholders, as their expectations can range greatly.

Managers must acknowledge the interdependent relationships among many stakeholders, given their diverse nature. The impact of a single stakeholder's involvement may not possess enough influence to affect the organisation significantly. Nevertheless, when collaborating with another stakeholder, the combined level of importance may be substantial enough to exert influence on the organisation. Hence, it is imperative for managers to not solely focus on stakeholder interests in isolated, dichotomous connections, but also take into account the possible interdependencies with other stakeholders (Neville & Bulent, 2006). The significance of stakeholder participation in attaining project success is emphasised in a literature study conducted by Najib et al. (2022). It is identified as a crucial component influencing stakeholder impact and warrants further examination.

Furthermore, Effective risk management is a vital factor in achieving success in stakeholder management in the realm of building projects (Najib et al., 2022).

- **Flexibility**

It is clearly stated in PMbok (2016) that The project life cycle must include sufficient adaptability to accommodate the diverse aspects encompassed inside the project. Demonstrates flexibility in addressing tactical priorities and possesses the capacity to efficiently analyse extensive volumes of information to identify crucial data. Project methods that possess flexibility to address unforeseen risks while yet upholding the overarching objectives of the project, incorporating robust change management strategies (PMI, 2016). A flexible approach is required in order to properly manage the project's stakeholders; It is important to use agile management techniques. The typical justifications for adopting agile methodologies include enhanced speed, increased responsiveness, a solution-oriented mindset, heightened creativity, and a greater emphasis on practicality. These advantages can be further expanded upon (Hands, 2016).

- **Responsibility**

Brian & Martin (2008) examine the ethical connections between construction organizations and their stakeholders, analysing them via the lenses of ethics, social contracts, and corporate responsibility.

The varying priorities and values across different countries significantly influence the manner in which businesses engage in corporate social responsibility (CSR) endeavours. At the environmental level, architects have the capacity to contribute to the heightened awareness within the architectural profession regarding environmental conservation. This can be accomplished

by incorporation of sustainability principles into the design process serves to mitigate the adverse environmental effects associated with buildings. This can be accomplished through the utilisation of durable materials that are both environmentally friendly and non-toxic, as well as being easy to maintain, energy efficient, and recyclable (Othman & Abdellatif, 2011).

According to the PMbok (2016), when stakeholders fulfil their responsibilities, they are more inclined to demonstrate accountability for their actions and decisions. This phenomenon has the potential to result in improved project outcomes. For instance, a conscientious stakeholder will engage proactively in risk management endeavours, so assisting in the identification and alleviation of potential dangers. Simultaneously, it is imperative for stakeholders to assume responsibility for effectively managing their resources in order to achieve project objectives.

- **Conflict Resolution**

Scholars specializing in stakeholder management have contended that the most intriguing category of firm-stakeholder interactions arises when there is a conflict of interests between some stakeholders and the company. The necessity of managing stakeholders arises from the absence of conflicting interests (Frooman & Murrel, 2005). Kirsi & Jaakko (2010) point out that during a period that is deemed most favourable for project management in terms of decision-making authority, the involvement and expression of perspectives by secondary stakeholders are restricted. The discrepancy between the timing of the opportunity to exert influence and the ability to exert influence may lead to an increase of conflicts during the implementation phase of the project.

The construction sector is commonly seen as having an adversarial mentality, it is because necessitate the collaboration of a temporarily created project team consisting of professionals from several disciplines. Project team members have the ability to prioritize their respective goals and priorities, with the aim of maximizing their personal gains, the initial step in seeking resolution for problems often involves engaging in negotiation amongst the parties involved (Cheung et al., 2006). The study conducted by Cheung et al. (2006) examines the various negotiating methods employed in construction conflicts and their corresponding outcomes, providing insights into the key aspects that contribute to successful conflict resolution. It has been shown that the utilization of obliging, dominating, and avoiding strategies seems to have a diminished impact on attaining functioning negotiating outcomes. The utilization of an integrating style has been identified as a valuable strategy for attaining favourable negotiation outcomes, while employing a comprising style is deemed a pragmatic way for settling conflicts.

- **Performance measurement**

Performance measurement is noted to directly influence project management and organizational success. Certain performance measurements can significantly influence the overall success of a project. The statement emphasizes the significance of implementing a strategic approach when using performance metrics in building projects. This approach should consider both project management objectives and organizational goals (Korhoren et al.,2023).

Oppong et al (2017) proposed an approach that specifically targets the management of stakeholder performance in building projects by emphasizing performance attributes. The model has been

specifically developed to possess adaptability, making it well-suited for a wide range of construction projects, encompassing diverse natures, sorts, and phases. It is recognized that the satisfaction of stakeholders and organizations can be subjective and multifaceted.

- **Prioritization**

The process of prioritization and ranking holds considerable importance in the strategic planning of stakeholder interaction. The process includes evaluating and prioritizing stakeholders according to several factors, including their degree of interest, influence, and project impact. Prioritization is essential for developing effective methods to manage and engage stakeholders across a project's whole duration (PMbok, 2016). Roeder and Tres (2013) point out project managers often have limitations in terms of time and resources when managing stakeholders. Therefore, prioritizing project stakeholders is a vital strategy for them. Furthermore, the utilization of prioritization matrices in project management might yield significant advantages, complementing the existing PMBOK principles. Matrices are utilized as instruments for the identification of crucial matters and the assessment of various options, thus establishing priorities for the execution process. By employing basic or weighted matrices, project teams can effectively evaluate and allocate relative significance to different concerns, ensuring that the most critical issues are prioritized to fulfil the project objectives. (Tom, 2023).

- **Empathy**

The purpose of empathy in stakeholder management for construction projects is of utmost importance. Empathy can be described as the cognitive and affective capacity to comprehend and reciprocate the emotions of others. This attribute holds

significant relevance within the context of construction projects, as they fundamentally serve as conduits for individuals to facilitate meaningful transformation. The value equation commences by comprehending stakeholders and discerning their foremost priorities. Construction projects sometimes involve intricate surroundings that give rise to conflicting demands. Decisions made solely from the viewpoint of one party involved may lead to adverse effects on other parties, ultimately leading to the failure of the project. Thus, it is crucial for project managers to clearly communicate measurable outcomes and evaluate them with a compassionate mindset to determine the maximum value for the entire group (Psaproject, 2020). According to Brian and Martin (2008), it is imperative for the construction sector in the 21st century to align itself with the challenge of managing conflicting stakeholder interests and ethical considerations. The study investigates the ethical interactions between construction organizations and their stakeholders, analyzing them from the perspectives of ethics, social contracts, and corporate responsibility. They assert that crucial commercial decisions in the building industry are inherently ethical judgments.

A study by Ebekozien et al (2023) placed significant emphasis on the significance of empathy in the reduction of conflicts and disagreements within construction projects, as well as the enhancement of communication and collaboration within project teams. The study shown that involving stakeholders in decision-making processes and fostering cooperative behavior can significantly reduce conflicts, project delays, and cost overruns. Moreover, Zhang & Hao (2022) founded that emotional intelligence of building project manager, which includes the characteristic of empathy, exerts a substantial influence on the overall

effectiveness of project teams. Empathetic leaders play a significant role in shaping team cohesion and project success, as they possess a heightened capacity to comprehend and effectively address the many needs and views of team members and stakeholders.

2.4. FINDING & DISCUSSION

The literature review provides a comprehensive overview of stakeholder management in the context of the construction project. It highlights the importance of stakeholder management for project success and outlines key CSFs for effective execution. A rich foundation for discussing various stakeholder theories and strategies in construction projects, as well as alternative frameworks for stakeholder management. The existing body of literature pertaining to stakeholder management in construction projects has highlighted a number of pivotal aspects that play a significant role in attaining positive outcomes. These characteristics include efficient communication, thorough identification and analysis of stakeholders, active interaction with stakeholders, and other related elements. Through the efficient management of these characteristics, project managers have the ability to cultivate favourable relationships with stakeholders and attain successful project outcomes. A clear definition of roles and responsibilities ensures that each stakeholder understands their duties, which can prevent conflicts and miscommunication. The communication strategy focuses on building and maintaining the project's image and reputation, as well as fostering the project team and its stakeholders establish robust and enduring ties. This is accomplished by employing flexible and often informal approaches (PMI, 2016). Being flexible in your approach to stakeholder management allows you to more effectively handle the

diverse range of personalities, interests, and needs that stakeholder may have. This can include adjusting communication styles, engagement methods, and conflict resolution strategies to best suit each stakeholder or situation. Moreover, empathy is not merely a favourable characteristic but an essential proficiency for proficiently handling stakeholders in construction projects, resulting in improved team synergy, less disputes, and enhanced project results.

The literature review references stakeholder salience theory by Mitchell et al. (1997), which emphasizes the varying degrees of importance stakeholders hold based on their power, legitimacy, and urgency. This theory is valuable for prioritizing stakeholders and tailoring engagement strategies. In a study conducted in 2015 by Hands, it was observed that both academic academics and experienced project practitioners expressed a need for increased emphasis on governance principles like as, transparency, accountability, responsibility, and fairness. Additionally, the information implicitly touches upon other relevant theories include the theory posits that firms should consider the interests of all stakeholders, not just shareholders, in their decision-making. And firms have an unwritten social contract with stakeholders to operate ethically and responsibly. These theories provide a foundation for understanding the importance of stakeholder management and guide ethical decision-making in construction projects. The content highlights several stakeholder engagement strategies, but the choice of strategy depends on the stakeholder's salience, project stage, and desired level of engagement. The content also emphasizes the importance of communication, understanding stakeholder needs, transparency, and collaboration as key factors for successful stakeholder engagement.

While traditional stakeholder management frameworks provide a valuable foundation for identifying, analysing, and engaging stakeholders (PMI, 2017), their rigid structure can limit their applicability in all project situations and flexible (Chen & Lvova, 2011). Alternative frameworks offer different perspectives:

- Social Network Approach

It offers a comprehensive perspective on stakeholder dynamics, aids in the identification of influential individuals, and promotes collaborative efforts, but the process of mapping and analysing extensive networks can be intricate, perhaps neglecting the specific requirements of individual stakeholders (Mediation Adaptation platform, 2013).

- Building Information Modeling (BIM)

BIM is a technological platform that enables stakeholder participation through the provision of a shared information model of a project. The advantages of this approach include enhanced communication and transparency, the opportunity for early engagement of stakeholders in the design and decision-making processes, and the facilitation of dispute resolution. but it demands financial commitment towards technology and training, may not be universally applicable to all projects and stakeholders (Lorek, 2022).

- Agile Management

Agile techniques place a strong emphasis on the iterative development process, input from stakeholders, and the ability to adjust flexibly to evolving requirements. It enhances the ability to promptly address stakeholder requirements, promotes cooperation, and permits modifications at various stages of the project's duration. However, the adoption of flexible planning and execution necessitates a culture transformation, which might pose

difficulties when attempting to execute it inside conventional construction settings (Businessmap, 2024).

Overall, the selection of a framework is contingent upon the unique setting of the project, the characteristics of the stakeholders involved, and the desired objectives (Khalilzadeh et al. 2021). Project managers should carefully evaluate the advantages and disadvantages of each framework and implement a customised approach that aligns with their specific requirements. Project managers can enhance the probability of project success and establish enduring positive relationships with stakeholders by consistently involving them, resolving their concerns, and adjusting to their evolving requirements (Khalilzadeh et al. 2021).

3. METHODOLOGY & SOURCES OF DATA

This chapter presents a succinct summary of the methodology and data sources employed in the study. The focus is on utilizing a mixed-method approach, employing a specific study design, describing the characteristics of the sample, utilizing certain data sources, and designing the survey. The data is acquired by a meticulous examination of literature, surveys employing questionnaires, interviews, and analyses of newspaper articles.

3.1. Method chooses

The research will employ a combination of **quantitative and qualitative methodologies**, detail from a literature review and a questionnaire survey. To adopt a mixed method to incorporate data and stakeholder opinions in order to properly comprehend the issues and considerations pertinent to this research topic. These arguments are discussed and analyzed utilizing research-based articles, newspaper analyses, interviews, literature reviews, and

in-depth historical information, all of which are backed up by pertinent data gathered through questionnaire surveys.

3.2. Research framework

The research procedure that was carried out is depicted in Figure 3.1. This study comprises four primary components. The research begins by discussing the concept of stakeholder project success factors, with particular emphasis on the perspective of project stakeholders. The subsequent section employs questionnaire interviews as a means of gathering the perspectives of professionals in three distinct sectors of the construction business regarding the aspects they deem significant. This portion outlines the research sample, details the procedure of data collecting, and elucidates the analysis of the quantitative study findings and verify its validity. The final section elucidates the practicality of these aspects in real-world initiatives by means of analysis. The final section of the article encompasses the discussion, recommendation and conclusion.

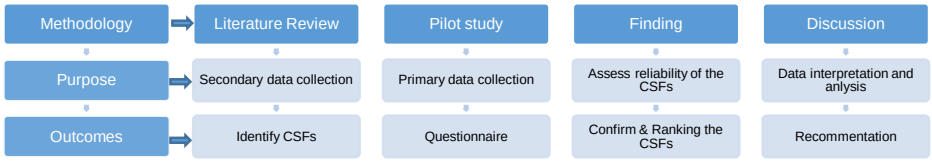
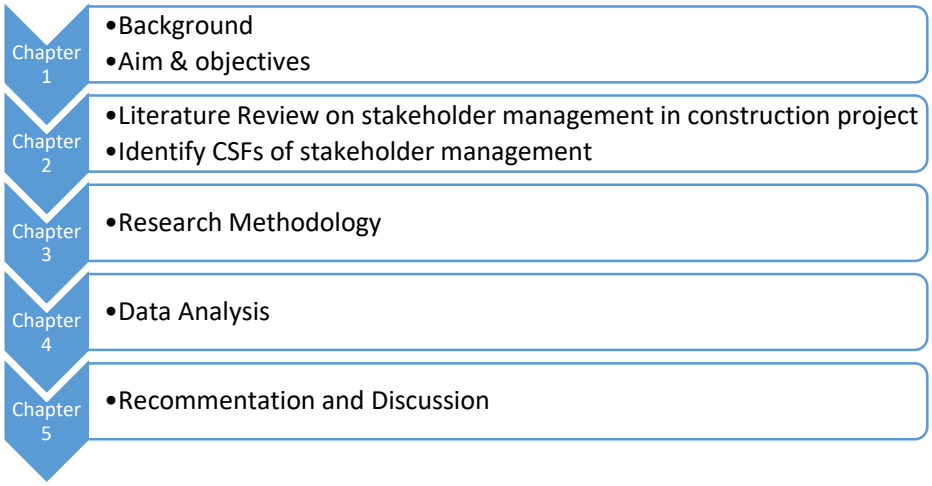


Figure 3.1 – Research framework

The elements of the framework align with the corresponding chapters of this paper, which are delivered in the same sequential order thereafter.

The section gives a framework that outlines the activities and steps involved in the thesis work. The research process commences with the formulation of a research concept derived from preliminary investigations, followed by the exploration of the selected topic through theoretical analysis.

The model incorporates techniques for gathering both secondary and primary data, which will be thoroughly analysis once all data and information have been collected. After that conclusions and recommendations must be formulated when conducting this analysis. The figure 3.2 - Thesis Structure as follows -



3.3. Research Design

To develop the theoretical foundation of the research object, elucidate the factors that have an impact on project stakeholders and the extent of their influence, while also providing a theoretical foundation and a clear direction for writing the paper. Therefore, necessary to use literature research and survey methods. It will allow the research conclusion to be established on a more solid foundation. The analysis project primarily encompasses important stakeholders and examines their interaction with the project, as well as the primary aspects that influence the project's success. Different construction sectors involve a different range of people, and their stakeholder engagement and relationships also change at each sector.

Impacts collection of the stakeholders involved in each sector on the project through **survey questionnaire**.

According to the CSFs identify by literature review and create a questionnaire. To test its suitability and make any necessary adjustments, including the format of the questionnaire, **a pilot should be conducted by two senior project managers. However, they expressed unwillingness to publish the information they expressed, so the information they communicated will not be shared in the paper. But their suggestions will be integrated into the ultimate iteration of the survey.** The questionnaire asks respondents to describe a specific industry sector they have worked on in their responses. The primary section of the questionnaire requires respondents to rate their level of agreement with each Critical Success Factor (CSF) using a five-point Likert scale. A score of 1 indicates significant disagreement, while a score of 5 indicates great agreement. The final questionnaire will distribute to the respondents in the **three sectors of the client (consultant), the general contractor and the supplier,** and their response data were collected.

Finally, to seek and analyze an effective solution for coordinating the relationship between all parties, which can serve as a future foundation for organization operating within the construction sector.

3.4. Sample Characteristics

350 questionnaires were provided to potential participants in total. First, these questionnaire participants came from subcontractors, general contractors and client groups in the construction sectors. The predominant method of distribution involved the utilization of WeChat groups and email networks. The company where the people participating in the questionnaire survey work is a relatively well-known company in the construction industry in Singapore. Those individuals were given questionnaires to fill up. Most of these people have participated in the design and construction of

MRT and building. Preliminary screening was conducted by collecting basic information from the respondents to ensure that they had the necessary qualifications to participate in the study. Finally, confirm with eligible respondents whether they are willing to participate in the study and explain the purpose, content, and expected results of the study to ensure they have full understanding and consent for participation. Of course, this process is time-consuming and difficult.

In order to reach potential respondents whose email addresses were not available; duplicates were disseminated using WhatsApp groups. The participants were given a time frame of about three months to fulfil the task of completing and submitting the questionnaire. One of the methods employed for the retrieval of surveys is the utilization of Google email. A total of 79 questionnaires were collected, project managers, consultants, and other project participants from contractor, client, and supplier businesses sectors. Most specific projects are public and architectural works. Appendices A for details of the questionnaire. The observed response rate of the survey was 22.6%, which aligns with the established range of 20-30% often observed in surveys conducted within the construction industry (Akintoye 2000).

3.5. Sources of Data

Prior to the exhaustive study, to acquire more reliable and accurate information. The following topics were the focus of the literature review:

- Stakeholder theory and strategies
- Framework for stakeholder management
- CSFs for stakeholder management
- CSFs in construction industry
- Success factor for project management

Limitation - The predominant portion of the data utilized in this article was obtained from secondary sources, which were gathered from the literature. Because at least eight years have passed since the references were published. As a result, part of our data can be out of date. As a result, there can be certain restrictions. It should be noted that there are many stakeholders in the construction business, making their interactions quite complicated. Even the private sector alone can be broken down into many stakeholder groups. Therefore, research on the relationship between relevant stakeholders may not be comprehensive enough. Simultaneously, a total of 350 questionnaires were distributed, yielding a response rate of merely 79 participants. The majority of individuals included in the study were professionals who possessed less than five years of experience. Consequently, additional refinement of the findings is necessary. Searched relevant literature in the above fields through Google Scholar, NTU Online Library and various websites and newspapers to study the topic. The following keywords were typed into a search engine to find our research data: stakeholders, stakeholder relations, construction management, communication, and strategies.

3.6. Survey Design

The survey report is specifically aimed at professionals within the construction business in Singapore who are employed by client companies, contractor companies, and supplier companies. The analysis of these critical success factors (CSFs) is of utmost importance in comprehending the fundamental components that contribute to the effective management of stakeholders in building projects (Yang et al, 2009). The adequacy of the questionnaire was evaluated by piloting it with two project managers, and their ideas were integrated into the final version. Throughout the study,

notified them that the data processing would be conducted in an anonymised manner. The survey document is partitioned into two distinct sections. The initial segment has two inquiries that centre on the interviewee's industry of expertise and the duration of their professional experience. The subsequent section comprises an assemblage of the significance of CSFs across several businesses. The questionnaire consists of twelve inquiries in total, with eleven of them being adapted from the current research on Critical Success Factors (CSFs). The last question serves as a supplementary addition to the aforementioned eleven inquiries.

In order to better complete the purpose of this study, the questionnaire was bilingual: English and Chinese. The inclusion of both English and Chinese languages in the questionnaire enhances its accessibility to a wider range of participants, reflecting the multicultural context of Singapore.

Participants provided responses to each item in the survey using a ‘levels of importance’ questions help to assess what is most important to client, contractor and supplier. Ranging from 1 for “Not at all important” through 2— “Slightly important”, 3— “Important”, 4— “Very important”, 5— “Extremely Important”. The questionnaire questions are presented in Appendix A.

The analysis of the survey results will yield significant insights on the comparative significance of several CSFs in stakeholder management within the construction sector. The results of this study can provide valuable insights for industry professionals and assist stakeholders in determining the importance for enhancing stakeholder management in construction projects.

Table 3.5. Selected CSFs for stakeholder management in construction industry.

No	CSFs
F1	Communication: Effective and regular communication with stakeholders helps build trust and make sure that everyone is on the same page.
F2	Understanding stakeholder needs: Understanding the needs, expectations, and priorities of stakeholders helps to ensure that their concerns are addressed and to their satisfaction.
F3	Transparency: Being transparent about decisions, processes, and progress helps to build trust and credibility with stakeholders.
F4	Stakeholder engagement: Help organizations to manage risks, make informed decisions, build trust, and contribute positively to project and the environment.
F5	Collaboration: Working with stakeholders to find solutions to problems and make decisions leads to better outcomes and stronger relationships.
F6	Flexibility: Being flexible and open to change helps to adapt to changing circumstances and stakeholder needs.
F7	Responsibility: Taking responsibility for actions and decisions helps to promote trust and accountability among stakeholders.
F8	Conflict resolution: Being able to effectively resolve conflicts helps to maintain positive relationships with stakeholders and ensures that objectives are achieved.
F9	Prioritization: Prioritizing stakeholders based on their level of influence and interest helps to effectively allocate resources and manage relationships.

F10	Performance measurement: Measuring performance against agreed-upon objectives and regularly reporting on progress helps to ensure accountability and continuous improvement.
F11	Empathy: Showing empathy and understanding towards stakeholders helps to build strong, positive relationships and can lead to more effective collaboration.

4. FINDING & ANALYSIS

This chapter provides a thorough examination of the gathered material.

The questionnaire includes 11 key success factors that were derived after a thorough assessment of pertinent literature. The results obtained from these investigations provide a valuable basis for the current research. A typical construction project in Singapore entails the involvement of various stakeholders, which encompass contracting partners such as clients, contractors, and suppliers. The contractor is responsible for supervising the project process and to make sure the quality, cost, and duration of the entire project lifecycle. The supplier is responsible for supplying construction supplies, while the client places emphasis on the project's quality, cost, and construction timeline (Smith, 2022).

Table 4.0 Statistical Method Analysis

Method	Purpose	Outcome
Cronbach's coefficient alpha	Prove reliability of the CSFs	Reliability of the CSFs
Frequencies (Means)	Ranking the important for CSFs in each sector	The rankings of CSFs according to various sectors of responders

The above two methods will be used to confirm the credibility of CSFs and the ranking of CSFs in different sectors.

4.1. Background of Respondent

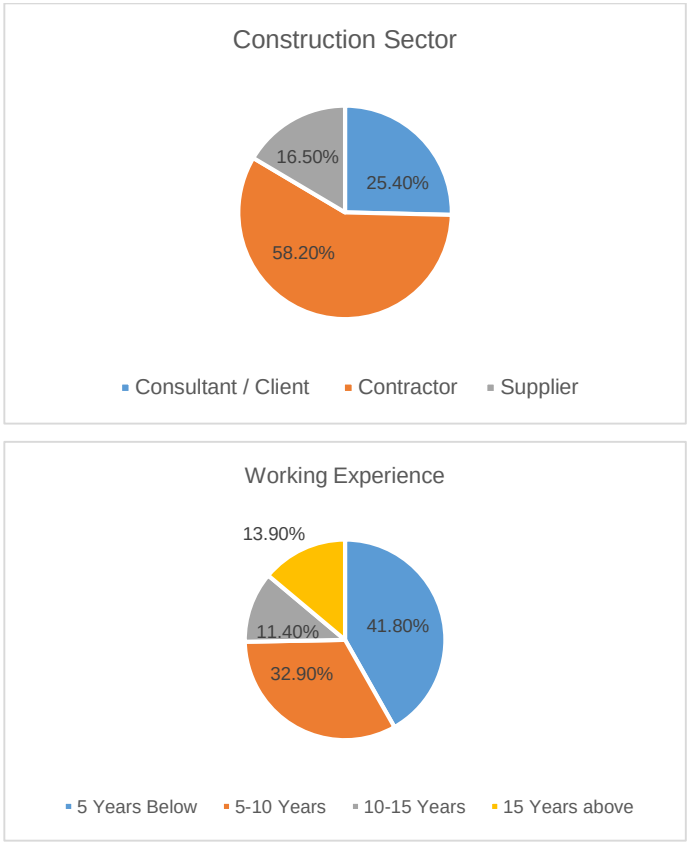


Figure 4.1 – Percentage of construction sector & working experience

Gather and analyse data from various sectors within the construction industry to determine the key characteristics that contribute to successful stakeholder management in building projects. Employ statistical methodologies to analyse the data and derive findings regarding the aspects that contribute to effective stakeholder management. Refer to figure 2, out of the total of 79 research samples, it was found that 46 samples (equivalent to 58.2%) were obtained from contractors, 20 samples (equivalent to 25.4%) were obtained from consultants, and 13 samples

(equivalent to 16.5%) were obtained from suppliers. The professionals in question exhibit varying levels of work experience, with individuals possessing 0-5 years of experience constituting 41.8% of the total. Those with 5-10 years of experience represent 32.9% of the total, while those with 10-15 years' account for 11.4%. Lastly, professionals with more than 15 years of work experience make up 13.9% of the total. This implies that roughly 50% of the participants occupy positions in the lower echelons of management.

Table 4.1. Statistics on respondent background

	Background	Frequency	Percentage
Sector 1	Consultant/Client	20	25.4%
Sector 2	Contractor	46	58.2%
Sector 3	Supplier	13	16.5%

4.2. Reliability of the CSFs

The Cronbach's coefficient alpha was employed to evaluate the internal consistency of the scales within the CSF categories. According to Leonard (2023), alpha levels that above 0.7 are considered to be acceptable. It is recommended to have an alpha value of 0.8 or higher when conducting individual comparisons. This indicates that all variables exhibit strong internal consistency and are deemed to be reliable. The calculation of Cronbach's Alpha involves the utilisation of the following formula:

$$\alpha = \frac{(K)}{(K-1)} \frac{Sy^2 - Sum\ Si^2}{Sy^2}$$

Figure 4.2 – Cronbach's Alpha Formula (Leonard, 2023)

Where:

α = Cronbach's Alpha

K = the quantity of items within the scale

Si = the summation of the scores for each individual item

Sy = the summation of the cumulative scores for all items

Table 4.2. Results of Cronbach's Coefficient Alpha (Refer to Appendix B)

CSFs	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
Variance	0.514	0.838	1.182	0.614	0.59	0.716	0.744	0.524	0.781	0.844	1.076
Alpha	0.853	0.852	0.860	0.848	0.853	0.848	0.846	0.859	0.861	0.845	0.856

All CSFs are numbered in table 4.2 at section 3.5.

The calculated Cronbach's Alpha for the data in the provided the table 4.2 as shown above is approximately 0.845 to 0.861. This demonstrates a significant degree of internal coherence among the items in your dataset, which is generally considered good for surveys. This proves the credibility and feasibility of the survey content.

4.3. Ranking of the CSFs based on their relevance within the sector.

This section is dedicated to the ranks of CSF. The rankings of CSFs are determined by calculating the average values. There is a positive correlation between the average and the importance, the higher the average, the higher the importance and vice versa. Table 4.3 shows the ranking of CSFs for different types of respondents.

Table 4.3. Ranking of the CSFs based on respondent sector

CSFs	Sector of Respondents					
	Consultant/Client		Contractor		Supplier	
	Mean	Rank	Mean	Rank	Mean	Rank
F1	4.60	1	4.65	1	4.69	1
F2	4.55	2	4.35	4	4.54	3=
F3	4.15	10	4.13	8=	3.38	11
F4	4.30	6=	4.30	5	4.15	8

F5	4.45	3=	4.43	2	4.54	3=
F6	4.30	6=	4.26	6	4.31	6
F7	4.20	8=	4.24	7	4.62	2
F8	4.45	3=	4.41	3	4.23	7
F9	4.40	5	4.13	8=	4.46	5
F10	4.05	11	4.02	10	3.92	10
F11	4.20	8=	3.87	11	4.00	9

As shown in the table 4.3, All the mean values exceed 3, indicating that all groups consider these CSFs crucial for the effectiveness of stakeholder management in building projects. From this table, an obvious finding is that factor F1 "Communication" ranks highest among all CSFs, regardless of the type of respondent. This means that in most projects, effective communication between all parties affects the final outcome of the project.

In consultant/ client perspective, factors F2 “Understanding stakeholder needs”, F5 “Collaboration”, and F8 “Conflict resolution “receive high scores (4.55, 4.45, 4.45 respectively), which means these are key areas of focus. They believe that in addition to communication, the success of stakeholder management hinges on these three key factors. Some overlooked potential viewpoint factors are F10 “Empathy” and F3 “Transparency” are at the bottom of the list with scores of 4.05 and 4.15, suggesting they are considered less critical by this group.

In contractor perspective, F7 “Responsibility” (score of 4.62) as the second most important. in contrast to its lower importance for consultants/clients. This might indicate that contractors are facing issues or prioritizing aspects that consultants/clients are not. F10 “Performance measurement” and F11 “Empathy” rank lowest for contractors, which means areas that may be overlooked or less problematic from their perspective.

In supplier perspective, when compared to other types of respondents, the score of F3 "transparency" in suppliers is relatively low, indicating a considerable difference from the rankings in other sectors, and could imply a difference in operational priorities or challenges faced by suppliers. The supplier is sensitive to the confidentiality of projects. Furthermore, F7 “Responsibility”, ranked second by suppliers (4.62), is also ranked high by contractors but less so by consultants/clients, which might indicate that this factor is more relevant to the supply and execution phase than the planning phase.

All sectors agree that F1 is the most important, signifying a universal critical success factor that might relate to overall project success or a fundamental business function. Factors like F3 “transparency”, F7 “Responsibility”, and F10 “Empathy “show significant variance in ranking between sectors. This could be due to different roles and perspectives each sector has in the industry. The company may need to tailor their strategies according to their role in the industry. For example, what is crucial for a supplier may not be as critical for a consultant/client. The discrepancies in rankings also highlight opportunities for better alignment and communication among the different sectors. Understanding each other's priorities could lead to improved collaboration and project outcomes. Lower-ranked factors for each sector indicate areas that may require attention and improvement. In addition, some respondents put forward their opinions on successfully managing stakeholders, including leadership, social gathering, excellent interpersonal network, organization culture, etc. We can analyse these factors in future research.

To understand the real differences in importance between the factors, one would need to know the statistical significance of the

differences in mean scores. Small differences may not be practically significant without a measure of variance, such as standard deviation or confidence intervals. The reliability of these rankings would also depend on the size and diversity of the sample from each sector. A larger and more diverse sample would give more confidence in the generalizability of these findings. By considering the above points, stakeholders can make informed decisions about where to focus their efforts for improvement, how to communicate with other sectors, and what strategies to prioritize for better stakeholder management and project success.

5. RECOMMENDATION & DISCUSSION

This chapter provides some opinions and implementation framework for 11 CSFs.

Processes are the operational components that enable the implementation of an organization's strategy. The procedures encompass the creation of novel projects and services, considering the requests, meeting the needs, and effectively managing plans and initiatives (Coursera, 2023). The study finds that identifying stakeholders, developing a communication plan, establishing trust, transparency, involving stakeholders, collaboration, addressing conflicts and ensuring compliance and etc are CSFs for management of stakeholders in a construction project. A framework for construction project managers on how to apply these best practices to improve their stakeholder management strategies. It outlines a strategic approach to stakeholder management by integrating CSFs identified across consultant/client, contractor, and supplier sectors. It emphasizes the importance of balancing diverse stakeholder needs with agile management principles to enhance project outcomes. Data from

the provided tables informed the development of the framework. Suggest each CSF is mapped against agile principles and combine with the traditional stakeholder management, creating a holistic management strategy. To enhance the implementation of the stakeholder management framework, a comprehensive approach will be taken, focusing on the Critical Success Factors (CSFs) in various sectors (Consultant/Client, Contractor, Supplier), each factor can be integrated into a structured process that includes specific agile practices:

- Initiation Phase

For **Stakeholder Identification (F2):** Initiate the project with a stakeholder analysis workshop to understand the needs, expectations, and priorities of stakeholders. The process of stakeholder analysis typically involves four main stages: i) identifying and characterising stakeholders, ii) mapping the significance and impact of stakeholders, iii) mapping the interests of stakeholders, and iv) defining the strategy for engaging stakeholders (Clausen et al., 2020).

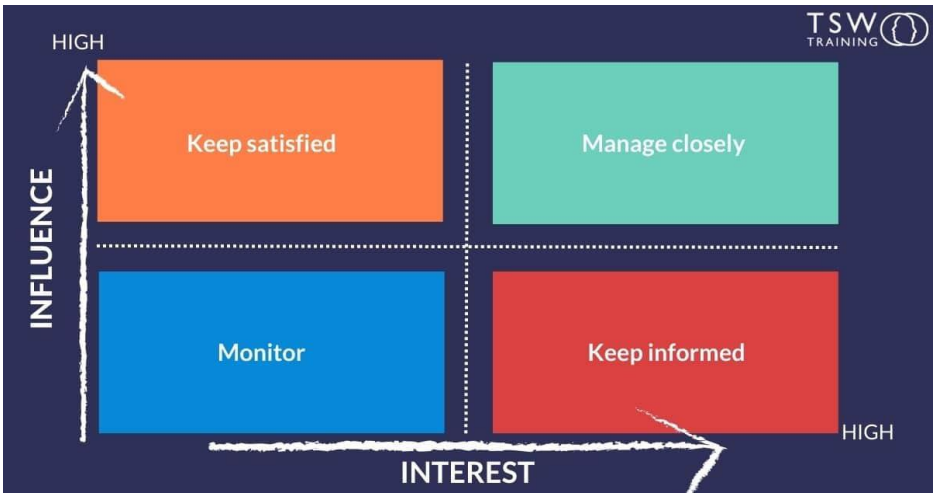


Figure 5.0 – Stakeholder Analysis Matrix (Wallbridge, 2023)

Employ tools like stakeholder maps (Figure 5.0) help to visualize the influence and interest of each stakeholder. The prospective

stakeholders can vary significantly depending on the project or activity. It is necessary to identify individuals who have a direct or indirect influence on the project. Subsequently, classify them according to their degree of impact and interest for the project. Ultimately, in order to comprehend their requirements, it is necessary to analyse and establish a strategy, assess, and monitor (Wallbridge, 2023).

- Planning Phase

For **Communication (F1)**: Develop a communication plan that outlines the frequency, channels, and content of communications, ensuring that stakeholders are kept informed and engaged (Filestage, 2024). According to the information provided by Filestage (2024), a framework presents a systematic six-step procedure for creating and executing a proficient communication strategy for projects:

1. Stakeholder Identification: Identify your internal and external stakeholders and ascertain their distinct information requirements.
2. Select Communication Channels: Determine the optimal communication channels for effectively engaging with each stakeholder group, such as use meetings, emails, or social media platforms.
3. Establishing Communication Frequency: Determine the frequency of communication with each group, taking into consideration their specific needs and the nature of the information being sent.
4. Tailor Content: Create content that is relevant and informative for each stakeholder group.
5. The allocation of responsibilities: Specify the individual or group accountable for the creation, administration, and dissemination of communication.

6. Monitor and evaluate: Regularly assess the effectiveness of your communication efforts and make adjustments as needed.

By adhering to this structure, one can guarantee that stakeholders are consistently updated and actively involved throughout the project, resulting in enhanced collaboration and improved project outcomes.

For **Agile Practices Integration** (F5 & F6): Plan for regular sprint planning meetings and backlog refinement sessions. This would integrate collaboration and flexibility, allowing for adjustments based on stakeholder feedback and changing project requirements (Businessmap, 2024).

For **Stakeholder Engagement** (F4): Engaging stakeholders in sprint planning and reviews ensures their continuous involvement in risk management and decision-making. Stakeholder participation and management should persist throughout the whole project planning phase, rather than being limited to the front-end project planning stage or any specific stage. (Chen & Lvova, 2011).

- Execution Phase

For **Regular Communication** (F1): Implement daily stand-ups and bi-weekly sprint reviews with stakeholder participation to maintain open lines of communication. Team members are able to maintain attention and remain on-task. Deliver concise, project-level updates to the remaining team members and ensure that all team members are held responsible for their respective contributions to the project (Adobe Communication Team, 2022).

Daily stand-ups are a fundamental component of the scrum framework, sharing the same status as sprint planning, sprint review, and sprint retrospectives. They assist teams in maintaining

agility, enabling them to swiftly adjust to evolving conditions and novel knowledge, so facilitating efficient development of work (Aha, 2024). In order to enhance the efficiency of meetings, the stand-up template is presented below. Constructed on a whiteboard, this tool facilitates seamless team collaboration in real-time and enables the addition of notes, resulting in time savings.

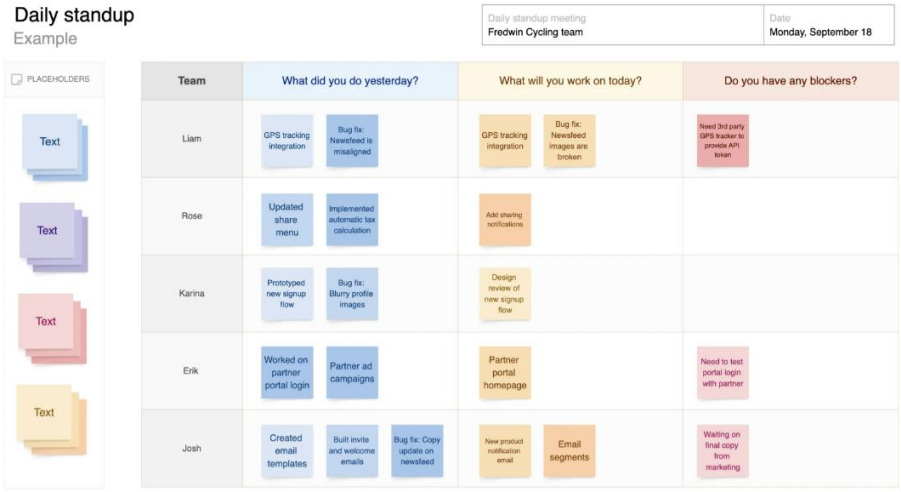


Figure 5.1 – Stand-up template (Aha, 2024)

For **Transparent Workflow** (F3): Use Kanban boards or Scrum boards to provide visual workflow transparency (Businessmap, 2024). This allows stakeholders to see progress in real time. Agile methodologies advocate for aggressive transparency to expedite the dissemination of information both within and across the organization. The purpose of inviting stakeholders to project meetings and reviews, as well as presenting project artifacts in public areas, is to promptly identify any discrepancies, dependencies, or other issues pertaining to the evolving project (PMI, 2016).

For **Responsibility and Accountability** (F7): Assign a Project Owner who will be responsible for ensuring that stakeholder interests are represented in the project backlog and that the team is delivering value (Filestage, 2024).

- Monitoring and Controlling Phase

For **Performance Measurement** (F10) and **keep transparency** (F3): Track sprint velocity and use burndown charts to measure performance against objectives. This data should be shared with stakeholders in a digestible format to maintain transparency. It is because performance management is crucial for firms due to its important nature. By means of both official and informal procedures, organisations are able to effectively synchronise their workforce, assets, and infrastructure in order to achieve their strategic goals. The system also functions as a dashboard, offering timely alerts for potential issues and enabling managers to identify the need for necessary modifications to maintain corporate operations. However, the absence of transparency is a significant drawback in performance management. It is vital for employees to hold the belief that their aims foster significant accomplishments. Oftentimes, the connection between individual exertion and organisational goals becomes unclear or becomes diluted when metrics and targets propagate throughout the corporation (Carpi et.al, 2017).

For **Conflict Resolution Processes** (F8): Host regular retrospectives to address any issues or conflicts that have arisen, ensuring that these are resolved in a manner that maintains positive relationships. Using the "plan–do–check–act" feedback loop, which is rooted in ground-breaking research conducted by Charles Shewhart and W. Edwards Deming, enables teams to gain insights from their errors and recognise valuable concepts that may be implemented in other contexts (Carpi et.al, 2017).

- Closing Phase

For **Final Review and Documentation** (F4): At the project's conclusion, conduct a final review meeting with stakeholders to

present the completed work and document lessons learned (Carpi et.al, 2017).

For **Empathy and Continuous Improvement** (F11): Solicit feedback on the project process and outcome, showing empathy and understanding towards stakeholder perspectives, and use this information to inform future projects. Empathy is centred around establishing a connection. The focus is on fostering trust and promoting cognitive alignment, so enhancing our problem-solving capabilities (Lunacon, 2024).

- Ongoing Process

Stakeholder Prioritization (F9): Consistently evaluate and rank stakeholders according to their degree of impact and involvement at every stage of the project (Wallbridge, 2023).

Adaptation and Iteration (F6): Maintain flexibility in the management approach, adapting the strategy as the project evolves and as new information about stakeholder needs comes to light (Businessmap, 2024).

- Tools and Techniques

Use agile project management software to facilitate many of these processes, such as Jira or Trello for task management (Burner, 2023) and transparency (Carpi et.al, 2017). Conduct empathy interviews or create empathy maps to understand and address stakeholder concerns better (Lunacon, 2024). Employ prioritization techniques such as Kano model during backlog refinement to ensure that stakeholder priorities are reflected in the work being done (Filestage, 2024).

This empirically informed framework proposes integrating CSFs with agile methodologies to create a responsive, collaborative, and effective stakeholder management strategy. During the investigation process, we found that the discussion research has

certain limitations. For example, the factors we explore may only be the situations that each sector is currently encountering or has already encountered. The survey report shows that many respondents gave some additional ideas about managing stakeholders. In addition, proposed several recommendations in this research report that could serve as future research avenues for improving the comprehension of stakeholder management. These include investigating the impact of social media and other digital technologies on stakeholder engagement, as well as examining how cultural disparities influence stakeholder management strategies in international construction projects. Stakeholders have the power to hinder or facilitate projects (PMI, 2016). Stakeholder management is a crucial endeavour that facilitates a shared comprehension of the objectives and anticipations of all involved parties. It helps to facilitate the formation of an idea that will attract support from all relevant stakeholders who will be affected by it, hence enhancing the probability of achieving a favourable result (Molwus, 2014). Naturally, this framework is not immutable and may require modification in accordance with the specific circumstances of the project (Chen & Lvova, 2011).

6. LIMITATION & FURTHER RESEARCH

Limitation - One limitation of this framework is its reliance on agile methodologies and some part based on the traditional management of stakeholders, which may not be universally applicable to all building projects. Traditional techniques are distinguished by their systematic and sequential approach to development, as well as their prioritisation of identifying

stakeholder demands in advance. The typical framework comprises five distinct stages, namely initiation, planning, execution, monitoring, and closure (Management Institute, 2008). Combine with traditional, agile is most appropriate for projects characterised by dynamic requirements and a significant level of uncertainty (Chen & Lvova, 2011), but in construction, some projects may have more predictable and stable requirements. Therefore, the framework may need to be adapted or supplemented with additional approaches to cater to a wider range of project types.

Future Work - Future investigations could prioritise the verification of the efficacy of this framework in actual construction endeavours. One such approach is to apply the framework in multiple construction projects and assess its influence on stakeholder involvement, project results, and overall project achievement. Moreover, it would be beneficial to do additional research to examine the incorporation of nascent technologies, such as artificial intelligence or blockchain, in order to augment stakeholder management methodologies within the realm of construction projects. For example, consider a hypothetical scenario where a construction company decides to implement the stakeholder management framework developed in a real construction project. Here's how the process might look:

Selecting the Project: Opt for a project of moderate scale, such as the construction of a residential complex, for the initial trial phase. The implementation of the stakeholder management framework should be incorporated into the project planning process. Determine the primary stakeholders, comprehend their concerns, devise tactics for involvement, and monitor connections throughout the project.

Data Collection: Monitor stakeholder engagements, project advancement, and results by utilising the framework's metrics.

Examining the Results: Following the completion of the project, scrutinise the data to assess the effectiveness of the framework in handling stakeholder relationships. Examine the participation of stakeholders, the impact of their engagement on results, and the overall achievement of the project.

Learning and Enhancing: Drawing upon the analysis, ascertain the efficacy and shortcomings of the framework. Enhance the communication, goal alignment, and overall outcomes of future projects.

Subsequent Application: Employ these observations to enhance the framework and employ it in subsequent endeavours. This facilitates the enhancement of stakeholder management in the long run.

It demonstrates the practical application of the framework within a tangible building project, aiming to validate its effectiveness and enhance stakeholder management methodologies.

7. CONCLUSION

Effective stakeholder management is essential in construction projects to enable the successful achievement of project goals and objectives, while also fulfilling the diverse demands and expectations of stakeholders (Olander & Stefan, 2007). The construction business is seen as a multifaceted sector that relies heavily on manual labor (Winch & Graham, 2010). Numerous large-scale construction projects, particularly those involving infrastructure, have evolved as a result of societal advancement and the dramatic rise in human requirements. These large-scale infrastructure projects are distinguished by their extensive

workforce, substantial investment, lengthy construction duration, and elevated project risk (Flybjerg et al, 2003). In contemporary project management, the engagement and satisfaction of stakeholders are pivotal to success (Bourne & Lynda, 2015). The delineated CSFs across various sectors encapsulate the essence of effective stakeholder management.

This paper initially identified 11 main factors that affect stakeholder management through literature materials, collected data through questionnaires, and analyzed the data to prove the credibility of these 11 main factors. As a result of the findings of the research, it was discovered that the majority of the individuals who took part in the study were of the opinion that effective communication is the most important factor in achieving successful stakeholder management in construction projects. The remaining 10 factors are considered important regardless of the industry, but the importance of each factor varies slightly from industry to industry.

Simultaneously, this paper proposes a framework that aligns these CSFs with agile management techniques to foster a responsive and collaborative environment. The data were synthesized from the provided tables, which detailed the mean importance and ranking of each CSF across three sectors. These CSFs were subsequently incorporated into an agile management framework, emphasizing iterative development and stakeholder collaboration.

The use of efficient stakeholder management practises has the potential to yield favourable project outcomes, whereas inadequate stakeholder management can contribute to project failure. The process involves identifying stakeholders, understanding their needs and expectations, and effectively managing these needs and expectations through the use of efficient communication and engagement tactics. (Lynda, 2016).

By taking on the duty of stakeholder management, project managers can develop strong connections, minimize risks, and increase the likelihood of project success (Filestage, 2024).

Overall, the results indicate that although participants share certain commonalities in their recognition of CSFs, their strategies for managing stakeholders are customized and likely shaped by the project's specific attributes and costs. These findings can be used by construction professionals to actively involve different stakeholders during the project management process.

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9. APPENDICES

Appendix A-

Critical success factors (csfs) for stakeholders management in the construction industry (thank you for taking the time to participate in this survey. Your insights will help us identify the critical success factors (csfs) that are crucial for stakeholders in the construction industry. Your responses will remain confidential and will be used for research purposes only)				
Q1	You are working in			
Answer	Consultant/Client	Contractor include subcontract	Supplier	Others
Q2	Years of Experience in the Construction Industry:			
Answer	5 years below	5-10 years	10-15 years	15 years above
Identification of CSFs (Please rate the following factors on a scale from 1 to 5, where 1 indicates "Not at all Important" and 5 indicates "Extremely Important." Feel free to provide comments or explanations for your ratings.)				
Q1	Communication: Effective and regular communication with stakeholders helps build trust and ensures that everyone is on the same page.			
Q2	Understanding stakeholder needs: Understanding the needs, expectations, and priorities of stakeholders helps to ensure that their concerns are addressed and to their satisfaction.			
Q3	Transparency: Being transparent about decisions, processes, and progress helps to build trust and credibility with stakeholders.			
Q4	Stakeholder engagement: Help organizations to manage risks, make informed decisions, build trust, and contribute positively to project and the environment.			

Q5	Collaboration: Working with stakeholders to find solutions to problems and make decisions leads to better outcomes and stronger relationships.
Q6	Flexibility: Being flexible and open to change helps to adapt to changing circumstances and stakeholder needs.
Q7	Responsibility: Taking responsibility for actions and decisions helps to promote trust and accountability among stakeholders.
Q8	Conflict resolution: Being able to effectively resolve conflicts helps to maintain positive relationships with stakeholders and ensures that objectives are achieved.
Q9	Prioritization: Prioritizing stakeholders based on their level of influence and interest helps to effectively allocate resources and manage relationships.
Q10	Performance measurement: Measuring performance against agreed-upon objectives and regularly reporting on progress helps to ensure accountability and continuous improvement.
Q11	Empathy: Showing empathy and understanding towards stakeholders helps to build strong, positive relationships and can lead to more effective collaboration.
Q12	Additional Comments: for stakeholder management, are there any other factors you believe are critical for success in the construction industry that were not covered in this questionnaire?
Conclusi-on	Thank you for participating in this survey. Your feedback is invaluable in understanding the Critical Success Factors for stakeholders in the construction industry. If you have any additional comments or suggestions, please feel free to share them.

Appendix B -

	You are working in	F1	F2	F3	F4	F5	F6	F7	F8	F9	F 10	F 11	V2
1	Consultant /Client	4	4	4	4	4	4	4	4	4	4	4	44
2	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
3	Contractor include subcontractor	5	4	4	4	4	4	5	4	4	4	4	46
4	Supplier	5	5	3	4	4	4	5	5	5	4	4	48

5	Contractor include subcontractor	4	4	5	4	3	4	5	5	4	4	4	46
6	Contractor include subcontractor	5	5	5	4	4	3	5	4	3	4	3	45
7	Contractor include subcontractor	5	5	4	5	5	4	4	4	4	4	3	47
8	Consultant /Client	5	4	2	4	5	5	3	4	5	4	3	44
9	Contractor include subcontractor	5	3	3	4	5	5	5	5	3	2	3	43
10	Supplier	5	4	5	4	5	4	5	3	5	4	4	48
11	Supplier	5	4	3	3	5	3	5	3	5	3	3	42
12	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
13	Contractor include subcontractor	5	5	4	5	5	5	4	5	4	5	4	51
14	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
15	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
16	Contractor include subcontractor	5	5	4	4	5	4	3	4	5	4	3	46
17	Supplier	4	4	2	4	4	4	4	4	4	4	4	42
18	Supplier	5	5	4	5	5	4	5	4	5	4	3	49
19	Contractor include subcontractor	4	4	4	5	5	4	4	4	4	4	4	46
20	Supplier	4	4	4	4	4	4	4	4	4	4	4	44
21	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
22	Supplier	5	5	2	3	4	5	5	5	5	5	5	49
23	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
24	Consultant /Client	5	5	4	5	5	5	5	5	5	4	3	51
25	Supplier	5	5	3	4	5	4	4	4	5	4	5	48
26	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
27	Contractor	5	5	5	5	5	5	5	5	5	5	5	55

	include subcontractor												
28	Contractor include subcontractor	4	4	4	4	3	4	3	3	3	4	4	40
29	Contractor include subcontractor	4	3	4	3	4	5	5	5	4	4	5	46
30	Contractor include subcontractor	5	5	5	5	5	4	4	4	4	4	4	49
31	Contractor include subcontractor	4	3	3	4	3	4	4	4	4	4	4	41
32	Supplier	3	4	3	4	4	4	4	4	3	3	3	39
33	Consultant /Client	5	5	3	4	5	5	5	5	5	3	4	49
34	Consultant /Client	5	5	5	4	4	4	5	5	5	3	4	49
35	Contractor include subcontractor	5	5	3	4	5	3	4	4	5	5	5	48
36	Consultant /Client	4	4	3	4	4	4	3	5	4	5	5	45
37	Contractor include subcontractor	5	5	5	3	5	5	5	5	5	5	5	53
38	Contractor include subcontractor	5	4	4	4	4	4	5	4	4	4	4	46
39	Contractor include subcontractor	4	5	5	5	4	5	2	4	4	2	1	41
40	Contractor include subcontractor	5	5		5	5	5	5	5	5	5	5	50
41	Contractor include subcontractor	5	5	3	5	5	4	5	3	5	5	4	49
42	Consultant /Client	5	4	5	5	5	5	5	5	5	5	5	54
43	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	4	4	53
44	Contractor include subcontractor	5	5	3	4	5	3	4	5	4	4	3	45
45	Contractor include subcontractor	1	1	1	1	1	1	1	5	5	2	2	21
46	Contractor include subcontractor	5	5	3	3	5	3	3	3	2	2	2	36
47	Consultant /Client	4	4	3	4	4	3	4	4	3	2	2	37
48	Contractor include subcontractor	5	5	4	5	4	4	4	4	4	3	3	45

49	Supplier	5	5	2	4	4	5	4	5	5	4	5	48
50	Supplier	5	4	3	5	5	5	5	4	4	2	2	44
51	Contractor include subcontractor	5	4	5	4	4	4	4	4	4	4	4	46
52	Consultant /Client	5	5	5	5	5	5	5	5	5	5	5	55
53	Contractor include subcontractor	3	1	5	5	5	5	5	5	5	4	2	45
54	Architecture firm	2	3	3	3	3	3	3	3	3	3	4	33
55	Consultant /Client	5	5	5	5	5	5	5	5	5	5	5	55
56	Contractor include subcontractor	4	4	4	4	4	4	4	4	4	4	4	44
57	Contractor include subcontractor	5	5	4	4	3	3	4	5	5	4	4	46
58	Contractor include subcontractor	5	5	2	5	5	5	5	5	5	3	2	47
59	Contractor include subcontractor	5	5	5	4	5	5	4	5	3	5	4	50
60	Consultant /Client	4	4	4	4	4	4	4	4	4	4	5	45
61	Consultant /Client	5	4	3	3	3	5	3	4	5	4	4	43
62	Contractor include subcontractor	4	4	5	5	5	4	4	4	3	3	4	45
63	Contractor include subcontractor	5	3	4	4	4	5	3	3	2	4	4	41
64	Contractor include subcontractor	4	4	5	4	4	5	4	4	3	5	4	46
65	Consultant /Client	5	5	5	5	5	5	5	5	5	5	5	55
66	Supplier	5	5	5	5	5	5	5	5	5	5	5	55
67	Consultant /Client	5	5	5	5	5	3	3	2	3	3	4	43
68	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
69	Supplier	5	5	5	5	5	5	5	5	3	5	5	53
70	Contractor include subcontractor	4	4	3	3	4	2	4	4	2	3	3	36
71	Contractor include subcontractor	5	5	5	5	5	5	5	5	5	5	5	55
72	Contractor	5	5	3	4	5	4	3	4	4	3	2	42

	include subcontractor												
73	Consultant /Client	5	5	5	5	5	5	5	5	5	5	5	55
74	Consultant /Client	5	5	5	5	3	3	5	5	5	5	5	51
75	Contractor include subcontractor	5	1	1	3	3	3	3	3	3	3	3	31
76	Contractor include subcontractor	5	5	5	4	4	5	4	5	3	3	5	48
77	Consultant /Client	5	5	5	5	5	5	5	5	5	5	5	55
78	Consultant /Client	4	5	5	3	5	4	4	5	3	4	2	44
79	Consultant /Client	5	5	4	4	5	4	3	4	4	3	5	46
												40.81	
Variance		0.51	0.84	1.18	0.61	0.61	0.72	0.75	0.52	0.78	0.85	1.08	8.45
										α =			**0.872**