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Stakeholder Management in Public Sector Infrastructure Projects

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Abstract: The underlying risks and complexities in government infrastructure projects have increased the importance of external stakeholder management in contemporary project management. In developing countries, it is also important for policymaking and planning of infrastructure programs due to the varying nature of stakeholders and their expectations from the government. Few studies have looked at how external stakeholders are involved in public infrastructure projects and how they work together to achieve common project goals by overcoming communication and decision-making barriers. The internal stakeholders and project managers also need to properly liaise with the external stakeholders without compromising the project goals. Thus, there is a need to strategize the stakeholder management process to improve public sector infrastructure projects, especially from a developing nation's perspective. Therefore, the scope of this research has evaluated the prevalence of external stakeholder management in public sector infrastructure construction projects in Pakistan by developing and validating its five core dimensions. Among the constructs were identification and classification, communication, engagement, empowerment, and risk control. Besides this, twenty-seven sub-variables of stakeholder management have also been identified in the context of public sector projects. The results of the factor loading show that "Risk Control" is the most contributing dimension of stakeholder management, and "Empowerment" is the least concern in the current practices. The study emphasizes the importance of establishing a systematic and comprehensive framework for empowering external stakeholders, which will strengthen and improve performance and project outcomes. This study reveals insights that will assist project organizations in integrating external stakeholders into their government-sponsored projects with their effective empowerment and sufficient engagement.

Keywords: Stakeholder management, construction stakeholder management, public sector, government infrastructure.

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1. Introduction

The classical interpretation of the term "stakeholder" is defined as "any group or individual whose interests are affected by the achievement of the project's objectives (Freeman, 1984). According to Smith and Love (2004), stakeholders have direct and indirect representation and contributions in the proposed project, and those may include: owner and client; project managers, senior managers, executives; employees; service providers, subcontractors, purchasers, suppliers; neighbours, residents, tenants, community representatives; interest groups, partners, visitors, customers, users; and team members involved in the process.

The Project Management Institute has defined a stakeholder as "a person or organization which is actively involved in the project and has a concern, which might be positively or negatively affected by the performance or completion of the project, exert influence over the project, its deliverables or its team members" (PMI, 2016a). Due to their impacts, effective management and controlling of these stakeholders and their expectations have become essential to the success of projects. A construction stakeholder is an individual (or group of individuals) who has a significant impact on the success of a project as well as the ecosystem in which it functions. The term "financial stake" refers to a stakeholder's claim to power, legitimacy, or urgency over the project. Internal stakeholders are those

who are actively related to the project execution, while external stakeholders are those who are mainly affected by the project. Members who are not directly involved in the project, national and local authorities, public goods, licensing and surveying organizations, research institutes, consulting firms, and private interest groups such as stockholders, union workers, and pressure groups are examples of external stakeholders (Parnell, Driscoll and Henderson, 2011). Therefore, SM is considered an important management function for achieving project success (Beringer et al., 2013). It ensures successful project outcomes and avoids failures by managing the interest of stakeholders through the integration of the project management process (Pacagnella Júnior et al., 2015). For the desired outcomes, it is essential to involve all the relevant project stakeholders in the entire lifecycle of projects. Olander and Landin (2005) stated that SM in the construction industry is a major concern and it needs further research on the characterization of stakeholders according to the project type and features to meet the growing demand of the industry (Park et al., 2017).

The conventional approaches to project management in the construction industry are complex and inefficient to deliver successful project outcomes (Ansah and Sorooshian, 2018; Ansah et al., 2016; Luo et al., 2017). Research in construction projects has also emphasized stakeholder involvement for enhanced project outcomes (Bal et al., 2013). SM is given only a passing mention in developing countries (Khan et al., 2021a). According to Almer and Koontz (2004), developing countries are being relying on public participation to reduce the occurrence of socio-economic and environmental conflicts during infrastructure construction projects since the 1990s. Unlike this, developed countries prioritize SM to improve decision-making and project implementation through collaborative governance. The global outlook shows that public infrastructure projects in China are managed with the participation of the public (Xie et al., 2014). According to Mutahara et al. (2020), in Bangladesh, the facilitation of multi-stakeholder participation is recommended to deal with management concerns in which different actors with different perceptions and interests have a stake. This study also suggests developing effective multi-stakeholder processes with respect to sustainable management. In Malaysia, SM has a positive and significant effect on the success of renewable energy projects. Also, it was figured out as an important approach for addressing the barriers and challenges in the advancement of renewable energy projects in Malaysia (Chee et al., 2021; Sorooshian et al., 2018; Sorooshian and Ting, 2018; Waris et al., 2019).

Pakistan is an important collaborator of China's One Belt One Road (OBOR) due to its geo-strategic location. The OBOR program instigated by the Chinese government revives the old silk route and connects China with Europe through many Asian countries. As a part of this gigantic construction program, Pakistan is a hub of many mega projects which are already in planning and execution phases. In this regard, public sector project management is gradually becoming an imperative subject due to the demands for improvement in accountability and organizational effectiveness in government organizations. Despite the economic significance of infrastructure projects in developing countries, it has been generally observed that government officials are not well equipped with contemporary project management skills deemed necessary for attaining the desired outcomes (Khan et al., 2019a). In such countries, these high valued projects have to deal with issues that are distinctive to multiple layers of overdemanding stakeholders, weak procurement systems, and administrative approvals (Ahsan and Gunawan, 2010). The infrastructure construction projects in Pakistan in the last few decades were not delivered efficiently due to many underlying issues associated with delaying in project completion, increased project cost, unsatisfactory project monitoring, lack of supervision, and scope deviation. At the policy level, the noteworthy reasons for the unsatisfactory performance mainly include ineffective governance and the disagreement of interest among the internal and external stakeholders (Ahmed and bin Mohamad, 2014). Other contributing factors also include a dearth of skilled labour lack of resources and complex bureaucratic procedures. Notwithstanding, the national policy and planning departments are striving to improve the performance of development projects through various programs. However, significant improvements are required so far in the performance of high valued and mega-scale projects (Khan et al., 2019b).

In recent years, scholars have addressed the issues in the performance of the public sector infrastructure of Pakistan (Gazder and Khan, 2018; Irfan and Hassan, 2017; Khan et al., 2019a; Khan et al., 2021a; Khan et al., 2021b; Khattak et al., 2016). The review of the aforementioned studies shows that the researchers have not addressed the theme of external SM in public sector infrastructure projects of Pakistan. Hence, this gap in research is a significant trigger for identifying the current study.

Infrastructure projects involve numerous stakeholders with a wide range of professional and technical backgrounds, as well as varying degrees and types of project objectives. Furthermore, stakeholders, whether adversarial or not, can have an influence on a project in a variety of ways, with the conclusion being either beneficial or negative, and so must be controlled. As a result, meeting continuous improvement, good stakeholder management, and satisfaction is worth focusing on. Complex stakeholder interdependence and competing interests, dynamics of high project unpredictability, financial oversight, and public scrutiny (Pacagnella Júnior et al. 2015). The indecisiveness and lack of cooperation of project stakeholders will have a detrimental influence on the overall project outcome. It is vital to provide suggestions, identify stakeholder concerns, and understand how to build connections while developing proper engagement tactics (Beringer et al., 2013). The goal of SM is to assure the effective completion of a project by considering stakeholder interests, requirements, influence, and conflicts, as well as strengthening stakeholders' contributions and responsibilities. Context evaluation in developing countries is far more difficult than in developed economies. Furthermore, inadequate project planning and development contribute to project delays and changes in scope. As a result, project stakeholders fluctuate during the project execution stage, shifting stakeholder interest. Political influence has an impact on project goals, budgeting, and stakeholders. Stakeholders are more attentive to political leaders than to the attainment of project objectives.

Besides, the distinct role of both internal and external stakeholders is evolving in the project management literature. Nevertheless, in a vast array of contemporary project management literature, the terms internal and external stakeholder is still subsumed under the broader umbrella of stakeholder management.

The development and implementation of a large-scale construction project may have ramifications for a variety of different interests. Positive consequences include improved communications, infrastructure, and a higher standard of living. On the other hand, construction projects frequently result in varying degrees of degradation and change on a regional scale, not least at the construction site. Stakeholders are representatives of these concerns who have invested in such development plans (Pacagnella Júnior et al., 2015).

A good public infrastructure project should plan and implement to meet the needs and concerns of as many external stakeholders as possible without compromising the project's purpose. The project manager's role requires knowledge of not only the technical process, but also the links between technology, environment, community, and people (Sorooshian et al., 2012). There is a need to increase knowledge about external stakeholders in construction projects and to develop methods and tools for analyzing their influence. (Olander, 2007).

The external monitoring and evaluation must be undertaken with regard to the project's goal, according to the developer and project manager. The objective must be to execute the job in conjunction with the project's specifications. The difficulty, therefore, becomes identifying trade-offs that address as many external stakeholders' demands and concerns as feasible. One obvious source of contention and disagreement is that decisions about the project's course of action were taken without considering the effects on external stakeholders. As a result, the whole project becomes unprepared for the possibility of conflict and consequently becomes unfit to plan for resolving or dealing with it (Olander, 2007; Mazur and Pisarski, 2015).

Therefore, the main objective of this study is to develop and validate the constructs (identification – classification, communication, empowerment, and risk control) of external SM in public sector infrastructure projects in Pakistan. As per the author's knowledge, this study is a very few among those studies that have focused on how to improve best identification and classification, empowerment, and risk control concerning external stakeholders in infrastructure project management. Furthermore, the objectives and outcome of the study also highlight the better external SM protocols and governance which is significant not only for professionals, government officials, researchers, politicians but also for nongovernmental organizations.

2. Literature Review

The Stanford Research Institute introduced Stakeholder Theory into Management in 1963. According to this, the term stakeholder is viewed as "any group or individual who is important for organizational survival" and "the ones who can affect or is affected by the achievement of the firm's objectives" (Freeman, 1984). Aaltonen et al. (2008) presented the SM processes aiming to highlight the importance of stakeholder identification, classification, analysis, and the management approach. According to stakeholder theory, the projects have interactions with the external environment, i.e., individuals, groups, and organizations that affect project decisions. Stakeholder theory endeavours to answer the important questions and needs of stakeholders (Bourne and Walker, 2008). The purpose of stakeholder engagement is to consider the stakeholder's interests and project needs. Relevant stakeholders could help in project success and provide solutions and sustainable practices. According to PMI (2017), effective engagement can be achieved by focusing on communication with all the relevant stakeholders. Continuous communication helps in understanding the needs of stakeholders, resolves the issues, settles the conflict of interests, and fosters appropriate stakeholder engagement in project decisions (PMI, 2017).

In the SM process, participants are identified and categorized to facilitate the initial and successive engagements. Chinyio and Olomolaiye (2010) mentioned that stakeholders are categorized based on different criteria Bonke and Winch (2002) are of the view that in a project, the stakeholders can be distributed into internal stakeholders being involved in project or provision of finance (e.g., contractors, clients & consultants) as well as external stakeholders being influenced by the project in an influential way (e.g., government authorities, neighbours and local community). Stakeholders can also be distinguished as direct and indirect depending on the axis of impact on the project. Similarly, primary and secondary stakeholders are different in classification. Stakeholder management's motivation is to design a framework as part of the organizational policy to avoid any future turbulence and changes. The process includes identification, analysis, communication, decision making in terms of managing stakeholders and categorized them into "analysis" and "engagement" aspects of tactics (Yang et al., 2011a). Furthermore, it involves the systematic identification, planning, implementation, and analysis of actions designed for engaging stakeholders. It also includes constant communication with stakeholders to understand their needs and expectations, resolving issues, managing conflicting interests, and encouraging appropriate stakeholder participation in project decisions and activities (PMI, 2017). Langtry (1994) has termed SM as an instrument for strategic management. Interactions with a particular type of stakeholders can either positively build an organization's image or sabotage its branding. Organizations are benefitted or are adversely affected by their stakeholder's input (Schneider, 2002). It is generally believed that well-managed stakeholders can help in determining the project definition, objectives, and project execution. The influence of stakeholders can be either minor or phenomenal and can be exercised incidentally or intentionally. Organizations ensure that their stakeholders and their influence must be administered effectually in every project, to overpower their negative effects. In the project, diverse stakes could become a central basis of the controversy between stakeholders; therefore, it is indispensable to manage the stakeholders in an effective manner (Chinyio and Olomolaiye, 2010). Infrastructure projects are comprised of numerous complex activities which the project teams must deal with them accordingly.

Yang et al. (2009) has emphasized the need for SM in construction projects, and state that construction projects are complex, and stakeholders possess temporary relationships; stakeholders have diverse interests as well as investments; to fulfill their requirements, the project managers have to communicate effectively; every one of the stakeholders must be aware of his tasks, roles, as well as requirements of the project and poor SM could lead to cost overrun and delays.

There is a need to engage the stakeholders in the earlier stages of construction projects. Emphasis is required to identify those stakeholders who are affected. They should be keenly involved in the project design as well as the engineering phase. Thus, ensuring their responsiveness to the local requirements and situations (Mathur et al., 2008). This will help to create a sense of ownership among them and foster the smooth execution of the project. The failure to address their concerns will lead to delayed planning because of the opposing waves of stakeholders employed against the progress of the project. Its main reason is the non-involvement and consideration of their interests in the appropriate manner (Olander, 2007). Smith and Love (2004) disclosed that the planning process of the local council project was delayed owing to hurdles from the residents who were ignored in the preliminary workshops and meetings at the initiation stage. At the inception stage of the project, significant decisions were made, but unfortunately, the stakeholders were kept ignorant, thus leading to criticism and delay. According to Winch (2010), managing external stakeholders in construction projects has become more challenging because they have gained much awareness of their legitimate powers through the regulatory reforms, and their right to access the information. So, according to Chinyio and Akintoye (2008), it is essential to identify and honor their expectations to minimize the negative impact and run the project productively. Jepsen and Eskerod (2009) argued that a holistic approach in gaining all stakeholders' contributions and support, is highly required for accomplishing the best results rather than a narrow focus of internal stakeholders. Nguyen et al. (2019b) have emphasised investigating the influence of project stakeholders also it is pertinent to comprehend the effect of external stakeholders which play a significant role in the project success.

Infrastructure construction projects involve multiple clusters of an individual with distinct roles and requirements. It is the prime responsibility of project managers to develop a communication and involvement plan to facilitate rational decision-making for all the concerned parties (Saghatforoush et al., 2011). A structured communication plan would help the project stakeholder to cooperate to sustain the overall benefits. Projects could attain long-term success by considering the expectations and requirements of the stakeholders and fulfilling their needs (Bal et al., 2013). In general, stakeholders have conflicts amongst them due to different levels of interest and primacies. To deal with such prevailing situations, the project authorities may take countermeasures to neutralize the rifts through a collaborative negotiation process (Moura and Teixeira, 2010). As a result, what is required from the negotiation with multiple stakeholders is managing their differing needs so that the outcome can achieve the highest possible satisfaction for those involved in the process (Achterkamp and Vos, 2008). Many problems are attributed to infrastructure projects around the world, which is the cause of project failure. For instance, one of the main reasons for project catastrophe is the local community opposition. As they feel that they have the greatest impact on the project's results thus, stakeholder involvement in infrastructure projects plays a significant role. Ineffective coordination amongst the key project groups, lack of awareness and abilities, ineffectiveness in project management systems, delay in decision makings are some of the examples of consequences due to ineffective SM and involvement (Yang et al., 2011b). Hence, to align the structure, processes, vision, and mission, organizations must adopt a stakeholder communication plan. Thus, keeping in view the above discussion, this can be claimed about SM that is an essential factor in the management of the activities in infrastructure projects.

2.1. Role of External Stakeholders

Construction and project management needs a massive amount of capital (Inga et al., 2020). Therefore, the success of mega projects needs to gain external stakeholder support, enabling strategic engagement to maximize the competitive edge (Ninan et al., 2020). This provides an opportunity to conclude more about the practice of interaction that represents stakeholders' unique demands and how best to manage them (Chow and Leiringer, 2020). In inter-organizational initiatives that add value in complex circumstances, external stakeholder participation is important, providing insights into the related functions, duties, arrangements, and initiatives in inter-organizational environments with different interests (Lehtinen and Aaltonen, 2020).

In addition, establishing good partnerships with the external stakeholders of an organization is the main success factor especially in project management (Sadkowska, 2018). To do so, an organization must give priority to the option of project location; internal stakeholder transparency; stakeholder engagement timing; public-private partnership knowledge; and internal stakeholder relationships are the five main facilitators for better external SM (Amadi et al., 2018). While it is important to consider the power of external stakeholders to achieve project performance, little attention has been provided to examine their methods of influence. To avoid this impact from transforming into an adverse effect on construction projects, there is a need for complete and transparent interaction with stakeholders (Nguyen et al., 2018). By prioritizing the responses to the expectations of stakeholders, managers should adopt a phenomenology roadmap to analyze stakeholder engagement to equally satisfy stakeholders determining the proportion of their relative importance to perceptions for three key types: moderate, equal, and compelling (Bahadorestani et al., 2020). Nonetheless, a combined internal and external stakeholder relationship often plays a crucial role in establishing consequences for interpersonal working relationships that are sufficiently flexible to typically extend to project management but may be better suited to large project environments (Mazur and Pisarski, 2015). Furthermore, many construction projects need successful cooperation between the different types of stakeholders involved in order to succeed, which will also help to contribute to stakeholder perspective studies in construction projects and to incorporate stakeholder knowledge in most cases (Nguyen et al., 2019a; Xue et al., 2020). In addition to that, research should attract attention to the scope in which stakeholders are placed, to derive their positions and interactions inside and outside the organization, and to establish new research directions for project governance stakeholders. These contexts affect the approaches of organizations to external stakeholders: achievement, massive projects, and morality (Derakhshan et al., 2019). In addition, a viable integrated approach is also needed to incorporate both risk management and SM to eliminate obstacles that impede the success of the project (Xia et al., 2018).

2.2. Public Sector Projects

Public sector projects have long-term socioeconomic and environmental impacts on any country (Wang et al., 2015). The policymakers are deeply concerned with the technique for project implementation (Oloruntobi Dada, 2013). Inefficiency in the public sector project management has been a serious problem for nations particularly for developing countries (Kossova and Sheluntcova, 2016). A massive budget of government resources is wasted in cost escalation, low quality, and late delivery of developmental projects (Klakegg et al., 2005). Project managers of public sector projects often face challenges in the processes of identifying stakeholders' needs, assessing their impacts, relationships, and devising appropriate engagement strategies for stakeholders (Yang et al., 2011b). Usually, conflicts arise due to diverse interests, perceptions, expectations, and vested concerns (Jäger and Zakharova, 2014). The SM process in public sector projects is informal and fragmented and is inadequate for managing complex interventions (Jäger and Zakharova, 2014). Accordingly, it is highly required that there should be a comprehensive, formal, and methodical SM process model for application in public sector projects (Jäger and Zakharova, 2014; Yang et al., 2011b). Identifying, managing, and influencing the key stakeholders through a structural approach within each phase of the project life cycle is an immense challenge. Hence, identifying and prioritizing the stakeholders during the project lifecycle is a good practice. The project is a matter of concern for the stakeholders, and it also affects them. So, they are required to be managed effectively. Researchers have noticed significant issues in managing stakeholders (Li et al., 2012). These issues were related to stakeholder disconnection and the processes that are essential for effective SM and integration (Rajablu et al., 2017).

Pakistan is among the long list countries where projects are either are not performing well due to ineffective stakeholder management. There are conflicts in the projects due to the difference of opinion among organizations and their respective stakeholders (Saad et al., 2020). One of the most popular examples is the construction of the Kalabagh Dam (hydroelectric power) project, which has not been started in the last three decades due to poor SM and engagement. The country's capital airport i.e., Islamabad international airport has also been delayed for more than 12 years mainly because of this underlying reason. Many scholars have acknowledged the importance of SM in construction projects but in developing countries like Pakistan, not much consideration has been given to promoting SM (Khan et al., 2021a; Nauman and Piracha, 2016; Saad et al., 2020). The implementation of several projects has been compromised due to the opposition and dissatisfaction of the relevant stakeholders of the projects (Zafar et al., 2020). Hence, there is a need for effective SM and engagement for the performance of the public sector in Pakistan.

3. Methodology

The study is quantitative and cross-sectional in nature. The survey is the primary research strategy and enables the collection of a sufficient data set within the constraints of time and resources (Saunders et al., 2009). The questionnaire is used to collect quantitative data relevant to the study's objectives. Due to time constraints, the time horizon will be a significant consideration and the quantitative component of the study will be conducted using a cross-sectional time horizon. In terms of sample size (Hair et al., 2010), it is determined by the statistical analysis requirement. A survey questionnaire was mailed to the Pakistan Engineering Council's registered project professionals who work in government planning and development departments. It included a total of 1000 employees who met the inclusion criteria. Each respondent was a gazetted government employee with relevant experience and role-appropriate knowledge. The data is analyzed using statistical tools, and the conclusions are conclusive.

A second-order factor analysis was used in the current study as a statistical technique. This ratio of 10:1 has been used by precedent scholars (Hair et al., 2010) for both agreeable results and generalization of the study. The items of SM in projects were examined in the form of a questionnaire, which included 30 items culled from academic studies. A sample size of 300 people (10 x 30 = 300) was chosen based on the suggested STV ratio. The structural equation modeling (SEM) was used in this study which is a statistical method that simultaneously combines a measurement model (confirmatory factor analysis (CFA)) and a structural model (regression or path analysis). CFA is used to test the hypothesized relationships between the observed variables as well as their latent variables. Latent variables' interrelationships are tested using the structural model, which is based on existing theory or empirical research in the domain of study. (Byrne, 2016). An indicator's latent construct is determined by using CFA. Prior to hypothesis testing or structural model analysis, the model's fit to the data is tested. CB-SEM is carried out using IBM AMOS 21 software. A questionnaire had been mailed with the sureties of anonymity in collating & handling their responses. The five-point Likert scale (1–5) was used to rate the responses. The Likert scale grading was varied from less to highly frequent, i.e., never, rarely, sometimes, often, and always. Survey instruments and constructs are adapted from literature to investigate the prevalence of external SM in public sector infrastructure projects.

The response rate was 40% in the pilot testing. Thus, the sample size was increased by 60%, to 480 participants. Out of 480 questionnaires, 340 professionals responded. 40 responses had to be discarded because of missing values and incomplete responses. A sample size of 300 was chosen for the final statistical analysis. Cronbach's alpha (also known as the reliability coefficient) was used to assess the data's internal consistency. Analyses of both qualitative and quantitative data made use of descriptive statistics. As SM was the key latent construct, it was also measured across five additional latent dimensions, resulting in a total of thirty observable items. As a result, CFA was used to confirm the findings in a second order. Subsequently, the absolute "comparative and parsimonious fit indices" were included in the analysis in order to ascertain the goodness of fit criteria for the construct under study. The absolute goodness-of-fit indices include the root mean square error of approximation (RMSEA); goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI). Chi-square/d. f is considered to be yet another index, used to examine the goodness of fit. The relative goodness-of-fit indices computed are the comparative fit index (CFI), Tucker-Lewis index (TLI) and normed fit index (NFI).

When managing stakeholders, it is critical to consider the project's life cycle (Burke and Barron, 2014). Each

stage in the project lifecycle has a different number and range of stakeholders, and their significance also varies, causing the project team to face a variety of challenges (Jepsen and Eskerod, 2013). According to Rajablu (2014), the SM consists of five observed variables of stakeholder identification and classification (IC), stakeholder communication (CM), stakeholder engagement (EN), stakeholder empowerment (ET), and risk control (RK). Table 1 has summarized the operationalization of the adapted constructs and elaborates the component of the external SM.

4. Results and Discussion

4.1 Confirmation of Measurement Items and Constructs

The statistical confirmation of the construct is an essential step in construct validation. Explaining and predicting the trend of the theories is based on a valid construct. Therefore, it is essential to evaluate the construct validation before its application and appropriate measurement of the phenomenon. The concept of uni-dimensionality is the first and most essential step in the construct validation process. It is usually evaluated through CFA. However, this approach is valid when the construct under evaluation has already been used in the past and its validity has been tested repeatedly. Moreover, we should also have a strong, substantial justification to adopt or adapt this construct and fit it in our research. In these two mentioned situations, we prefer to use only CFA for uni-dimensional measurement. On the contrary, if a construct and its observed variables are relatively new in the field of research, then its uni-dimensionality should be evaluated in two steps: at first step through principal component factor analysis (PCFA) and second step through CFA on the identified items of the construct.

The application of PCFA is based on some pre-requisites like Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. If the KMO test value is over 0.60 and Bartlett's Test has significant findings, then it indicates that many variables can be grouped into a smaller number of seats (components). Simply, it means PCFA is an appropriate technique for data reduction on the data at hand. Current study findings have shown that both essential tests followed the threshold values as KMO value is > 0.60 and Bartlett's Test showed significant results as shown in Table 2. In the next step the importance of each observed variable in the grouping, the process was evaluated through commonality analysis. All the extracted values were greater than the recommended value of 0.40.

In the thirty observed variables, communality values were in the range of (0.656-0.904) as shown in Table 3. Then Eigenvalues for this PCFA analysis identified five components out of 30 which had values greater than 1.0 (threshold) as shown in Figure 1. It showed that there should be five components for the classification of thirty observed items. Further, extracted variation through the identified components is an important parameter to evaluate the efficiency of PCFA. Here, the five identified components explained 83% cumulative variation from the data that was above the required level (0.60). Extracted components of the PCFA were rotated through varimax rotation to get the balanced division of observed variables and their explained variation into five identified components. The results have shown that these five components covered variables of five dimensions of the main construct, i.e., SM as shown in Table 4. It also showed that these thirty variables were rightly classified as per the literature.

Table 1. Operationalization of the construct

Constructs	Items	References
Stakeholder identification & classification	IC1: stakeholders identified; IC2: stakeholders analyzed; IC3: stakeholders perceptions; IC4: stakeholders role; IC5: stakeholder's influence; IC6: stakeholders register	(Khan, Waris, Panigrahi, et al., 2021; Rajablu et al., 2017; Rowlinson and Cheung, 2008)
Communication	CM1: stakeholders communication path; CM2: information and accurate data; CM3: stakeholders data information; CM4: stakeholders data information dissemination; CM5: stakeholders exchange of information with the project management team; CM6: stakeholders exchange of information with each other.	(Kerzner and Kerzner, 2017; Khan, Waris, Panigrahi, et al., 2021; PMI, 2017; Rajablu et al., 2017)
Engagement	EN1: stakeholders enabled to outline the project scope definition; EN2: stakeholders expectations; EN3: stakeholders about project aims and objectives; EN4: stakeholders enabled to define project success factors and success criteria; EN5: stakeholders potential concerns; EN6: stakeholders constant support	(Aaltonen and Kujala, 2010; Khan, Waris, Panigrahi, et al., 2021; Rajablu et al., 2017)
Empowerment	ET1: stakeholders motivation; ET2: stakeholders commitment; ET3: stakeholders negotiation; ET4: stakeholders monitoring; ET5: stakeholders participation; ET6: stakeholders and benefits realization process	(Aaltonen and Kujala, 2010; Khan, Waris, Panigrahi, et al., 2021; Rajablu et al., 2017)
Risk control	RK1; risk probability assessment; RK2: conducts risk impact assessment; RK3: risk proximity assessment; RK4: communicates risk with all stakeholders; RK5: risk profile; RK6: risk response.	(Khan, Waris, Panigrahi, et al., 2021; Pinto, 2016; PMI, 2017; Rajablu et al., 2017)

Table 2. KMO and Bartlett's test

KMO measure of sampling adequacy	0.909
Bartlett's test of Sphericity sig.	0.00

Table 3. Communalities, extraction method, principal component analysis

	Initial	Extraction
IC1	1.000	0.810
IC2	1.000	0.853
IC3	1.000	0.827
IC4	1.000	0.866
IC5	1.000	0.806
IC6	1.000	0.656
CM1	1.000	0.780
CM2	1.000	0.861
CM3	1.000	0.858
CM4	1.000	0.904
CM5	1.000	0.855
CM6	1.000	0.774
EN1	1.000	0.847
EN2	1.000	0.861
EN3	1.000	0.875
EN4	1.000	0.816
EN5	1.000	0.855
EN6	1.000	0.845
ET1	1.000	0.797
ET2	1.000	0.739
ET3	1.000	0.809
ET4	1.000	0.843
ET5	1.000	0.800
ET6	1.000	0.829
RK1	1.000	0.842
RK2	1.000	0.866
RK3	1.000	0.821
RK4	1.000	0.831
RK5	1.000	0.890
RK6	1.000	0.820

Moreover, five sets of observed variables were having the least correlation across the components but showed maximum within each of the same components. These results showed the presence of uni-dimensionality within the five sub-constructs of the main construct i.e., stakeholder management. After measuring the uni-dimensionality through the PCFA approach, uni-dimensionality was assessed through CFA. Its results have many things to discuss regarding uni-dimensionality and convergent validity as well. However, for uni-dimensionality factor loads with their significance are essential. In the analysis, first, the second-order construct was drawn, and thirty questions were placed to measure the five dimensions of stakeholder management. Then these five dimensions measure the main construct. At the first level, dimensions or sub-constructs were measured through observed variables showing in the rectangular shapes as in Figure 2. At this phase, factor loading of each observed variable on the sub-construct was mentioned on the arrow however at the head of the arrow, there was a squared correlation (R2) that also showed the contribution of this observed variable in the measurement of that specific sub-construct. Similarly, these five confirmed sub-constructs will develop the main construct.

Table 4. Rotated component matrix

	Component				
	1	2	3	4	5
IC1	0.862				
IC2	0.851				
IC3	0.827				
IC4	0.862				
IC5	0.816				
IC6	0.682				
CM1		0.803			
CM2		0.829			
CM3		0.840			
CM4		0.872			
CM5		0.826			
CM6		0.754			
EN1			0.842		
EN2			0.859		
EN3			0.884		
EN4			0.842		
EN5			0.874		
EN6			0.876		
ET1				0.846	
ET2				0.781	
ET3				0.861	
ET4				0.853	
ET5				0.809	
ET6				0.840	
RK1					0.819
RK2					0.809
RK3					0.799
RK4					0.813
RK5					0.854
RK6					0.820

Initially, we run the analysis for thirty variables, all variables and sub-constructs showed significant factor loadings in their paths with high R2 values except for three variables; IC5, RK3, and ET1. These three variables had shown less factor loading than the threshold (0.50, as suggested by Awang, 2012) and also had insignificant t-statistic. These three items were deleted step by step in different combinations and noted the remaining factor load. In the end, we decided to drop these three items based on their constant insignificant behavior in the convergence process. We revised the construct by deleting these three items and got the significant factor loads for the paths of the remaining 27 variables. Now the minimum factor loading was 0.74 at the sub-construct level and 0.64 at the construct level. All the R2 values were above than threshold (0.40, as discussed by Awang, 2012). These results showed the uni-dimensionality of the construct through CFA.

4.2. Convergent Validity

The next step is to evaluate the validity of the construct, convergent, construct validity, and discriminant validity. The last-mentioned type of validity could not be computed due to the presence of a single construct in the study. For convergent validity, all items in the model should be significant (Tabachnick and Fidell, 2007). In the discussion, it is already established that all items at the first level and sub-constructs at the second level were significant and met the requirement of convergent validity. However, there was some problem with model fitness indices, which ultimately affects the construct validity. Therefore, to improve the model, we run the modification indices analysis that indicated a few important paths, which could be drawn, and model fitness might improve. Now the finalized construct with their items, constructs, factor loads, R2, and covariance's is shown in Figure 2. The finalized model indices are given in Table 5. Where all the fit indices, the recommended criteria are given. To evaluate and decide about the validation of the latent constructs, the recommended criteria goodness of CFA was used. Other than GFI and AGFI all indices were following the thresholds given in the literature. Literature has also discussed that at least one criterion from each given three types of indices should be significant that showed the model fitness for further usage (Hair et al., 2010). Moreover, GFI and AGFI are sensitive indices when the sample is greater than 200 (Awang, 2012). It would be a reason for not getting ideal values on these two indices.

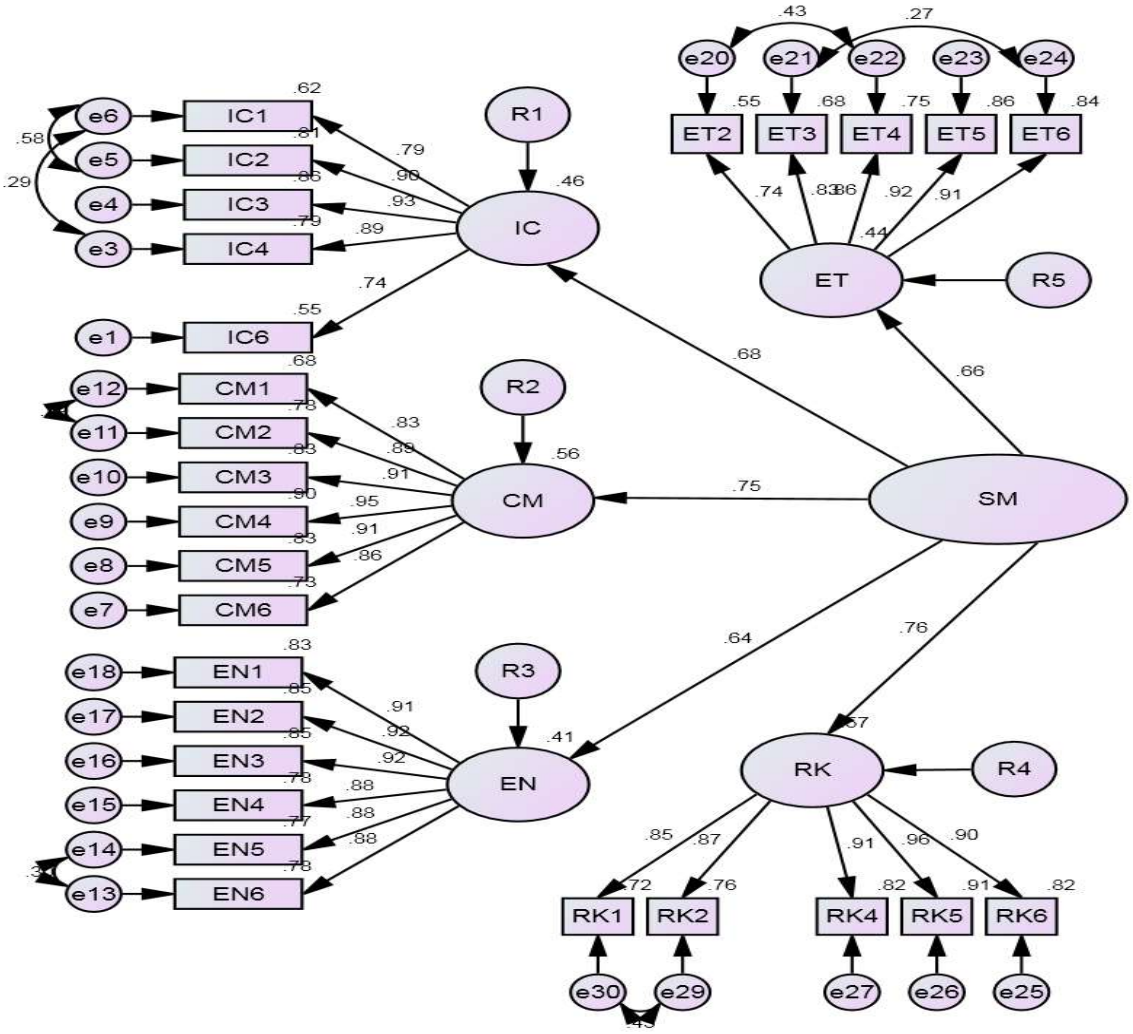

Fig. 1. Scree plot

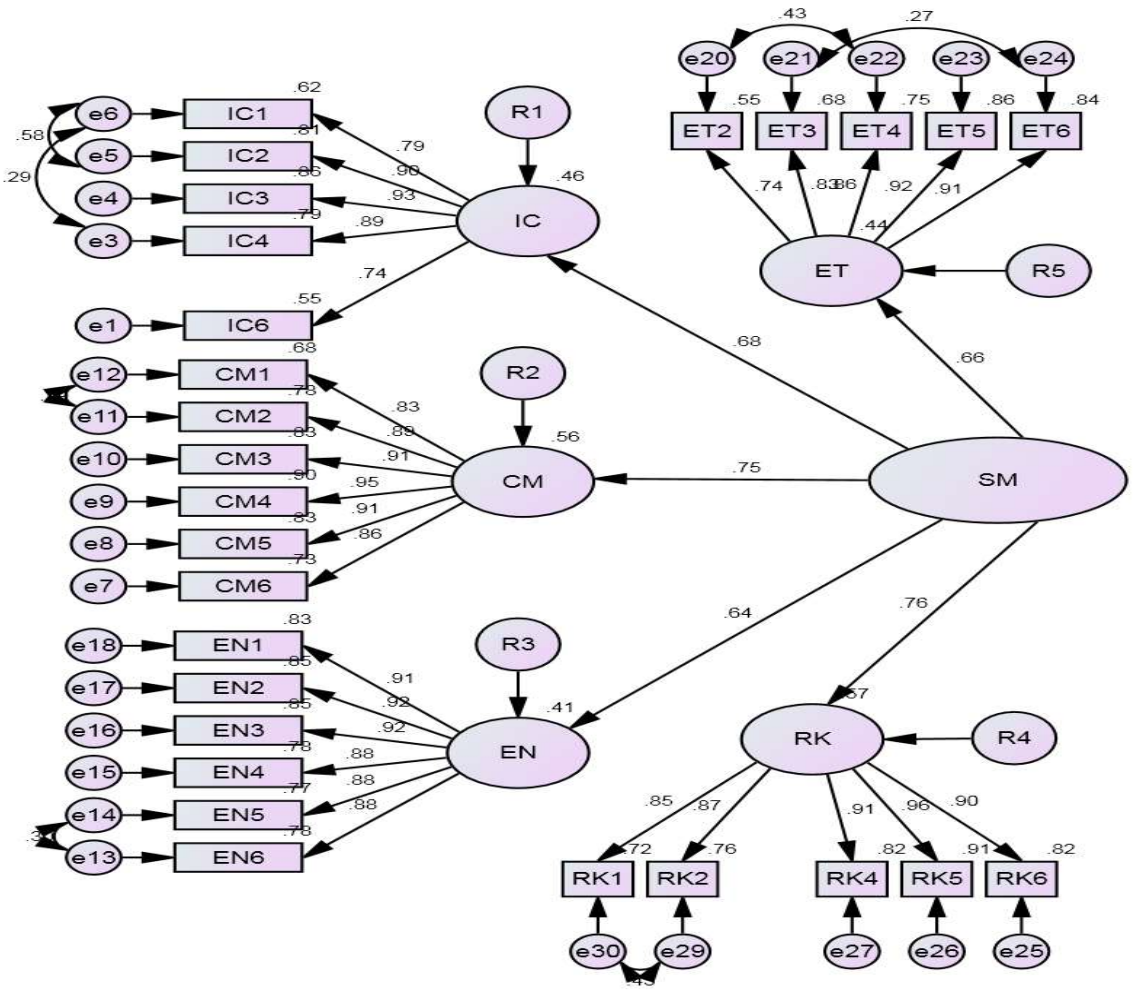

Fig. 2. The second-order construct of stakeholder management

Table 5. The goodness of fit indices

GFI	Absolute fit index		Comparative fit index				Parsimonious fit
	GFI	RMSEA	CFI	TLI	NFI	AGFI	Chi-square/ d.f
Recommended values	⩾ 0.90	⩽ 0.10 but ideally ⩽ 08	⩾ 0.90	⩾ 0.90	⩾ 0.90	⩾ 0.90	⩽ 5.0
Estimated values	0.822	0.080	0.908	0.906	0.901	0.801	3.80

4.3. Reliability Analysis

After determining the uni-dimensionality and validity of the items, we conducted a reliability analysis on the confirmed 27 items. We primarily have five sub-constructs and one primary construct. We conducted two separate reliability analyses: first, for individual confirmed items of sub-constructs, and then for all confirmed items of the main construct. Results have shown that both analyses produced acceptable results because both computed values were far greater than the threshold value ($\alpha > 0.70$, as stated by Saunders et al., 2009). Table 6 shows that stakeholder management with its five dimensions and identified 27 variables is statistically validated in Pakistan's context for future research. Moreover, factor loads highlighted that RK is the most contributing dimension of SM and ET is the least. However, ET is still a significant dimension of SM.

Table 6. Reliability analysis

Sr. No	Name of construct	Number of items	Reliability coefficient
1	IC	5	0.934
2	CM	6	0.959
3	EN	6	0.963
4	ET	5	0.939
5	RK	5	0.956
6	Overall	27	0.958

4.4. Prevalence of External Stakeholder Management

To evaluate the prevalence of external SM practices, mean values based on the confirmed items of each sub-construct and main construct were computed. The higher mean demonstrated the higher practices of SM and vice versa. All five dimensions and the overall mean of external SM were calculated and the Radar diagram in Figure 3 is the depiction of the computed mean values. The mean values of IC and CM are almost equal which shows both dimensions were equally prevalent in Pakistan's context.

Among them, IC enables the project professionals to recognize the stakeholder's perceptions. IC empowers the project teams to portray the stakeholder environment clearly which can serve as a pre-requisite for the identification of performance measures (Aaltonen, 2010)

Whereas CM allows the stakeholders to exchange the information for engagement and empowerment. It is an effective trust-building mechanism that helps in building stakeholder relationships (Lander et al., 2004; Terje Karlsen et al., 2008). In their study, Al Qubaisi et al. (2015) have also endorsed the substantial role of CM in project success.

The least practiced dimensions of SM were ET and EN. EN enables to define project scope, success factors, and support throughout the lifecycle of the project. It is a process that helps in getting the stakeholder on board and reduces stakeholders' adverse effects. It also focuses on communication with all the key stakeholders for effective stakeholder engagement (PMI, 2017). ET plays an important role in satisfying the stakeholder's commitment throughout the project lifecycle. It supports stakeholder participation in decision-making and benefits realization (Rajablu et al., 2017). Fageha and Aibinu (2013) have proposed stakeholder ET from the initiation of the project

The mean values were in the range of 3 (sometimes) to 4 (often) on the Likert scale i.e., that concludes that external SM and its dimensions were fully practised in Pakistan. The study's findings on the prevalence of external SM practices revealed that it was not widely practiced. As a result, external SM practices remain an issue in Pakistan that should be addressed (Saad et al., 2020). Our study's findings are consistent with previous research conducted explicitly in developing countries. The Asian region, which includes the majority of developing countries, took the lead (with 24%) in publishing articles on the topic of external SM and its importance in developing countries. The reason for the high number of publications in this area indirectly highlighted the need for SM in this area (Khan, Waris, Panigrahi, et al., 2021). According to the studies, SM was a less addressed area of project management in a practical scenario of mega projects in developing countries (Mok, Shen and Yang, 2015; Shen and Xue, 2021). Considering the preceding discussion, external SM is a critical factor in the management of activities in infrastructure projects. Likewise, the overall success and performance of the project can be accomplished through external SM, which recognizes the value of the project and establishes a link between stakeholders while keeping their responsibilities, rights, and interests in mind. Moreover, if external SM is involved in decision-making activities, the entire process will be improved and a potential bottleneck between stakeholders and decision-making bodies will be avoided.

The performance of construction projects and the satisfaction of the stakeholders depend on the carefulness and the decisions made by the authorities in promoting stakeholder communication (Landin, 2000). Leung and Olomolaiye (2010) claimed that during the design stage of the project, continual, and frequent communication is very important. Many scholars have taken power/interest matrix as a common approach (Newcombe, 2003; Olander and Landin, 2005). The stakeholders are classified based on their level of interest in the projects. In the power/interest matrix, the project management team has to consider all the stakeholders in a different method and employ different engagement tactics (Newcombe, 2003). SM is a powerful tool that developing countries use to improve the outcomes of project decision-making and implementation through collaborative government (Khan et al., 2021).

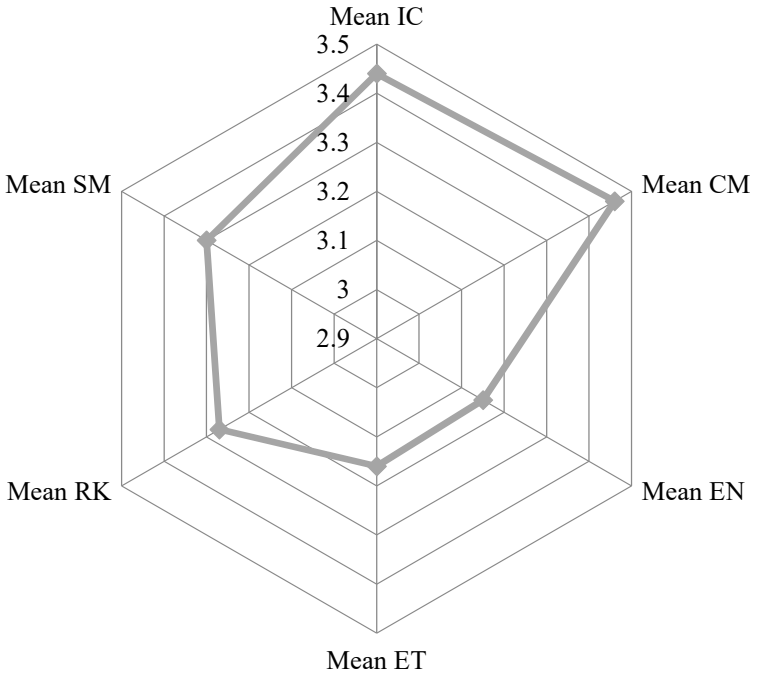

Fig. 3. Prevalence of SM and its dimensions

Stakeholder theory states that performance is dependent on an organization's understanding of key business and competitive drivers, strategic thinking abilities, and communication and leadership skills. In this context, project teams must understand and respond to different stakeholder groups. In the main structure of project management, the incorporation of stakeholder theory along with triple constraints will have a positive impact on the success of the project.

5. Conclusion and Future Research Prospects

The findings of this study have drawn attention to the importance of external SM in Pakistan's public-sector projects. It has been determined that external SM practices have not been widely adopted, which has resulted in projects that have underperformed. The study fills a gap in the literature by validating the constructs of external SM for government-sponsored infrastructure projects. Construct validation is an essential aspect of this study and provides a basis for an accurate evaluation of the phenomenon. The results reveal that 'Risk Control' is the most important contributing dimension of stakeholder management, while 'Empowerment' is the least important concern and lowers the stakeholder participation in decision-making and benefits realization. Public-sector organizations are required to move away from the conventional approach, which focuses on specific actions and market mechanisms. There is a need to establish a formal and comprehensive structure to manage stakeholders, which will strengthen and enhance the performance of public projects. The standardized project management methodologies need to be followed along with the government planning manuals to ensure better external SM processes, estimations, monitoring, controlling, and lessons learned. In the prevailing geopolitical situation in the country, the importance of managing the project stakeholders will undoubtedly increase, as there is always administrative pressure on public agencies to manage projects successfully.

Other developing countries, especially those with similar socio-economic situations to Pakistan, may benefit from the findings due to inefficient public sector capacity, stakeholder influences, and resource constraints. The research outcome is also relevant to the government's policy and planning departments that are attempting to improve infrastructure facilities through a variety of performance models, but still require significant improvements in order to achieve their desired outputs.

6. Limitations of Study

In the vast array of contemporary project management literature, the terms "internal" and "external" stakeholders are still subsumed under the broader umbrella of "stakeholder management." Thus, it may be viewed that a single-sided approach to considering internal or external stakeholders could undermine the value. As such, it is not a straightforward approach to manage multifaceted stakeholders, especially in the case of limited research precedents and insights in the domain of project management versus internal or external stakeholders. In this study, the term "stakeholder" refers to all individual people, organizations, or institutions with a stake in the project and the ability to influence its outcome. Moreover, as per the author's modest knowledge, comprehensive empirical studies of the understudied phenomenon are not abundant in the available literature. Further studies, based on qualitative data, can extend the understanding of project SM in infrastructure projects and explore implications from other geographical regions of the world.

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References

Aaltonen, K. (2010). Stakeholder management in international projects. Aalto University, Espoo, Finland.

Aaltonen, K., Jaakko, K., and Tuomas, O. (2008). Stakeholder salience in global projects. *International Journal of Project Management*, 26, 509-16.

Aaltonen, K., and Kujala, J. (2010). A project lifecycle perspective on stakeholder influence strategies in global projects. *Scandinavian Journal of Management*, 26, 381-97.

Achterkamp, M. C., and Vos, J. F. (2008). Investigating the use of the stakeholder notion in project management literature, a meta-analysis. *International Journal of Project Management*, 26, 749-57.

Ahmed, R., and Bin Mohamad, N. A. (2014). Performance of project in public sector of Pakistan: Developing a Framework for future Challenges. *Serbian Project Management Journal*, 4, 3-12.

Ahsan, K., and Gunawan, I. (2010). Analysis of cost and schedule performance of international development projects. *International Journal of Project Management*, 28, 68-78.

Al Qubaisi, J. M. L. F., Badri, M. A., Ajmal, M., and Elanain, H. M. A. (2015). Leadership, culture and team communication: analysis of project success causality–a UAE case. *International Journal of Applied Management Science.*

Amadi, C., Carrillo, P., and Tuuli, M. (2018). Stakeholder management in PPP projects: external stakeholders' perspective. *Built Environment Project and Asset Management*.

Ansah, R. H., and Sorooshian, S. (2018). 4P delays in project management. *Engineering, Construction and Architectural Management*.

Ansah, R. H., Sorooshian, S., Mustafa, S. B., and Duvvuru, G., (2016). Lean construction tools. In *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 784-93.

Awang, Z. (2012). *Structural equation modeling using AMOS graphic*. Penerbit Universiti Teknologi MARA, Selangor, Malaysia.

Bahadorestani, A., Karlsen, J. T., and Farimani, N. M. (2020). Novel Approach to Satisfying Stakeholders in Megaprojects: Balancing Mutual Values. *Journal of Management in Engineering*, 36, 04019047.

Bal, M., Bryde, D., Fearon, D., and Ochieng, E., (2013). Stakeholder engagement: Achieving sustainability in the construction sector. *Sustainability,* 5 (2): 695–710.

Beringer, C., Jonas, D., and Kock, A. (2013). Behavior of internal stakeholders in project portfolio management and its impact on success. *International Journal of Project Management*, 31, 830-46.

Bonke, S., and Winch, G. (2002). Project stakeholder mapping: analyzing the interests of project stakeholders. In, *Frontiers of project management research*, *Project Management Institute*, pp. 385-405.

Bourne, L., and Walker, D. H. (2008). Project relationship management and the Stakeholder Circle™. *International Journal of Managing Projects in Business*, 1, 125-30.

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge, UK.

Chee, S. Y., Firth, L. B., Then, A. Y.-H., Yee, J. C., Mujahid, A., Affendi, Y. A., Amir, A. A., Lau, C. M., Ooi, J. L. S., and Quek, Y. A. (2021). Enhancing Uptake of Nature-Based Solutions for Informing Coastal Sustainable Development Policy and Planning: A Malaysia Case Study. *Frontiers in Ecology and Evolution*, 625.

Chinyio, E., and Olomolaiye, P. (2010). Introducing stakeholder management. *Construction stakeholder management*, 1.

Chinyio, E. A., and Akintoye, A. (2008). Practical approaches for engaging stakeholders: findings from the UK. *Construction management and economics*, 26, 591-99.

Chow, V., and Leiringer, R. (2020). The practice of public engagement on projects: from managing external stakeholders to facilitating active contributors. *Project Management Journal*, 51, 24-37.

Derakhshan, R., Turner, R., and Mancini, M. (2019). Project governance and stakeholders: a literature review. *International Journal of Project Management*, 37, 98-116.

Fageha, M. K., and Aibinu, A. A. (2013). Managing project scope definition to improve stakeholders' participation and enhance project outcome. *Procedia-Social and Behavioral Sciences*, 74, 154-64.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach.* Cambridge University Press, UK: Harpercollins College Div.

Gazder, U., and Khan, R. A. (2018). Effect of Organizational Structures and Types of Construction on Perceptions of Factors Contributing to Project Failure in Pakistan. *Mehran University Research Journal of Engineering and Technology*, 37, 12.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., and Tatham, R. L. (2010). *Multivariate data analysis.* Prentice hall Upper Saddle River, NJ.

Inga, C., Ochoa, F., and Farje, J., (2020). Competency management model to resolve conflicts with external stakeholders in construction projects. Proceedings of *Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI)*, Bogota, Colombia, 1-6.

Irfan, M., and Hassan, M. (2017). The Effect of Project Success on Corporate Reputation of the Public Sector Organizations in Pakistan. *International Journal of Economics and Management*, 11, 815-32.

Jäger, T., and Zakharova, A., (2014). Stakeholder participation to improve societal acceptance for mega projects.: A case study of the forum for the coal-power plant "Datteln 4" project.

Jepsen, A. L., and Eskerod, P. (2009). Stakeholder analysis in projects: Challenges in using current guidelines in the real world. *International Journal of Project Management*, 27, 335-43.

Kerzner, H., and Kerzner, H. R. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. Hoboken, New Jersey: John Wiley & Sons.

Khan, A., Waris, M., Ismail, I., Sajid, M. R., Ali, Z., Ullah, M., and Hussain, A. (2019a). Investigating the Practices of Project Governance in Public Sector Infrastructure Program in Pakistan. *Advances in Civil Engineering.*

Khan, A., Waris, M., Ismail, I., Sajid, M. R., Ullah, M., and Usman, F. (2019b). Deficiencies in Project Governance: An Analysis of Infrastructure Development Program. *Administrative Sciences*, 9.

Khan, A., Waris, M., Panigrahi, S., Sajid, M. R., and Rana, F. (2021a). Improving the Performance of Public Sector Infrastructure Projects: Role of Project Governance and Stakeholder Management. *Journal of Management in Engineering*, 37.

Khan, A., Waris, M., Ullah, M., and Bokhari, I. H. (2021b). Review of Public Sector Project Planning in Pakistan. *Pakistan Journal of Social Sciences*, 41, 503-14.

Khattak, M. S., Mustafa, U., and Shah, S. (2016). Mapping Project Management Competencies with Different Complexities for Improving Performance. *Journal of Managerial Sciences*, 10.

Klakegg, O. J., Samset, K., and Magnussen, O. M., (2005). Improving Success in Public Investment Projects. Lessons from a Government Initiative in Norway to Improve Quality at Entry. Proceedings of the *19th IPMA World Congress*. Norway.

Kossova, T., and Sheluntcova, M. (2016). Evaluating performance of public sector projects in Russia: The choice of a social discount rate. *International Journal of Project Management*, 34, 403-11.

Lander, M. C., Purvis, R. L., Mccray, G. E., and Leigh, W. (2004). Trust-building mechanisms utilized in outsourced IS development projects: a case study. *Information & Management*, 41, 509-28.

Landin, A. (2000). *Impact of quality management in the Swedish construction process*. Department of Construction Management, Lund Institute of Technology.

Langtry, B. (1994). Stakeholders and the moral responsibilities of business. *Business Ethics Quarterly*, 431-43.

Lehtinen, J., and Aaltonen, K. (2020). Organizing external stakeholder engagement in inter-organizational projects: Opening the black box. *International Journal of Project Management*, 38, 85-98.

Leung, M.-Y., and Olomolaiye, P. (2010). Risk and Construction Stakeholder Management. *Construction stakeholder management (Wiley-Blackwell)*, 75-98.

Li, T. H., Ng, S. T., and Skitmore, M. (2012). Conflict or consensus: An investigation of stakeholder concerns during the participation process of major infrastructure and construction projects in Hong Kong. *Habitat International*, 36, 333-42.

Luo, L., He, Q., Jaselskis, E. J., and Xie, J. (2017). Construction project complexity: research trends and implications. *Journal of Construction Engineering and Management*, 143.

Mathur, V. N., Price, A. D., and Austin, S. (2008). Conceptualizing stakeholder engagement in the context of sustainability and its assessment. *Construction management and economics*, 26, 601-09.

Mazur, A. K., and Pisarski, A. (2015). Major project managers' internal and external stakeholder relationships: The development and validation of measurement scales. *International Journal of Project Management*, 33, 1680-91.

Mok, K. Y., Shen, G. Q., and Yang, J. (2015). Stakeholder management studies in mega construction projects: A review and future directions. *International Journal of Project Management*, 33, 446-57.

Moura, H. M. P., and Teixeira, J. M. C. (2010). Managing stakeholders conflicts. *Construction stakeholder management*, 286-316.

Mutahara, M., Warner, J., and Khan, M. (2020). Multi-stakeholder participation for sustainable delta management: a challenge of the socio-technical transformation in the management practices in Bangladesh. *International Journal of Sustainable Development & World Ecology*, 27, 611-24.

Nauman, S., and Piracha, M. (2016). Project stakeholder management-a developing country perspective. *Journal of Quality and Technology Management*, 13, 01-24.

Newcombe, R. (2003). From client to project stakeholders: a stakeholder mapping approach. *Construction management and economics*, 21, 841-48.

Nguyen, T. H. D., Chileshe, N., and Rameezdeen, R. (2018). External stakeholder strategic actions in construction projects: a Vietnamese study. *Construction management and economics*, 36, 443-58.

Nguyen, T. H. D., Chileshe, N., Rameezdeen, R., and Wood, A. (2019a). External stakeholder strategic actions in projects: A multi-case study. *International Journal of Project Management*, 37, 176-91.

Nguyen, T. H. D., Chileshe, N., Rameezdeen, R., and Wood, A. (2019b). Stakeholder Influence Pathways in Construction Projects: Multicase Study. *Journal of Construction Engineering and Management*, 145.

Ninan, J., Mahalingam, A., Clegg, S., and Sankaran, S. (2020). ICT for external stakeholder management: sociomateriality from a power perspective. *Construction management and economics*, 1-16.

Olander, S. (2007). Stakeholder impact analysis in construction project management. *Construction management and economics*, 25, 277-87.

Olander, S., and Landin, A. (2005). Evaluation of stakeholder influence in the implementation of construction projects. *International Journal of Project Management*, 23, 321-28.

Oloruntobi Dada, M. (2013). Expected success factors for public sector projects in Nigeria: a stakeholder analysis. *Organization, Technology & Management in Construction: An International Journal*, 5, 852-59.

Pacagnella Júnior, A. C., Porto, G. S., Pacífico, O., and Salgado Júnior, A. P. (2015). Project stakeholder management: a case study of a Brazilian science park. *Journal of technology management & innovation*, 10, 39-49.

Park, H., Kim, K., Kim, Y.-W., and Kim, H. (2017). Stakeholder management in long-term complex mega construction projects: The Saemangeum Project. *Journal of Management in Engineering*, 33, 05017002.

Parnell, G. S., Driscoll, P. J., and Henderson, D. L. (2011). *Decision making in systems engineering and management*. John Wiley & Sons.

Pinto, J. K. (2016). *Project Management: Achieving Competitive Advantage*. Pearson.

PMI, (2016a). *Governance of Portfolios, Programs, and Projects: A Practice Guide*. Newtown Square, PA, USA.

PMI (2017). *A Guide to the Project Management Body of Knowledge: PMBOK Guide*. Project Management Institute: Newtown Square, Pennsylvania, US.

Rajablu, M., Hamdi, S., Marthandan, G., and Yusoff, W. F. W. (2017). Managing for stakeholders: introducing stakeholder metrics-integrated model to lead project ethics and success. *International Journal of Project Organisation and Management*, 9, 31-56.

Rajablu, M., Marthandan, G., and Yusoff, W. F. W. (2014). Managing for stakeholders: the role of stakeholder-based management in project success. *Asian Social Science*, 11, 111.

Rowlinson, S., and Cheung, Y. K. F. (2008). Stakeholder management through empowerment: modeling project success. *Construction management and economics*, 26, 611-23.

Saad, A., Zahid, S. M., and Muhammad, U. B. (2020). Role of awareness in strengthening the relationship between stakeholder management and project success in the construction industry of Pakistan. *International Journal of Construction Management*, 1-10.

Sadkowska, J. (2018). Difficulties in building relationships with external stakeholders: a family-firm perspective. *Sustainability*, 10, 4557.

Saghatforoush, E., Trigunarsyah, B., Too, E. G., and Heravitorbati, A., (2011). Effectiveness of constructability concept in the provision of infrastructure assets. In *Proceedings of The First International Postgraduate Conference on Engineering, Designing and Developing the Built Environment for Sustainable Wellbeing*, 175-80. The Queensland University of Technology.

Saunders, M., Lewis, P., and Thornhill, A. (2009). *Research methods for business students* (*Pearson education*).

Schneider, M. (2002). A stakeholder model of organizational leadership. *Organization Science*, 13, 209-20.

Shen, G. Q., and Xue, J. (2021). Managing stakeholder dynamics and complexity in mega infrastructure projects. *Frontiers of Engineering Management*, 8, 148-50.

Smith, J., and Love, P. E. (2004). Stakeholder management during project inception: Strategic needs analysis. *Journal of architectural engineering*, 10, 22-33.

Sorooshian, S., Anvari, A., Salimi, M., and Falatoonitoosi, E. (2012). Interrelation study of entrepreneur's capability. *World Applied Sciences Journal*, 17, 818-20.

Sorooshian, S., Qi, L. C., and Li Fei, L. (2018). Characterization of ISO 14001 implementation. *Environmental Quality Management*, 27, 97-105.

Sorooshian, S., and Ting, K. C. (2018). Reasons for implementing ISO 14001 in Malaysia. *Environmental Quality Management*, 27, 125-33.

Tabachnick, B. G., and Fidell, L. S. (2007). *Using multivariate statistics*. Allyn & Bacon/Pearson Education.

Terje Karlsen, J., Græe, K., and Jensvold Massaoud, M. (2008). Building trust in project-stakeholder relationships. *Baltic Journal of Management*, 3, 7-22.

Wang, N., Yao, S., Wu, C.-C., and Jiang, D., (215). *Critical Factors for Sustainable Project Management in Public Projects*. IAMOT. Cape Town.

Waris, M., Azlan, Z. S., Tamyez, P. F. M., Ullah, M., and Khan, A. (2019). Analyzing the Constructs of Stakeholder Engagement towards Renewable Energy Projects Success in Malaysia: A PLS Approach. *KnE Social Sciences*, 818–43-18–43.

Winch, G. M. (2010). *Managing construction projects* John Wiley & Sons.

Xia, N., Zou, P. X., Griffin, M. A., Wang, X., and Zhong, R. (2018). Towards integrating construction risk management and stakeholder management: A systematic literature review and future research agendas. *International Journal of Project Management*, 36, 701-15.

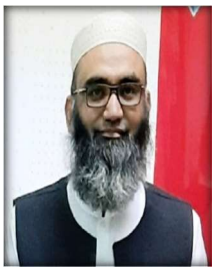
Xue, J., Shen, G. Q., Yang, R. J., Wu, H., Li, X., Lin, X., and Xue, F. (2020). Mapping the knowledge domain of stakeholder perspective studies in construction projects: A bibliometric approach. *International Journal of Project Management*, 38, 313-26.

Yang, J., Shen, G. Q., Bourne, L., Ho, C. M. F., and Xue, X. (2011a). A typology of operational approaches for stakeholder analysis and engagement. *Construction management and economics*, 29, 145-62.

Yang, J., Shen, G. Q., Drew, D. S., and Ho, M. (2009). Critical success factors for stakeholder management: Construction practitioners' perspectives. *Journal of Construction Engineering and Management*, 136, 778-86.

Yang, J., Shen, G. Q., Ho, M., Drew, D. S., and Xue, X. (2011b). Stakeholder management in construction: An empirical study to address research gaps in previous studies. *International Journal of Project Management*, 29, 900-10.

Zafar, I., Wuni, I. Y., Shen, G. Q., Zahoor, H., and Xue, J. (2020). A decision support framework for sustainable highway alignment embracing variant preferences of stakeholders: case of China Pakistan economic corridor. *Journal of Environmental Planning and Management*, 63, 1550-84.



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