**Moderating Effect of Senior Management Support on the Relationship between Schedule Delay Factors and Project Performance**

Riaz Ahmed\*, a , Abrar Hussain a , Simon P. Philbinb

\* Correspondence Author

aBahria University, Islamabad, Pakistan

bLondon South Bank University, UK

# Abstract

Schedule delays in construction projects are often a major concern and considered as a global phenomenon in the construction industry. In regard to project delivery, lack of senior management support is one of the main issues that impact project outcomes. This empirical research study aims to investigate the moderating effect of senior management support on the relationship between schedule delay factors and project performance. A questionnaire survey method was adopted to collect data from project directors, project managers, civil and construction engineers, project supervisors and experts from small, medium and large construction companies from major cities in Pakistan. A response rate of 84% was obtained based on 310 valid responses from a sample of 368 potential participants that received the survey. The cross sectional data were used to test direct relationships and moderating effect through regression analysis and ‘process’ method, respectively. The findings indicate that schedule delays in construction projects occur due to lack of commitment, insufficient site management, poor site coordination, lack of clarity in project scope, lack of communication and substandard contracts, in addition to major delays owing to improper planning. Moreover, the relationship between schedule delay factors and project performance is moderated by all dimensions of senior management support, i.e. providing resources, structural arrangements, communication, expertise and power.

**Keywords:** Schedule delay factors, project performance, senior management support, construction projects.

**Introduction**

The construction industry can be regarded as the backbone of any country’s economy and this industrial sector plays a vital role in economic growth (Yap, Chow, & Shavarebi, 2019). In this context, construction management and planning are crucial and often challenging activities, where the lack of adequate planning can result in construction projects failing to be completed with the required schedule and agreed budget allocation. Indeed, schedule delays often occur due to ineffective planning and management set of project activities (Pehlivan & Öztemir, 2018). Not surprisingly the costs and time taken by projects are two of the primary factors that contribute towards the success of projects in the construction industry (Johnson & Babu, 2020). Construction projects can often encounter delays that are caused by multiple factors and this can be commonplace across the construction industry. Usually a project will be considered as being successful if it has been completed on time and according to the agreed schedule, within the planned budget and according to the defined specifications and stakeholders’ satisfaction (Gebrehiwet & Luo, 2017). According to Larsen, Shen, Lindhard, and Brunoe (2016), problems of time and cost overrun as well as inferior quality have been common across the construction industry for a long time.

In order to identify where delays have occurred in construction projects, a review of multiple studies has been carried out by Abbasi et al. (2020), which found that schedule delays can often become sources of conflict in the construction industry. One cannot deny the complexity and dynamic nature of construction projects, where risks and delays occurring in construction projects are a global phenomenon (Muneeswaran, Manoharan, Awoyera, & Adesina, 2020). Gebrehiwet and Luo (2017) identified that 70% of projects in the construction industry faced schedule delays, with an average delay of 1-30% in the schedule from the originally planned duration and which resulted in an average cost overrun of 50%.

Delays in construction industry projects have long been a major problem. Indeed, delays in construction activities can have severe consequences on achievement of the overall goals of the construction project (Enshassi, Arain, & Al‐Raee, 2010; Kazaz, Ulubeyli, & Tuncbilekli, 2012). Projects that are behind schedule can be viewed as indicating poor project performance as well as low levels of productivity (Ramanathan, Narayanan, & Idrus, 2012). Delays not only result in cost overruns but can also lead to a loss of market share as well as a reduced competitive advantage (Odeh & Battaineh, 2002). Furthermore, project owners face many problems that are caused by project schedule delays, for instance, a lack of rental space, decrease in revenues, and shortcomings with production and other facilities.

A project cannot usually be successful without the support of senior management, therefore, a lack of support can be seen as a barrier to project success. (Guimaraes & Igbaria, 1997; Igbaria, Iivari, & Maragahh, 1995). This is because the role of senior management is significant across the full project life cycle. Although senior management may often take less interest in ongoing projects that are generally considered as being more operational in nature unless cost or schedule overruns occur and thereby result in low project performance (Crawford, 2005; Thomas, Delisle, Jugdev, & Buckle, 2002). In light of the above mentioned studies, schedule delays in construction projects can be viewed as a major and common problem where a lack of senior management support is also a critical barrier to project success.

Many factors cause schedule delays and these factors are interrelated either directly or indirectly. In order to identify schedule delays and rank the contributing factors according to their importance, many studies have been conducted but these studies unfortunately have not explored the interrelationship among the factors (Bashir, Ojiako, & Mota, 2020). Senior management support is one of the most critical factors for the success of any project but research conducted on the impact of this critical factor is limited (Dong, Neufeld, & Higgins, 2009; Staehr, 2010). In order to provide guidance to project managers and senior leaders, there is a pressing need for further research on the role of senior management (and different types of senior management support) in regard to the performance of construction projects (Boonstra, 2013). In a related area, the study by Gebrehiwet and Luo (2017) was limited to exploring the causes of major schedule delays and the effects on projects in Ethiopia. This study found that the quality and performance of the construction process itself had a major role in determining whether a schedule delay occurred. In other work, Shehu, Endut, Akintoye, and Holt (2014) recommended to use a comprehensive methodology to explore schedule delays in construction projects. Whereas Doloi, Sawhney, Iyer, and Rentala (2012) suggested that the relationship between the various causes of schedule delays and the resulting impact on the overall project delay (i.e. project performance) needs to be explored further in future research.

Hussain, Zhu, Ali, Aslam, and Hussain (2018) suggested that future research should be conducted in order to determine the level of importance (from most to least) of the causes of schedule delays, which would help to improve decision-making in projects. Based on the study of Chinese construction projects, the improvement of schedule delays and the need for senior management to mitigate the impact of such delays was identified as part of future studies by Wang, Ford, Chong and Zhang (2018). Indeed, the study by Adam, Josephson, and Lindahl (2017) was limited to a literature review of public sector construction projects, which emphasized the need to determine the magnitude of the global phenomena of schedule delays in construction projects. There is also a need to pursue future research on to what extent schedule delays are affected by construction project performance, and furthermore, whether project performance is impacted positively or negatively (Al-Fadhali and Zainal, 2017).

Surprisingly, in most of the reported studies, researchers have explored the factors of schedule delays in construction projects in the public sector (Adam et al., 2017), but there is a lack of research on private sector construction projects and this is especially the case in Pakistan. Therefore, the first gap in the knowledge base is the need to explore the factors that cause schedule delays in both public and private sector construction projects in Pakistan. A further gap has been identified, which is that although researchers have investigated limited types of schedules delays and the level of senior management support, there are nevertheless a lack of studies on the moderating role of senior management support on the impact of schedule delay factors on project performance. Consequently, this study aims to answer the following research question:

“Does senior management support moderate the relationship between schedule delay factors and project performance?”

Therefore, the purpose of this study is to investigate the moderating effect of senior management support on the relationship between the factors that cause schedule delay and project performance. The study contributes to engineering management and project management literature in the context of schedule delays, project performance and the specific role of senior management, in addition to the adoption of a comprehensive methodology. This study is also significant for engineering managers, project managers, construction industry practitioners and agencies, in order to minimize the extent of schedule delays that affect project performance. This will help to improve future projects’ performance through avoiding the same causes of delays encountered during implementation of engineering and project management practices.

The remainder of the of the article has been structured as follows. Firstly, the literature review identified relevant previous studies. Secondly, on the basis of the literature review, the research model and hypotheses have been developed and thirdly, data analysis, discussion of results and conclusions are provided. Implications and limitations of the study are provided at the end of the article.

## **Literature Review and Theoretical Framework**

## ***Schedule Delay Factors***

The project schedule is the planned timeframe to complete a project (Project Management Institute, 2019)and schedule delays in the construction industry can often be a source of conflict (Abbasi et al., 2020). One cannot deny the complexity and dynamic nature of construction projects, including the occurrence of delays and the corresponding risk factors (Muneeswaran et al., 2020). In a study conducted by Doloi et al. (2012), seven critical factors for schedule delays were identified in construction projects and these factors have been adopted as the independent variables as follows.

### *Lack of Commitment*

Commitment means that all parties have agreed on the course of action for a particular project (Jawad & Ledwith, 2020). A lack of commitment by the sponsor, the owner or client can contribute towards the delay of a project as they are the major stakeholders of a project and a lack of commitment can affect completion of the goals and objectives of the project (Zidane & Andersen, 2018). A lack of commitment towards safety by management is clearly a risk and serious matter for any construction project undertaken (Arifuddin, Suraji, & Latief, 2019). A lack of commitment by management also leads to lack of motivation by the project team (Mittal, Paul, Rostami, Riley, & Sawhney, 2020). Consequently, the commitment of all parties concerned is critical for any project to be completed successfully (Iyer & Jha, 2005).

### *Inefficient Site Management*

Inefficient site management refers to vagueness in the specification of activities and the potential for contradictory interpretation by stakeholders. It can also relate to poor labor productivity, inadequate contractor experience and a lack of control over sub-contractors (Doloi et al., 2012). It is important to employ construction sector professionals with relevant knowledge of the site management of a construction project (Curran & Spillane, 2020). The site manager must identify any poor site management issues in the early stage of the project, although this activity can be a time-consuming process that requires significant time and effort by site managers (Ratajczak, Riedl, & Matt, 2019). The schedule performance of a project can be improved significantly by implementing proper site management including effective communication between all stakeholders of a project through providing clear instructions and technical details (Durdyev & Hosseini, 2019). Poor site management and poor supervision leads to cost and time overruns, which can affect project performance significantly (Zidane & Andersen, 2018). Doloi et al. (2012) identified that ‘inefficient site management’ is one of the seven critical factors of schedule delays in Indian construction projects.

### *Poor Site Coordination*

Poor site coordination refers to the unavailability of construction design or drawings according to the schedule, a lack of timely decisions from the project owner, an unrealistic schedule as per the contract, as well as poor site management and supervision (Doloi et al., 2012). In the construction industry, the design of a building is clearly very important and implementation of the conceptual design into its physical form depends upon the practicality of the design, drawing or BIM (building information modelling) resource provided to the construction team on site (Jalaei, Jalaei, & Mohammadi, 2020). Project teams mostly face design related issues that cause the project delays, including frequent changes in the initial design, the impact of external conditions as well as delays in the finalization of the project design by the project owner (Durdyev & Hosseini, 2019). Mistakes made by the project team in drawings or design and the definition of engineering specifications are the factors that affect project performance in the preconstruction phase of a project (Khoso, Khan, Faiz, & Akhund, 2019).

### *Improper Planning*

It has been stated that: *“Planning is the formulation of a course of action to guide a project to completion, where an explicit operational plan needs to be established along with milestones and consideration of possible obstacles throughout the project’s life”* (PMI, 2017, p. 213). Therefore, improper planning and scheduling refers to situations where tasks to be completed by the main contractor and any subcontractors have not been planned according to the master schedule and without consideration of the factors that cause tasks to be completed according to schedule (Bajjou & Chafi, 2018). A study conducted by Arantes and Ferreira (2020) identified that improper planning is one of the most crucial factors that cause schedule delays in the construction industry and it is therefore suggested that the project team should allocate significant time to the planning phase in order to facilitate the corresponding implementation stage. The main reason for improper planning identified by Durdyev and Hosseini (2019) is the adoption of an unrealistic project schedule, which may be due to various delays in construction project activities or caused by the client. It has also been identified that improper planning is one of the critical schedule delay causes in the construction industry in Malaysia (Sambasivan & Soon, 2007).

### *Lack of Clarity in Project Scope*

A lack of clarity in scope refers to the situation where there is uncertainty in regard to the project specification (Atkinson, Crawford, & Ward, 2006). Well-defined objectives and clarity in project scope can help to support achievement of the project goals and objectives, which leads to the success of a project. This is because clarity in scope gives clear directions to the project team to undertake the project activities (Fashina, Abdilahi, & Fakunle, 2020). Changes in the scope of an individual project can in some cases also affect the scope of other projects that are executed (Kock, Schulz, Kopmann, & Gemünden, 2020).

*Lack of Communication*

Communication means to convey the message to other stakeholders and effective communication is key to success for any project or organization (Ruck & Welch, 2012). A lack of communication directly impacts the effectiveness and performance of construction projects and a persistent poor level of communication will most likely lead to the failure of projects. In order to achieve the goals and objectives of the projects, negotiation-based communications are essential with all the project stakeholders (Lu, Yu, Wang, & Hong, 2020). A study conducted by Kar and Jha (2020) suggested that construction practitioners must keep in mind several factors, such as the need for proper communication as well as issues related to finance during procurement and scope changes, in order to improve the cost and schedule performance of a project. Therefore, a lack of communication can be a core obstacle to project success, which can lead to further issues and problems occurring that ultimately impact the performance of the project (Banaeianjahromi & Smolander, 2019).

*Substandard Contracts*

Substandard contracts refer to the poor means of contracting as part of improper planning during the contract bidding stage. This can lead to the selection of an inexperienced contractor since contractors submitting bids can often be overly optimistic and without a full recognition of practical contingencies along with ineffective risk management. Substandard contracts can further lead to conflicts in the project, which in some cases can result in costly litigations and arbitrations (Doloi et al., 2012). Substandard contracts can be the primary outcome of an ineffective bidding process, which leads to unrealistic schedules and inexperienced contractors ultimately impacting the technical viability and implementation of the project (Arantes & Ferreira, 2020). Poor contract management and awarding of contracts to inexperienced contractors can be commonplace in the construction sector, which causes cost and schedule delays (Kog, 2019). Substandard contracts can also lead to project reworks due to the low quality output of the construction work (Bajjou, & Chafi, 2018). For this purpose, Satyanarayana and Iyer (1996) emphasized the importance of implementing contract administration effectively for construction projects.

## ***Project Performance***

Project success can be considered and measured against the project objectives and management success can be measured against an appropriate project performance scale, such as whether the project is completed within the planned cost, time and desired quality levels (Cooke-Davies, 2002). Traditionally, the performance of a project can be defined and evaluated according to the required resources for the project completion (Razmdoost & Mills, 2016). Time and cost overruns are two aspects of the construction industry regardless of the nature of the project, which affect project performance (Assaad, El-Adaway, & Abotaleb, 2020). The project success rate can be increased if the host organization of the project takes the stakeholders’ interest into consideration (Ali & Ahmed, 2019). In the current era, the construction industry has been heavily investing in construction projects but at the same time such projects can often still suffer from poor project performance in terms of cost and time overruns (Gunduz & Yahya, 2018). In the study reported herein, the project performance measures are based on the dimensions of schedules performance, cost performance, quality performance and stakeholders’ satisfaction as defined by Ahmed and Anantatmula (2017), which are summarized as follows:

### *Schedule Performance*

Schedule performance means performance of the project in terms of time and understandably schedule performance has a significant impact on the project. Many factors can impact schedule performance, such as schedule estimates, schedule design, quality estimates, schedule control mechanism, design documents, leadership skills and project management (Sunindijo, 2015). In order to improve project performance, the mitigation measures to control schedule delays can be adopted at an early stage (Samsudin et al., 2020). Schedule performance of a project is very important as it is used as a base for forecasting future projects (de Andrade, Martens, & Vanhoucke, 2019). Any delay occurred in the planning phase significantly affects the schedule performance of the project in subsequent stages (Habibi, Kermanshachi, & Safapour, 2018). Moreover, schedule performance has a significant effect on the overall performance of the project (Ahadzie, Proverbs, & Sarkodie-Poku, 2014). A project is successful when it is completed within budget, on time, as per specifications and stakeholders’ satisfaction (Gebrehiwet & Luo, 2017). Meng (2012) has suggested the need to explore how the schedule is a critical factor that affects the project performance.

### *Cost Performance*

Cost performance can be defined and measured according to how a project is completed within the planned budget or cost requirement. The efficiency of the project can be reflected by the cost performance, which significantly affects project stakeholders (Razmdoost & Mills, 2016). Cost performance of construction projects can be increased by ensuring effective cost estimation and avoiding pessimism or optimism biases(Hoseini, van Veen, Bosch-Rekveldt, & Hertogh, 2020).Schedule and cost performance are two major indicators that are used for prediction of future project performance (Assaad et al., 2020). A study by Kim (2019) concluded that production planning and cost performance are positively correlated in heavy construction projects. The clarity of the project scope as well as the competencies exhibited by the project manager has a positive impact on cost performance of the project (Sinesilassie, Tabish, & Jha, 2018). A construction project can be considered as a successful project if it is completed within budget, on time, as per specifications and stakeholders’ satisfaction (Gebrehiwet & Luo, 2017). As schedule performance and cost performance are also affected by poor cost estimates, there is a clear need for effective project planning to avoid such issues arising (Sunindijo, 2015). Projects will most likely not produce the expected outcomes when the plan changes frequently, thereby resulting in time and cost overruns (Anantatmula, 2010).

### *Quality Performance*

*“Quality is attributed to all those items that fulfil the minimum standards set by the manufacturer or monitoring body”* (Harvey & Green, 1993, p. 13). The success of the project is commonly determined by the timely completion of the project and within the budget estimate without compromising on the quality of the project (Johnson & Babu, 2020). People and process-related quality management practices are very important in an organization and both affect the inter-organization project performance (Lu, Cai, Wei, Song, & Wu, 2019). A study by Ning (2018) concluded that ambiguity in quality performance can have a significant impact on project performance since a lack of details associated with the contractual arrangements of projects results in the uncertainties that result in lower project performance. Mir and Pinnington (2014) discussed the notion that where cost and schedule performance are critical, quality performance is also significant for project performance. The quality performance of a project refers to attributes of high quality deliverables with minimal maintenance requirements in order to achieve the quality according to the owner’s requirements (Ahmed & Anantatmula, 2017).

### *Stakeholders’ Satisfaction*

Stakeholders means *“any group or individual who can affect, or is affected by, the achievement of the organization's objectives”* (Ng, & Skitmore, 2013, p. 15). Indeed, a study conducted by Ma and Fu (2020) identified that key stakeholders' satisfaction and project sustainability are interrelated as a project cannot be successful without the satisfaction of all stakeholders. Engagement of internal and external stakeholders is strongly emphasized in regard to effective project governance since an organization needs to leverage both direct and indirect relations with external stakeholders (Derakhshan, Turner, & Mancini, 2019). Since large-scale construction projects have many stakeholders, in order to achieve project success it is essential to identify the key stakeholders along with their expectations. Moreover, it is impossible to secure project stakeholders’ satisfaction without an adequate response to their expectations (Bahadorestani, Ghalehnovi, & Farimani, 2018). Consequently, stakeholder engagement and satisfaction are both considered very important factors in the construction industry and domain of project management and therefore researchers have given a lot of attention to this area of research (Oppong, Chan, & Dansoh, 2017).

## ***Senior Management Support***

Senior management support can be viewed as the readiness of senior management to provide desired resources, power and authority (Ahmed, Mohamad, & Ahmad, 2016). Senior management support can be considered as a key factor for the success of any project (Liu, Liu, & Yang, 2020). Indeed, senior management support has been identified by many researchers as being a critical success factor in construction projects (Ghanbaripour, Sher, & Yousefi, 2020; Gunduz & Almuajebh, 2020; Wuni & Shen, 2020). Lack of senior management support is the barrier to changes in lean construction projects (Bayhan, Demirkesen, & Jayamanne, 2019). Furthermore, a project can be successful if its management understand what are the main barriers of effective risk management and how leadership can avoid these barriers through providing a supporting organizational culture, adequate resources along with effective senior management support (Dandage, Mantha, Rane, & Bhoola, 2018). In order to measure the level of senior management support, we adapted the dimensions of senior management support that was identified by Boonstra (2013) and operationalized by Ahmed and Azmi bin Mohamad (2016), which are described as follows.

### *Provide Resources*

The need to provide resources is important in regard to measuring senior management support for a project and this involves providing human, material and financial resources. A lack of availability of these resources is a serious threat to the project (Hastak & Baim, 2001). Senior management not only provides resources but also facilitates the process of decision-making as part of a supportive organizational culture through the necessary leadership and commitment (Kiesnere & Baumgartner, 2020). Projects which have sufficient senior management support will have higher chances of acquisition of the necessary organizational resources required to deliver the project (Khattak & Shah, 2020). Providing resources for the regular training of construction projects’ staff can also improve the productivity of the staff (Enshassi, Saleh, & Mohamed, 2019). The study conducted by Latan, Jabbour, de Sousa Jabbour, Wamba, and Shahbaz (2018) shows that there is a positive significant relationship between senior management support and organizational resources as the strategy of providing more resources depends upon the commitment of senior management.

### *Structural Arrangements*

Structural arrangements refers to implementation of suitable project structural arrangements to achieve the objectives of the project, such as ensuring appropriate processes, procedures and system adoption (Ahmed et al., 2016). Senior management is responsible for formulating and implementing effective strategies for a project that are used in decision-making and management processes (Yun et al., 2020). Senior management develops appropriate processes for information flow, and this is important since a misunderstanding of project information can lead to errors in design and problems in the circulation of information among project team (Hyun, 2020). Senior management provides the procedures and processes for the smooth conduct of management processes (Novianty, 2019) and senior management support also brings the organizational change that enables potential business problems to be solved satisfactorily (Lee, Park, & Baker, 2018).

### *Communication*

*“Communication is a process of sharing meanings with others”* (Croucher, 2015, p. 24). Communication is needed to convey messages to other stakeholders and effective communication can be considered as a critical project success factor for any organization (Ruck & Welch, 2012). A lack of effective communication on construction sites causes ambiguity in regard to perceiving relevance and importance of certain project activities and therefore it is important for project managers to understand how effective communication impacts the success of a construction project (Akunyumu et al., 2019). Adopting an open communication approach by the management can also lead to innovative ideas and adoption of new technologies by the project team (Hsu, 2019). Senior management should facilitate the adoption of a centralized information flow system in order to maintain project performance (C. Li, Sun, & Dong, 2018).

### *Expertise*

Expertise means knowledge of a specific domain (Bolger & Wright, 2007). Senior management expertise can be related to relevant expertise of construction projects, project implementation and knowing how organizational change and system implications affect projects as well as recognizing the power and interest of the stakeholders. Through these forms of expertise, senior management support enhances the efficiency and performance of the project (Ahmed et al., 2016). A requisite level of understanding and experience of the senior management function in the major areas of organizational management that can have a significant impact on project performance (Priscilla & Siregar, 2020). Cognitive behavior and the expertise of senior management also helps to motivate the middle level managers (Henry, Buyl, & Jansen, 2019). Senior management expertise is required to exercise the organizational policies and procedures to maintain the required level of project performance (Mullins, 2018).

### *Power*

The power of senior management enables the necessary support to be provided to the project, including a clear definition of project roles and responsibilities for different project stakeholders (Boonstra, 2013). Members of the senior management team in an organization have the necessary power that can mobilize the required resources to ensure construction projects are completed within the schedule, budget and specification requirements (Yun et al., 2020). Project managers, other senior leaders and the Project Management Office (PMO) each have a role in ensuring project performance through exercising their respective power bases (Wiewiora, Chang, & Smidt, 2020). Furthermore, the CEO as a leader of the organization along with other members of the senior management team have a significant influence on organizational performance and this can inevitably cascade down to impact the performance of programs and projects (Tanikawa & Jung, 2019).

**Research Model and Research Hypothesis**

The resource-based theory has been considered as the context for this empirical research study, since: *“Resource-based theory contends that the possession of strategic resources provides an organization with a golden opportunity to develop competitive advantages over its rivals. These competitive advantages in turn can help the organization enjoy strong profits”* (Barney, 1991, p. 8; Wernerfelt, 1984). The purpose of the resource-based theory is to understand how competitive advantage can be achieved by the organization through utilizing its physical and non-physical resources (Kor & Mahoney, 2004). If the resources of the organization are valuable, then they enable an organization to implement strategies to improve the efficiency and effectiveness of the organization. The traditional SWOT (strengths-weaknesses-opportunities-threats) model suggests that an organization can only improve its performance if it exploits the opportunities and minimizes the threats by strategically using its valuable resources (Barney, 1991). We have related the resource-based theory to the research study in the context that if senior management provides the necessary resources (i.e. human resources, financial and equipment) through implementing necessary strategies, this will result in improved project performance. This is because the strategy will require effective structures, management processes, relevant expertise, adequate power, assets and resources to be deployed so as to maximize opportunities and minimize threats that may result in impacts such as schedule delays for projects. Furthermore, valuable resources also help an organization to sustain its competitive advantage. The research model is presented in Exhibit 1 which is followed by definition of the research hypotheses that have been synthesized from the extant literature.

Lack of Commitment

Inefficient Site Management

* Scheduled Performance
* Cost Performance
* Quality Performance
* Stakeholders’ Satisfaction

**Schedule Delay Factors**

Poor Site Coordination

**Project Performance**

**H1**

**H7**

**H6**

Improper Planning

Substandard Contracts

Lack of Communication

Lack of Clarity in Project

Scope

**H5**

**H4**

**H3**

**H2**

**Senior Management Support**

Provide Resources

Structural Arrangements

Communication

Expertise

Power

**H8**

**Exhibit 1.** Research Model

A lack of commitment by management is a crucial barrier to project success as management provides the necessary support to ensure timely completion of project tasks (Jawad & Ledwith, 2020). The commitment by all project stakeholders is critical for any project completion to be successful (Iyer & Jha, 2005). It has been found that a lack of commitment is one of the ten attributes that has significant impact on productivity of the construction industry (Dixit et al., 2017). A committed person has the desire to attain project goals and when the whole project team is committed to achieve the project objectives, commitment leads to project success. Therefore, an adequate level of commitment has a vibrant role in sustaining project performance (Liu, 1999). Commitment towards completing project activities by team members should be encouraged by the project manager as a lack of commitment has a negative impact on project performance. Commitment is a motivational factor and it can significantly affect project performance (Ahimbisibwe & Nangoli, 2012). In light of the above mentioned studies, our first hypothesis, denoted by H1, is as follows:

**H1:**Lack of commitment has a significant impact on project performance.

It is important to have professionals with relevant knowledge of site management for a construction project otherwise the project will face the issues of inefficient site management (Curran & Spillane, 2020). In construction, inefficient site management has been found to be one of the main causes among other five causes of schedule delays and it can affect the project schedule performance (Kadir et al., 2005). In many cases, projects are not completed on time due to various reasons and poor site management is one of them (Gebrehiwet & Luo, 2017). One of the fundamental factors of schedule delays and cost increase is ‘poor site management’ as cost and schedule performance ultimately affect the overall project performance (Akhund et al., 2017). Effective site management helps to organize on-site activities effectively and it has a significant impact on the achievement of the eventual project outcome (Cheng et al., 2012). In light of the above mentioned studies, our second hypothesis, denoted by H2, is as follows:

**H2:**Inefficient site management has a significant impact on project performance.

In the construction industry, the design of a building is clearly important and implementation of the conceptual design into its physical form depends upon the practicality of the design or drawing provided to the construction team on site (Jalaei et al., 2020). Coordination plays a vital role on successful implementation of all phases of the project as through the on-site coordination of the project, the weak performance of the project can be identified and appropriate action undertaken to remedy the situation (Alaloul, Liew, and Zawawi, 2016). In this context, poor site coordination has been identified by Iyer and Jha (2005) as a key project failure parameter for many construction projects in India. Indeed, Dixit et al. (2017) found that poor site coordination has significant impact on the productivity of construction projects in India. Sustainable coordination and communication are required to achieve the project goals and objectives as well as improve project performance in the execution stage (Arashpour, Abbasi, Arashpour, Hosseini, & Yang, 2017). In light of the above mentioned studies, our third hypothesis, denoted by H3, is as follows:

**H3:**Poor site coordination has significant impact on project performance.

A study conducted by Arantes and Ferreira (2020) identified that improper planning is one of the most crucial factors among others that cause schedule delay in the construction industry. Pre-construction planning and development of the project management plan plays a vital role in any project, since effective planning in the planning stage significantly impacts the overall project performance. Indeed, studies have highlighted that planned commercial projects can achieve a profit margin of 23%, while projects with poor planning only achieve a profit margin of 3% (Hanna & Skiffington, 2010). Organizations that direct the necessary efforts towards project planning have a lower chance of project failure, and effective and efficient planning is always a good strategy by project managers to enhance project performance (Aladwani, 2002). In light of the above mentioned studies, our fourth hypothesis, denoted by H4, is as follows:

**H4:**Improper planning has significant impact on project performance.

Changes in the scope of individual projects can also affect the scope of other projects that are being executed as part of a wider program or portfolio of work (Kock et al., 2020). Clarity in project scope significantly affects the cost performance and schedule performance of a project (Clark, 1989). A poor definition of project scope usually results in project failure as project implementation is clearly related to the accurate definition and clarity of the project scope. Moreover, a well-defined scope at all levels of the project can support project success (Cho & Gibson Jr, 2001). The clarity of scope at an early stage of the project results in an improved set of outputs and eventual achievement of the desired outcomes (Bingham & Gibson Jr, 2017). In light of the above mentioned studies, our fifth hypothesis, denoted by H5, is as follows:

**H5:**Lack of clarity in project scope has significant impact on project performance.

Lack of communication can also affect other factors that result in delay of payments and financial claims in projects (Shaikh et al., 2020). Communication among team members is very important which has a positive relationship with effective implementation of projects (Katz, 1982). Effective communications are required in projects to ensure that project managers can motivate team workers to achieve the required project outputs. Communication can help to sustain a good working environment and motivate team workers to focus and maintain project performance (Martinez & Hurtado, 2018). In light of the above mentioned studies, our sixth hypothesis, denoted by H6, is as follows:

**H6:**Lack of communication has significant impact on project performance.

Organizations that enter into substandard contracts face the risk of cost and time overrun (Viswanathan & Jha, 2020). On this matter, Suprapto, Bakker, Mooi, and Hertogh (2016) identified that more collaboration and well defined contracts help in achieving improved project performance and create an optimal professional relationship among key parties, e.g. project owner and contractor. Drafting and signing of contracts that cover all the necessary details according to the specified project requirements can have a significant impact on project performance. An effective relationship between the main contractor and subcontractors enabled through properly designed and negotiated contract management will likely result in an improved outcome for projects (Meng, 2012). In light of the above mentioned studies, our seventh hypothesis, denoted by H7, is as follows:

**H7:**Substandard contracts have significant impact on project performance.

Senior management support can be a key factor for the success of any project (Liu et al., 2020). Indeed, without senior management support, a project is unlikely to perform well and will often result in schedule delays. Literature has found many critical factors that significantly influence project success and senior management is often cited as being critical to the performance of projects (Ziemba & Oblak, 2013). Project success is affected significantly by the support and involvement of senior management (Zwikael, 2008). Senior management not only provides resources but also facilitates the process of decision-making and the corresponding organizational culture through leadership and the commitment shown in the organization (Kiesnere & Baumgartner, 2020; Ahmed et al., 2016). Furthermore, senior management is responsible for formulating and implementing strategies that enable effective decision-making and management processes in projects (Yun et al., 2020).

Mutual communication among stakeholders helps in problem solving and improved decision-making, which improve project performance (Ghanbaripour et al., 2020). The level of understanding and experience of senior management in the major areas of organizational management can have a significant impact on project performance (Priscilla & Siregar, 2020). Further, members of the senior management team who have power can mobilize the necessary resources more easily and significantly enhance the construction process (Yun et al., 2020). In light of the above mentioned studies, our eighth hypothesis, denoted by H8, is as follows;

**H8:** Senior management support (i.e. through providing the necessary resources, structural arrangements, communication, expertise and power) significantly moderates the relationship between schedule delays and project performance.

**Methods**

In this study, we adopted the of positivism philosophy as the research paradigm, which can be implemented through use of quantitative methods in order to test the hypotheses that have been deductively generated. The population for the quantitative study included building construction projects from the public sector as well as private sector buildings, such as high rise buildings, high rise apartments, residential societies projects, office building, plazas and residential villas. The input for data analysis was collected from project directors, project managers, civil and construction engineers, project supervisors and other professionals working in construction companies in Pakistan. The companies selected have undertaken small, medium and large construction projects in both the public and private sectors in major cities of Pakistan. The respondents were contacted through email and data was collected through an online survey. The results were presented as viewed by the respondents of the study based on the actual data. The respondents were assured about the confidentiality of their provided information that was only to be used for research purposes in the study. No human or psychological issues were involved or found during the conduct of the study.

The sample size was calculated using the formula given by Daniel & Cross (2018), i.e. n = N\*X / (X + N – 1), where, X = Zα/22 ­\*p\*(1-p) / MOE2 and Zα/2 = critical value of the normal distribution at α/2 (where confidence level is 95% and the value of α is 0.05, therefore, 1.96 is the critical value). MOE = Margin of Error; p = sample proportion; N = population size; and the resulted sample sized was n = 368, which is in line with sample of earlier studies (Ahmed et al, 2016; Ahmed & Anantatmula, 2017; Yang et al, 2011; and Yang et al., 2013). The survey questionnaire was distributed to 368 project directors, project managers, civil and construction engineers, project supervisors and experts of small, medium and large construction companies from major cities of Pakistan. In response, a total of 318 respondents participated in the survey with a response rate was 86%, which is well as compared to 67% response of similar earlier studies (Yang et al., 2012; Yang et al., 2011). Out of 318 received responses, 2 responses were from construction projects in UAE and 6 respondents were not construction experts and thus 8 responses were excluded from the collected data. Therefore, 310 valid responses were selected for data analysis and the response rate was 84% in terms of valid responses.

This research study adopted a cross-sectional survey approach. The questionnaire used in the survey was comprised of four main parts, in the first section, respondents were asked about their demographic information, i.e. age, gender, qualification, designation, experience, organization type, organization sector, project type and team size. The second section comprised the questions related to schedule delays and according to the study by Doloi et al. (2012). Questions in the third section related to dimensions of project performance, which were adopted from the study by Ahmed and Anantatmula (2017). In the fourth and last section, the questions related to senior management support according to the study by Ahmed and Azmi bin Mohamad (2016). The convenience sampling technique as classified through non-probability sampling was used in the research study.

***Measures***

A 5-point Likert Scale for all three measures was used in the questionnaire. For “Schedule Delay Factors” 28 items were used indicating; 1 = Very Low, 2 = Low, 3 = Average, 4 = High, 5 = Very High (Doloi et al., 2012). For “Project Performance” 14 items were used and the scale was indicated as 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree (Ahmed and Anantatmula (2017). For “Top Management Support” 25 items were used and the scale was indicated as 1 = Not at all, 2 = Once in a while, 3 = Sometimes, 4 = Fairly often, 5 = Frequently, if not always (Ahmed et al., 2016). Cronbach’s Alpha (α) Analysis was carried out to check the data reliability.Values ofCronbach's Alpha (α) normally range between 0 and 1. To validate the reliability of the instruments, we used the cut-off value of 0.70 (Roberts & Priest, 2006) for all items that were included in the questionnaire.

The value of Cronbach’s Alpha (α) of items of schedule delays was 0.941, α value of items of project performance was 0.869 and α value of items of senior management support was 0.951 respectively, which are greater than 0.70, therefore, data was reliable for further computation. Kaiser–Meyer–Olkin (KMO) and Bartlett’s Test of Spehericity were adopted to test the homogeneity and the suitability appropriateness in sampling variance (Snedecor & Cochran, 1967). The KMO value is ≥ 0.60 (vary between 0 to 1) is accepted (Noursis, 1985) and for Bartlett’s test, the p-value of Bartlett’s Test of Spehericity < 0.05 is acceptable (McCleave, 1967). All values of KMO are greater than 0.60 and the values of Bartlett’s test of Spehericity are significant, i.e. p < 0.05, therefore, the data is suitable and homogenized in sampling variance.

The validity check of the data was performed by Exploratory Factor Analysis (EFA). The EFA has been used by many researchers due to its design features for analytical analysis and soundness of EFA results (Fabrigar, Wegener, MacCallum & Strahan, 1999). The valid responses of 310 questionnaires were collected to test our hypotheses, which is suitable to carry out the EFA. In order to run the EFA, the Principal Component Analysis method was adopted by selecting the Varimax Rotation (Field, 2009). EFA were made by loading all the items, and the value of 0.4 of Principal Component was used as a threshold (Conway & Huffcutt, 2003) during EFA. All values of 67 items were greater than the threshold value of 0.4, therefore, all items were valid for hypothesis testing and further analysis.

**Results**

The SPSS (v23) statistical package was used for the data analysis stage of the research study. To analyze the data, correlation, regression and regression-based moderation test “PROCESS” were used.

***Common Method Bias (CMB)***

In order to check whether the data is affected by Common Method Bias (CMB), Harman’s single factor test was used, it is the most commonly used technique by researchers to test either data is affected by the common method variance or not. The result of the single factor test must be less than 50% of the total variance to be considered that the data is not biased or affected by common method variance (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).  In order to validate the data through Harman’s single factor test, all 67 items were loaded in factor analysis by applying principal axis factoring. The results depict that a single factor in extracting is 32.582% of total variance since it is far less than 50% so we concluded that there is no issue of common method biased and data is valid for further computation. Summary of demographic profile is given in Exhibit 2.

**Exhibit 2.** Summary of Demographic Profile

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Items** | **Characteristics** | **N** | **%** | **Items** | **Characteristics** | **N** | **%** |
| **Gender** | Male | 290 | 93.54 | **Team Size** | less than 10 | 14 | 4.52 |
|  | Female | 20 | 6.46 |  | 11-20 | 60 | 19.35 |
| **Age** | 18-25 Years | 42 | 13.55 |  | 31-40 | 77 | 24.84 |
|  | 26-33 Years | 169 | 54.52 |  | more than 40 | 65 | 20.97 |
|  | 34-40 Years | 91 | 29.35 | **Project Type** | Small Size  | 71 | 22.90 |
|  | 41-49 Years | 08 | 2.58 |  | Medium Size  | 163 | 52.58 |
| **Qualification** | Matriculation | 01 | 0.32 |  | Large Size  | 76 | 24.52 |
|  | Intermediate | 03 | 0.97 | **Project Duration** | <=1 year | 69 | 22.26 |
|  | Graduation | 52 | 16.77 |  | <= 3 years | 120 | 38.71 |
|  | Masters | 167 | 53.87 |  | <= 5 years | 71 | 22.90 |
|  | MS/MPhil | 74 | 23.87 |  | > 5 years | 50 | 16.13 |
|  | PhD | 01 | 0.32 | **Project City** | Rawalpindi | 36 | 11.61 |
|  | PMP | 12 | 3.87 |  | Islamabad | 149 | 48.06 |
| **Designation** | Project Director | 11 | 3.55 |  | Karachi | 43 | 13.87 |
|  | Project Manager | 37 | 11.94 |  | Lahore | 56 | 18.06 |
|  | Construction Manager | 28 | 9.03 |  | Peshawar | 15 | 4.84 |
|  | Civil Engineer | 135 | 43.55 |  | Others | 11 | 3.55 |
|  | Consultant | 20 | 6.45 | **Experience** | < 3 Years | 54 | 17.42 |
|  | Contractor | 06 | 1.94 |  | 3-5 Years | 118 | 38.06 |
|  | Site Supervisor | 09 | 2.90 |  | 5-10 Years | 98 | 31.61 |
|  | Supervisor | 45 | 14.52 |  | 10-15 Years | 30 | 9.68 |
|  | Others | 19 | 6.13 |  | > 15 Years | 10 | 3.23 |
| **Sector** | Public Sector | 27 | 8.71 |  |  |  |  |
|  | Private Sector | 283 | 91.29 |  |  |  |  |

***Correlation Analysis***

According to Cohen (1988), Pearson Correlation Coefficient has certain limits or brackets to show, if the value of “r” is greater than 0.5, it is indicated “strong,” between 0.3 to 0.5, then “moderate” and less than 0.3, it is indicated weak relationship between the tested variables. In the context of this study, the demographics have shown significant relationship with senior management support [age (r=0.132\*), designation (r=-0.123\*), experience (r=0.150\*\*), sector (r=0.255\*\*), team size (r=0.188\*\*) and project duration (r=0.242\*)], schedule delay factors [sector (r=0.166\*\*), project type (r=-0.153\*\*) and project duration (r=0.115\*\*)], and project performance [experience (r=0.132\*), sector (r=0.251\*\*), team size (r=0.132\*), and project duration (r=0.228\*\*)] . Results of correlation analysis are shown in Exhibit 3. The results of the correlation analysis show that lack of commitment has significant negative weak correlation with project performance (r = -0.288, p = 0.000) and significant negative moderate correlation with senior management support (r = -0.331, p = 0.000). Insufficient site management has significant positive moderate correlation with project performance (r = 0.444, p = 0.000) and senior management support (r = 0.444, p = 0.000). poor site coordination has significant positive moderate correlation with project performance (r = 0.439, p = 0.000) and Senior Management Support (r = 0.441, p = 0.000).

Improper planning has shown significant positive strong correlation with project performance (r = 0.507, p = 0.000) and senior management support (r = 0.529, p = 0.000). Lack of clarity in project scope has significant positive moderate correlation with project performance (r = 0.491, p = 0.000) and significant positive strong correlation with Senior Management Support (r = 0.507, p = 0.000). Lack of communication has significant positive moderate correlation with project performance (r = 0.429, p = 0.000) and significant positive strong correlation with senior management support (r = 0.505, p = 0.000). Sub-standard contracts has significant positive moderate correlation with project performance (r = 0.485, p = 0.000) and significant positive strong correlation with senior management support (r = 0.505, p = 0.000). Lastly, project performance has significant positive strong correlation with senior management support (r = 0.748, p = 0.000) and vice versa.

|  |
| --- |
| **Exhibit 3.** Summary of Correlation Analysis |
| **Sr.** |  **Variables** |  **Mean** |  **SD** | **Correlation** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| 1 | Lack of commitment (LOC) | 2.4524 | 0.63120 | 1 |  |  |  |  |  |  |  |  |
| 2 | Insufficient Site management (ISM) | 3.9960 | 0.80035 | -0.113\* | 1 |  |  |  |  |  |  |  |
| 3 |  Poor site  coordination (PSC) | 4.0984 | 0.70424 | -0.139\* | 0.733\*\* | 1 |  |  |  |  |  |  |
| 4 | Improper (IP)planning | 4.1385 | 0.72842 | -0.167\*\* | 0.719\*\* | 0.811\*\* | 1 |  |  |  |  |  |
| 5 | Lack of clarity in project scope (LCPS) | 4.1477 | 0.69150 | -.0197\*\* | 0.696\*\* | 0.850\*\* | 0.830\*\* | 1 |  |  |  |  |
| 6 | Lack of communication (LOCM) | 4.1817 | 0.68656 | -0.214\*\* | 0.609\*\* | 0.704\*\* | 0.766\*\* | 0.766\*\* | 1 |  |  |  |
| 7 | Substandard contracts (SSC) | 4.1183 | 0.84399 | -0.256\*\* | 0.683\*\* | 0.778\*\* | 0.759\*\* | 0.777\*\* | 0.686\*\* | 1 |  |  |
| 8 | Project performance (PP) | 4.2011 | 0.51200 | -0.288\*\* | 0.444\*\* | 0.439\*\* | 0.507\*\* | 0.491\*\* | 0.429\*\* | 0.485\*\* | 1 |  |
| 9 | Senior management support (SMS) | 4.2831 | 0.51639 | -0.331\*\* | 0.444\*\* | 0.441\*\* | 0.529\*\* | 0.507\*\* | 0.505\*\* | 0.505\*\* | 0.748\*\* | 1 |
| \*Correlation is significant at the 0.05 level (2-tailed).\*\*Correlation is significant at the 0.01 level (2-tailed). |

***Hypothesis testing results***

This study has eight hypotheses to examine the relationship and moderating effect. The regression analysis was used to test the first seven hypotheses i.e. relationship between schedule delays and project performance (Ahmed & Anantatmula, 2017). In order to test eight hypothesis or investigate moderating effect of senior management support on the relationship between schedule delays and project performance, the regression based tool called “PROCESS” by Hayes (2012) was used. The results of the regression analysis of hypotheses 1-7 are shown in Exhibit 4.

|  |
| --- |
| **Exhibit 4.** Results of Hypothesis Testing (1-7) – Regression Analysis |
| **Hypothesis** | **IVs** | **Project Performance (DV)** |
| **Coefficients** | **Model Summary** | **ANOVA** |
| **B** | **β** | **t** | **Sig** | **R** | **R2** | **Adj R2** | **F** | **Sig** |
| **H1** | LOC | -0.234 | -0.288 | -5.277 | 0.000 | -0.288 | 0.083 | 0.080 | 27.842 | 0.000 |
| **H2** | ISM | 0.284 | 0.444 | 8.690 | 0.000 | 0.444 | 0.197 | 0.194 | 75.522 | 0.000 |
| **H3** | PSC | 0.319 | 0.439 | 8.570 | 0.000 | 0.439 | 0.193 | 0.190 | 73.440 | 0.000 |
| **H4** | IP | 0.356 | 0.507 | 10.312 | 0.000 | 0.507 | 0.257 | 0.245 | 106.328 | 0.000 |
| **H5** | LCPS | 0.363 | 0.491 | 9.879 | 0.000 | 0.491 | 0.241 | 0.238 | 97.602 | 0.000 |
| **H6** | LOCM | 0.320 | 0.429 | 8.344 | 0.000 | 0.429 | 0.184 | 0.182 | 69.617 | 0.000 |
| **H7** | SSC | 0.294 | 0.485 | 9.731 | 0.000 | 0.485 | 0.235 | 0.233 | 94.702 | 0.000 |

For H1, the value of R2 is 0.083, indicating that approximately 8.3% variance in the project performance is due to the lack of commitment. The value of Standardized Beta Coefficient (β) is -0.288 and p = 0.000, which indicates that there is weak, negative and significant relationship between lack of commitment and project performance, therefore, H1 is accepted.For H2, the value of R2 is 0.197, indicating that approximately 19.7% variance in the project performance is due to the inefficient site management. The value of β = 0.444 and p = 0.000, which indicates that there is moderate, positive and significant relationship between inefficient site management and project performance, therefore, H2 is accepted. For H3, the value of R2 is 0.193, indicating that approximately 19.3% variance in the project performance is due to the poor site coordination. The value of β = is 0.439 and p = 0.000, which indicates that there is moderate, positive and significant relationship between poor site coordination and project performance, therefore, H3 is accepted.

For H4, the value of R2 is 0.257 indicating that approximately 25.7% variance in the project performance is due to the improper planning. The value of β = 0.507 and p = 0.000, which indicates that there is strong, positive and significant relationship between improper planning and project performance. Therefore, H4 is accepted.For H5, the value of R2 is 0.241, indicating that approximately 24.1% variation in the Project performance is due to the lack of clarity in project scope. The value of β = 0.491 and p = 0.000, which indicates that there is moderate, positive and significant relationship between lack of clarity in project scope and project performance, therefore, H5 is accepted. For H6, the value of R2 is 0.182, indicating that approximately 18.2% variance in the project performance is attributed to lack of communication. The value of β = 0.429 and p = 0.000, which indicates that there is moderate, positive and significant relationship between lack of communication and project performance, therefore, H6 is accepted.

For H7,the value of R2 is 0.235 indicating that approximately 23.5% variance in the project performance is attributed to substandard contracts. The value of β = 0.485 and p = 0.000, which indicates that there is moderate, positive and significant relationship between substandard contracts and project performance, therefore, H7 is accepted. Improper planning as cause of schedule delay attributed the project performance most (R2 = 25.7%), then lack of clarity in project scope (R2 = 24.1%), sub-standard contracts (R2 = 23.5%), poor site management (R2 = 19.7%), poor site coordination (R2 = 19.3%), communication (R2 = 18.2%) and lack of commitment (R2 = 8.3%) respectively from most to least attributed to project performance of construction projects in Pakistan.

A moderation analysis is a kind of regression analysis which explain the impact of independent variables on the dependent variables through or under the influence of moderator, moderator modifies the form and defines the strength of the relationship (Baron & Kenny, 1986). In order to test the impact of schedule delay factors (IV) on project performance (DV) under the influence of each construct of senior management support (MV), regression with the support of a tool called “PROCESS” by Hayes (2012) was used to test our all five dimensions of Senior Management Support. The purpose of using this statistical technique is that it automatically calculate all the required outcomes whether the most other regression routine do not carry out all steps automatically (Hayes, 2012).

The results of moderation were also analyzed by defining in which category the moderation lies i.e. homologizers, quasi-moderators or pure moderators as classified by Sharma, Durand, & Gur-Arie (1981). If the moderator variable does not significantly moderate the true relationship between IV and DV and affects the strength of the association is called “homologizers.” If moderator variable significantly moderates the true relationship between IV and DV and at the same time related to DV then it is called “quasi-moderator.” If moderator variable significantly moderates the true relationship between IV and DV but does not associate or related to DV then it is called “pure moderator” (Sharma, Durand & Gur-Arie, 1981; Cerin, 2014). The results of the moderations analysis of all five dimensions (provide resources, structural arrangements, communication, expertise, power) of top management support are shown in Exhibit 5.

The first condition for significance as defined by Hayes, (2012) is that the value of p is less than the 0.05 and both the values of the Lower Level of Confidence Interval (LLCI) and Upper Level of Confidence Interval (ULCI) are either positive or negative and “zero” does not lie between them. The results for the provide resources dimension (*R2* = 0.4604 and p < 0.05) indicated that 46.04% of variance in the project performance is due to schedule delays, provide resources and their interaction or combine effect. The results for the structural arrangements dimension ( *R2* = 0.5072 and p < 0.05) indicated that 50.72% variance in the project performance is due to schedule delays, structural arrangements and their interaction or combines effect. The results for the communication dimension (*R2* = 0.5719 and p < 0.05) indicated that 57.19% of variance in the project performance is due to schedule delays, communication and their interaction or combines effect. The value of the expertise dimension (*R2* = 0.5006 and p < 0.05) indicated that 50.06% of variance in the project performance is due to schedule delays, expertise and their interaction or combines effect. The results of the power dimension (*R2* = 0.5013 and p < 0.05) indicated that 50.13% of variance in the project performance is due to schedule delays, power and their interaction or combines effect.

The data from Exhibit 5 highlights the moderating results of interaction terms, both the values of LLCI and ULCI are negative and “zero” does not lie between them and the value of p < 0.05 which is indicated that provide resources, structural arrangements, communication, expertise and power by senior management significantly moderate the relationship between schedule delays and project performance. Negative values of both LLCI and ULCI indicated that all five dimensions of senior management support are weakened the relationship between schedule delays and project performance and also lies in “quasi-moderator” category. After moderation test of all the constructs of senior management support separately, it has been revealed that provide resources, structural arrangements, communication, expertise and power by senior management significantly moderate the relationship between schedule delays and project performance, therefore, the H8 of the study is accepted.

**Exhibit 5.** Results of Moderation Analysis (Senior Management Support)

|  |  |
| --- | --- |
| **Variable**  | **Project Performance** |
| **R** | **R2** | **MSE** | **F** | **df1** | **df2** | **p** |
| Provide resources | 0.678 | 0.460 | 0.142 | 87.029 | 3 | 306 | 0.000 |
| Structural arrangements | 0.712 | 0.507 | 0.130 | 104.988 | 3 | 306 | 0.000 |
| Communication | 0.756 | 0.571 | 0.113 | 136.263 | 3 | 306 | 0.000 |
| Expertise | 0.707 | 0.500 | 0.132 | 102.252 | 3 | 306 | 0.000 |
| Power | 0.708 | 0.501 | 0.132 | 102.515 | 3 | 306 | 0.000 |
|  | **Model** | **Coeff** | **se** | **t** | **p** | **LLCI** | **ULCI** |
| Provide resources | SDF | 1.151 | 0.227 | 5.056 | 0.000 | 0.703 | 1.599 |
| POR | 1.259 | 0.201 | 6.259 | 0.000 | 0.863 | 1.655 |
| SDFxPOR | -0.222 | 0.055 | -4.041 | 0.001 | -0.331 | -0.113 |
| Structural arrangements  | SDF | 0.737 | 0.195 | 3.779 | 0.002 | 0.353 | 1.121 |
| STA | 0.949 | 0.161 | 5.869 | 0.000 | 0.631 | 1.267 |
| SDFxSTA | -0.128 | 0.046 | -2.769 | 0.006 | -0.219 | -0.037 |
| Communication  | SDF | 0.513 | 0.185 | 2.768 | 0.006 | 0.148 | 0.878 |
| COM | 0.839 | 0.147 | 5.699 | 0.000 | 0.549 | 1.129 |
| SDFxCOM | -0.090 | 0.043 | -2.083 | 0.038 | -0.175 | -0.005 |
| Expertise | SDF | 0.844 | 0.201 | 4.182 | 0.000 | 0.447 | 1.242 |
| EXP | 1.009 | 0.163 | 6.183 | 0.000 | 0.688 | 1.330 |
| SDFxEXP | -0.147 | 0.047 | -3.131 | 0.001 | -0.240 | -0.054 |
| Power  | SDF | 0.861 | 0.182 | 4.717 | 0.000 | 0.502 | 1.220 |
| PWR | 0.972 | 0.156 | 6.208 | 0.000 | 0.664 | 1.280 |
| SDFxPWR | -0.149 | 0.043 | -3.432 | 0.001 | -0.235 | -0.064 |

SDF= Schedule Delay Factors; POR= Provide Resources; STA= Structural Arrangements; COM= Communication; EXP=Expertise; PWR= Power.

**Discussion**

The findings of this study substantiate the research hypotheses; the study identified that there is significant impact of schedule delays on project performance and all five dimensions of senior management support significantly moderate the relationship between schedule delays and project performance. Therefore, the results of this empirical study address the research questions and the research objectives have been met. The results of the correlation analysis show that a lack of commitment has significant negative weak correlation with project performance and a significant negative moderate correlation with senior management support. This indicates that the lack of commitment is decreasing while the project performance and senior management support is increasing. This is because the lack of commitment by senior management which is a crucial barrier to project success since management provides support for timely completion of project activities (Jawad & Ledwith, 2020). Therefore, the results support that as the lack of commitment decreases the project performance and senior management support increases.

The moderate correlation outcome between most of the variables indicated that the performance of the projects was not increased as much as schedule delays increased. The positive correlation between schedule delays and project performance is due to the reason that the overall performance of the project were increased due to the other factors but schedule delays were also obstacles in achieving the goals of their project as cost and time are usually two primary factors that contribute towards the success of projects in construction industry (Johnson & Babu, 2020). Furthermore, the project performance has significant positive strong correlation with senior management support, which highlights that if senior management provides sufficient support for the project, project performance is increased as senior management support is the key factor for the success of any project (Liu et al., 2020). Senior management support as the critical success factor is in line with many researchers in construction projects (Ghanbaripour et al., 2020; Gunduz & Almuajebh, 2020; Wuni & Shen, 2020).

 The study found that improper planning has the highest value of R2 = 25.7%, which means improper planning has the most impact on schedule delays and can be attributed to project performance in the construction projects that were part of the study. A study conducted by Arantes and Ferreira (2020) also identified that improper planning is one of the most crucial factor affecting performance in the construction industry. Lack of commitment has the lowest value of R2 = 8.3% and also has a negative correlation with project performance and senior management support, which indicated that when the lack of commitment decreased, the project performance increased. This identifies that in the projects, the senior management of the projects was committed to completing the projects.

The significant moderation results of the first dimension of the senior management support indicated that the provision of resources weakens the relationship between schedule delays and project performance. The results identify that senior management support has influence in enhancing the project performance, since senior management not only provides resources but also facilitates the process of decision-making as part of a supporting organizational culture through leadership and commitment (Kiesnere & Baumgartner, 2020). Those projects which have sufficient senior management support have more chances of acquisition of the required organizational resources for project delivery (Khattak & Shah, 2020). The significant moderation results of the second dimension of the senior management support indicated that that senior management provides the procedures and processes (i.e. structural arrangements) for the smooth and efficient conduct of project activities that impact project performance (Novianty, 2019). The significant moderation results of the third dimension of the senior management support indicated that communication weakens the relationship between schedule delays and project performance. Mutual communication among stakeholders helps in problem-solving and improved decision-making, which increase project performance (Ghanbaripour et al., 2020).

The significant moderation results of the fourth dimension of the senior management support satisfied the theory that the understanding and experience of senior management of the major areas of organizational management have a significant impact on project performance (Priscilla & Siregar, 2020). The significant moderation results of the fifth dimension of the senior management support indicated that the role of senior management power has an influence on project performance as members of senior management have power that can be deployed to ensure resources are mobilized and ensure projects are completed according to the specified requirements (Yun et al., 2020). Furthermore, the results revealed that all five dimensions of senior management support significantly impact the relationship between schedule delays and project performance and at the same time are significantly associated with project performance independently, and therefore, lie in a “quasi-moderator” category of interaction.

**Implications**

***Theoretical Implication***

The research study empirically identified that schedule delays (i.e. lack of commitment, insufficient site management, poor site coordination, improper planning, lack of clarity in project scope, lack of communication and substandard contracts) significantly impact the performance of construction projects in Pakistan and improper planning has the highest influence that is attributed to project performance. Furthermore, senior management support, in terms of providing resources, structural arrangements, expertise and power, moderate the relationship between schedule delays and project performance. The five dimensions of the moderator variable were also identified as “quasi-moderator” variables, therefore, the results satisfied and confirmed our proposed resource-based view theory for the study. The study identified that project performance can be increased by support of senior management in terms of providing resources, structural arrangements, expertise and power and through this support, an organization can achieve higher performance, optimally unitize its physical and non-physical resources, and deploy competitive advantage over its competitors which is contended by the resource-based view of strategy.

***Practical Implications***

The practical implications of this study are that project managers and construction [practitioners](https://www.google.com/search?sxsrf=ALeKk022qlVUY_5jBNlxAqAe3FIWV451cA:1598092583113&q=practitioners&spell=1&sa=X&ved=2ahUKEwiI6u_lzq7rAhVLBWMBHdyOApoQkeECKAB6BAgPECU) of both public and private sectors require guidance on how to reduce the level of schedule delays that occur in the construction industry. The findings of this study have identified that through effective project planning, schedule delays can be reduced. Furthermore, with the support of senior management, the overall project performance can be improved. The results help to rank the causes of schedule delays of the study undertaken from most to least in the sample of the construction industry in Pakistan. The findings indicate that improper planning as a cause of schedule delays attributed the project performance has the most impact, then lack of clarity in project scope, sub-standard contracts, poor site management, poor site coordination, communication and lack of commitment, respectively. Through this ranking, project managers and construction [practitioners](https://www.google.com/search?sxsrf=ALeKk022qlVUY_5jBNlxAqAe3FIWV451cA:1598092583113&q=practitioners&spell=1&sa=X&ved=2ahUKEwiI6u_lzq7rAhVLBWMBHdyOApoQkeECKAB6BAgPECU) can improve their understanding of which area is the most critical and needs greater attention for improvements to mitigate the effects of these causes in various projects.

**Conclusion**

This research study has identified empirical evidence that independent variables of schedule delay factors can be significantly attributed to project performance. This indicates that the phenomena of schedule delays in construction projects also exist in public and private construction projects in Pakistan. Lack of commitment is decreasing while the project performance and senior management support is increasing, as lack of commitment by the management is a crucial barrier to project success as management provides all the support to its activities for timely completion. Therefore, it has been concluded that if lack of commitment is decreased then the project performance and senior management support increased. The positive moderate correlation outcome between most of the independent and dependent variables indicated that the performance of the projects was not increased as much as schedule delays increased.

Other than lack of commitment, there is a positive correlation between independent and dependent variables. The positive correlation between schedule delays and project performance is due to the reason that the overall performance of the projects was increased due to the other factors. However schedule delays were also obstacles in achieving the goals of project since cost and time are usually two primary factors that contribute towards the success of projects in construction industry. Senior management support in terms of providing resources, structural arrangements, communication, expertise and power moderate the relationship between schedule delays and project performance. All five constructs of senior management support (moderator variable) were also identified as “quasi-moderator” variables, therefore, the results satisfied and confirmed the proposed resource-based theory for the study.

**Limitations and Future Research Directions**

One of the main limitations is that the study was conducted during the current situation of the COVID-19 pandemic and this led to data collection via the email method which was used to complete the online questionnaire survey. In normal times, a higher response may have been obtained through visiting the construction organizations in Pakistan (although it should be noted that an overall response rate of 84% is still relatively high). The second limitation is that the study was cross-sectional and the results were concluded on the basis of the survey questionnaire from construction companies in Pakistan at a specific point of time. Therefore, one cannot generalize the results with projects from other countries or studies undertaken by researchers in other countries. The third limitation is that collected data through the survey questionnaire was prone to errors due to the respondents’ own concerns over privacy issues or any legal bindings with the parent organizations on non-disclosure of facts and figures. Further, a small number of demographics have shown limited significant relationship in the context of this study, which may be replicated in the future to see the differences across the countries, in addition to other related demographics. It is suggested that future research can be directed towards investigating the cost and quality related independent variables and their impact on project performance according to the moderating role of senior management support in different geographical environments and industrial sectors.

**Acknowledgement**

We appreciate the constructive feedback of the anonymous reviewers to improve the manuscript. Special thanks to editors and associate editors for their guidance, motivation and productive review for further improving the quality of the manuscript. We would like to also thank all the respondents who voluntarily participated in the survey.

**References**

Abbasi, O., Noorzai, E., Gharouni Jafari, K., & Golabchi, M. (2020). Exploring the Causes of Delays in Construction Industry Using a Cause-and-Effect Diagram: Case Study for Iran. *Journal of Architectural Engineering, 26*(3), 1-16.

Abd El-Razek, M., Bassioni, H., & Mobarak, A. (2008). Causes of delay in building construction projects in Egypt. *Journal of construction engineering and management, 134*(11), 831-841.

Abdul-Rahman, H., Berawi, M. A., Berawi, A., Mohamed, O., Othman, M., & Yahya, I. (2006). Delay mitigation in the Malaysian construction industry. *Journal of construction engineering and management, 132*(2), 125-133.

Adam, A., Josephson, P.-E. B., & Lindahl, G. (2017). Aggregation of factors causing cost overruns and time delays in large public construction projects. *Engineering, construction and architectural management, 24(3), 393-406*.

Agyekum-Mensah, G., & Knight, A. D. (2017). The professionals’ perspective on the causes of project delay in the construction industry. *Engineering, construction and architectural management, 24(5), 828-841*.

Ahadzie, D., Proverbs, D., & Sarkodie-Poku, I. (2014). Competencies required of project managers at the design phase of mass house building projects. *International journal of project management, 32*(6), 958-969.

Ahimbisibwe, A., & Nangoli, S. (2012). Project communication, individual commitment, social networks, and perceived project performance. *Journal of African Business, 13*(2), 101-114.

Ahmed, R., & Anantatmula, V. S. (2017). Empirical study of project managers leadership competence and project performance. *Engineering Management Journal, 29*(3), 189-205.

Ahmed, R., Mohamad, N. A. B., & Ahmad, M. S. (2016). Effect of multidimensional top management support on project success: an empirical investigation. *Quality & Quantity, 50*(1), 151-176.

Ahmed, S., Memon, A. H., Memon, N. A., Laghari, A. N., Akhund, M. A., & Imad, H. U. (2018). Common factors of cost escalation in construction industry of Pakistan. *Engineering, Technology & Applied Science Research, 8*(6), 3508-3511.

Akhund, M. A., Khoso, A. R., Memon, U., & Khahro, S. H. (2017). Time overrun in construction projects of developing countries. *Imperial Journal of Interdisciplinary Research, 3*(5), 1-6.

Akunyumu, S., Adjei-Kumi, T., Danku, J. C., & Kissi, E. (2019). Communication problems in projects-a research study for construction site projects: a case study of Ghana. *International Journal of Project Organisation and Management, 11*(4), 343-361.

Aladwani, A. M. (2002). IT project uncertainty, planning and success. *Information Technology & People, 15(3), 210-226*.

Alaloul, W. S., Liew, M. S., & Zawawi, N. A. W. A. (2016). Identification of coordination factors affecting building projects performance. *Alexandria Engineering Journal, 55*(3), 2689-2698.

Al-Fadhali, N., & Zainal, R. (2017). A Theoretical Framework on Factors Causing Delay of Construction Industries Projects. *Soc. Sci*, *12*, 393-399.

Ali, M. I., & Ahmed, R. (2019). Identifying sustainability strategies for public sector projects of developing countries. *Global Management Journal for Academic & Corporate Studies, 9*(2), 152-164.

Almahmoud, E. S., Doloi, H. K., & Panuwatwanich, K. (2012). Linking project health to project performance indicators: Multiple case studies of construction projects in Saudi Arabia. *International journal of project management, 30*(3), 296-307.

Amoatey, C. T., & Ankrah, A. N. O. (2017). Exploring critical road project delay factors in Ghana. *Journal of Facilities Management*, 15(2), 110-127.

Amri, T., & Marey-Pérez, M. (2020). Towards a sustainable construction industry: Delays and cost overrun causes in construction projects of Oman. *Journal of Project Management, 5*(2), 87-102.

Anantatmula, V. S. (2010). Project manager leadership role in improving project performance. *Engineering Management Journal, 22*(1), 13-22.

Arantes, A., & Ferreira, L. M. D. (2020). Underlying causes and mitigation measures of delays in construction projects. *Journal of Financial Management of Property and Construction*, 25(2), 165-181.

Arashpour, M., Abbasi, B., Arashpour, M., Hosseini, M. R., & Yang, R. (2017). Integrated management of on-site, coordination and off-site uncertainty: theorizing risk analysis within a hybrid project setting. *International journal of project management, 35*(4), 647-655.

Arifuddin, R., Suraji, A., & Latief, Y. (2019). Study of the causal factors of construction projects vulnerability to accidents. *International Journal of Innovative Technology and Exploring Engineering, 8*(6), 711-716.

Assaad, R., El-Adaway, I. H., & Abotaleb, I. S. (2020). Predicting Project Performance in the Construction Industry. *Journal of Construction Engineering and Management, 146*(5), 04020030. doi:doi:10.1061/(ASCE)CO.1943-7862.0001797

Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International journal of project management, 24*(4), 349-357.

Atkinson, R., Crawford, L., & Ward, S. (2006). Fundamental uncertainties in projects and the scope of project management. *International journal of project management, 24*(8), 687-698.

Attakora-Amaniampong, E. (2016). Project management competencies of building construction firms: A structural equation model approach. *Architecture research, 6*(3), 68-79.

Bahadorestani, A., Ghalehnovi, M., & Farimani, N. M. (2018). Designing a Model of key Stakeholders’ Expectations in the Subway Construction Projects: Studied in MUR Construction Project. *Amirkabir Journal of Civil Engineering, 50*(1), 67-70.

Bajjou, M. S., & Chafi, A. (2018). Empirical study of schedule delay in Moroccan construction projects. *International Journal of Construction Management*, 1-18.

Banaeianjahromi, N., & Smolander, K. (2019). Lack of communication and collaboration in enterprise architecture development. *Information Systems Frontiers, 21*(4), 877-908.

Barbosa, A. P. P. L., Salerno, M. S., Nascimento, P. T., Albala, A., Maranzato, F., & Tamoshus, D. . (2020). Configurations of project management practices to enhance the performance of open innovation R&D projects *(pre-printed version)*. DOI: [10.1016/j.ijproman.2020.06.005](https://doi.org/10.1016/j.ijproman.2020.06.005),

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120.

Barriga, E. M., Jeong, J. G., Hastak, M., & Syal, M. (2005). Material control system for the manufactured housing industry. *Journal of Management in Engineering, 21*(2), 91-98.

Bashir, H., Ojiako, U., & Mota, C. (2020). Modeling and Analyzing Factors Affecting Project Delays Using an Integrated Social Network-Fuzzy MICMAC Approach. *Engineering Management Journal, 32*(1), 26-36.

Bayhan, H. G., Demirkesen, S., & Jayamanne, E. (2019). *Enablers and Barriers of Lean Implementation in Construction Projects.* Paper presented at the IOP Conference Series: Materials Science and Engineering. IOP Publishing, 471(1), 1-9.

Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. *International journal of project management, 14*(3), 141-151.

Berssaneti, F. T., & Carvalho, M. M. (2015). Identification of variables that impact project success in Brazilian companies. *International journal of project management, 33*(3), 638-649.

Bingham, E., & Gibson Jr, G. E. (2017). Infrastructure project scope definition using project definition rating index. *Journal of Management in Engineering, 33*(2), 04016037.

Bolger, F., & Wright, G. (2007). *Expertise and Decision Support*: Springer US.

Boonstra, A. (2013). How do top managers support strategic information system projects and why do they sometimes withhold this support? *International journal of project management, 31*(4), 498-512.

Chander, M., Jain, S. K., & Shankar, R. (2013). Modeling of information security management parameters in Indian organizations using ISM and MICMAC approach. *Journal of Modelling in Management*, 8(2), 171

Chaos, E. (2001). The Standish Group International. *Complexity International 9(1), 16-25*.

Chen, G.-X., Shan, M., Chan, A. P., Liu, X., & Zhao, Y.-Q. (2019). Investigating the causes of delay in grain bin construction projects: the case of China. *International Journal of Construction Management, 19*(1), 1-14.

Chen, I. J., & Popovich, K. (2003). Understanding customer relationship management (CRM). *Business process management journal*, 9(5), 672-688

Cheng, E. W., Ryan, N., & Kelly, S. (2012). Exploring the perceived influence of safety management practices on project performance in the construction industry. *Safety science, 50*(2), 363-369.

Cho, C.-S., & Gibson Jr, G. E. (2001). Building project scope definition using project definition rating index. *Journal of architectural engineering, 7*(4), 115-125.

Chollet, B., Brion, S., Chauvet, V., Mothe, C., & Géraudel, M. (2012). NPD projects in search of top management support: The role of team leader social capital. *M@ n@ gement, 15*(1), 44-75.

Clark, K. B. (1989). Project scope and project performance: the effect of parts strategy and supplier involvement on product development. *Management science, 35*(10), 1247-1263.

Cooke-Davies, T. (2002). The “real” success factors on projects. *International journal of project management, 20*(3), 185-190.

Crawford, L. (2005). Senior management perceptions of project management competence. *International journal of project management, 23*(1), 7-16.

Croucher, S. M. (2015). *Understanding Communication Theory: A Beginner's Guide*: Taylor & Francis.

Curran, M., & Spillane, J. (2020). External Stakeholder Management and Engagement on Urban Construction Projects in Ireland. *Proceedings of the Institution of Civil Engineers-Management, Procurement and Law*, 1-11.

Dandage, R. V., Mantha, S. S., Rane, S. B., & Bhoola, V. (2018). Analysis of interactions among barriers in project risk management. *Journal of Industrial Engineering International, 14*(1), 153-169.

de Andrade, P. A., Martens, A., & Vanhoucke, M. (2019). Using real project schedule data to compare earned schedule and earned duration management project time forecasting capabilities. *Automation in Construction, 99*, 68-78.

Derakhshan, R., Turner, R., & Mancini, M. (2019). Project governance and stakeholders: a literature review. *International Journal of Project Management, 37*(1), 98-116.

Dixit, S., Pandey, A. K., Mandal, S. N., & Bansal, S. (2017). A study of enabling factors affecting construction productivity: Indian scnerio. *International Journal of Civil Engineering & Technology, 8*(6), 741-758.

Doloi, H., Sawhney, A., Iyer, K., & Rentala, S. (2012). Analysing factors affecting delays in Indian construction projects. *International journal of project management, 30*(4), 479-489.

Dong, L., Neufeld, D., & Higgins, C. (2009). Top management support of enterprise systems implementations. *Journal of Information technology, 24*(1), 55-80.

Durdyev, S., & Hosseini, M. R. (2019). Causes of delays on construction projects: a comprehensive list. *International Journal of Managing Projects in Business*, 13(1), 20-46

Dwivedi, Y. K., Ravichandran, K., Williams, M. D., Miller, S., Lal, B., Antony, G. V., & Kartik, M. (2013). *IS/IT project failures: a review of the extant literature for deriving a taxonomy of failure factors.* Paper presented at the International working conference on transfer and diffusion of IT, 7388.

Edwards, B. (1989). *Project sponsors: In their contribution to effective IT implementation.* Paper presented at the In the Oxford/PA conference.

Ehsani, M., Izadi, B., Yoon, Y.-J., Cho, K. M., Koozechian, H., & Tojari, F. (2013). An investigation of the effect of fan relationship management factors on fan lifetime value. *Asian Social Science, 9*(4), 248.

Enshassi, A., Arain, F., & Al‐Raee, S. (2010). Causes of variation orders in construction projects in the Gaza Strip. *Journal of Civil Engineering and Management, 16*(4), 540-551.

Enshassi, A., Saleh, N., & Mohamed, S. (2019). Barriers to the application of lean construction techniques concerning safety improvement in construction projects. *International Journal of Construction Management*, 1-17.

Faremi, O. J., Ajayi, O. O., & Faremi, O. E. . (2020). Factors Influencing the Use of Substandard Materials in the Construction of Residential Buildings. CSID Journal of Infrastructure Development*, 3(10), 40-50*.

Faris, H., Hutchinson, D., & Gaterell, M. (2020). *Improving collaboration in construction projects in developing countries: the case of Kurdistan region of Iraq.* Paper presented at the The 10th International Conference on Engineering, Project, and Production Management, 175-186.

Fashina, A. A., Abdilahi, S. M., & Fakunle, F. (2020). Examining the challenges associated with the implementation of project scope management in telecommunication projects in Somaliland. *PM World Journal*, 1-16.

Fernandes, G., O'Sullivan, D., Pinto, E. B., Araújo, M., & Machado, R. J. . (2020). Value of project management in university–industry R&D collaborations. *International Journal of Managing Projects in Business, 13(4), 819-843*.

Flyvbjerg, B., Holm, M. S., & Buhl, S. (2002). Underestimating costs in public works projects: Error or lie? *Journal of the American planning association, 68*(3), 279-295.

Flyvbjerg, B., Skamris Holm, M. K., & Buhl, S. L. (2003). How common and how large are cost overruns in transport infrastructure projects? *Transport reviews, 23*(1), 71-88.

Gebrehiwet, T., & Luo, H. (2017). Analysis of delay impact on construction project based on RII and correlation coefficient: Empirical study. *Procedia engineering, 196*, 366-374.

Ghanbaripour, A. N., Sher, W., & Yousefi, A. (2020). Critical success factors for subway construction projects–main contractors’ perspectives. *International Journal of Construction Management, 20*(3), 177-195.

Guimaraes, T., & Igbaria, M. (1997). Client/server system success: Exploring the human side. *Decision Sciences, 28*(4), 851-876.

Gulino, M. L., Sergeeva, N., & Winch, G. . (2020). Owner capabilities in social infrastructure projects: towards an expansion of the dynamic capabilities’ framework. *International Journal of Managing Projects in Business, 13(6), 1263-1282*

Gunduz, M., & Almuajebh, M. (2020). Critical Success Factors for Sustainable Construction Project Management. *Sustainability, 12*(5), 1990.

Gunduz, M., & Yahya, A. M. A. (2018). Analysis of project success factors in construction industry. *Technological and Economic Development of Economy, 24*(1), 67–80-67–80.

Habibi, M., Kermanshachi, S., & Safapour, E. (2018). *Engineering, procurement and construction cost and schedule performance leading indicators: state-of-the-art review.* Paper presented at the Proceedings of Construction Research Congress, 378-388.

Hanna, A. S., & Skiffington, M. A. (2010). Effect of preconstruction planning effort on sheet metal project performance. *Journal of construction engineering and management, 136*(2), 235-241.

Harvey, L., & Green, D. (1993). Defining quality. *Assessment & evaluation in higher education, 18*(1), 9-34.

Hasim, S., Fauzi, M. A., Endut, I. R., Yusof, Z., & Ridzuan, A. R. M. (2020). Issues and Adoption Process for Supply Chain Management of Materials in Construction Projects. In *ICACE 2019* (pp. 53-59): Springer.

Hastak, M., & Baim, E. J. (2001). Risk factors affecting management and maintenance cost of urban infrastructure. *Journal of Infrastructure Systems, 7*(2), 67-76.

Henry, L. A., Buyl, T., & Jansen, R. J. (2019). Leading corporate sustainability: T he role of top management team composition for triple bottom line performance. *Business Strategy and the Environment, 28*(1), 173-184.

Hilali, A., Charoenngam, C., & Barman, A. (2019). Barriers in contractual scope management of international development projects in Afghanistan. *Engineering, Construction and Architectural Management*, Vol. 26, No. 8, pp. 1574-1592.

Hoseini, E., van Veen, P., Bosch-Rekveldt, M., & Hertogh, M. (2020). Cost Performance and Cost Contingency during Project Execution: Comparing Client and Contractor Perspectives. *Journal of Management in Engineering, 36*(4), 05020006.

Hsu, H. Y., Liu, F. H., Tsou, H. T., & Chen, L. J. (2019). Openness of technology adoption, top management support and service innovation: a social innovation perspective. *Journal of Business & Industrial Marketing*, 34(3), 575-590.

Hussain, S., Zhu, F., Ali, Z., Aslam, H. D., & Hussain, A. (2018). Critical delaying factors: public sector building projects in Gilgit-Baltistan, Pakistan. *Buildings, 8*(1), 6.

Hyun, H., Kim, H., Lee, H. S., Park, M., & Lee, J. . (2020). Integrated Design Process for Modular Construction Projects to Reduce Rework. *Sustainability, , 12*(2).

Ibbs, C. W., Wong, C. K., & Kwak, Y. H. (2001). Project change management system. *Journal of Management in Engineering, 17*(3), 159-165.

Igbaria, M., Iivari, J., & Maragahh, H. (1995). Why do individuals use computer technology? A Finnish case study. *Information & management, 29*(5), 227-238.

Iyer, K., & Jha, K. (2005). Factors affecting cost performance: evidence from Indian construction projects. *International journal of project management, 23*(4), 283-295.

Jalaei, F., Jalaei, F., & Mohammadi, S. (2020). An integrated BIM-LEED application to automate sustainable design assessment framework at the conceptual stage of building projects. *Sustainable Cities and Society, 53*, 101979.

Javed, S. A., Syed, A. M., & Javed, S. (2018). Perceived organizational performance and trust in project manager and top management in project-based organizations. *Grey Systems: Theory and Application*, 8(3), 230-245.

Jawad, S., & Ledwith, A. (2020). Analyzing enablers and barriers to successfully project control system implementation in petroleum and chemical projects. *International Journal of Energy Sector Management*, doi/10.1108/IJESM-08-2019-0004.

Johnson, R. M., & Babu, R. I. I. (2020). Time and cost overruns in the UAE construction industry: a critical analysis. *International Journal of Construction Management, 20*(5), 402-411.

Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project management journal, 36*(4), 19-31.

Kadir, M. A., Lee, W., Jaafar, M., Sapuan, S., & Ali, A. (2005). Factors affecting construction labour productivity for Malaysian residential projects. *Structural survey*, 23(1), 42-54.

Kar, S., & Jha, K. N. (2020). Examining the Effect of Material Management Issues on the Schedule and Cost Performance of Construction Projects Based on a Structural Equation Model: Survey of Indian Experiences. *Journal of Construction Engineering and Management, 146*(9), 05020011.

Katz, R. (1982). The effects of group longevity on project communication and performance. *Administrative science quarterly*, 81-104.

Kazaz, A., Ulubeyli, S., & Tuncbilekli, N. A. (2012). Causes of delays in construction projects in Turkey. *Journal of Civil Engineering and Management, 18*(3), 426-435.

Khan, R. A., & Gul, W. (2017). *Emperical study of critical risk factors causing delays in construction projects.* Paper presented at the 2017 9th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS), 900-906.

Khattak, M. S., & Shah, S. Z. A. (2020). Top Management Capabilities and Firm Efficiency: Relationship via Resources Acquisition. *Business & Economic Review, 12*(1), 87-118.

Kheyroddin, A. (2018). Evaluation of project critical success factors for key construction players and objectives. *International Journal of Engineering, 31*(2), 228-240.

Khoso, A. R., Khan, J. S., Faiz, R. U., & Akhund, M. A. (2019). Assessment of Change Orders Attributes in Preconstruction and Construction Phase. *Civil Engineering Journal, 5*(3), 616-623.

Kiesnere, A. L., & Baumgartner, R. J. (2020). Top Management Involvement and Role in Sustainable Development of Companies. *Responsible Consumption and Production*, 827-839.

Kim, Y.-W. (2019). The impact of make-ready process on project cost performance in heavy civil construction projects. *Production Planning & Control, 30*(13), 1064-1071.

Knapp, K. J., Marshall, T. E., Rainer Jr, R. K., & Morrow, D. W. (2006). The top information security issues facing organizations: What can government do to help. *Network security, 1*, 327.

Kock, A., Schulz, B., Kopmann, J., & Gemünden, H. G. (2020). Project portfolio management information systems’ positive influence on performance–the importance of process maturity. *International Journal of Project Management, 38*(4), 229-241.

Kog, Y. C. (2019). Construction Delays in Indonesia, Malaysia, Thailand, and Vietnam. *Practice Periodical on Structural Design and Construction, 24*(3), 04019013.

Kor, Y. Y., & Mahoney, J. T. (2004). Edith Penrose's (1959) contributions to the resource‐based view of strategic management. *Journal of management studies, 41*(1), 183-191.

Larsen, J. K., Shen, G. Q., Lindhard, S. M., & Brunoe, T. D. (2016). Factors affecting schedule delay, cost overrun, and quality level in public construction projects. *Journal of Management in Engineering, 32*(1), 04015032.

Latan, H., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Wamba, S. F., & Shahbaz, M. (2018). Effects of environmental strategy, environmental uncertainty and top management's commitment on corporate environmental performance: The role of environmental management accounting. *Journal of Cleaner Production, 180*, 297-306.

Lee, J. Y., Park, S., & Baker, R. (2018). The moderating role of top management support on employees’ attitudes in response to human resource development efforts. *Journal of Management & Organization, 24*(3), 369-387.

Li, C., Sun, L. Y., & Dong, Y. (2018). Innovating via building absorptive capacity: Interactive effects of top management support of learning, employee learning orientation and decentralization structure. *Creativity and Innovation Management, 27*(4), 431-443.

Li, T. H., Ng, S. T., & Skitmore, M. (2013). Evaluating stakeholder satisfaction during public participation in major infrastructure and construction projects: A fuzzy approach. *Automation in construction, 29*, 123-135.

Liu, A. M. (1999). A research model of project complexity and goal commitment effects on project outcome. *Engineering Construction and Architectural Management, 6*(2), 105-111.

Liu, J., Liu, Y., & Yang, L. (2020). Uncovering the influence mechanism between top management support and green procurement: The effect of green training. *Journal of Cleaner Production, 251*, 119674.

Lu, C., Yu, Z., Wang, X., & Hong, Y. (2020). Empirical Study on the Obstacles to the Success of Joint Ventures in Construction Projects. *Advances in Civil Engineering, 2020*, doi.org 10.1555/2020/1748198.

Lu, P., Cai, X., Wei, Z., Song, Y., & Wu, J. (2019). Quality management practices and inter-organizational project performance: Moderating effect of governance mechanisms. *International Journal of Project Management, 37*(6), 855-869.

Lyytinen, K., & Hirschheim, R. (1988). Information systems failures—a survey and classification of the empirical literature. In *Oxford surveys in information technology* (pp. 257-309).

Ma, L., & Fu, H. (2020). Exploring the influence of project complexity on the mega construction project success: a qualitative comparative analysis (QCA) method. *Engineering, Construction and Architectural Management, 27(90, 2429-2449*.

Martinez, L. A. M., & Hurtado, S. R. F. (2018). Internal Communication Issues in the Firms: Does It Affect the Productivity. *Rev. Eur. Stud., 10*, 1.

Masood, R., Ali, M., Shafique, F., Shafique, M. A., Zafar, B., Maqsoom, A., & Ullah, Z. (2015). Investigating the Delay Factors of Construction Projects in Metropolitan City of a Developing Country. *Journal of Civil Engineering and Architecture Research, 2 (9)*, 947-955.

Meng, X. (2012). The effect of relationship management on project performance in construction. *International journal of project management, 30*(2), 188-198.

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International journal of project management, 32*(2), 202-217.

Mittal, Y. K., Paul, V. K., Rostami, A., Riley, M., & Sawhney, A. (2020). Delay factors in construction of healthcare infrastructure projects: a comparison amongst developing countries. *Asian Journal of Civil Engineering*, 1-13.

Moon, H., Kim, K., Lee, H.-S., Park, M., Williams, T. P., Son, B., & Chun, J.-Y. (2020). Cost Performance Comparison of Design-Build and Design-Bid-Build for Building and Civil Projects Using Mediation Analysis. *Journal of Construction Engineering and Management, 146*(9), 04020113.

Mullins, F. (2018). HR on board! The implications of human resource expertise on boards of directors for diversity management. *Human Resource Management, 57*(5), 1127-1143.

Muneeswaran, G., Manoharan, P., Awoyera, P., & Adesina, A. (2020). A statistical approach to assess the schedule delays and risks in Indian construction industry. *International Journal of Construction Management, 20*(5), 450-461.

Ning, Y. (2018). Impact of quality performance ambiguity on contractor's opportunistic behaviors in person-to-organization projects: The mediating roles of contract design and application. *International Journal of Project Management, 36*(4), 640-649.

Nixon, P., Harrington, M., & Parker, D. (2012). Leadership performance is significant to project success or failure: a critical analysis. *International Journal of productivity and performance management*, 204-216.

Novianty, I. (2019). The Quality of Management Accounting Information Systems from Users’ ethics, Environmental Uncertainty, And Top Management Support Perspectives (An Empirical Case of Local Government In Indonesia). *South Asian Journal of Contemporary Business, Economics & Law, 12*(1).

Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay: traditional contracts. *International journal of project management, 20*(1), 67-73.

Ojha, A., Chouhan, V., Gupta, L., & Goswami, S. (2020). A case study on project performance of railway underpass construction project in Jaipur, India. *AIP Conference Proceedings, 2204*(1), 020005. doi:10.1063/1.5141542

Oppong, G. D., Chan, A. P., & Dansoh, A. (2017). A review of stakeholder management performance attributes in construction projects. *International Journal of Project Management, 35*(6), 1037-1051.

Pinto, J. K., & Slevin, D. P. (1987). Critical factors in successful project implementation. *IEEE transactions on engineering management*(1), 22-27.

Project Management Institute (2017). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)–Sixth Edition*: Project Management Institute.

Project Management Institute (2019). *A Guide to the Project Management Body of Knowledge (PMBOK(R) Guide-Sixth Edition / Agile Practice Guide Bundle (HINDI)*: Project Management Institute.

Prasad, K., Vasugi, V., Venkatesan, R., & Bhat, N. S. (2019). Critical causes of time overrun in Indian construction projects and mitigation measures. *International Journal of Construction Education and Research, 15*(3), 216-238.

Priscilla, M., & Siregar, S. V. (2020). The Effect of Top Management Team Expertise on Corporate’s Accrual and Real Earnings Management. *Advanced Issues in the Economics of Emerging Markets, 27(1), 79-101*.

Ramanathan, C., Narayanan, S., & Idrus, A. B. (2012). Construction delays causing risks on time and cost-a critical review. *Construction Economics and Building, 12*(1), 37-57.

Rashid, Y. (2020). Analysis of delay factors and their effects on construction projects. *Management Science Letters, 10*(6), 1197-1204.

Ratajczak, J., Riedl, M., & Matt, D. T. (2019). BIM-based and AR application combined with location-based management system for the improvement of the construction performance. *Buildings, 9*(5), 118.

Razmdoost, K., & Mills, G. (2016). Towards a service-led relationship in project-based firms. *Construction Management and Economics, 34*(4-5), 317-334.

Ruck, K., & Welch, M. (2012). Valuing internal communication; management and employee perspectives. *Public relations review, 38*(2), 294-302.

Salahi Pehlivan & Ali Erhan Öztemir (2018): Integrated Risk of Progress-Based

Costs and Schedule Delays in Construction Projects, Engineering Management Journal, DOI: 10.1080/10429247.2018.1439636, 30(2), 108-116.

Safapour, E., Kermanshachi, S., & Nipa, T. J. (2020). Schedule Performance Analysis of Infrastructure Reconstruction Projects Due to Extreme Events. *management, 44*(45), 46-47.

Safapour, E., Kermanshachi, S., & Taneja, P. (2019). *Investigation and analysis of the rework leading indicators in construction projects: state-of-the-art review.* Paper presented at the Proceedings of the 7th CSCE International Construction Specialty Conference, 12-15.

Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International journal of project management, 25*(5), 517-526.

Samsudin, N., Adeleke, A., & Ajibike, W. (2020). Effects of Contractors’ Delay Factors on Building Project Performance Among Kuantan Malaysian Construction Industry. *Social Science and Humanities Journal*, 1705-1715.

Satyanarayana, K., & Iyer, K. (1996). Evaluation of delays in Indian construction contracts. *Journal of the Institution of Engineers (India), 77*(2), 14-22.

Shah, M. N., Dixit, S., Kumar, R., Jain, R., & Anand, K. (2019). Causes of delays in slum reconstruction projects in India. *International Journal of Construction Management*, 1-16.

Shaikh, H., Zainun, N., & Khahro, S. (2020). *Claims in Construction Projects: A Comprehensive Literature Review.* Paper presented at the IOP Conference Series: Earth and Environmental Science, 498(1), 012095.

Shehu, Z., Endut, I. R., Akintoye, A., & Holt, G. D. (2014). Cost overrun in the Malaysian construction industry projects: A deeper insight. *International journal of project management, 32*(8), 1471-1480.

Sherf, E. N., Sinha, R., Tangirala, S., & Awasty, N. (2018). Centralization of member voice in teams: Its effects on expertise utilization and team performance. *Journal of Applied Psychology, 103*(8), 813.

Sinesilassie, E., Tabish, S., & Jha, K. (2018). Critical factors affecting cost performance: a case of Ethiopian public construction projects. *International Journal of Construction Management, 18*(2), 108-119.

Sohu, S., Abdullah, A. H., Nagapan, S., Fattah, A., Ullah, K., & Kumar, K. (2017). *Contractors perspective for critical factors of cost overrun in highway projects of Sindh, Pakistan.* Paper presented at the AIP Conference Proceedings.

Sohu, S., Abdullah, A. H., Nagapan, S., Jhatial, A. A., Ullah, K., & Bhatti, I. A. (2018). Significant mitigation measures for critical factors of cost overrun in highway projects of Pakistan. *Engineering, Technology & Applied Science Research, 8*(2), 2770-2774.

Staehr, L. (2010). Understanding the role of managerial agency in achieving business benefits from ERP systems. *Information systems journal, 20*(3), 213-238.

Sunindijo, R. Y. (2015). Project manager skills for improving project performance. *International Journal of Business Performance Management, 16*(1), 67-83.

Suprapto, M., Bakker, H. L., Mooi, H. G., & Hertogh, M. J. (2016). How do contract types and incentives matter to project performance? *International journal of project management, 34*(6), 1071-1087.

Tanikawa, T., & Jung, Y. (2019). CEO power and top management team tenure diversity: implications for firm performance. *Journal of Leadership & Organizational Studies, 26*(2), 256-272.

Thomas, J., Delisle, C. L., Jugdev, K., & Buckle, P. (2002). Selling project management to senior executives: The case for avoiding crisis sales. *Project management journal, 33*(2), 19-28.

Todorović, M. L., Petrović, D. Č., Mihić, M. M., Obradović, V. L., & Bushuyev, S. D. (2015). Project success analysis framework: A knowledge-based approach in project management. *International journal of project management, 33*(4), 772-783.

Ullah, K., Nagapan, S., Sohu, S., & Khan, M. S. (2018). Measures to mitigate causative factors of budget overrun in Malaysian building projects. *International Journal of Integrated Engineering, 10*(9).

Vilventhan, A., & Kalidindi, S. N. (2016). Interrelationships of factors causing delays in the relocation of utilities. *Engineering, construction and architectural management, 23(3), 349-368*.

Viswanathan, S. K., & Jha, K. N. (2020). Critical risk factors in international construction projects. *Engineering, Construction and Architectural Management*, 27(5), 1169-1190.

Wang, T. K., Ford, D. N., Chong, H. Y., & Zhang, W. (2018). Causes of delays in the construction phase of Chinese building projects. *Engineering, Construction and Architectural Management, 25(11), 1534-1551*.

Wernerfelt, B. (1984). A resource‐based view of the firm. *Strategic management journal, 5*(2), 171-180.

Wiewiora, A., Chang, A., & Smidt, M. (2020). Individual, project and organizational learning flows within a global project-based organization: exploring what, how and who. *International Journal of Project Management, 38*(4), 201-214.

Wright, E. R., Cho, K., & Hastak, M. (2014). Assessment of critical construction engineering and management aspects of nuclear power projects. *Journal of Management in Engineering, 30*(4), 04014016.

Wuni, I. Y., & Shen, G. Q. (2020). Critical success factors for management of the early stages of prefabricated prefinished volumetric construction project life cycle. *Engineering, Construction and Architectural Management, 27(9), 2315-2333*.

Daniel, W. W., & Cross, C. L. (2018). *Biostatistics: a foundation for analysis in the health sciences*. Wiley.

Yang, L.-R., Huang, C.-F., & Hsu, T.-J. (2014). Knowledge leadership to improve project and organizational performance. *International journal of project management, 32*(1), 40-53.

Yang, L.-R., Wu, K.-S., & Huang, C.-F. (2013). Validation of a model measuring the effect of a project manager’s leadership style on project performance. *KSCE Journal of Civil Engineering, 17*(2), 271-280.

Yang, L.-R., Wu, K.-S., Wang, F.-K., & Chin, P.-C. (2012). Relationships among project manager’s leadership style, team interaction and project performance in the Taiwanese server industry. *Quality & Quantity, 46*(1), 207-219.

Yap, J. B. H., Chow, I. N., & Shavarebi, K. (2019). Criticality of construction industry problems in developing countries: Analyzing Malaysian projects. *Journal of Management in Engineering, 35*(5), 04019020.

Yeung, J. F., Chan, A. P., Chan, D. W., Chiang, Y., & Yang, H. (2013). Developing a benchmarking model for construction projects in Hong Kong. *Journal of construction engineering and management, 139*(6), 705-716.

Young, R., & Poon, S. (2013). Top management support—almost always necessary and sometimes sufficient for success: Findings from a fuzzy set analysis. *International journal of project management, 31*(7), 943-957.

Yun, L., Wan, J., Wang, G., Bai, J., & Zhang, B. (2020). Exploring the missing link between top management team characteristics and megaproject performance. *Engineering, Construction and Architectural Management*, 27(5), 1039-1064.

Zidane, Y. J.-T., & Andersen, B. (2018). The top 10 universal delay factors in construction projects. *International Journal of Managing Projects in Business, 11(3), 650-672*.

Ziemba, E., & Oblak, I. (2013). *Critical success factors for ERP systems implementation in public administration.* Paper presented at the Proceedings of the Informing Science and Information Technology Education Conference, 1-20.

Zwikael, O. (2008). Top management involvement in project management. *International Journal of Managing Projects in Business*, 1(4), 498.

**Appendix – I**

**Measures of Schedule Delay Factors:**

|  |
| --- |
| * Site accidents occurred due to lack of safety measures
 |
| * Lack of motivation for contractor in project (on early finish)
 |
| * Use of improper or obsolete construction methods
 |
| * Delay in material delivery by vendors
 |
| * Ambiguity in specifications and conflicting interpretation by stakeholders
 |
| * Poor labor performance or productivity
 |
| * Lack of control over sub-contractor
 |
| * Inadequate experience of contractor
 |
| * Non availability of drawing/design on time
 |
| * Slow decision making by owner
 |
| * Unrealistic time schedule imposed in contract
 |
| * Poor site management and supervision
 |
| * Extreme weather conditions
 |
| * Lack of skilled operators for specialized equipment
 |
| * Inefficient use of equipment
 |
| * Poor coordination among stakeholders
 |
| * Delay in material procurement by the contractor
 |
| * Rework due to change of design or deviation from initial scope
 |
| * Rework due to errors in execution
 |
| * Frequent change/hiring of sub-contractor
 |
| * Increase in scope of work
 |
| * Improper estimation of materials leading to damage
 |
| * Obtaining permissions from local authorities take time
 |
| * Delay in approval of completed work by client
 |
| * Consultant or Architect's reluctance for change
 |
| * Poor means of contracting
 |
| * Improper planning of contractor during bidding stage
 |
| * Ambiguity in contract documents
 |

**Measures of Project Success:**

|  |
| --- |
| * All project assignments were followed as per planned schedule
 |
| * The schedule for each phase of the project was essentially the same as planned
 |
| * Major project activities were completed on-schedule
 |
| * The project was delivered on schedule
 |
| * The cost objectives were met in the project
 |
| * The budget for each phase of the project was essentially the same as planned
 |
| * The overall budget for the project was essentially the same as planned
 |
| * The project deliverables were of high quality
 |
| * The project deliverables were highly reliable and met user requirements
 |
| * The quality objectives of projects were achieved
 |
| * The facilities were built based on the owner’s requirements
 |
| * The project owner was satisfied with the project’s deliverables
 |
| * The project team was satisfied with the project’s deliverables
 |
| * The customer was satisfied with the project’s deliverables
 |

**Measures of Senior Management Support**

|  |
| --- |
| * Senior management (SM) provided sufficient resources to complete the project successfully
 |
| * SM provided sufficient resources to the project team in crises
 |
| * SM ensured availability of sufficient resources to provide a supportive stakeholder environment for the accomplishment of the project
 |
| * SM provided sufficient resources to support system adaptations in the organization
 |
| * SM provided adequate resources for effective system implementation to institute organizational change
 |
| * SM ensured implementation of appropriate project structures to accomplish project objectives
 |
| * SM strengthened stakeholder support in the organization
 |
| * SM adapted appropriate structures processes, and controlling procedures to implement organizational change
 |
| * SM focused on strategic and structural planning to improve organizational efficiency and market value
 |
| * SM regularly communicated with the project team members to ensure successful project
* completion
 |
| * SM tailored communication to promote the significance of project in the organization
 |
| * SM often deliberated project implications relating to system and organizational change
 |
| * SM frequently communicated project implications to different clusters of project stakeholders
 |
| * SM encouraged frequent communication to discuss potential system and organizational changes with various groups of project stakeholders
 |
| * SM established effective communication strategy to enhance project and organizational efficiency
 |
| * SM possessed relevant experience and expertise in project management
 |
| * SM recognized the importance of project implications, system implementation and organizational change
 |
| * SM recognized the necessity of system adaptation in the organization
 |
| * SM recognized the interest and power of project stakeholders
 |
| * SM encouraged the project team to enhance project efficiency and organizational performance
 |
| * SM used its power to implement critical system changes in an organization
 |
| * SM exercised its authority to support the team members during implementation of project activities
 |
| * SM often used its power to implement best project management practices in the organization
 |
| * SM exercised its authority to define unambiguous roles and responsibilities of project stakeholders
 |
| * SM ensured effective system implementation to institute organizational change
 |