Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
June 2024 5(6), 1681–1690

AN ANALYSIS THE PROJECT BACKGROUND FACTORS IN CONSTRUCTION PROJECTS

Shalaka Pensalwar[1], Dr. P.S.Charpe[2], Ranjit Shiral[3]

[1]Research Scholar, Kalinga University, Raipur
[2]Research Guide, Kalinga University, Raipur
[3]Co-Research Guide, Bhawant Institute of Technology, Barshi

DOI
10.29121/shodhkosh.v5.i6.2024.2494

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Construction is a driver of every economy, including India. It uses a lot of people, material, and machinery, and it has a deadline. Consequently, it helps the country's economy improve tremendously. A technical breakthrough has had a significant impact on the building sector. Some Indian industries are using quality management systems. Particularly among construction firms capable of managing megaprojects, quality management systems have been extensively used and embraced. Because of the inherent challenges of the construction business, there is currently no reliable method for objectively gauging the system's efficacy in this field. The objectives are to evaluate the Project Background Aspect or factors in construction projects.

Keywords: Construction, Factor Analysis, Quality, QMS

1. INTRODUCTION

The construction industry is vital to the growth of any economy, & India is no exception. Time constraints and extensive use of labor, materials, and machinery are hallmarks of this endeavor. Therefore, it has a significant impact on the national economy and its rapid expansion. The construction business has been profoundly impacted by the technical breakthrough. The building industry is experiencing extreme cycle changes. Manufacturing cement, pipes, sanitary products, tiles, ready mix concrete, and other construction-related goods & services all benefit from construction's expansion. In addition to being a moneymaker for the country, building also fosters the growth of its human capital & creates more jobs than any other industry. Given the magnitude of the construction industry's impact, it's critical that the most pressing obstacles to productivity be pinpointed. Poorly developed & accepted technologies in the building sector in many nations, as well as a disjointed relationship among construction costs and delays, have an impact on overall quality. The initial planning stages to the final handover & beyond, quality is an integral part of the construction process. By learning the quality standards for the building construction project & elements that affect them, the quality issues can be managed. Real-world, time-sensitive challenges experienced by project engineers, quality engineers, safety

engineers, & site engineers are the focus of this analysis. In order to ensure efficient quality management & timely project completion, the study's findings will be useful to all parties involved.

2. LITERATURE REVIEW

Prachi Vinod Ingle et al. (2022) Consistently positive results from building projects are the goal of the project management team. Most studies agree that time, money, & quality are important indicators of performance. Nonetheless, in contemporary project management, other performance metrics carry equal weight. This paper's goal is to identify key performance indicators (KPIs) impacting the Indian building sector. Performance categories that affect the success of a project were compiled using a thorough literature review. To learn how experts in the field feel about the pinpointed problems, a survey instrument was created. PCA & SEM were used to analyze the data. According to the findings, there are 10 factors that affect how well a project is completed: how well it serves customers, how well it meets its deadlines, how well it manages its finances, how well it collaborates with others, how satisfied its stakeholders are, and how well it cares for its environment. Confirmatory factor analysis (CFA) utilizing partial least squares test-structural equation modeling was used to verify all domains of performance (PLS-SEM). The findings of this article provide advice for construction managers to follow in order to boost the efficiency of their projects.

Dalia Khalid Faeq et al. (2021) In the construction industry in Sulaymaniyah City, Kurdistan Region, Iraq, this study aims to empirically investigate the impact of TQM as characterized by (management-leadership, employee relations, supplier management, project design, training, quality data and reporting, process management, continuous improvement, & customer focus) on organizational performance. A survey questionnaire was used to obtain primary data from 106 organizational leaders, department heads, managers, & supervisors for this study. Statistical packages like SPSS & SEM were used to examine the collected data. The findings demonstrated that all TQM tenets significantly improve construction firms' bottom lines. The proposed model provided a satisfactory explanation.

Mr. Prayesh Pramod Rawale et al. (2021) Quality planning, quality control, & quality assurance are all parts of the construction industry's QMS. The overarching purpose of construction is to guarantee the project's successful completion within the limitations of increased quality, a fixed schedule, and reduced costs. The findings, which are grounded on the QMS, suggested that the construction firms were going to foster a pliable and encouraging organizational climate that would promote the growth of a quality management system across all facets of their operations. Project participants were interviewed as part of the study to compile the data for the survey. Everyone from the building's owner to a consultant in charge of the project to the business owner to a slew of other consultants & contractors is involved in the undertaking. The authors created the questionnaire based on the quality evaluation of construction projects by the developer / contractor, contractor, & customer / resident. Data from developer/contractor interviews & questionnaires are analyzed & presented in this article.

Fazal Ali Shaikh et al. (2020) Companies in the building industry around the globe have embraced the ISO QMS, known as ISO 9001, since its inception in 1987. The purpose of this research is to identify the degree of commitment made to implementing ISO 9001's core practices by construction companies, as well as the primary benefits gained by doing so. Although 51 well-known Pakistani construction firms were taken into account & evaluated, the response rate remained unchanged at 59%. Finally, version 27 of the SPSS was used for the statistical analysis. The study's findings examine the most important benefits & fundamental features of ISO 9001. The prior literature review uncovered a total of 34 fundamental features. Outcome demonstrated the significance of ISO application in building projects. Most crucial to success is recognizing existing problems and eliminating preventable credentials. Among the many benefits of ISO in the building business are Employment satisfaction, The proportion of successful new projects has increased, material waste has decreased, & new connections have been made in international markets. The research will help Pakistani construction enterprises improve the quality of their work and performance, and it will pique the industry's interest in adopting ISO 9001 in order to raise quality standards.

Mazlina Zaira Mohammad et al. (2019) The construction industry must ensure that all projects will be completed on time, within budget, and to the highest standard of quality and safety possible. The purpose of this essay is to review five published works of literature about QMS in the construction industry from a Malaysian perspective in order to provide a critical and constructive critique. The literature of the Quality Management System in Malaysia has been analyzed.

Results from these studies often pointed to three outcomes: increased owner/client satisfaction, enhanced firm management and work capacity, & ability of the project management team to swiftly oversee the development activities throughout the project's life cycle. If more investigations used project-level key performance indicators to evaluate QMS's efficacy across large sample sizes, they would yield more reliable results.

U. Abdullahi et al. (2019) The necessity to evaluate QMS in the Nigerian construction industry is motivated by several negative reports on quality performance. Low quality management has been linked to an increase in building failures and, in the worst circumstances, building collapse. The purpose of this article is to evaluate the QMS of Nigerian construction companies and to provide effective next steps for enhancing quality performance. Twenty construction companies in Abuja, Nigeria, had their management teams fill out questionnaires to obtain the data. The research found that inspections & statistical quality control procedures are the most often employed quality management tools by Nigerian construction companies. On the other hand, the research showed that few Nigerian construction companies routinely use quality management plans (QMP) or quality audits (a tool for ensuring high standards in the construction industry's output). The most major problems with QM practice include inadequate quality planning arrangements, poor communication of quality requirements, & lack of awareness of the benefits of QM. As a result, Nigeria's construction industry adopts few elements of quality management practice. Educating the public on the need of quality management in the building trades is so essential.

M.S. Abd-Elwahed et al. (2018) The primary goal of this study is to assess the familiarity with & usage of QM tools in a representative cross-section of Saudi Arabia's manufacturing sector, as well as to track the various policies for putting quality strategies into action & degree to which they are integrated into the sector's management structures. The implementation of a questionnaire covering essentials such as familiarity with and skill with the various QM strategies & supporting tools. Each QM method's effect on the real expansion of industrial organizations is measured, as is the influence of the executive management style and its compatibility with the effective deployment of quality resources. The research found that while many industrial firms adopted some form of quality management strategy or policy, there were still varying interpretations among those firms. There is also a disparity in the proficiency with which QM methods are understood and applied.

A J Likita et al. (2018) TQM into a philosophy that leads construction professionals in delivering high-quality projects is a common practice in the construction industry. TQM in construction firms is a unique perspective that must be taken very seriously in every building endeavor. The building industry has been criticized in the past due to its comparatively low levels of production & manufacturing. The purpose of this article is to have a conversation on how QM is implemented in the building industry. In order to draw a conclusion about TQM in the building industry, this report analyzed and reviewed the outcomes of five separate studies. The research showed that TQM was being used effectively in the building industry in Saudi Arabia, India, the United States, & South Africa. Artificial Neural Network (ANN) applications aid TQM implementation in the building industry. To sum up, using quality management standards will allow for more precise regulation of operations in the building industry.

Sevilay Demirkesen et al. (2017) Many facets of project management contribute to the success of a construction project. Since efficient project management in construction begins with the integration of processes & people, integration management is a must. Findings from this research quantify the correlation amongst integration management and its constituent parts & examine their impact on construction project management outcomes. A project charter, knowledge integration, process integration, staff integration, supply chain integration, & change management are all considered elements of integration management, while time, money, quality, safety, & client satisfaction are the dimensions of project management performance. Data from 121 projects were assessed utilizing SEM after a questionnaire was developed and sent to construction industry professionals. SPSS AMOS was used to do the statistical analysis. The study's results suggest that integration management has a significant bearing on the results of project management. This research makes a contribution to the field of project management because it creates a conceptual framework for integration management, identifies the effect integration management has on performance, & suggests a number of tools and strategies to facilitate effective integration throughout the project life cycle. By taking into account the components proposed and using the tactics indicated for the construction phases, industry practitioners may advantage from the framework produced.

MSBA Abd El-Karim et al. (2017) The owner, the contractor, & subcontractor all have a vested interest in keeping the project under budget and on schedule. Disagreements can arise during building projects because of issues including running over budget or falling behind schedule. For financial reasons, the owner cares as much as the contractor does about how quickly a project is completed. The owner, the contractor, the environment, etc., may all have a role in the occurrence of multiple sorts of risk factors that can drive up construction costs & cause delays. Overruns in both cost and time affect more than only the building industry and the economy as a whole. There has been a lot of research done on the topic of building projects going over budget and behind schedule, but this study was still deemed valuable to the Egyptian construction sector because of the ongoing changes and developments in the field. Due to the intricate nature of construction projects, it's crucial that budgets & timetables be adaptable enough to allow for adjustments without increasing the overall cost or length of the project, both of which must be met to ensure its success. Therefore, the goals of the research described in this paper are to isolate, examine, and evaluate the impact of the variables that affect time & money. There are sixteen Egyptian construction firms from which data is gathered. The researchers plan to utilize the collected data, output charts, & analysis spreadsheets to create a computerized model they will refer to as RIAM.

Attaullah Shah et al. (2016) Pakistan's building sector has been focused on improving its quality for quite some time. The local construction industry lacked clear guidance due to the lack of a quality-related regulatory organization & local quality standards. To develop a QMS for construction projects, an exploratory method was used to analyze the existing literature, and then a questionnaire was distributed to project engineers, managers, supervisory consultants, and contractors. The study was bolstered by in-depth interviews with key stakeholders & covered key quality factors for construction processes & inputs. Field workers were consulted in the creation of quality check lists, and these were then used to evaluate completed projects. The findings revealed that there is a growing consciousness among the key players, but that the quality assurance methods and instruments in use are inconsistent and prone to error. For Pakistan's construction industry to fully embrace TQM, additional standardization of processes & inputs is required.

Swapnil Subhash Erande et al. (2016) The current globalization policies have altered the economic landscape over the past decade. Since there is a growing trend of worldwide bidding, competition among India's construction firms has increased. For a construction company to win a bid, it must demonstrate that it can compete with others in terms of quality, cost, & timeline. The key to success in our industry is a relentless focus on the needs of the consumer. The Indian construction industry needs the notion of TQM if it is to compete on a global scale. The goal of TQM is to boost a business's total performance by enhancing customer service, employee morale, and productivity. This study intends to shed light on challenges associated with implementing TQM in the construction industry by discussing the TQM ideas and techniques utilized by construction organizations. The research is undertaken by a questionnaire survey of businesses in the Pune & Nasik areas, as well as through in-person interviews with company managers and engineers. In this study, the significance index is employed for the analysis. The purpose of this research is to uncover effective strategies for introducing TQM in the building trades.

D. Ashokkumar et al (2014) The primary focus of this work is on the engineering design phase of projects, including its significance & elements that influence it. The project even include going to a a few different building sites and filling out a questionnaire to determine the nature of the issue (major aspects) & cost variation due to a quality flaw in the QMS. The building industry is vital to the progress of any nation. The region's health has a direct bearing on the construction industry's progress. Having high-quality materials and workmanship is essential for any building project to be completed successfully. To enhance the quality of construction projects throughout their life cycle, a project QMS is essential. Quality control during the implementation (construction) phase contributes significantly to the most recent high-quality outcomes of the project, despite the importance of the QMS across the entire project life cycle.

Ashwini R. Patil et al. (2013) Fast and effective material acquisition is crucial to meeting the deadline and completing the project. Losses in worker productivity & overall delays can increase the entire project cost if proper material planning & management are not implemented. These expenses can be cut down on with good material management. This research report is part of a two-part effort to investigate the state of the art in Material Management. Understanding the impact of material planning on a project's execution requires first obtaining qualitative information on discrepancies between the two in the form of a S curve analysis utilizing MSP tool, and then rationalizing those discrepancies. Responses to S-curve analyses have focused on administrative causes, consultant causes, contractor defects, or a lack of resources,

among other things. These major shift causes are shown in a pie chart. Inventory control techniques, such as ABC & EOQ analysis, are implemented in the second stage of research to address stock-out issues by ensuring a steady supply of raw materials during times of low production, preventing stock from deteriorating, & keeping investment in inventories at a manageable level.

3. METHODOLOGY

Research methodology lays out the procedures will follow to collect and analyse data related to a specific topic. The current study will focus on significant issues. To begin, we will determine what aspects of the QMS are most important. Costly difficulties with construction projects' quality will persist unless effective strategies for managing & enhancing the performance of quality are developed & put into practice. Each component will be handled independently during descriptive statistics & one ANOVA to ensure that no one element's importance is overlooked. Factor Analysis however, will take into account all the salient features uncovered by descriptive & ANOVA analyses.

4. PROJECT BACKGROUND ASPECT

PFA encompasses the factors that require thorough examination to ensure no detail is missed. This aspect encompasses ten components, which are listed in Table 1.

Table 1 Listed Factors considered under the project background aspect

Sl.No.	FACTOR NUMBER	ASPECTS / FACTORS
PROJECT BACKGROUND		
1.	PBF1.	Knowledge about material resources near the site
2.	PBF2.	Time management on tender submission
3.	PBF3.	Knowledge about the climatic condition
4.	PBF4.	Knowledge about client reputation
5.	PBF5.	Knowledge about the methodology of construction
6.	PBF6.	Knowledge about labour and material cost
7.	PBF7.	Awareness about quality management
8.	PBF8.	Knowledge about codes and specifications
9.	PBF9.	Clarity about contract terms
10.	PBF10.	Usage of latest technology

Table 2 displays the results, including the means and standard deviations, of the ten factors.

Table 2: Factors Used in the Project's Background and Their Mean and Standard Deviation

Sl.No.	FACTOR NUMBER	ASPECTS / FACTORS	MEAN	STANDARD DEVIATION
PROJECT BACKGROUND				
1.	PBF1.	Knowledge about material resources near the site	4.076	0.266
2.	PBF2.	Time management on tender submission	4.801	0.400
3.	PBF3.	Knowledge about the climatic condition	4.788	0.409

4.	PBF4.	Knowledge about client reputation	2.915	1.108
5.	PBF5.	Knowledge about the methodology of construction	4.085	0.279
6.	PBF6.	Knowledge about labour and material cost	4.788	0.409
7.	PBF7.	Awareness about quality management	3.731	0.443
8.	PBF8.	Knowledge about codes and specifications	3.865	0.811
9.	PBF9.	Clarity about contract terms	4.000	0.270
10.	PBF10.	Usage of latest technology	4.511	0.501

The detected factors, which should be considered important, are listed in Table 3. Nine of these components had mean values more than 3.

Table 3: Project Background Aspect Factors with Mean Values Greater Than 3

Sl.No.	FACTOR NUMBER	ASPECTS / FACTORS	MEAN	STANDARD DEVIATION
PROJECT BACKGROUND				
1	PBF1.	Knowledge about material resources near the site	4.076	0.266
2	PBF2.	Knowledge about time management	4.801	0.400
3	PBF3.	Knowledge about the climatic condition	4.788	0.409
4	PBF5.	Knowledge about client reputation	4.085	0.279
5	PBF6.	Knowledge about the methodology of construction	4.788	0.409
6	PBF7.	Knowledge about labour and material cost	3.731	0.443
7	PBF8.	Awareness about quality management	3.865	0.811
8	PBF9.	Knowledge about codes and specifications	4.000	0.270
9	PBF10.	Clarity about contract terms	4.511	0.501

The means of the respondents' replies for each management element were compared using a one-way ANOVA between groups. To determine which group differs in their judgement of the factor's relevance, Turkey's Post Hoc Tests were used for factors with significance levels less than 5%. Table 4 shows the ANOVA results for the components related to the project backdrop aspect.

Table 4 ANOVA Testing Factors Underlying the Project Background Aspect

Sl.No.	FACTOR NUMBER	ASPECTS / FACTORS	SIGNIFICANCE VALUE
PROJECT BACKGROUND			
1	PBF1.	Knowledge about material resources near the site	0.3510
2	PBF2.	Time management on tender submission	0.0137
3	PBF3.	Knowledge about the climatic condition	0.0690
4	PBF4.	Knowledge about client reputation	0.0217
5	PBF5.	Knowledge about the methodology of construction	0.0720
6	PBF6.	Knowledge about labour and material cost	0.0383
7	PBF7.	Awareness about quality management	0.0380
8	PBF8.	Knowledge about codes and specifications	0.0238
9	PBF9.	Clarity about contract terms	0.0733
10	PBF10.	Usage of latest technology	0.1835

With a significance level of less than 5%, five factors were identified, and they are detailed in Table 5.

Table 5: Factors with Significance Values in the Project Background Aspect Roughly 5%

Sl. No	FACTOR NUMBER	ASPECTS / FACTORS	SIGNIFICANCE VALUE
PROJECT BACKGROUND			
1	PBF2	Time management on tender submission	0.0137
2	PBF4	Knowledge about client reputation	0.0217
3	PBF6	Knowledge about labour and material cost	0.0383
4	PBF7	Awareness about quality management	0.0380
5	PBF8	Knowledge about codes and specifications	0.0238

There were five components that were found to have significance levels below 5%; these factors should be interpreted differently.

Under project 6's background aspects, the most important factors are those that emerge practically everywhere in the descriptive & ANOVA analyses. Table 6 lists the four key criteria that were identified.

Table 6 Listed Factors Under Project Background Aspects

Sl.No.	FACTOR NUMBER	ASPECTS / FACTORS	SIGNIFICANCE VALUE
PROJECT BACKGROUND			
1	PBF2	Time management on tender submission	0.0137
2	PBF6	Knowledge about labour and material cost	0.0383
3	PBF7	Awareness about quality management	0.0380
4	PBF8	Knowledge about codes and specifications	0.0238

In order to keep the tender submission time limit in verify, certain relevant details may be omitted from the final proposal. This will cause issues and delays down the road that aren't essential. The total cost of a building project is largely affected by what is known about the cost of manpower and materials at a later stage. Accordingly, early on, you should prioritise the component, understanding the cost of labour and materials. When people are informed about quality management, they will experience these advantages:

1. Noble reputation
2. Additional satisfied customers
3. Increase income of establishments
4. No complains
5. No penalties
6. Good work environment.

In terms of project background aspects, knowledge of quality management is the most important component to consider. In order to carry out their duties correctly and prevent mistakes, all project engineers on a construction team should be well-versed in relevant codes & requirements. Acquiring familiarity with relevant codes and requirements may help eliminate flaws and errors.

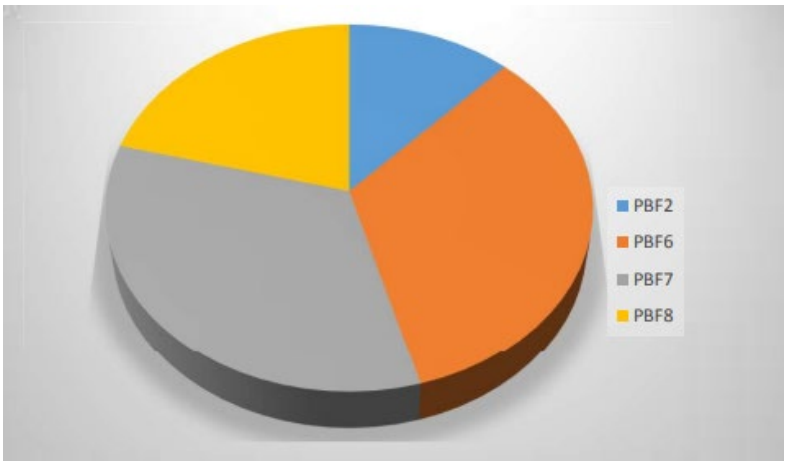

Fig. 1 Critical Factors Considerations for the Project's Background

The characteristics that were deemed most essential based on the analysis conducted under the project background aspects are displayed in Figure 1. With better understanding of manpower & material costs, the contractor should keep to the time management for tender submission. In order to control quality, the project engineer needs to be familiar with relevant standards & regulations.

5. CONCLUSION

The management of interdependent organisational processes is just as important as the end product when it comes to ensuring high quality on construction initiatives, which can include vast quantities of resources and numerous dynamic processes. However, service providers & connected parties often have varying perceptions of quality, which might hinder the assessment of construction companies' output. Particularly among construction firms capable of managing megaprojects, quality management systems have been extensively used and embraced. Despite the abundance of literature on the topic of quality management systems in other sectors (such as manufacturing, food service, and services), the construction industry has received surprisingly little attention. This is due to the fact that, rather than focusing on quality management systems, those researchers are keen on investigating the construction industry's project costing or work quality.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

Abd El-Karim, M. S. B. A., Mosa El Nawawy, O. A., & Abdel-Alim, A. M. (2017). Identification and assessment of risk factors affecting construction projects. HBRC journal, 13(2), 202-216.

Abd-Elwahed, M. S., & El-Baz, M. A. (2018). Impact of implementation of total quality management: An assessment of the Saudi industry. South African Journal of Industrial Engineering, 29(1), 97-107

Abdullahi, U., Bustani, S. A., Hassan, A., & Rotimi, F. E. (2019). Assessing Quality Management Practice in Nigerian Construction Industry. Journal of Construction Business and Management, 3(2), 17-25.

Adeyemi, B. S., Aigbavboa, C. O., & Thwala, W. D. (2022). Factors Affecting Total Quality Management Implementation in the Construction Industry. Human Factors in Management and Leadership, Vol. 55, 2022, 141–147 https://doi.org/10.54941/ahfe1002243

Alzahrani, J. I., & Emsley, M. W. (2013). The impact of contractors' attributes on construction project success: A post construction evaluation. International journal of project management, 31(2), 313-322.

D.Ashokkumar, '' Study of Quality Management in Construction Industry'' 1-February-2014

Demirkesen, S., & Ozorhon, B. (2017). Impact of integration management on construction project management performance. International Journal of Project Management, 35(8), 1639-1654.

Erande, S. S., & Pimplikar, S. S. (2016). Total quality management in Indian construction industry. Int. Research J. of Eng. and Technology, 3, 685.

Faeq, D. K., Garanti, Z., & Sadq, Z. M. (2021). The Effect of Total Quality Management on Organizational Performance: Empirical Evidence from the Construction Sector in Sulaymaniyah City, Kurdistan Region–Iraq. UKH Journal of Social Sciences, 5(1), 29-41.

Ingle, P. V., & Mahesh, G. (2022). Construction project performance areas for Indian construction projects. International Journal of Construction Management, 22(8), 1443-1454.

Kumar, V. S., Sivaprakasam, S., Enayathali, S. S., & Dhevsssenaa, P. R. Inhibiting Factors of Implementing Total Quality Management on Construction Sites. JOURNAL OF CRITICAL REVIEWS ISSN- 2394-5125 VOL 6, ISSUE 06, 2019

Likita, A. J., Zainun, N. Y., Rahman, I. A., Awal, A. A., Alias, A. R., Rahman, M. A., & Ghazali, F. M. (2018, April). An overview of total Quality management (TQM) practice in construction sector. In IOP Conference Series: Earth and Environmental Science (Vol. 140, No. 1, p. 012115). IOP Publishing.

Mohammad, M. Z., Viana, M., & Raghib, A. T. (2019, October). Benefits and implications of the different types of quality management in the Malaysian construction industry. In IOP Conference Series: Materials Science and Engineering (Vol. 650, No. 1, p. 012008). IOP Publishing.

Olafsdottir, A. H., Sverdrup, H., Stefansson, G., & Ingason, H. T. (2019). Using system dynamics to better understand quality management in the construction industry. International Journal of Productivity and Quality Management, 26(2), 223-245.

Patil, A. R., & Pataskar, S. V. (2013). Analyzing material management techniques on construction project. International Journal of Engineering and Innovative Technology, 3(4), 96-100.

Rawale, M. P. P., & Mahatme, P. S. (2021) A STUDY ON QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS AT AMRAVATI. Volume 6 || Issue 7 ISO 3297:2007 Certified ISSN (Online) 2456-3293 DOI 10.51397/OAIJSE07.2021.0017

Salihi, R. A. A., & Ghasemlounia, R. (2021). Total quality management benefits and barriers in construction industry. Available at SSRN 3799849.

Shah, A. (2016). Study of Quality Management System in Construction Industry of Pakistan. Attaullah, Study of Quality Management System in Construction Industry of Pakistan (March 30, 2016).

Shaikh, F. A., & Sohu, S. (2020). Implementation, advantages and management of ISO 9001 in the construction industry. Civil Engineering Journal, Vol. 6, No. 6, 1136-1142.

Shayan, S., Pyung Kim, K., & Tam, V. W. (2022). Critical success factor analysis for effective risk management at the execution stage of a construction project. International Journal of Construction Management, 22(3), 379-386.

Shurrab, J. and Hussain, M. (2018), "An empirical study of the impact of lean on the performance of the construction industry in UAE", Journal of Engineering, Design and Technology, Vol. 16 No. 5, pp. 694-710. https://doi.org/10.1108/JEDT-09-2017-0095

Zapata, J. D. G., Guzmán, B. V. R., Velasquez, L. P., & Castañeda, L. M. H. Analysis of Building Construction in a Colombian Case from a Total Quality Management Perspective. Proceedings of the International Conference on Industrial Engineering and Operations Management Monterrey, Mexico, November 3-5, 2021