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## **CONSTRUCTION STAKEHOLDERS' PERCEPTION TOWARD THE SUCCESS FACTORS OF CONSTRUCTION PROJECTS**

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**Abstract:** Each construction project has unique characteristics that require creative yet different management techniques to tackle and address the associated challenges. However, despite the dissimilarities in their nature, all construction projects are intended to be successful and profitable. A successful construction project is a project that completed within the intended time frame and budget, with acceptable quality, and no serious accidents. Successful managers lead and motivate different players of a project towards achieving the same goal and accomplish construction projects' objectives. Similar perception is the glue that holds all players collaborate and work together towards the same goals. Although the difference in perceptions is inevitable, it raises challenges that can hinder a project to succeed. Therefore, the purpose of this study was to 1) assess how construction managers perceive the relative values of safety, quality, cost, and time and 2) examine the difference between the perceptions of project managers and intermediate-level managers and workers. To fulfill the research objectives, 48 construction employees across the U.S. participated in this study. The results showed that safety has the highest relative importance in the perception of managers compared to the other factors. The findings revealed that there is a significant difference between the perception of construction project managers and superintendents concerning project cost ( $p\text{-value} < 0.01$ ) but not safety, quality, and time ( $p\text{-value} > 0.1$ ). This research can help construction professionals and practitioners to identify the difference in perceptions among key players and enhance managerial efforts to align dissimilar views towards the success of construction projects.

**KEYWORDS:** construction, safety, quality, cost, time, superintendents, managers

### **1 INTRODUCTION**

Construction environments are dynamic and complex in nature. Most construction projects are delayed or over budget. The construction industry also suffers from high rates of fatal and non-fatal occupational injuries. Construction is the most hazardous industry in the United States (BLS 2015). Researchers have extensively studied the factors that impact the success of construction projects. Chan et al. (2004) identified 44 factors in five categories such as 'project management actions,' project procedures,' external environment,' 'project-related factors,' and 'human-related factors' as crucial to project success. Ahsan and Guanawan (2010) studied the causes of delay and overturns in construction projects and identified 11 and seven causes for the delay and overturn, respectively. A quantitative analysis of construction projects revealed that "poor design and negligence of the owner, change orders, weather condition, site condition, late delivery, economic conditions, and increase in quantities" cause a delay in construction projects (Al-Momani, 2000).

Similarly, researchers have reported numerous factor (i.e., 36 factors by Namian et al. 2016) that impact the safety performance of construction workers. A close investigation of the literature reveals that one of the leading factors that impact time, cost, quality, and safety of projects, is communication among project stakeholders. In other words, past research has emphasized the importance of cooperation, trust, effective communication and mutual understanding of project key players. Effective communication fosters project success. In fact, a similar perception is a glue that holds all stakeholders to collaborate and work towards the same goals. Otherwise, construction outcomes could be negatively impacted (Al-Bayati et al. 2017). As a result, different perspectives exacerbate adversarial relationship and consequently affect project delays, arising claims, cost overruns, and litigation (Moore et al. 1992). Therefore, the purpose of this study is to 1) assess how construction managers perceive the relative values of safety, quality, cost, and time and 2) examine the difference between the perceptions of project managers and intermediate-level managers (i.e., superintendents) and construction workers.

## **2 METHODOLOGY**

Successful completion of construction projects is defined based on safety, quality, cost, and time of the projects. Effective management is necessary to achieve success in construction projects. In other words, a proper and effective management style aims to achieve the project goals concerning safety, quality, cost, and time. Due to the dynamic nature of construction projects, managers often need to trade-off these underlying factors of success to address the existing project constraints. Construction managers often prioritize one factor over the other to lead, convince, and motivate the intermediate-level managers (i.e., superintendents) and workers to follow their plan to complete the construction projects successfully. Although the existence of different perceptions is normal and inevitable, the difference in perceptions toward the main objectives raises challenges and causes issues that may hinder the success of construction projects. Therefore, the purpose of this study is to 1) assess how construction managers perceive the relative values of safety, quality, cost, and time and 2) examine the difference between the perceptions of project managers and intermediate-level managers (i.e., superintendents) and construction workers.

To fulfill the research objectives, 48 construction managers across the U.S. were contacted to participate in a survey designed to quantify the perceptions concerning safety, quality, cost, and time. The surveyed experts had, on average, over 23 years of construction experience working in the United States across the country. The participants included construction company president and vice president, CEO, safety manager, project manager, and other managerial titles. A questionnaire was designed on an online platform, Qualtrics, which is tailored for scientific surveys. The questionnaire consisted of 12 questions was developed to quantify the opinion of construction experts concerning the relative importance of safety, quality, cost, and time of construction projects. The survey asked the participants to rate the importance of four key factors namely safety, quality, cost, and time on a scale of 1 to 10. The participants expressed their opinion and also how they feel their workers and superintendents rate the same factors. Complementary questions asked their view on the impact of the difference in perspective and suggestions to improve the construction projects performance regarding the objectives of the study.

## **3 RESULTS**

After the data collection, the obtained data were then integrated and analyzed. The data showed there is a gap between the perception of managers, workers, and superintendents on how they value safety, quality, time, and cost (see Figure 1). Generally, the data showed that managers rate each factor higher compared to both workers and superintendents. However, safety was prioritized first accompanied by quality ranked second for all three groups.

Although the difference in perceptions of managers, workers, and superintendents concerning safety, quality, time, and the cost is revealed by the obtained data, further analyzes needed to investigate if the difference is statistically significant. The data were analyzed conducting 2-sample tests using XLSTAT 2019. The results are presented in Table 1.

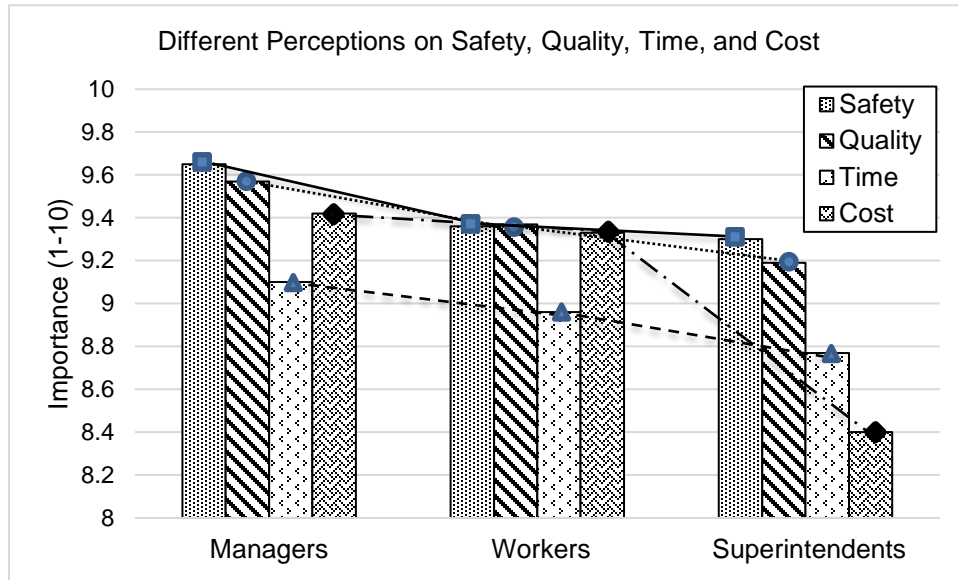


Figure 1. Perceptions of Managers, Workers, and Superintendents on Safety, Quality, Cost, and Time

Table 1. Two-sample t-test p-values

p-value	Safety	Quality	Time	Cost
Managers vs. Workers	0.418*	0.536*	0.738*	0.778*
Managers vs. Superintendents	0.329*	0.280*	0.341*	0.008**
Workers vs. Superintendents	0.899*	0.579*	0.561*	0.022**

\* p-value > 0.05; \*\* p-value < 0.05

As shown in the table, only two out of 12 comparisons resulted in statistically significant differences (p-value < 0.05). These differences include comparing the managers and superintendents and workers and superintendents regarding the cost of projects. The results showed that cost is significantly less important for superintendents compared to managers and workers.

In addition to the comparisons among different groups, the data were integrated to compare the relative importance of safety, quality, time, and cost among construction stakeholder. To compare the scores of the four factors; the data were standardized using Equation 1.

$$SS_i = \left( \frac{S_i - M}{SD} \right) \quad \text{Eq. 1}$$

where  $SS_i$  is the standardized score;  $S_i$  is the score of factor  $i$ ;  $M$  is the average of all four factors;  $SD$  is the standard deviation of the data

Further data analyses revealed that overall safety has the highest importance and time has the lowest importance. As can be seen in Figure 2., safety and quality have an importance score above the average and time and cost have a score below the average which indicates their scores are below the average.

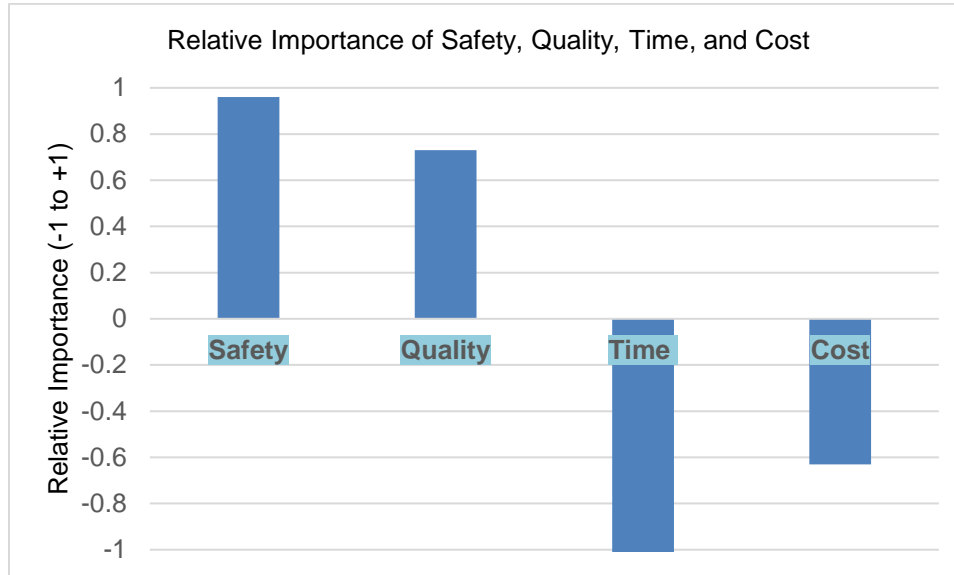


Figure 2. Relative Importance of Safety, Quality, Cost, and Time

#### 4 DISCUSSION

Data analyses revealed that safety is prioritized over quality, time, and cost of projects by all key parties of construction projects namely managers, workers, and superintendents. The participants provided their insights regarding safety and how to improve overall site safety. Among the obtained information, consistency was mentioned frequently, consistency in safety behavior and safety policy and procedure, effective communication, safety awareness meeting, providing education and training, increasing safety awareness, and daily housekeeping and equipment check-up. Safety incentives, zero tolerance culture, and more effective safety training are also mentioned by the surveyed experts.

Statistical analyses did not show a significant difference in the perception of safety among managers, workers, and superintendents. The results indicate the safety is valued by the key players of construction activities. However, the difference in the perception of the importance of safety should not be tolerated. As one of the surveyed experts mentioned that “everybody has to be on the same page there is no gray area when it comes to safety.” It is expected that in successful projects, all team members share a similar perspective on the critical factors. Otherwise, due to the dynamic and complex nature of construction projects, success cannot be expected. A high variety of perceptions on safety, quality, cost, and time is an alarm indicating root defects in the management and performance of construction teams. One of the participants of the study concisely explains that: “any difference means poor communication” or another interviewee emphasized that “the perspectives by all levels must be the same to be successful.”

In addition, managers can propagate their safety values to have impacts on their employees and superintendents and motivate them through establishing a culture that values safety, high quality, and effective performance. In other words, valuing safety can result in better performance and higher quality as another expert indicated that “when the working men/women see that management from the top executives to the entry level field engineer are genuinely concerned about safety, I feel they are more motivated to perform better both in productivity and quality.” The success of construction projects depends on the boosted collaboration based on the experts: “If the superintendent, safety manager, and project manager have different agendas and do not work collaboratively the project NEVER makes money.” Mutual communication facilitates achieving similar perspectives. Managers need to foster communication among

their employees in addition to employees and managers. A manager who participated in this study shared a strategy that they successfully implemented and adopted which has led to success: “it is pivotal for our employees to understand they can come to management with safety concerns.”

## **5 LIMITATION**

Despite its strengths and values of the current study, it has limitations that must be addressed in future studies. The first limitation of the study is its relatively small sample size. The larger sample size is recommended to obtain more reliable results.

In addition, the study only targeted managers and asked their opinion regarding the importance of safety, quality, cost, and time in addition to how they feel their workers and superintendents value these four key elements. Managers opinions on their workers and superintendents could be biased. Further studies are needed in which superintendents and workers participate in the study and express their opinion and discuss their perspectives.

Finally, this research only asked the importance of safety, quality, cost, and time and to what extent managers, workers, and superintendents value them. The study fails to investigate their perspectives more in-depth. Future research must be conducted to explore different aspects of construction workers and manager, their strategies and approaches, their incentives, goals, objectives, expectations, and commitments.

## **6 CONCLUSION**

Each construction project has unique characteristics that require creative yet different management techniques to tackle and address the associated challenges. However, despite the dissimilarities in their nature, all construction projects are intended to be successful and profitable. A successful construction project must be profitable, and to be profitable, construction projects have to complete on time and on the budget, and have an acceptable quality, and no serious occupational accidents. In other words, successful managers aim to achieve the project objectives regarding the projects' safety, quality, cost, and duration. Due to the dynamic nature of construction projects, different players have an impact on the success of a project, and effective managers lead them towards the same goals which require all stakeholders have similar perspectives on critical factors namely safety, quality, cost, and time. The difference in perceptions toward the main objectives raises challenges and causes issues that can cause the failure of construction projects. Therefore, the purpose of this study was to 1) assess how construction managers perceive the relative values of safety, quality, cost, and time and 2) examine the difference between the perceptions of project managers and intermediate-level managers (i.e., superintendents) and construction workers. To fulfill the research objectives, 48 construction managers across the U.S. were recruited to participate in the designed study. The results showed that safety has the highest relative importance in the perception of managers, workers, and superintendents compared to the other factors (i.e., quality, cost, time). The current findings comply with the existing body of literature emphasizing the importance of safety. Also, statistical analyses of the results revealed that there is a statistically significant difference between the perception of project managers and superintendents and workers and superintendents concerning project cost but not the safety, quality, and time. This research can help construction professionals and practitioners to identify the difference in the perceptions among key players and enhance the managerial efforts to align dissimilar views towards the success of construction projects. Further research is required to study different aspects of stakeholders' perceptions such as strategies and approaches, their incentives, goals, objectives, expectations, and commitments to achieve projects' established goals and objectives.

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