

Evaluation of Sustainability Determinants to Develop a Sustainability Rating System for California Infrastructure Construction Projects

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Project 2142
June 2022



Introduction

This research provides insights into the sustainability criteria relevant to California infrastructure construction projects to better inform transportation agencies about how to meet the project's sustainability goals. The online survey for transportation planners, engineers, construction managers, and/or policymakers is designed and implemented to determine the important sustainability determinants that affect the success in meeting sustainability goals when conducting infrastructure construction projects in California. This research is limited to Californian infrastructure construction projects, which may confine the outcomes to lead to a general adaptation by other state transportation authorities, but it is meaningful for a better understanding of the contemporary issues and demands related to California infrastructure construction projects and their ongoing sustainability efforts.

Study Methods

The authors analyzed the factors used in existing sustainability rating systems in the nation and identified the common factors. This study grouped the factors into six major categories such as site-related category, water- and wastewater-related category, energy-related category, materials- and resources-related category, environmental-related category, and "other" category. The other category includes factors that do not directly support the previously listed category. The study implemented the online survey method in October to December 2021 to evaluate the sustainability characteristics that infrastructure industry professionals currently are aware of under the current situation in California. A data set of 25 validated survey responses out of 59 surveys collected was used for statistical data analysis (Analysis of Variable, Kruskal-Wallis tests, and two-sample t-tests).

Findings

The analysis results showed that the median response values for the six major sustainability categories do not show any significant difference. The results also showed that no statistically significant difference in the mean response values can be found among the six major sustainability categories considered. Based on the pairwise comparison results, only the other category showed a difference compared to water- and energy-related categories. However, mean ranks among the factors under each category are useful in prioritizing the importance of the factors considered, which can be useful for the successful implementation of sustainability in infrastructure construction projects in California.

Will California infrastructure construction projects need to adopt the existing sustainability rating system to meet sustainability goals or develop a standalone rating system?

Policy Recommendations

The study findings are meaningful for legislators and transportation agencies because they provide insights into the sustainability criteria relevant to infrastructure construction projects for better-informed decisions about how to meet the project's sustainability goals. Therefore, the study can be used as a steppingstone for deciding the important sustainability determinants when implementing the sustainability strategies in infrastructure construction projects.

About the Authors

Dr. Joseph J. Kim, P.E. (PI) is Professor of the Department of Civil Engineering and Construction Engineering Management at California State University Long Beach. He was involved in supervising a graduate student and was responsible for overall project coordination, assuring successful project completion, and preparing the final MTI report.

Patricia McCarthy, P.E., is a civil engineering graduate student at the Department of Civil Engineering and Construction Engineering Management at California State University Long Beach who contributed to accomplishing the goals of this research project. Her interests within the field include construction engineering and sustainable project management. The scope of her work includes assistance with the design of the survey form, collection and analysis of survey data, and preparation of the MTI report.

To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/2142



MTI is a University Transportation Center sponsored by the U.S. Department of Transportation's Office of the Assistant Secretary for Research and Technology and by Caltrans. The Institute is located within San José State University's Lucas Graduate School of Business.