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Leveraging Technology in Construction: A Case Study of a Residential Project in Lisbon

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Abstract

The construction industry is a crucial indicator of economic development and a significant contributor to a country's GDP. However, it is recognized for its potential adverse environmental impacts. The effects include environmental degradation, resource depletion, and social disruption, underscore the need for enhanced construction practices. In modern construction-management, technology plays an indispensable role in overcoming challenges and achieving project goals. Additionally, integrating sustainability into construction practices is increasingly important for environmental and social responsibility. This case study examines the pivotal role of technology in managing a residential construction project in Lisbon, which faced numerous challenges. These challenges emerge from variables such as Location, Field related and the unique characteristics of the site. The project is to build a four-story residential building and aimed to retain the historic facade of the original structure while integrating modern residential design. Despite significant encountered delays, the project achieved the desired outcome. Key challenges included multiple failed attempts to retain the facade, significant vegetation growth after the rainy seasons, unforeseen water springs during excavation, and disruptions from road closures and airplane traffic. Technological interventions involved advanced structural analysis software, drone technology, ground-penetrating radar (GPR), GPS and logistics-management software, and AI-generated imagery. These solutions were crucial in addressing the challenges and ensuring effective construction-management. Data for this study were collected through direct observation. Future research can explore the long-term impacts of these technological solutions on construction efficiency and sustainability.

Keywords

Construction-Management, Technology, Sustainability, Operations and Logistics.

Biographies

Nasrah Alarayedh Is a PhD student at ISCTE-IUL and a researcher at BRU-Iscte (Business Research Unit). She holds an MSc in Management with a specialization in Construction and a bachelor's in civil engineering. Her current main research topics are Sustainability, Technology, operations, and supply chain management in the field of construction. Currently working as a Data Specialist at Qualitest in Lisbon, Portugal. Previously contributed as a civil Engineer in various construction projects at Arcadis Middle East, working in Bahrain, Qatar, and Saudi Arabia. Nasrah's skills include construction management, data analytics, passionate about leveraging technology to drive business insights and create effective strategies. Nasrah is eager to continue contributing to projects that intersect construction and technology.

Ana Lúcia Martins is an Assistant Professor at ISCTE-IUL and an integrated researcher at BRU-Iscte (Business Research Unt). She holds a PhD in Management, with a specialization in Operations Management and Technology, and an MSc in Management, with a specialization in Strategy. She currently serves as Iscte Business School Vice-dean for Teaching and Innovation, and as Vice-President of Iscte's Pedagogical Council. She also serves as director of the Master in Humanitarian Action, along with a director from the School of Sociology and Public Policy, a program

jointly offered by both schools, and in the past served as director of the bachelor's degree in Industrial Management and Logistics. Ana teaches Operations Management, Logistics Management, Service Operations Management, and Supply Chain Management. Ana authored more than 85 scientific articles. Ana publishes in scientific journals such as the International Journal of Logistics Management, International Journal of Industrial Engineering and Management, and Public Money and Management, among others. She has authored book chapters in logistics management and lean management in the justice systems. Her current main research topics are operations management in humanitarian settings, logistics management, supply chain management, and lean management in the services area, mainly in judicial and healthcare systems.