

# Preface

The realm of infrastructure development is a complex tapestry woven with threads of financial intricacies, risk, and the pursuit of delivering enduring value. In this edited reference book, we embark on a comprehensive exploration of the multifaceted journey from the initial conception of an infrastructure project to the meticulous curation of its service value over time. It is our privilege to present to you a compilation of knowledge, insights, and methodologies that have the potential to reshape the landscape of infrastructure project management.

The International Organization for Standardization aptly defines the life cycle cost of an infrastructure project, encapsulating the costs incurred during construction, operation, maintenance, and the eventual end-of-life phase. Each of these stages is intertwined with intricate financial calculations and is influenced by a spectrum of potential risks that can be encountered during the project's construction and service life. The accurate assessment and early mitigation of these risks stand as pillars upon which project viability rests, particularly in the wake of recent financial crises and the stringent budgetary constraints experienced in Europe and elsewhere.

In response to the evolving demands of infrastructure development and the pressing need for cost-effective projects, we recognize the critical importance of the "value for money" methodology. Its effective application is a linchpin for success in the complex world of construction.

This book emerges from a compelling need to delve deep into the world of multicriteria methodologies. Our aim is to offer a comprehensive resource that equips professionals in public and private corporations, academics, and students with the tools and knowledge necessary to navigate the intricate landscape of financial evaluation and risk management within infrastructure projects. In these pages, we bring forth theoretical frameworks and the latest empirical research findings that enrich the reader's understanding of the strategic role of trust and decision-making processes within infrastructure projects.

Our intended audience spans a diverse spectrum, encompassing professionals, researchers, and students engaged in construction management across various sectors, including public institutions, private companies, universities, and investment

corporations. The insights shared within these chapters are not limited to the confines of academic discourse; they extend to support executives and decision-makers entrusted with managing infrastructure projects within a wide array of work communities and environments.

The themes explored within this book are both timely and timeless. Topics range from risk management and value engineering to the service value of assets and the cost of infrastructure projects. We journey through the fascinating intersection of behavioral finance and financial evaluation, and we venture into the world of quantitative evaluation and multicriteria risk management techniques.

As the editors of this book, we commend the dedication and expertise of our esteemed contributors who have shared their insights and experiences. Their collective wisdom and research findings serve as valuable building blocks for anyone committed to enhancing their grasp of the intricacies involved in financial evaluation and risk management within infrastructure projects.

We invite you to embark on this intellectual journey with us and explore the intricate dimensions of infrastructure projects. Whether you are a seasoned professional, a diligent researcher, or an eager student, we trust that the contents of this book will broaden your horizons, sharpen your skills, and empower you to navigate the complexities of financial evaluation and risk management in infrastructure projects.

## **CHAPTER OVERVIEW**

### **Chapter 1: Exploring the Mechanisms for Value-for-Money Diffusion in the Design and Procurement of EU Public Infrastructure Projects**

In this chapter, the authors delve into the intricacies of achieving Value for Money (VfM) in EU public infrastructure projects. They shed light on procurement and design options that can lead to enhanced VfM, emphasizing the significance of contractor involvement in the design phase. This chapter explores a hybrid approach that integrates open tender and Competitive Dialogue (CD) elements, offering contractors the opportunity to propose value-enhancing design variants. To address this novel approach, a Multi-Criteria Decision Making model is introduced, exemplifying its application within the context of EU procurement legislation.

## **Chapter 2: The Impact of Risks and Uncertainty in Life Cycle Cost Analysis of Construction Projects – The Case of Energy Analysis on Construction Projects**

This chapter delves into the unpredictable nature of construction projects and how risks and uncertainties can complicate cost estimation. It introduces a risk-based Life Cycle Cost Analysis approach, emphasizing the importance of initiating this analysis at the project's inception and maintaining it throughout its realization. The authors employ well-established risk identification and analysis methods to manage energy-based risks in residential construction projects. They use an illustrative case to demonstrate how this approach informs decision-making throughout the project.

## **Chapter 3: ESG in Construction Risk Management – A Strategic Roadmap for Controlling Risks and Maximizing Profits**

In this chapter, the focus shifts to Environmental, Social, and Governance (ESG) considerations in construction risk management. The authors explore how ESG principles can be integrated into construction projects to enhance sustainability, efficiency, safety, and long-term value creation. They highlight the role of ESG risk management in attracting investors, improving supply chain efficiency, and reducing environmental impact. The chapter provides strategic insights on how construction companies can navigate ESG risks to create a more sustainable and profitable business.

## **Chapter 4: Investigating Mega Project Schedule Challenges in Transnet Capital Projects**

This chapter delves into the complexities of mega infrastructure projects, particularly within the context of Transnet Capital Projects in South Africa. The study analyzes the challenges associated with schedule management in these large-scale projects. By employing a quantitative approach, the authors gather data from megaproject personnel to critically assess schedule challenges. The chapter offers valuable insights into the practical difficulties and opportunities for improvement in managing large infrastructure projects.

## **Chapter 5: Application of Artificial Neural Networks for the Prediction of Cashflows in Public Road Works**

This chapter explores the application of artificial neural networks in predicting cashflows for public road projects. The authors provide an overview of the financial

flows and Greek legislation that define them, before applying neural networks to 37 public road projects. They compare different models, including a hybrid approach, to predict cashflows. The results offer a valuable foundation for decision-making within the context of public road projects and open avenues for future research.

## **Chapter 6: Investigating the Risks of Time and Cost Overruns in Infrastructure Projects**

Chapter 6 takes a holistic approach to the investigation of risks associated with time and cost overruns in infrastructure projects, particularly in the procurement and construction phases. The authors employ probabilistic analyses to identify risks and assess their impact on project delivery. Real case studies are presented, both with and without identified risks, providing a practical understanding of the challenges and opportunities in managing time and cost in infrastructure projects.

## **Chapter 7: Attributes of an Effective Project Manager – The Case of European Operational Programs in the Public Sector**

This chapter examines the key attributes of an effective project manager, with a focus on EU Operational Programs in the public sector. The authors explore the characteristics and competencies required for project managers to understand and influence various project parameters. Using the MUSA method, they assess the degree of satisfaction and the importance of these attributes in successful project management. The chapter offers valuable insights into the qualities that make a project manager effective in a complex and dynamic environment.

## **IN SUMMARY**

As we draw the final curtain on this meticulously curated edited reference book, *Financial Evaluation and Risk Management of Infrastructure Projects*, we find ourselves reflecting on the remarkable journey we've undertaken alongside our esteemed contributors and readers. This book was born from a collective passion for unraveling the intricacies of infrastructure project management, financial evaluation, and risk mitigation, and it has been our privilege to guide you through its pages.

The chapters within this volume represent a diverse array of perspectives and insights from experts across the globe, each bringing a unique lens to the multifaceted world of infrastructure projects. From exploring mechanisms to achieve Value for Money (VfM) in EU public infrastructure projects to delving into the profound impact of risks and uncertainty in Life Cycle Cost Analysis, the chapters offer a

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comprehensive view of the field. We've ventured into the realm of Environmental, Social, and Governance (ESG) in construction risk management, investigating mega project schedule challenges, and even employed artificial neural networks to predict cashflows in public road works.

The content presented within these chapters stands as a testament to the ever-evolving nature of infrastructure project management and the intricate web of financial and risk considerations that accompany it. We have explored the nuances of decision-making, the complexities of managing large-scale projects, and the strategic importance of sustainable and responsible practices in construction.

For those navigating the world of infrastructure projects, this book serves as an invaluable resource. Whether you are a seasoned professional looking to enhance your expertise, a diligent researcher seeking fresh insights, or an eager student embarking on a learning journey, the knowledge contained herein empowers you with tools to navigate the complex landscape of financial evaluation and risk management within infrastructure projects.

We extend our heartfelt gratitude to the authors who contributed their expertise, time, and wisdom to this compilation. Your dedication to advancing the field of infrastructure project management is evident in the richness of the content you've provided.

To our readers, we hope that the chapters contained in this book have broadened your horizons, sharpened your skills, and enriched your understanding of the challenges and opportunities within the world of infrastructure projects. May the knowledge presented here fuel your passion and guide your endeavors in this dynamic field.

In closing, we are reminded that the world of infrastructure projects will continue to evolve, presenting new challenges and opportunities. It is our hope that this book will remain a timeless reference, offering valuable insights and guidance as you navigate the intricate path of financial evaluation and risk management in infrastructure projects. Thank you for joining us on this intellectual journey.

Warm regards,

*Kleopatra Petroutsatou*  
*Aristotle University of Thessaloniki, Greece*

*Constantin Zopounidis*  
*Technical University of Crete, Greece & Audencia Business School, France*