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Financial Sustainability of Airports

RAM-Verlag
2026

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Title:

Financial Sustainability of Airports

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ISBN 978-3-96595-055-9

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INTRODUCTION

The global aviation industry operates in an era defined by rapid digital transformation and extreme market volatility. In this context, the financial sustainability of airport infrastructure has become a central theme of transport economics, as regional airports face increasing pressure to balance large-scale investment requirements with long-term economic viability. Accurate assessment of investment projects is no longer merely a financial exercise; it is a strategic necessity requiring the integration of advanced computational intelligence and modern software solutions.

Traditional investment appraisal methods, such as deterministic Net Present Value (NPV), have long served as the industry standard. However, the contemporary aviation market - marked by shifting passenger demands and fluctuating fuel prices - reveals the inherent limitations of these static models. Deterministic calculations, relying on single-point estimates, fail to capture the stochastic nature of market risks, often leading to an underestimation of potential downsides that could jeopardize the financial stability of the entire enterprise.

The uniqueness and innovative contribution of this scientific monograph lie in its role as a pioneering methodological blueprint for the aviation sector. While global financial hubs increasingly rely on stochastic modeling, its application within the corporate management of airport infrastructure remains remarkably rare - particularly in the Slovak Republic, where the practical implementation of the Monte Carlo method is almost non-existent. This publication bridges this significant strategic gap by providing airport executives and strategic planners with a practical "how-to" guide for implementing sophisticated software tools, such as Crystal Ball, into everyday managerial practice. In an era where data is the new oil, this work demonstrates how to transform raw data into actionable intelligence through modern simulation techniques.

The structure of this monograph is systematically organized to guide the reader from theoretical foundations to practical optimization. The first chapter establishes the economic characteristics of airport infrastructure and risk management principles, while the second chapter justifies the shift to probabilistic modeling by introducing Monte Carlo simulation as a

superior alternative to static appraisals. The analytical depth continues in the third chapter through sensitivity and tornado analyses to isolate critical variables affecting the airport's financial health. At the core of the research, the fourth chapter presents a comparative analysis of three distinct financeng structures using an overlay chart approach to evaluate how different debt-to-equity ratios influence the overall risk profile. Finally, the fifth chapter offers a synthesis of results, providing a framework for management to interpret simulation outputs and utilize them for the iterative optimization of investment activities.

This work is intended for a diverse professional audience, including senior airport management, financial analysts, and the academic community. By synthesizing theoretical rigor with empirical evidence from Košice Airport (Letisko Košice – Airport Košice, a.s.), this mono-graph seeks to promote a more resilient, data-driven, and modern approach to ensuring the financial sustainability of critical transport infrastructure in the 21st century.