Summary

This thesis builds upon the know-how and practical international expertise of the author in the aviation field and specifically in airport management consulting, safety, and operations. Combining the 360-degree experience gained by the author across the aviation sector with the research performed and presented hereafter, this thesis explores the touchpoints between airport economics and the technical, operational, and safety areas.

The highest and most innovative contribution of this thesis from both the practical and theoretical perspective stems from the unique airport management model proposed, which aims at maximizing airport revenues and passenger satisfaction, while enhancing the individual performance of all airport subsystems.

Currently, there is no available model that links airport revenues – and profitability – to airport operations. Thus, the thesis investigates how airports can use artificial intelligence to optimize both aeronautical and non-aeronautical revenue streams of airports. This paper frames airports as dual-role entities – infrastructure providers and economic engines – and surveys global best practices in airport finance, service quality, and digital transformation. It identifies the gap that needs to be bridged: current revenue-management approaches treat passenger behavior, operational performance, and digital tools in isolation.

To fill this gap, a study was conducted via an on-site passenger survey at Bucharest Otopeni Airport to understand how travelers' perceptions of terminal retail space, available waiting time, travel purpose, and flight history influence their spending intentions. Insights from this survey revealed that passengers' sense of time and commercial-space appeal play a key role in driving in-terminal purchases, while factors such as the type of airline – whether full fare or low cost – and whether the passenger is a frequent traveler or not proved less decisive.

Building upon these behavioral insights, the thesis reviews existing AI applications, such as passenger-flow forecasting, predictive maintenance, and dynamic pricing, and synthesizes them into a five-pillar Airport Artificial Intelligence (A2I) Model:

- Economic & Financial Strategies: Integrating dynamic fee structures and optimized retail offerings.
- Data Integration & AI Analytics: Consolidating disparate systems into a unified analytics platform.
- Operational & Technological Enhancements: Automating processes and AI-assisted operations.

- Staff Support: Empowering personnel and resource allocation.
- Service Quality: Achieving the performance sought by passengers and stakeholders.

The core of the A2I Model is an indicative engine that translates the most impactful perceptual and operational factors into revenue forecasts and actionable recommendations.

Next, the thesis addresses critical implementation considerations such as data privacy, investment planning, workforce transition, AI limitations, and ongoing system reliability. It concludes by providing a practical roadmap especially for small and mid-sized airports, to adopt the proposed framework and achieve sustainable growth amid evolving market conditions in international aviation.

Keywords: airport revenues, airport digitalization, AI in airports, airport efficiency, aviation digitalization