Classroom Companion: Business

Andreas Wittmer
Thomas Bieger
Roland Müller *Editors*

Aviation Systems

Management of the Integrated Aviation Value Chain

Second Edition

Springer

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Editors
Andreas Wittmer
Center for Aviation Competence
(CFAC-HSG)
University of St. Gallen
St. Gallen
Switzerland

Roland Müller
Foundation for Aviation Competence
St. Gallen
Switzerland

Thomas Bieger
Institute for Systemic Management
and Public Governance
University of St. Gallen
St. Gallen
Switzerland

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Preface

Globalisation has led to a strongly growing demand in international air transport. This growth was fuelled by deregulation of the airline sector. The industry has been challenged by downturns every decade and at the time of finalising this book, by COVID-19, the biggest global aviation downturn in history. The aviation industry is facing huge challenges, especially with respect to its impact on the environment and new technologies to solve those challenges. More than ever, policy makers, business leaders, but also the whole society need a deeper understanding of the aviation sector and the connections between its benefits and costs.

This book targets industry managers as well as policy makers, institutional customers of the sector, and in particular students in the field of transport and tourism. It provides an overview on the aviation sector with a special focus on value creation and strategies based on industrial economics. The consequent application of a system view makes the book unique in its field. The book draws on the rich tradition of integrated management approaches and the use of system models in management research and teaching of management at the University of St. Gallen. The system view and the use of system models help to understand interrelated and interdependent developments, like the consequences of technical progress on regulation, supply and demand.

The authors were fortunate enough to be able to draw on research results of many years at the Center of Aviation Competence at the University of St. Gallen. Therefore, the editors thank all colleagues who contributed to this book by discussions, research contributions and administrative support, and especially the co-authors René Puls, Adrian Müller, Erik Linden, Jan-Christian Schraven, Mark Roth and Philipp Boksberger. Special thanks go to our assistant Christopher Siegrist, who did the language editing and supported with different works along the development of the book.

Andreas Wittmer
Thomas Bieger
Roland Müller
St. Gallen, Switzerland
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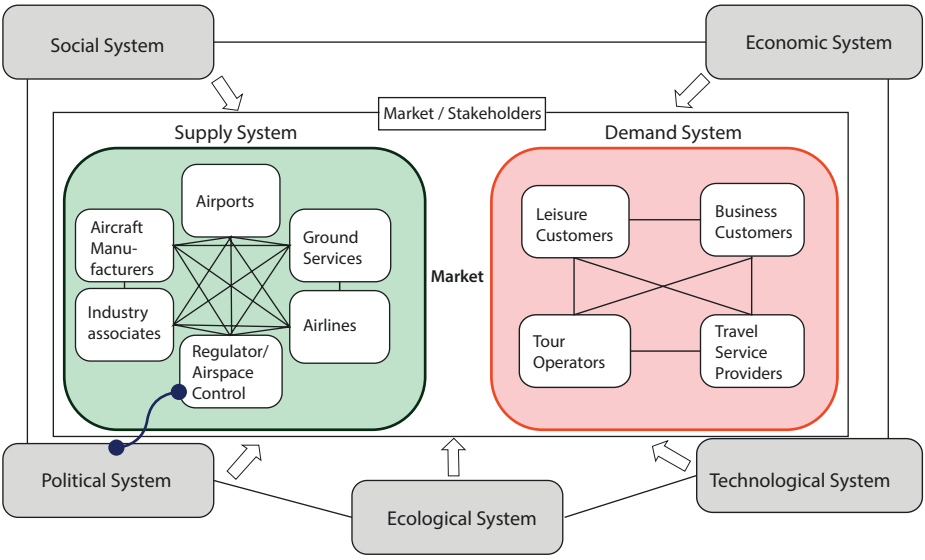
Aviation Systems Management Summary

The liberalisation of markets, rapid technological changes and the establishment of new businesses in air transportation constantly raise new questions for theory and practice. Current and future developments in aviation are thereby shaped by the industry actors and structures, in short, the aviation system. The textbook *Aviation Systems* addresses these questions by providing a detailed picture of major management aspects in the field of air transportation. Directed at students, researchers and practitioners alike, the book deals with the three major stakeholder groups in aviation: the air transportation industry itself (supply side), the customers (demand side) and the regulatory bodies and organisations (institutional side). The book follows a superior system approach in the field of aviation economy and creates the big picture of the aviation industry. The following figure shows the aviation system as a fundamental framework underlying the chapters of this book.



Source: Wittmer & Bieger, 2006

► Chapters 1 and 2: Fundamentals and Structure of Aviation Systems

► Chapter 1 starts with an overview of trends, especially mobility trends, which will shape the aviation industry.

► Chapter 2 provides an overview on the fundamental industry structures, the industry's importance, its size and historical development. The author introduces the air transportation industry as a highly dynamic and complex industry, charac-

terised by high cyclicality and a great vulnerability to external shocks and volatile commodity prices.

While on several levels of the value chain the industry is characterised by duopolistic (aircraft manufacturers) or oligopolistic (airports) market structures, on other levels of the value chain, companies act in a polypolistic market and face fierce competition (airlines). Main stages of the aviation value chain, however, face the problem of a high fixed cost structure characterised by specific and capital-intensive investments in long-term assets. This creates high exit barriers, but at the same time there is an oversupply and a very competitive market, which leads to low prices demanded by the market.

► Chapter 3: The Environment of Aviation

The economic relevance of aviation includes direct, indirect, induced and catalytic effects. Apart from its economic relevance, air transportation leads to social benefits by contributing to global welfare as well as improved living standards, and supports and increases cultural understanding as well as multicultural cooperation. The authors also show within this chapter that these benefits come at the cost of negative ecological impacts. The textbook gives an overview on major negative externalities of aviation, both on a local and a global level.

► Chapters 4–7: The Supply Side of Aviation

► Chapters 4–7 covers the supply side of aviation. It presents the path from the aviation value chain to the aviation system (► Chap. 4) as well as the theoretical basics of network management and its application to air transportation. By introducing major strategies for network management – such as the hub-and-spoke system vs. the point-to-point system – the authors analyse the prerequisites for the operation of these systems and their usage in the different business models that exist in aviation, whilst providing a new framework for analysing airline business models (► Chap. 5). The major business models in aviation are also introduced: the full-service network carriers, regional (niche/wet lease) airlines, point-to-point carriers, leisure airlines and business aviation. A view from an airline planning and operations perspective is added in ► Chap. 6. In a further step, the focus is moved from the air to the ground. ► Chapter 7 provides an introduction to the "landside" of air transportation, including airports and the respective ground infrastructure.

► Chapters 8 and 9: The Demand Side of Aviation

The demand side of the aviation industry can be classified into people flying for business and leisure purpose. Business travellers usually seek quality services and demand frequent flights to a wide range of destinations, and they are willing to pay

a premium for these benefits. Leisure travellers, by contrast, often seek the lowest available price, but are less concerned with service offerings, flight frequency or the number of destinations served. Generally, it can be observed that the heterogeneity of passengers is increasing. The authors discuss marketing, segmentation, pricing (revenue management) and customer value of air transport (► Chap. 8). Furthermore, passenger behaviours are discussed to better understand the behavioural issues of passengers (► Chap. 9).

► Chapters 10–15: Steering and Controlling the System

Steering aspects (e.g. influence of regulatory institutions, aviation law), safety provision and human factors, long-term planning as well as controlling aspects in aviation (e.g. corporate governance, risk management) are analysed in detail to show how the aviation industry is shaped by its institutional surroundings. Regulations cover all elements of the air transportation value chain, from the construction of aircraft to customer contacts specifying how contract conditions of tickets are shaped.

The book distinguishes between public and private institutions on the one side, as well as between national and supranational institutions on the other side (► Chap. 10). While public organisations generally serve as norm-setting and monitoring institutions, private organisations often serve as a platform for member exchange and advocacy and are not allowed to set binding norms and rules. Important institutions, such as ICAO and IATA, are introduced and their specific roles and competencies are discussed. It is also shown how the industry is shaped by the norms and regulations set by these bodies. In this respect, the ► Chap. 10 elaborates on how international institutions influence competition structures in air transportation and thus may cause potential distortions among states and individual companies, such as airlines and airports.

► Chapter 11 provides an overview of risk, safety and security in aviation from a consumer and also air service provider perspective and leads to the discussion of an organisational cultural understanding in relation to human factors. Human factors (► Chap. 12) deal with the human–machine interface and all factors which influence humans when operating planes with respect to safety. The book investigates an increasingly intercultural industry, where cultural differences and languages become an increasing issue. Furthermore, the just culture concerning how we deal with failures, e.g. blame or no blame for failures, is addressed.

Aviation governance (► Chap. 14) deals with corporate governance of aviation companies. Corporate governance includes corporate risk management. The book shows how corporate risks (► Chap. 13) and the integration of all risks, not only safety risks, are highly important for sustaining an aviation company in the long run.

Furthermore, the aviation industry is exposed to regular external shocks, which is challenging for management. During an environmental shock, there are high levels of uncertainty, which can lead to unproductive long-term decisions. ► Chapter 15 addresses how to strategically prepare for external shocks in management.

► Chapter 16: Future Technologies and Development of Aviation

The book picks up three developments, which are linked to new technologies and might influence the future of air travel.

Supersonic travel was possible in the past until the famous Concorde crashed and supersonic travel came to a halt. Since then, new developments of supersonic air transport failed to enter the market for technical, economic and environmental reasons. Nevertheless, there are certain concepts, and some of them may make it to the market in the coming years.

Space tourism is a new potential market for travellers. While the first companies are already trialling their products, the technological implementation and the price of space travel make it unclear as to when and how the market will develop.

There are many different fields for the application of drones and urban air mobility. One of them being passenger transport. Despite the many obstacles in place, there are many opportunities for drone taxis. It will take some time until obstacles are overcome and trust in automated air vehicles will allow them to enter the market. The market entry will most likely be seen in markets where time versus cost efficiency gains are possible. This will most likely be in city transport, intercity transport and airport shuttle services.

Andreas Wittmer

Contents

Contributors

Thomas Bieger Institute for Systemic Management and Public Governance, University of St. Gallen, St. Gallen, Switzerland
thomas.bieger@unisg.ch

Philipp Boksberger PITB Boksberger GmbH, Rüschlikon, Switzerland
philipp@boksberger.ch

Erik Linden Center for Aviation Competence (CFAC-HSG), University of St. Gallen, St. Gallen, Switzerland
erik.linden@orbit.ms

Adrian Müller Center for Aviation Competence (CFAC-HSG), University of St. Gallen, St. Gallen, Switzerland
adrian.mueller@unisg.ch

Roland Müller Foundation for Aviation Competence, St. Gallen, Switzerland
roland.mueller@ffac.ch

René Puls Center for Aviation Competence (CFAC-HSG), University of St. Gallen, St. Gallen, Switzerland
rene.puls@unisg.ch

Mark Roth AviMed Consulting, Wetzikon, Switzerland
mark.roth@avimedconsulting.com

Jan-Christian Schraven Swiss International Air Lines, Basel, Switzerland
jan-christian.schraven@swiss.com

Andreas Wittmer Center for Aviation Competence (CFAC-HSG), University of St. Gallen, St. Gallen, Switzerland
andreas.wittmer@unisg.ch