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Evaluation Structure for the Access Time (Slot) Upon Market Power at Airport Operators

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ABSTRACT

The changes in aviation market lead to many changes in business environment within airport operation. The need for access time (slot) efficient management at the Europe's busiest airports is on top of the agenda for stakeholders and airport authorities, focusing on measures to improve efficiency of the current primary allocation. There are many examples where the access time is the key driver for airports' market power supporting decisions towards capacity expansion, new infrastructures in airport territory and promoting incentives to control the degree of business market power in the content of competitive markets. This paper deals with the development of a methodology framework to evaluate the structure for the slot upon airports' market power. By adopting a top-down analysis the key challenges of slot coordination upon airports' market power affecting decision process towards optimum slot allocation are presented. The methodology framework provides essential results for both the airport operators and airport management. The paper findings promote the business attitude that must be taken into consideration in the optimum structure for the slots upon market power at airport operators.

Keywords: *slot allocation, airport operators, airport management, market power*

INTRODUCTION

The aviation market has evolved rapidly in the last decade and especially after 2011 many changes have influenced the aviation market. Oobserving the traffic trends after 2008, it is highlighted that after a cut back between 2008 and 2013 due to financial downturn and economic recession, air traffic has gone up by 10% from 2014 to 2017, and according to Euro control most-likely scenario, traffic demand in Europe is expected to grow to around 16 million flights by 2040. This growth in air traffic will create pressure on airport capacity and will certainly reduce the number of slots available (ACI, 2019).

The observation of the airport capacity usage along the day highlights that the current 16% planned capacity growth by 111 European airports (28% for the top 20 airports) is still not enough to manage the extra demand. By 2040, the top 20 airports will operate close or above 80% of their capacity starting with the first rotations till the end of the day in the most-likely scenario Regulation and Growth. With this future level of congestion, it becomes difficult to accommodate minor deviations from plan, and delays begin to accumulate rapidly. In consequence the number of EU coordinated airports has increased to 104 (in 2018) from 98 that was in 2010. In addition, air carriers and airports have adapted or developed new business models that is characterized by change of ownerships in airports and merges and acquisitions in airlines. There are many arguments whether slot management lead to efficient use of congested airport capacity (Givoni et al., 2009).

The demand regulation for airport operators is managed, based on different slot allocation schemes. The need for access time (slot) efficient management at the Europe's busiest airports is on top of the agenda for stakeholders and airport authorities, focusing on measures to improve efficiency of the current primary allocation. Comparative benchmarking of slot coordinated airports is a tool for measuring their productivity performance in meeting their established goals, by identifying areas of weakness that can be targeted for improvement and conducting comparisons with similar airports to identify opportunities for growth. Therefore, it is very important to investigate the factors that affect slot allocation and coordination under

airport capacity constraints. The aim of the paper is to draw a comprehensive picture of the factors and sub factors that impact the demand for slot coordinated airports and slot regulation, the opportunities, threats and weaknesses for airport slot coordination efficient management and market power of airports.

MATERIALS AND METHODS

Based on IATA World Slot Guidelines, the slot is "the permission given by a management entity for an operation to use airport infrastructure for arrival or departure at an airport on a specific time window" (IATA, 2019). Slot trading is on top of agenda of managers a decision-makers in order to improve slot efficient management (Pagliari, 2001). On 2012, the European Parliament adopted a new regulation for the allocation of slots allowing air carriers to buy, sell, and lease slots at the EU airports. Based on this, competitiveness between carriers and consumer benefits will be increased (Fukui, 2012, 2010; Brueckner, 2009).

The aim of the paper is to draw a comprehensive picture of the factors and sub factors that impact the demand for slot coordinated airports and slot regulation. The main purpose is to analyze the trends of factors that influence the demand for slot coordinated European airports and investigate the market drivers, restraints, opportunities and structure of slot for market power at airport operators.

The environment that affects the slot Regulation encapsulates many different influences. The general layer of the external environment that affects the demand for slot coordinated airports and the slot regulation consists of broad socioeconomic, technological, legal, policy factors and the market. The methodology developed in this paper aims to investigate how these factors impact on the Slot Regulation and allocation. The methodology paths (Figure 1) are defined as:

- **Path1.** Define the external factors and sub factors that influence demand for coordination and slot regulation.
- **Path2.** Identify the key drivers of change on the competition between air carriers, the efficiency of the use of airport capacity and connectivity within and to/ from the EU
- **Path3.** Identify the implications to market power of airports

The PESTEL analysis framework adopted to analyze and monitor the external environment factors that have an impact on the demand of slot coordinated airports and thus slot coordination. These results will be used to identify threats and weaknesses of slot regulation that will be used in SWOT analysis to define the key drivers of change. Finally, the implications of these changes to airport market power will be highlighted based on Porter analysis.

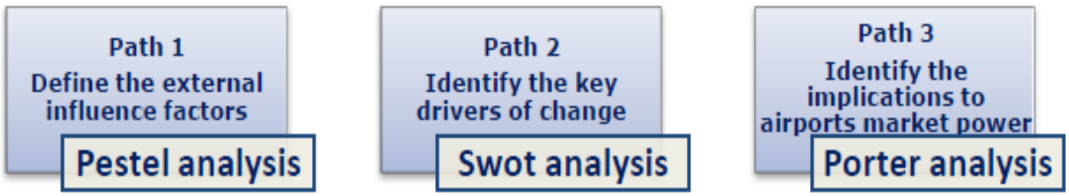

Figure1. *Methodology Framework Paths*

KEY TRENDS REVIEW

For airports to meet the demand, facilitate improvements in global connectivity, and ensure that benefits to the global economy are delivered, investment in airport infrastructure is critical. Change of ownership structure and privatization has been shown to be a successful way to fund infrastructure development. In 2016 the proportion of public airports has dropped significantly since 2010, when close to 80% of airports were fully under public ownership. In the intervening years there has been a shift both towards fully privately-owned airports, but also various forms of Public-Private Partnerships (PPPs) with a quarter of European airport operators having a mix of both public and private participation in their ownership in 2016 (ACI, 2016). There is significantly increased private participation in 2016 compared to 2010, in terms of both fully private airports and PPPs.

Now only around a quarter of European airport passengers travel via an airport which has no private shareholder. As in 2010, private participation is more focused on the larger airports – over 40% of European airports have at least some private involvement, but these handles close to 75% of passenger traffic each year. (eg. operators such as Manchester Airports

Group and SEA Milano moved to a mixed ownership model, and public ownership models moved to private such as the concessions of Portuguese airport operator ANA and 14 regional Greek airports) (ACI,2016).

As regards airlines merges and acquisitions from 2011 a wave of mergers and acquisitions in the European airline industry, have occurred such as the acquisition of 55% of Brussels Airlines (in 2016) and Air Berlin (in 2017) by Lufthansa, the acquisition of Virgin Atlantic in 2019 by Air France- KLM, the acquisition of Tap Express (Portugalia Airlines) (2012) by TAP air Portugal and the acquisition of Olympic airlines by Aegean airlines (Greece) in 2013.

Finally, some recent air carrier bankruptcies have happened such as: Cyprus Airways (Cyprus) and Estonian Air (Estonia) in 2015, VLM Airlines (Brussels) and Air Vallee (Italy) in 2016, FLY Niki (Austria), and Air Berlin (Germany) in 2017, Primera Air (Denmark), Cobalt Air (Cyprus), Fly Viking (Norway), Dart Airlines (Ukraine), Next jet (Sweden) in 2018.

In view of these recent years' changes and the trends of all the related external factors that may influence slot regulation, the aim is to identify which are these external factors, and which are the key drivers of change that may affect demand for slot coordinated airports.

Path1. *External (Exogenous) Influence Factors Determination*

The first path of the methodology analysis framework is based on PESTEL framework applied to identify which external factors may impact on demand for slot coordination and slot regulation.

PESTEL analysis identifies external, often government-influenced issues affecting an industry competition. It is an acronym of these six groups of issues: political, economic, social, technological, environmental and legal. Examples of the issues covered in PESTEL analysis are:

Political

Government taxation, legal and regulatory intervention in the marketplace

Economic

The macro-economic backdrop, including economic growth, inflation, interest rates and exchange rates

Social

The societal backdrop, including population trends, consumption patterns, age distribution

Technological

Trends in R&D and innovation, affecting both product and production, and the threat from substitute products

Environmental

Trends in weather and climate, and the impact of climate change on your firm's operations and customer preference

Legal

Trends in laws which impact on a firm's operations and decision-making, including employment, health/ safety/ environment, antitrust, consumer protection, capital adequacy and governance laws

Based on above analysis framework all the slot coordination influences are categorized in six categories: Society, Technology, Economics, Environment, Political/Legal and market. These factors are not in depended, but many are linked.

Over the past 30 years the airline industry has seen several changes, such as the increased market share of low-cost carriers (LCCs) as well as facing its fair share of challenges, from volcanoes erupting to infectious disease outbreaks. The next 30 years are likely to be more turbulent, as a new wave of technological change and innovation unfurls. As a global industry, subject also to national-level regulation, the airline industry is highly sensitive to such surprises such as for example the negotiation about the UK vote to leave the EU (widely referred to as Brexit).

Global economic expansion is expected to continue, with regional challenges that will contribute to an overall modest growth and influence air transport demand. In the past, emerging markets have driven economic growth, but there are now some regional divergences from this trend. In the short term, the outcome which appeared to surprise global financial markets, implies the materialization of an important downside risk for the world economy. A list of key sub factors of each factor (Society, Technology, Economics, Environment, Political/Legal and Market) based on above analysis have an impact on Slot regulation are then defined (Figure 2). Then the intention is to cast the net wide to identify both relevant drivers and trends, as well as weak from a wide range of fields, including all the sub factors that might impact the slot regulation external environment.

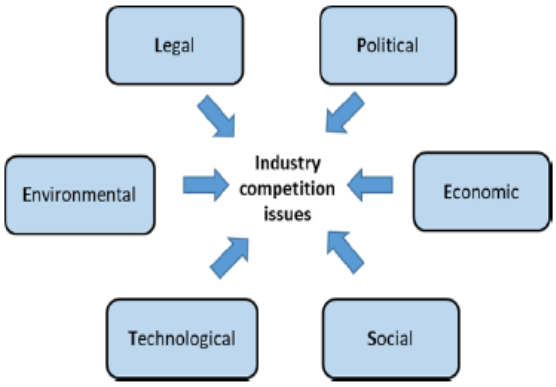

Figure2. *Pestel Framework for Slot Allocation*

Path2. *Identification of Key Drivers of Change*

The next path of the methodology framework analyse the key trends and developments as given in Path 1 and investigate their effects of those changes on competition between air carriers, the efficiency of the use of airport capacity and connectivity within and to/from the EU, and how these have evolved as presented in Figure 3.

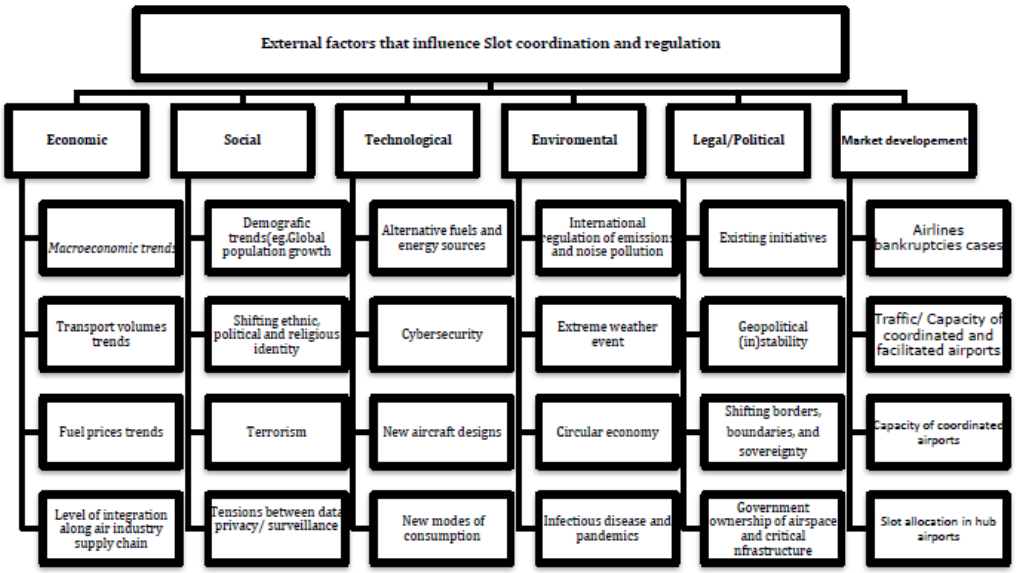

Figure3. *External Factors That Influence Slot Regulation Determination*

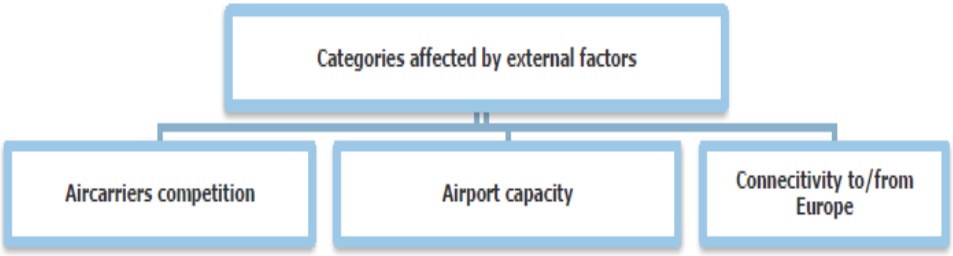

Figure4. *External Factors Effects Categories*

The SWOT analysis provides the framework for matching resources and capabilities to the competitive environment in which the airport enterprise operates.

The SWOT framework can be used as an instrument for devising and selecting strategy, and is equally applicable in any decision-making situation, provided the desired objective has been clearly defined (Evans, 2013). When combined with an inventory of opportunities and threats within or beyond the industry's environment, the industry is making a so-called SWOT analysis: establishing its current position in the light of its strengths, weaknesses, opportunities and threats (Kurtilla et al., 2002).

After the investigation of the trends of the external factors and sub factors that influence the Slot Regulation, the next target is to identify the key drivers of change, which are forces likely affect most the slot regulation in Europe market and especially in air carriers competition, efficient use of airport capacity and connectivity and to/from Europe.

The SWOT analysis summarize the key issues from the external environment factors and the strategic capabilities of air carriers and airports that are most likely to impact on slot regulation. Opportunities and threats occur because of external forces such as demographic, economic, technological, political legal, social dynamics. Analytically:

Opportunities

How air carriers and airports benefit from the macroeconomic, social technological developments or demographic changes taking place? The perceived opportunities real depend upon the extent and level of detail included in the external factor's analysis.

Threats

The changes in regulations, substitute technologies and other forces in the competitive field may pose serious threats; for example, resulting in lower air carrier's competition and decreasing of air connectivity to/from Europe.

Opportunities and threats can will be classified according to their potential impact and actual probability, as illustrated in Figure 5.

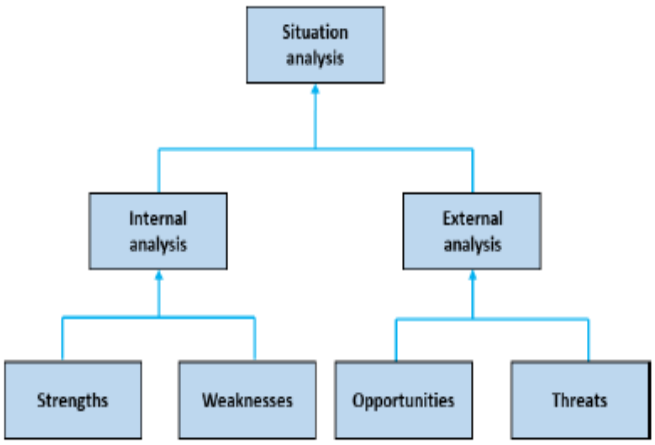

Figure5. *Swot Analysis Framework for Key Drivers of Change*

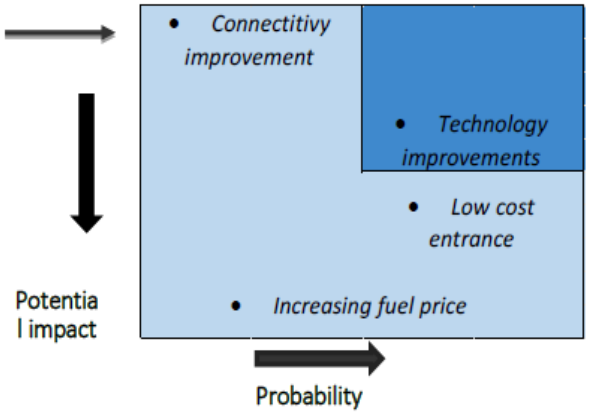

Figure6. *Examples of Probabilities and Potential Impact of Drivers of Change*

Path3. *Identification of the Implications to Airports Market Power*

In next path, a 5 Porter's competitive analysis is applied to identify the fundamental 5 competitive forces as analytically described below the context in which the airlines competitive environment and slot providers and suppliers interact by these 5 forces.

Porter analysis argues that the interaction of these forces determines the competitive environment faced by an industry. Over the time the competitive environment as is analyzed in Porter's five forces model will be subject to many changes. These changes may come in the shape of socioeconomic, technological, market, environmental and policy developments which will often be difficult to predict. The challenge

facing is a daunting one in that decisions must be made not only to take account of the competitive dynamics of the market but also in terms of a changing and unpredictable external environment.

Porter's competitive analysis identifies five fundamental competitive forces that determine the relative attractiveness of an industry: new entrants, bargaining power of buyers, bargaining power of suppliers, substitute products or services and rivalry among existing competitors. Competitive analysis provides an insight into the relationships and dynamics of an industry and allows a company to make strategic decisions regarding the best defendable and most economically attractive position. Competitive intensity determines enterprise's profitability.

The frame work is used to gain a better understanding of the industry context in which the airport is operating. For example, airport operators may use the framework to analyse the attractiveness and market power by identifying whether new products, services or businesses are potentially profitable.

The Porter analysis can also be used to evaluate the airport's strategic position in the marketplace, as it accounts of a broad range of competitors beyond the obvious or immediate. This creates an understanding of the strengths of both the enterprise's current competitive position and the desired position.

The Porter model is an aid to evaluating the competitive arena from all perspectives based on five fundamental forces. By identifying the strength and direction of each force, it is possible to assess quickly the strength of the organization's position, together with its ability to make a profit or maintain profitability in a competitive environment. For each of the five forces, it is considered how well the airport operator can compete in:

New Entrants

Are there entry barriers for new contenders? The lower the barriers to entry to a market, the tougher typically the competition. Barriers to entry can be technology, operations, people or cost related.

Substitutes

How easily can your product or service be substituted with a different type of product or service? The easier it is for customers to use a substitute product or service, the tougher typically the competition.

Buyers' Bargaining Power

To what extent can buyers' bargain? The more bargaining power customers possess, the tougher typically the competition. Ask any supplier to the supermarket chains.

Suppliers' Command of Industry

What level of influence do suppliers have? The more bargaining power suppliers possess, the tougher typically the competition.

Existing competitors

What advantages do competitors have?

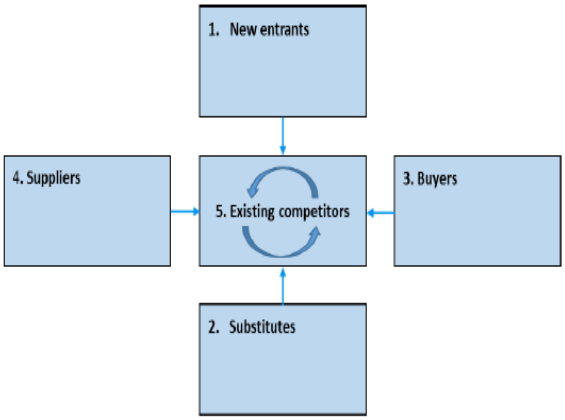

Figure7. *Porter Analysis Frame Work (Nellis Et Al., 2016).*

Dimitriou et al. (2016) adopted Porter's five forces analysis, and analyzed the level of competition within the transport industry and business strategy development.

For the purpose of this research paper, after identifying the importance and impact of the external environment on slot through PESTEL and SWOT analyses, the implication of the external environment to competition are investigated through the above Porter analysis.

Modifying and applying the Porter Five Forces analysis borrowed from the traditional field of microeconomics, the five forces that determine the structure in slot regulation and allocation are:

Bargaining Power of Buyers of Slots Allocation

If the buyers have strong bargaining power then they usually tend to drive price up.

Bargaining Power of Suppliers of Slots Allocation

If suppliers have strong bargaining power then they will extract higher price from the Slots Allocation.

Threat of Substitute Products and Services

If the threat of substitute is high then Slots Allocation must either continuously invest into R&D or it risks losing out to disruptors in the industry.

Intense Competition among Existing Players

If competition is intense then it becomes difficult for existing players to earn more profits.

Threat of New Entrants

If there is strong threat of new entrants then current players will be willing to earn less profit to reduce the threats.

Figure7. *5 Porter Analyses on the External Environment that Influence Slot Coordination and Regulation*

Discussion and Concluding Remarks

Airports serving tourist destinations are essential counterpart of the tourist demand supply chain and their market power impact essential the region's attractiveness, and regional development. Comparative benchmarking of slot coordinated airports is a tool for measuring their performance in meeting their established goals, by identifying areas of weakness that can be targeted for improvement and conducting comparisons with similar airports to identify opportunities for market power improvement.

This paper developed evaluated the structure for the slot upon airports' market power, by adopting a top-down analysis and highlighting the key challenges of slot coordination upon airports' market power affecting decision process towards optimum slot allocation. The methodology frame work promotes essential results for both airport operators and highlight the business attitude that must be taken into consideration in the optimum structure for the slots upon market power.

The novelty of the methodology framework adopted is that it could be a useful and easy handle tool to support stakeholders, decision makers, planners and managers around regulation policy, pricing policy and strategic planning to manage airports slot coordination and monitor the airports performance with desirable economic and financial targets as well as social outcomes. The managerial implications provided to industry based on the above methodology frame work is to monitor and improve airports slot coordination efficient management.

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