Exploring Airports' Landside Congestion Impacts on the dynamic of Passengers Satisfaction.

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Key-words: Airport management, service quality drivers, landside congestion, customer satisfaction, system dynamics model.

Abstract

International airports may suffer landside congestion when air traffic grows. This is likely to generate an impact on the service quality provided to passengers. Due to the high complexity of the airport system and very often the lack of data available, few studies adopt a systemic perspective in investigating the dynamic of passengers' satisfaction. The airport service quality management literature identify six main critical areas on which airport managers should focus on. In this preliminary research, a System Dynamics model was built to support airport managers to outline alternative policies to improve passengers' satisfaction. The analysis was carried out in an Italian international airport. It focused, in particular, on how security controls waiting time and airport terminal cleanliness impact on passengers' satisfaction. Although only two critical areas were investigated in this preliminary stage, simulation results portrayed counterintuitive behaviours. After a literature review on airport service quality management, main drawbacks are highlighted and the contribution of the System Dynamics methodology is made explicit. In the second part of the paper, a brief introduction of the investigated international Italian airport is provided. Then the System Dynamics model built is presented and validated simulation results with airport managers are shown. Finally, main contributions of this preliminary study and further research are also discussed.

Literature review on airport service quality management

In the last decade, the continuous growing trend recorded of air transport demand often resulted in airport congestion with significant consequences on passengers' satisfaction and airport's attractiveness and image. This phenomenon is now considered a priority in the agenda of airport managing directors. Air traffic forecasts show that growth will continue in the next years, consequently congestion problems will continue to raise (Czerny A.I. 2010). One of the main reasons of such an exponential pattern can be found in the diffusion since the early 1990 of the fast growing business of low-cost carriers, which to some extent revolutionised the airline industry (Papatheodorou A., Lei Z. 2006). Such market's changes led to an increasing pressure on airport core business efficiency, non-aviation earnings and on the airport service quality management. The service quality has a strong impact on airports aviation's revenues. In fact, aviation fees used to be defined by Aviation Regulators Bodies. Periodically, airport operators provide to the Regulator Agency a forecast on the service quality they assume to achieve in a given period. If this goal is reached, then airport operators are allowed to increase aviation fees. Otherwise, a fee reduction is applied. For the above reasons, airport managing directors face a high pressure on keeping stable passengers' service level.

Different methodologies were developed to measure airport performance by using a variety of input and output variables (Oum et al. 2003; Francis and Humphreys, 2002; Humphreys and Francis, 2002). Very often, such approaches show to be in contrast each other. Gillen and Lall (1997) suggested dividing airport operations into landside and airside. This is considered an important step as different performance measurement models may result.

For what concerning the airports efficiency measurements, Data Envelopment Analysis (DEA) and Malmquist Total Factor Productivity (TFP) index were used (Pels et al., 2001; Abbott and Wu, 2002). As a result of mentioned papers, more attention should be paid on recognizing and explaining airports inefficiencies. Most of these studies were conducted at a worldwide level. In fact, ATRS (2004) and Oum et al. (2003) conducted an airports benchmarking research, which measured and compared the efficiency of a sample of airports located in the Asia Pacific, Europe and North America. In particular, ownership structure, business diversification strategy and extent outsourcing effects on airport productivity were analysed. They assessed that some influencing attributes are beyond airport operator control and thus performance indicators do not reflect the real airport efficiency. Ming-Miin Yu (2010) developed a theoretical model to obtain a set of efficiency measures, adjustments in capacities as well as an efficient reference set for benchmarks that provide an alternative framework for airport performance evaluation. In particular, he applied a Slacks-based Measure Network Data Envelopment Analysis (SBM-NDEA) that allows multi-process interactions by introducing linking activities between sub-processes.

Other studies aimed at developing service quality for several airport passengers' terminal components (Seneviratne and Martel, 1991; Yen et al., 2011). Brunetta et al. (1999) developed a Simple Landside Aggregate Model (SLAM) for estimating capacity and delays in airport passengers' terminals. In particular, the model was designed to evaluate alternative configurations of various processes and holding facilities in a terminal.

Adikariwattage V. et al. (2012) introduced a classification criterion for airports that focuses on the comparability of passengers terminal facilities by using Cluster analysis.

In order to evaluate airport service quality, different models were built as those developed by Liou et al. (2011) and Chou Chien-Chang (2011). The firsts applied a Dominance-Based Rough Set approach (DRSA) to a customer satisfaction survey, which led to a prediction model representing a set of decision rules that should help airport decision makers to improve service quality. The second author used a Fuzzy Multi-Criteria Decision-Making method to evaluate the service quality of a Taiwanese airport. In particular, the study defined some service issues such as courtesy of staff, check-in time and availability of lifts and stairs and, in a general sense, some areas where improvements were needed. Furthermore, Barros et al. (2007) used regression analysis to evaluate the service quality level for transfer passengers at the Bandaranaike International Airport (Sri Lanka). Their study showed that passengers' satisfaction was influenced by the treatment they received from security check staff.

In the past, both FAA (Federal Aviation Administration) and ACI (Airport Council International) also developed alternative methods to evaluate and improve the service quality. However, the proposed methods shown different drawbacks. Some authors studied how to improve airport service quality. Park (1999) assessed that the principal goal of airports is to maximize user satisfaction, by aiming for high quality of service level perceived by passengers. By the way, Correia & Wirasinghe (2004) remarked that one of the main concerns in perceiving high service quality is the lack of passenger input. Because of the fact that airport quality service is based on passengers' perception, Magri and Alves (2005) made a study based on service quality passengers' perception at six Brazilian airports. The developed methodology serves as an instrument to evaluate the quality of premises and services of an airport and provides a way to obtain airport terminal quality indicators. In fact, some studies were developed with the purpose of defining service quality indexes. Rhoades et al. (2000) analysed 12 airport industry factors from the user standpoint to develop a quality index for North American airports. Yeh and Kuo (2003) developed a Fuzzy Multi-Attribute Decision Making (MADM) model to calculate a service quality index, which would help airport operators in comparing the overall service quality level in order to identify service areas to be improved. They analysed service quality of 14 Asia-Pacific international airports and the following set of six attributes was examined: comfort, processing time, convenience, courtesy of staff, information visibility and security.

Each attribute involves a variety of performance measures and indexes. In order to identify those attributes, Correia et al. (2008) provided a methodology to identify the most important airport' attributes according to users perception. In order to assess customer satisfaction index, a general practice adopted by several airports often consists in the involvement of passengers in surveys to detect their service quality perception of a certain number of quality attributes. This type of surveys allow airports managers to identify the quality parameters that are of most concern to passengers in order to prioritize resources allocations and to improve the service level.

Airport operations are characterised by a very high complexity level, and most of the previous studies often tended to simplify such complexity, either ignoring passengers input or focusing on certain aspects of landside services separately, such as the terminal building, information visibility, check-in or queuing time only (Liou et al. 2011).

A recurrent problem faced by the above studies is also the lack of reliable databases. This reduces the possibility to test all the investigated hypotheses. In order to overcome such a limit, most studies tend to focus on single attributes of airport passengers terminal (check-in counter, departure lounge, etc.), neglecting the overall service quality evaluation (Correira et al. 2008).

From the above analysis, it is possible to remark that few studies investigated airport service quality management adopting a systemic perspective. Therefore, more studies are required to effectively support decision-makers in understanding and planning airport service quality policies (Liou et al. 2011).

System Dynamics contribution to airport service quality management

Only recently, airport service quality has been analysed with a dynamic perspective, either focusing on operational and management issues. Manataki and Zografos (2009) developed a System Dynamics tool for airport terminal performance analysis that allowed airport managers to perform alternative policies and to evaluate trade-offs in terminal planning. System Dynamics revealed its ability to be easily adapted for terminal configurations assessment and to evaluate the impact of cross-interaction between different system elements. Cronrath E. M. (2009) developed a System Dynamics model to investigate the influences of the connectivity on airports competitive position in the air traffic network. The model allowed to identify "limits to growth", which results in an S-shaped growth pattern for connectivity. Minato & Morimoto (2011) used System Dynamics modelling and simulation to propose optimal strategies for sustaining Japanese airports ecosystems. They concluded that flight ticket subsidies associated to non-aeronautical revenues enhancing measures allowed an increase of regional airports viability.

From the above analysis, it emerges that System Dynamics can contribute to analyse airports' performance and to support decision makers to evaluate alternative terminal design, planning and operations strategies. The mentioned studies are mainly focused on planning and operational parameters (security control waiting time, check-in time etc). These measures represent performance indexes that can be used by airports' operators to understand which areas needed improving actions. However, these measures are influenced by several parameters which seem to be not taken into account. In addition, Yeh and Kuo (2003) in their work assessed that on one hand, performance measures considered make results harder to analyse. On the other hand, the general service quality attributes considered are not enough to help decision-makers to focus their efforts for improvement.

The above remarks provided the conceptual basis to develop a System Dynamics model to evaluate the impact of landside congestion on service level. Among the main benefits of such an approach, it is possible to make explicit the following aspects:

- it can give a consistent contribution in supporting airports operators to pursue short-, medium- and long-term goals;
- due to the high complexity level of the airport system, it can foster a better understanding of the interactions between main variables, to evaluate counterintuitive behaviours and to identify possible undesired side effects.

The research methodology

In order to investigate the airport system and to develop the SD model, a 4-months research project was carried out with an Italian international airport. Existing airport's management reports has been analysed and different meeting with airport managers were set. Such meetings allowed the authors to identify the relevant system and to elicit managers' mental model about the cause-effect relationships between the aviation, service quality, finance, commercial and human resources departments (Figure 1). Once the cause-effect relationships between main variables were made explicit, the developed causal loop diagram was validated by airport managers. The SD model was then built and validated through structural and behavioural tests (Forrester and Senge, 1980). By the way, because of the intention of developing a pilot study, in this step of the project non-aviation sector is not considered.

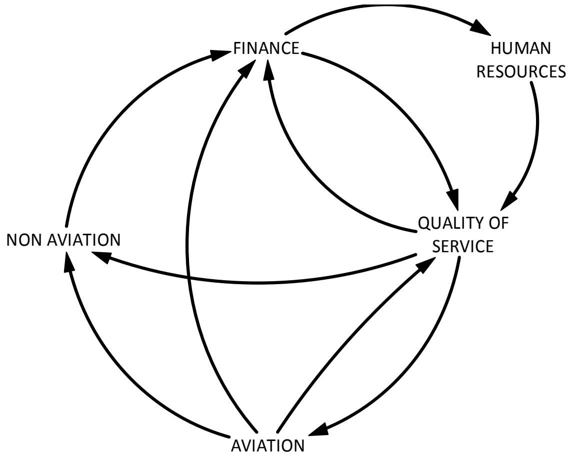


Fig. 1 – System perspective of investigated areas

The Italian international airport case study

The investigated airport is one of the largest regional airports in Italy for number of international destinations served. It is located in the region of Emilia-Romagna, in the north of Italy, and represents one of the most important junction for passengers and cargo activities.

In the last years, because of the agreements signed with new traditional and, in particular, low-cost carriers, direct connections growth of about 30% in 5 years. Leisure international destinations are those preferred by low-cost carriers and this phenomena led to a consistent change of the airport passengers profile. Nowadays, leisure and business air traffic represent about the 70% and the 25% of the total airport air traffic respectively. The airport geographical position significantly influences the passengers profile and, in particular the business air traffic. In fact, because of the proximity to Milan, most of the business flight are operated by Malpensa Airport hub. For what concerning business connections with Italian central regions, high-speed trains are available and preferred by travellers.

Despite the continuing stagnation in domestic consumption and the difficulties experienced by some airlines, which reduced routes and frequencies, passengers increased of about 2 million people in 5 years. Because of the airport "continuous improvement" policy, and in order to offer a high quality service level to passengers, in 2008 a quality system program was adopted.

The airport operator is in charge of the global quality of service offered to passengers even if some activities are beyond its control. In particular, service quality management is divided into six main areas, each of which has several performance indices (Table 1, Appendix 1). Airport quality data are acquired by surveys, where passengers are asked to provide their perception of different service quality attributes and their priority level. Data manipulation lead to the definition of single attribute satisfaction indices. The quality of service level of each area is defined by the weighted average of the referred quality attributes levels, which in turn gives the global service quality index. The analysis of available data showed that airport terminal cleanliness and security check waiting time are two of the quality attributes which are of most concern to passengers.

In Figure 2, the Airport Terminal Cleanliness Index and the Annual Cleaning Expenditure are considered. The index represents the airport terminal cleanliness passengers' perception. Because of the increase of the passengers flow, in particular from 2010 (Appendix 2), a reduction of the terminal cleanliness seems to be predictable. After an in-depth analysis of the system, the annual expenditure for terminal cleaning activities is the parameter, which most affects the terminal cleanliness. From 2010, despite the consistent expenditure, the customer satisfaction index drastically decreased.

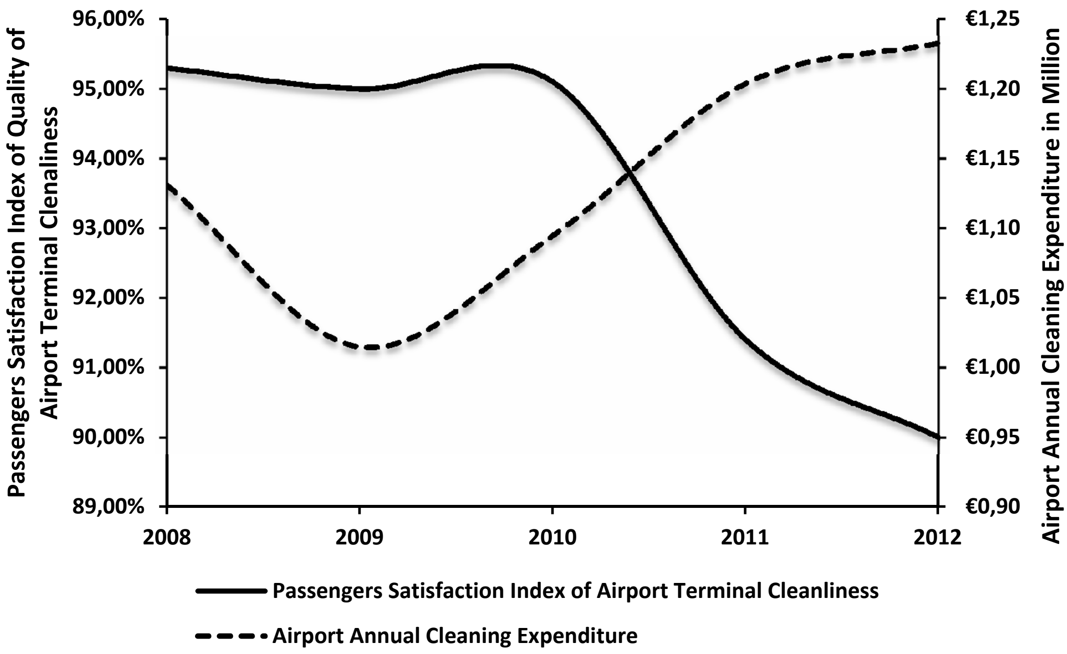


Fig. 2 – Passengers Satisfaction Index of Airport Terminal Cleanliness Vs Airport Annual Cleaning Expenditure

In order to consider the increase of passengers, a comparison between the airport cleanliness index and the average cleaning expenditure per passenger is needed. As shown in Figure 3, despite the increase in terms of global cleaning expenditure, the average expenditure value per passenger was reduce.

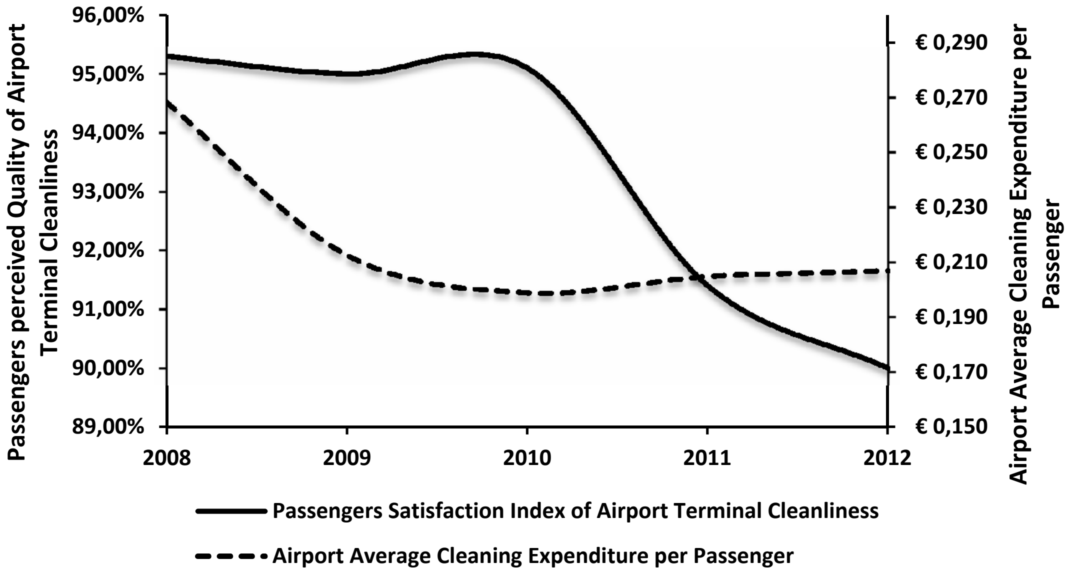


Fig. 3 – Passengers Satisfaction Index of Airport Terminal Cleanliness Vs Airport Average Cleaning Expenditure per Passenger

In Figure 4, security check waiting time index and security staff training hours are considered. At first sight, because of the variables behaviours, it seems possible to assess that these two parameters are strongly related by a certain direct relationship.

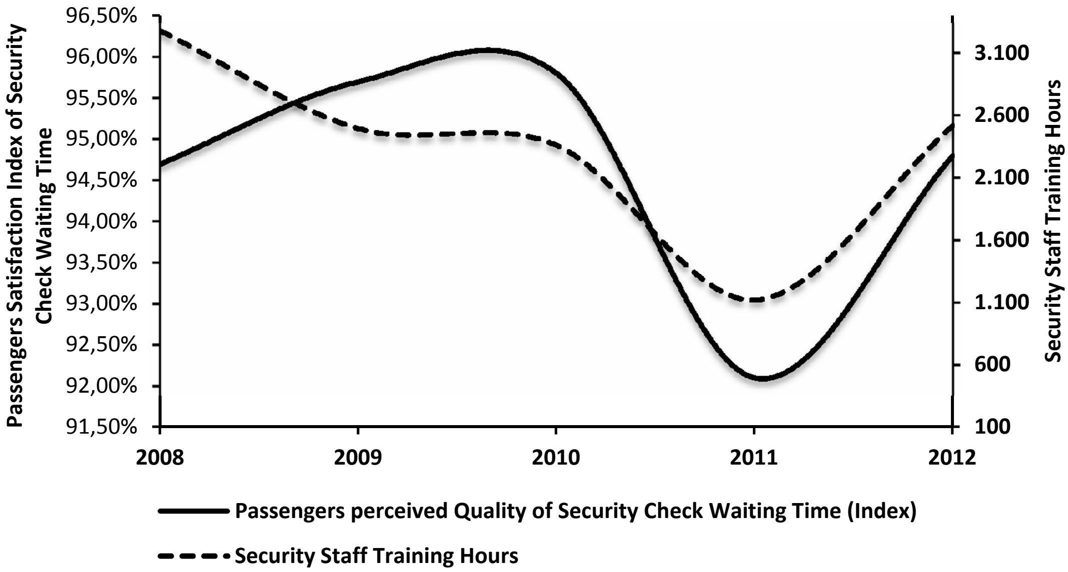


Fig. 4 – Passengers Satisfaction Index of Security Check Waiting Time Vs Security Staff training Hours

Feedback loop analysis

Figure 5 shows the causal-loop diagram summarizing the main feedbacks investigated in the model.

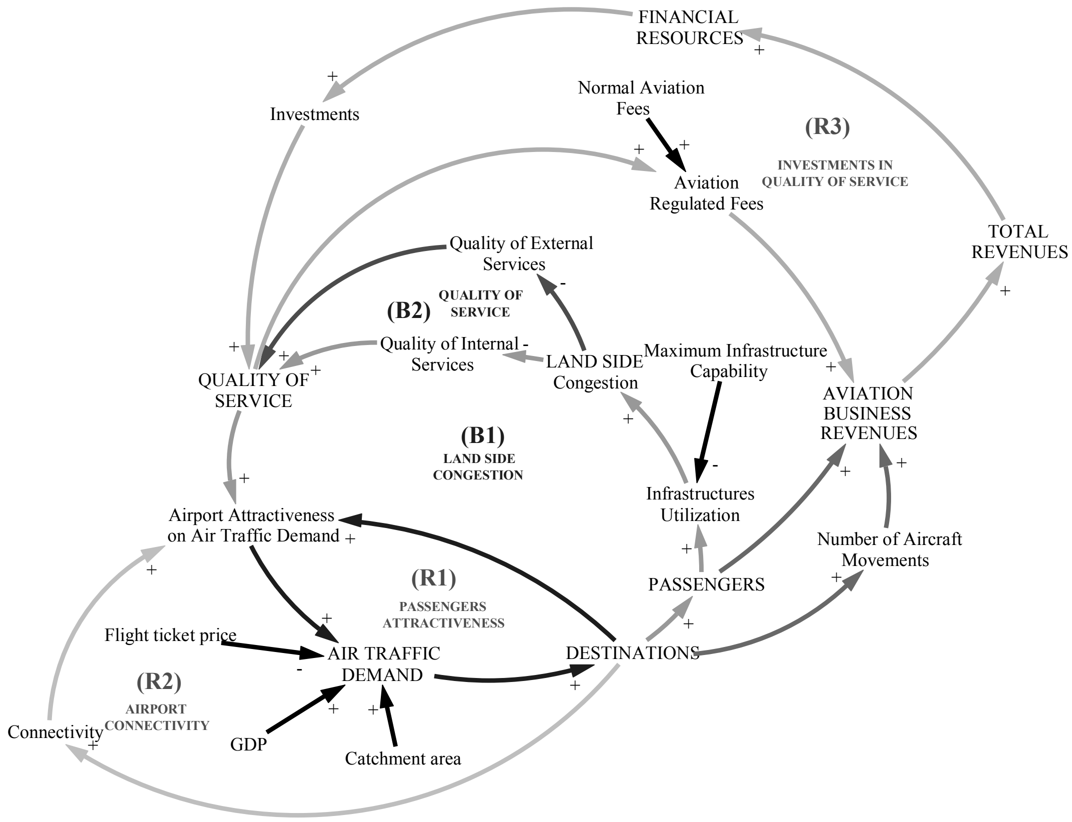


Fig. 5 - Overview of model feedback structure

Reinforcing loop (R1): PASSENGERS ATTRACTIVENESS

Air Traffic Demand $\rightarrow^+$ Destinations $\rightarrow^+$ Airport Attractiveness $\rightarrow^+$ Air Traffic Demand

Air traffic demand is strongly dependant on flight ticket price, GDP (Gross Domestic Product) and catchment area, which are considered as exogenous variables of the system. An increase in flight tickets price has a negative effect on air traffic demand because passengers have to bear a higher travel expenditure. If the GDP increases it is expected that air traffic demand increases too because, for instance, companies manage higher flows of resources (goods, people, money) which, in turn, could boost air travels. Catchment area has a very important effect on the air traffic demand: if the catchment area increases, it means that airport can provide the service to a higher number of potential passengers. The larger the catchment area is the higher the local air traffic demand will be. If the air traffic demand increases, the number of destinations offered by the airport to passengers very often increases too. The number of destinations offered has a positive impact on the airport attractiveness, which positively affects air traffic demand in turn.

Reinforcing loop (R2): AIRPORT CONNECTIVITY

Air Traffic Demand $\rightarrow^{+}$ ***Destinations*** $\rightarrow^{+}$ ***Connectivity*** $\rightarrow^{+}$ ***Airport Attractiveness*** $\rightarrow^{+}$ ***Air Traffic Demand***

As expressed in the previous feedback loop, if the air traffic demand increases the number of destinations offered by the airport increases too. The increment of destinations portfolio leads to an increase of the airport connectivity because of the fact that more destinations are attainable by passengers and fewer flights are needed in order to get to certain destinations that are not directly connected. The connectivity level has a direct effect on the airport attractiveness that influences in turn the air traffic demand.

Reinforcing loop (R3): INVESTMENTS ON QUALITY OF SERVICE

Aviation Business Revenues $\rightarrow^{+}$ ***Total Revenues*** $\rightarrow^{+}$ ***Financial Resources*** $\rightarrow^{+}$ ***Investments*** $\rightarrow^{+}$ ***Quality of Service*** $\rightarrow^{+}$ ***Aviation Regulated Fees*** $\rightarrow^{+}$ ***Aviation Business Revenues***

Aviation business revenues depend on both the number of departing passengers and aircraft movements (departures, landings, parking etc), and on aviation regulated fees. An increase of aviation business revenues involves an increase in terms of total revenues with a benefit in terms of financial resources available. Investments are directly dependant on financial resources because of the fact that it could be possible to allocate higher budget for quality of service improvement. Aviation regulated fees are fixed for every airport by a National Aviation Regulator Body depending on the service quality level achieved by the airport's operator: if quality of service level increases , aviation fees increase and aviation business revenues increase in turn.

Balancing loop (B1): LANDSIDE CONGESTION

Air Traffic Demand $\rightarrow^{+}$ ***Destinations*** $\rightarrow^{+}$ ***Passengers*** $\rightarrow^{+}$ ***Infrastructure Utilization*** $\rightarrow^{+}$ ***Landside Congestion*** $\rightarrow^{-}$ ***Quality of Internal Services*** $\rightarrow^{+}$ ***Quality of Service*** $\rightarrow^{+}$ ***Infrastructure Utilization*** $\rightarrow^{+}$ ***Airport Attractiveness*** $\rightarrow^{+}$ ***Air Traffic Demand***

A change in destinations implies a direct proportional change of passengers travelling from or to the airport. If passengers' traffic increases, there is a proportional increase in terms of airport's infrastructure utilization, which is influenced by the maximum infrastructure capability level. As the infrastructure utilization level increases, landside congestion level becomes consistent and this has a proportional effect on the internal and external quality of service level. Service quality has a direct impact on the airport attractiveness, which affects the air traffic demand and then destinations. In particular, internal services are referred to those activities that are directly provided by the airport operator such as handling, cleanings, etc.

Balancing loop (B2): QUALITY OF SERVICE

Air Traffic Demand $\rightarrow^{+}$ Destinations $\rightarrow^{+}$ Passengers $\rightarrow^{+}$ Infrastructure Utilization $\rightarrow^{+}$ Landside Congestion $\rightarrow^{-}$ Quality of External Services $\rightarrow^{+}$ Quality of Service $\rightarrow^{+}$ Infrastructure Utilization $\rightarrow^{+}$ Airport Attractiveness on Air Traffic Demand $\rightarrow^{+}$ Air Traffic Demand

As shown in the previous feedback loop, landside congestion has an impact on the quality of service level by internal and external services. Although several parties involved in the system are not directly controlled by airport operator (police, municipality transportation systems etc), external services quality strongly affects the overall passengers satisfaction.

The Stock and Flow structure of the model

In this paragraph, the Stock and Flow structure of the model is discussed. In particular, the model is composed by the following 7 sections: (a) destinations, (b) airport attractiveness, (c) passengers, (d) quality of service, (e) airport terminal cleaning expenditure, (f) security staff training hours and (g) regulated aviation fees are represented. Because of the impact on quality of service, final destinations are considered as policy levers. Model equations are available by contacting the corresponding author.

Destinations (a), Airport Attractiveness (b) and Passengers (c)

Destinations are modelled as a stock variable, because destinations' portfolio is as a strategic resource for the airport operators. The aim of the management is to increase the number of destinations in order to increase passengers' flow and the airport attractiveness. In particular, in this phase of the project, just direct destinations are considered.

Appendix 3 shows the behaviours of Business and Leisure passengers from 2008 until 2012. Because of the variation of leisure and business traffic, it is possible to assume that destinations differently affect Business and Leisure passengers. For this reason, both passengers' profiles are considered and are modelled as two different stock variables.

Destinations and Passengers are related by two different graph functions, represented by the variables within the Airport Attractiveness section.

In order to better understand passengers' dynamics, in the next phase of the project authors intend to analyse destinations by considering top, medium and low interest destinations.

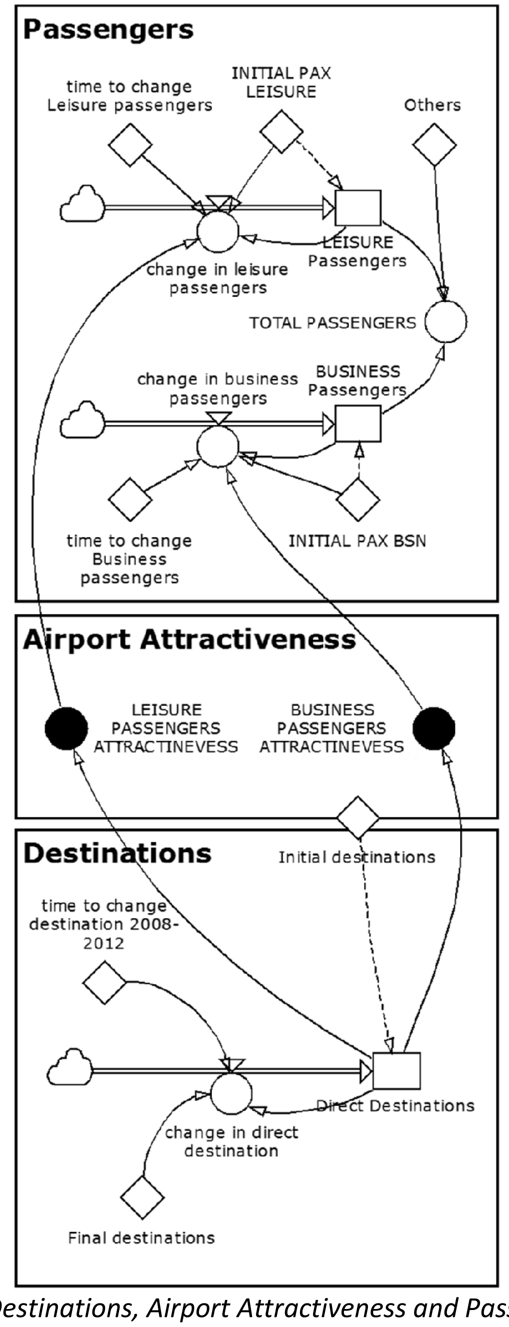


Fig. 6 – Destinations, Airport Attractiveness and Passengers

Quality of Service sector (d)

In Figure 7, the quality of service sector is represented.

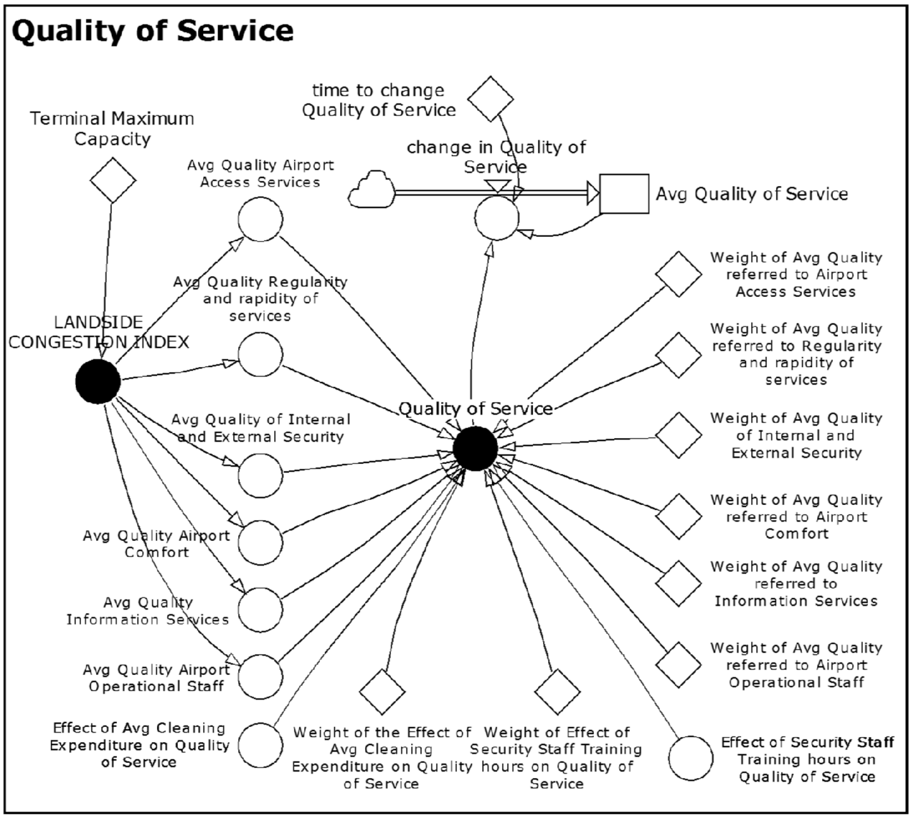


Fig. 7 – Quality of service section

In this sector, the effect of landside congestion on service quality is made explicit. For this reason, a landside congestion index is defined. This parameter affects the six-service quality areas considered. By the weighted average of the six quality areas, the overall quality of service level is obtained. As shown in Table 1 - Appendix 1, security check waiting time and general cleanliness of airport terminal quality attributes are referred to “regularity and rapidity of services” and “airport comfort” quality areas respectively. Because of the purpose of this work, their effects are separately evaluated and referring quality areas do not consider their contribution.

Airport Terminal Cleaning Expenditure (e) and Security Staff Training Hours (f)

Two different sections are dedicated to Airport Terminal Cleaning Expenditure and Security Staff Training Hours. Data acquired and following considerations on variables behaviours, lead to consider these parameters as important policy levers.

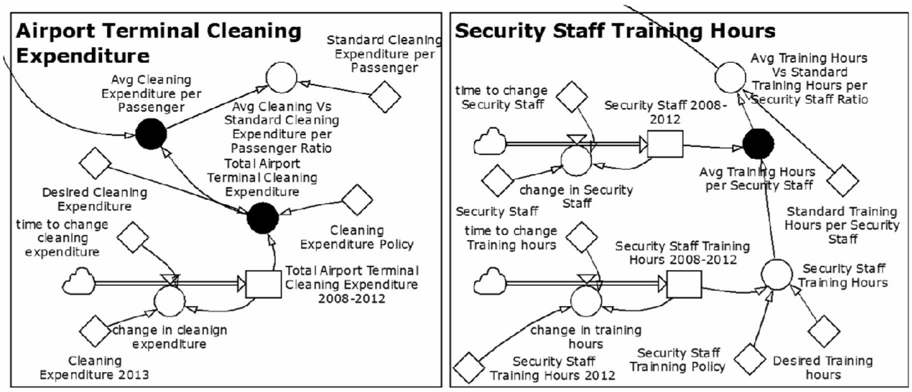


Fig. 8 – Airport Terminal Cleaning Expenditure and Security Staff Training Hours section

Simplified high-level view of the stock and flow structure

Figure 9 shows a simplified stock and flow diagram underlying the main relationships between involved variables and sections.

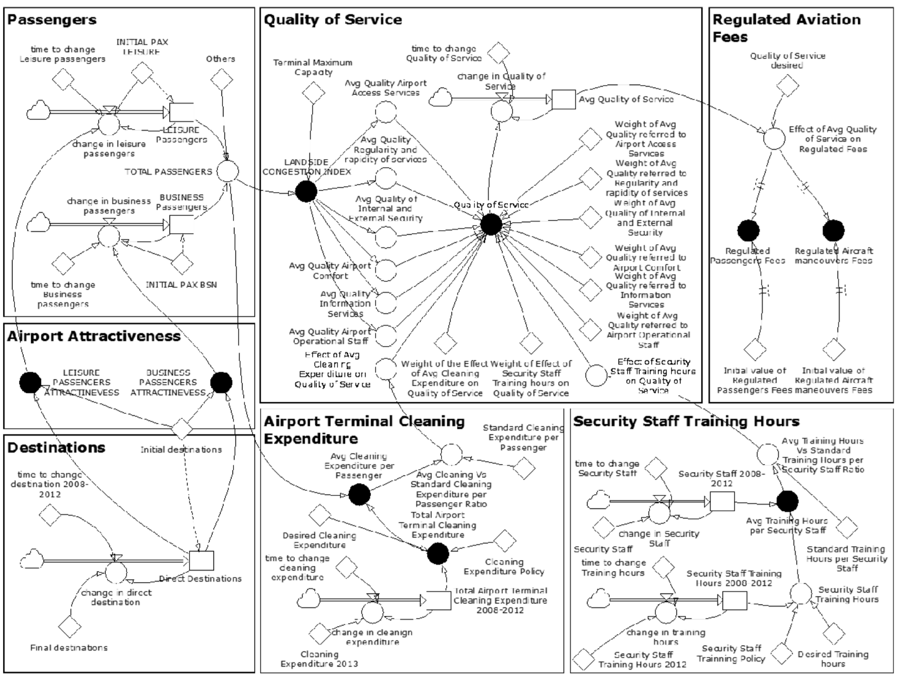


Fig. 9 – Simplified high-level view of the stock and flow structure

Scenario analysis

For the purpose of this project, three alternative scenarios are analysed (Tab. 2). In Figure 10, simulations results are shown. In order to better understanding the defined policy levers impact on quality of service, decisions are applied at the beginning of 2013.

Decisions / Scenario	**Scenario 1**	**Scenario 2**	**Scenario 3**
Final destinations	+0	+0	+5
Airport Terminal Cleaning Expenditure	1,2 M€	2 M€	2 M€
Security Staff Training Hours	2525 hrs	2525 hrs	3500 hrs

Table 2 – Decision policies adopted for different scenarios

Scenario 1

The first run is a "no action" scenario (Figure 10, black line). In this case, no variation in final destinations, cleaning expenditure and training hours are applied. As represented by results, the service quality and aviation fees decrease. In order to maintain high standards in terms of quality of service, the simulated policy seems to be not adequate for the purpose.

Scenario 2

In the second scenario (Figure 10, grey line), we evaluate the impact of airport terminal cleanliness on quality of service. In particular, cleaning expenditure is increased from 1,2 M€ to 2 M€. As a result, investing more financial resources on airport terminal cleaning lead to a positive effect in terms of quality of service. Because of the relationships assessed, aviation fees increase too.

Scenario 3

In the third run (Figure 10, black dotted line), final destinations, cleaning expenditure and security staff training hours are increased. Results show an increase in terms of quality of service and aviation fees. However, despite the higher number of security staff training hours, the service quality level is lower than in the scenario 2. This is an unexpected result, which seems to underlie a counterintuitive behaviour. This result is addressed to the effect of security staff training hours, which after a certain value it negatively affects the overall quality of service level.

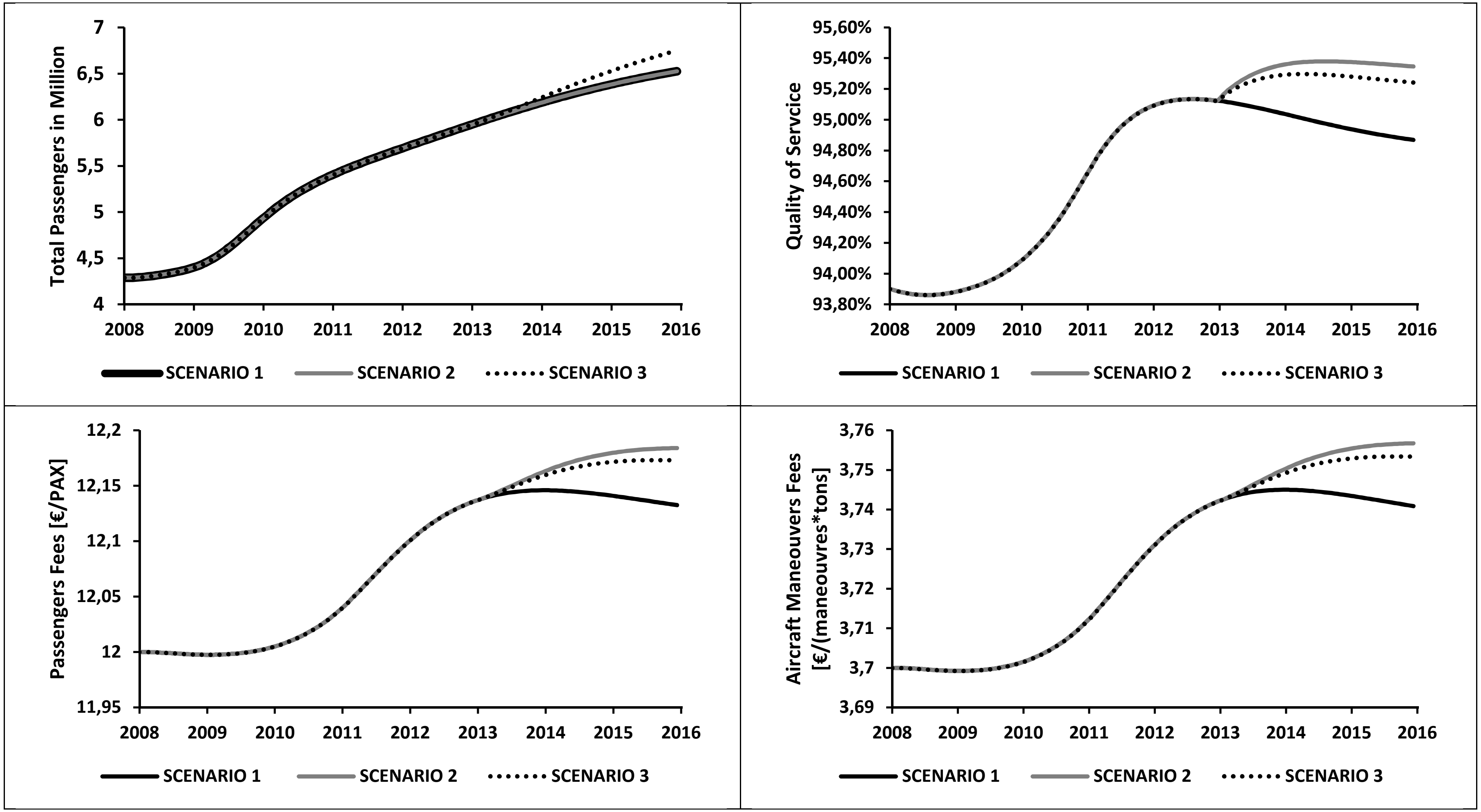


Fig. 10 – Simulations results: Total passengers, quality of service and aviation fees.

Conclusions

The airport service quality provided to passengers is strongly influenced by both aviation and non-aviation activities. Due to the high impact of passengers' service level on aviation revenues, airport operators are continuous struggling with alternative airport efficiency policies. In order to align service quality objectives with corporate goals, a deep system consciousness is required and cause-effect relationships between areas must be made explicit. This paper aims to contribute to understand how landside congestion may affect on the overall airport service quality and in turn on passengers satisfaction. A 4-month project was carried out with an Italian international airport, which provided the basis to build a SD model to support airport operator to evaluate alternative strategies to improve passengers' service quality. In this preliminary study, airport terminal cleaning expenditure and security staff training hours were selected as main policy levers to act on passengers' service quality. Simulated results showed unexpected side effects and counterintuitive behaviours, which facilitated decision makers learning. The results obtained encourage the prosecution of the project by focusing on the areas affecting passengers' service quality. In order to validate the developed SD model and to generalise the study results, this research should be also extended to a larger number of international airports.

Acknowledgement

Special thanks are extended to the Bologna G. Marconi Airport for the support in developing this project.

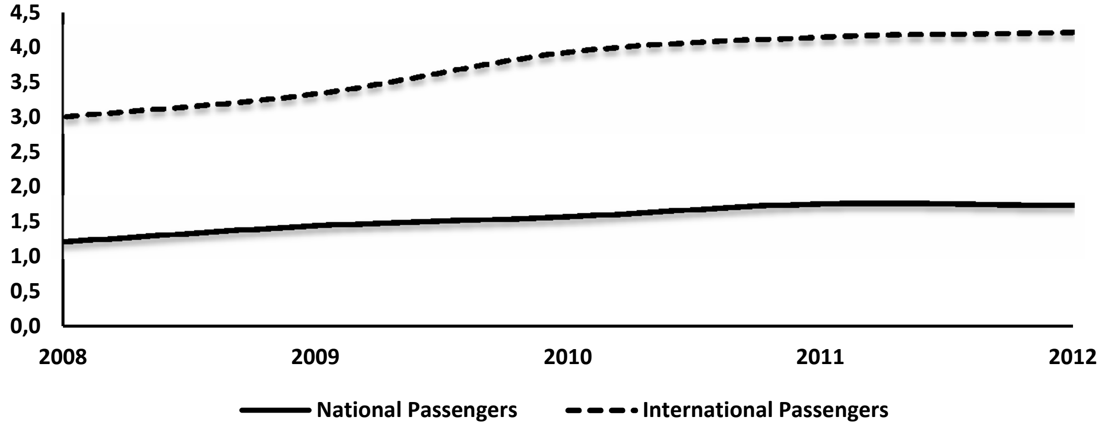
Appendix 1

Quality of Service Areas	Airport Operator Level of Control	Body in charge
A: Airport Access Services		
Bus/train/taxi prices, availability, frequency and punctuality	Low	Others
Road links between city and airport	Low	Others
Clarity and comprehensibility of access road indications	High	Airport Operator
B: Regularity and rapidity of services		
Departures:		
Check-in waiting time	Medium	Handler
Ticket office waiting time	Medium	Carriers
Passports check waiting time	Low	Police
Security check waiting time	**High**	**Airport Operator**
Arrivals:		
Passports check waiting time	Low	Police
Luggage return waiting time	Medium	Handler
Landing operations waiting time	Medium	Handler
C: Internal and External Security		
Luggage security check (departing passengers)	High	Airport Operator
Personal security perception	High	Airport Operator
D: Airport Comfort		
General cleanliness of airport terminal	**High**	**Airport Operator**
Toilettes	High	Airport Operator
Toilettes cleanliness	High	Airport Operator
Luggage trolleys availability	High	Airport Operator
Air conditioning systems efficiency	High	Airport Operator
Transport passengers systems efficiency	High	Airport Operator
Airport lightness	High	Airport Operator
Airport noisiness	High	Airport Operator
Seats availability	High	Airport Operator
E: Information services		
Information offices efficiency	High	Airport Operator
Announcements comprehensibility	High	Airport Operator
Internal directions comprehensibility	High	Airport Operator
F: Airport operational staff		
Ticket office staff courtesy	Medium	Carriers
Ticket office staff professionalism	Medium	Carriers
Check-in staff courtesy	Medium	Handler
Check-in staff professionalism	Medium	Handler
Security check staff courtesy	High	Airport Operator
Security check staff professionalism	High	Airport Operator

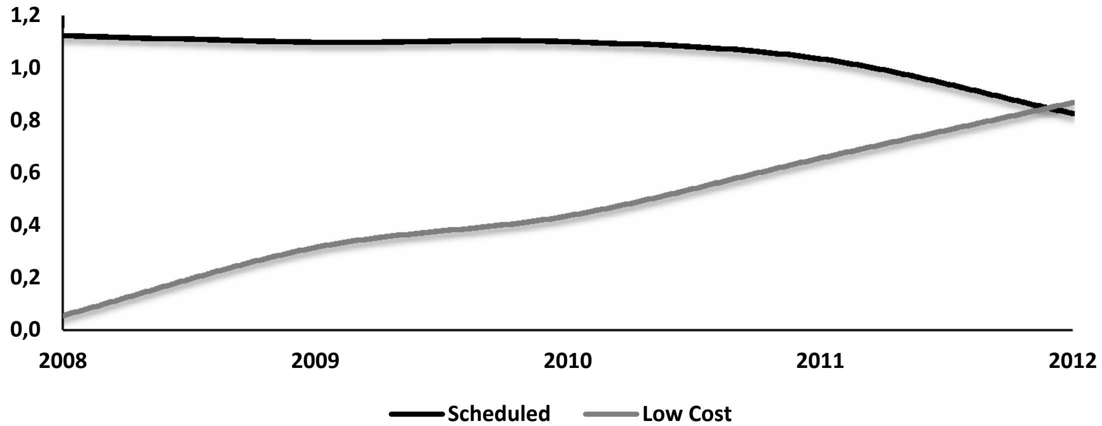
Table 1 – Quality of Service Areas and Performance indices

Appendix 2

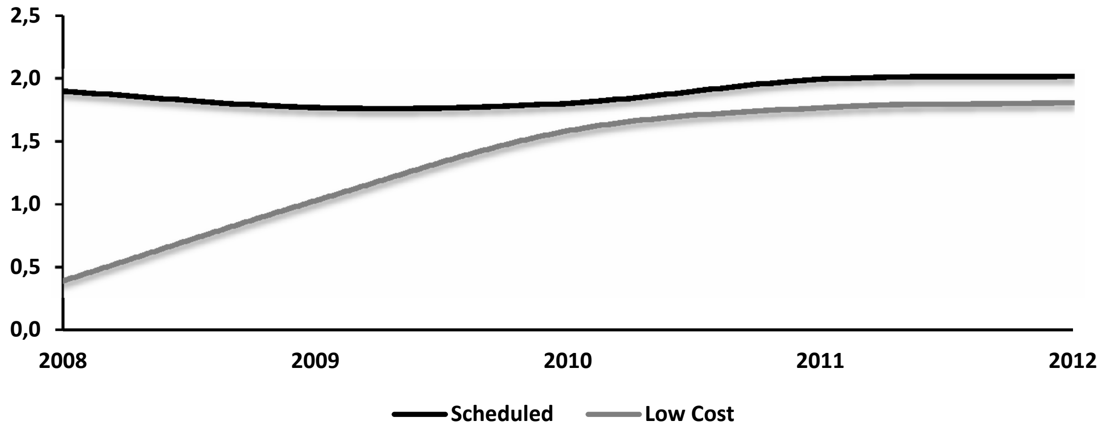
National Vs International Passengers in million



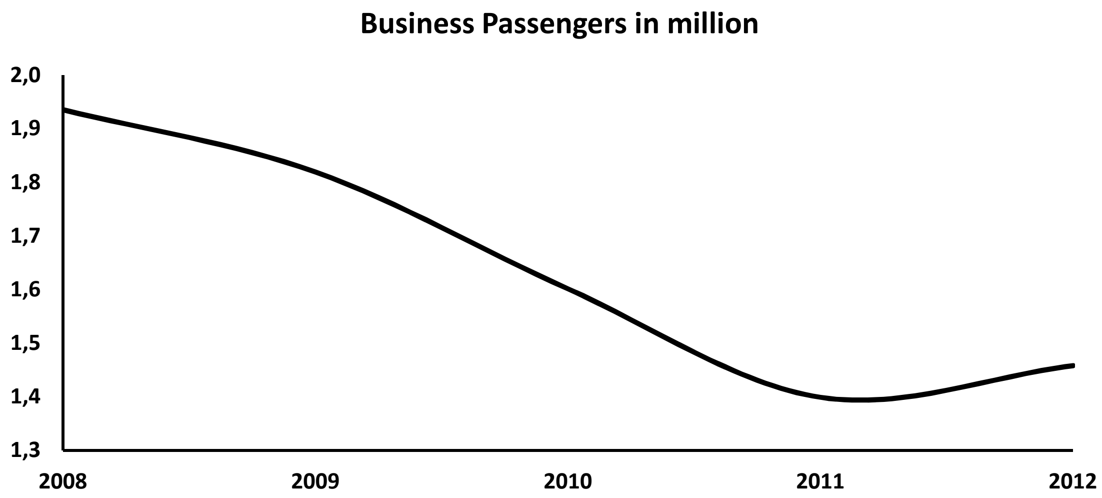
National Passengers in million

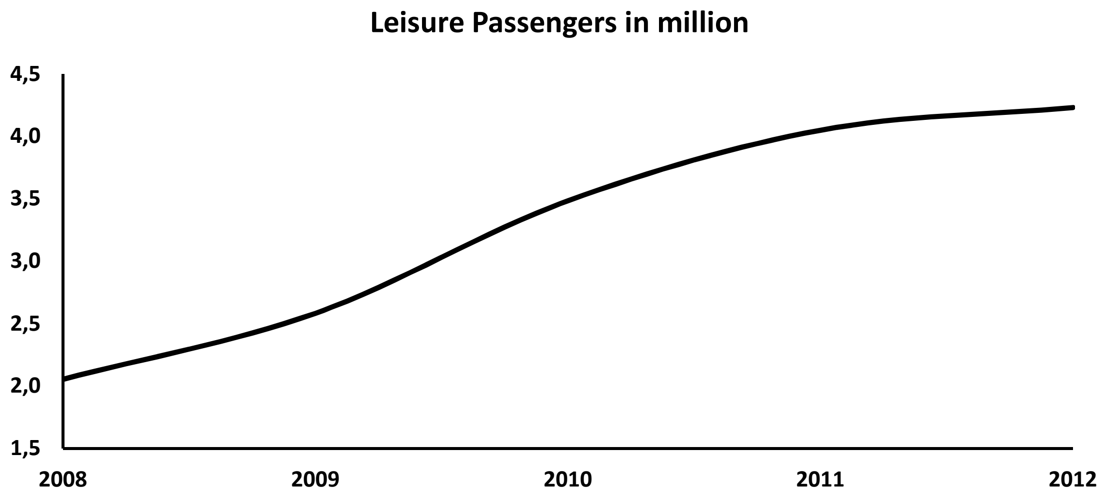


International Passengers in million



Appendix 3


Business Passengers in million
2,0
1,9
1,8
1,7
1,6
1,5
1,4
1,3
2008
2009
2010
2011
2012


Leisure Passengers in million
4,5
4,0
3,5
3,0
2,5
2,0
1,5
2008
2009
2010
2011
2012

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