Reviving failed projects: Comparing the short term and long term performance in EU-funded airport failures

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COLOPHON

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ABSTRACT

A critical report by the European Court of Auditors investigated the EU-funded renovation and building projects at 20 airports in 5 countries in Europe. It deemed all airport a 'poor value for money'. This thesis looked at the long term relevance of the investments by looking at the performance of 4 of the 20 airports during the 2013-2019 period. A good long term strategy may in some cases result in project revival however, but as few projects are the same, not many research progress has been made regarding project revival. Using a comparative quantitative approach, this thesis looked into whether project revival was present in these cases and what we could learn form it. The research on the long term found promising trends at 3 of the 4 airports. 2 of 4 airports can be considered sustainable airports and one of them can even be called a success. The results confirmed existing literature on the relevance of long term analyses when assessing project performance. Project revival thus was apparent in 3 of the 4 cases, which showed similar conditions in the 2013-2019 period, such as takeovers by larger entities, good catchment areas, rising tourism numbers and a good use of the EU-funds.

INTRODUCTION

The 21 century saw an enormous rise in tourism travel and air travel (Law, 2018). Airports saw steep rises in traffic and many governments stepped in to expand or fund their new or growing airports. But many of these airports did not achieved their intended goal and stagnate or fall into decline. Not only debatable investments have found their way into the air travel sector, with many airports being dependent on the indefinite rise of tourism, the financial crises of the last decades have proven to be detrimental to the sector. The EU also is no stranger to airport failures (Harter, 2012; Crisp, 2014; Hutchinson, 2015). Massively exceeding costs, disappointing returns or just poor investments seem the most common reasons for airport failure.

These three reasons of project failure were all apparent in a report by the European Court of Auditors from 2014. The audit focused on 20 EU-funded airports in five member states (Estonia, Greece, Spain, Italy and Poland). These airports received a total EU funding of 666 million euro. However, most of the airports failed in the research period (2007-2013) and were dubbed by the audit as a poor value for money. Most often the funds were spent on the wrong things or were not even needed in the first place. Although every airport in the research had finished their renovations and projects by the end of 2013 and could be covered in the report, it fails to make a long term analysis of these failed airports. As De Wit (1988) stated not all failed projects fail in the end, some may eventually land on their feet and become great successes. To test this statement, this thesis will focus on the performance of several of the airports studied by the ECA and see whether there is a positive or negative trend. Several crises, such as the global financial crisis of 2008 had enormous impacts on the air travel sector (Ringbeck et al., 2009). Many national crises continued in the following years, especially in Europe's peripheral countries, in which all airports in the report are situated. This could have affected the results of the report and obscured the potential of certain cases. Besides that it has been evident that air travel has been on the rise once more (Law, 2018), thus bringing new opportunity to the airports. Therefore we can assume the airports have seen more favourable circumstances and we can assume a more positive performance since the ECA assessments were made in 2013.

Researching how different airports made different approaches and resulted in different outcomes, may give an insight in how failed projects may be revived. During or after completion, many unexpected factors can influence a project and often times there is no preventing the outcome, which follows. An unexpected ill-timed financial crisis can halt a very well organised project. Obviously, preventing project failure is preferable, but as bad investment and project failure is still apparent all over the world, a greater knowledge about project revival can prove to be beneficial for many cases. Although one might suggest every project is different, reasons for failure can be similar in different sectors. Thus suggesting a similar occurrence in project revival is not unthinkable. Of course there is not one solution for all failed projects, but finding beneficial developments in revived projects can always be tested to other failures.

ECA-Report

The report made by the ECA (2014), we will be the base of this research. If 'the report' is mentioned, I will be talking about their research. I will build upon their findings and try to test their legitimacy in the long term. Even though the report was overall very clear, the Audit was vague in several instances and did not support their statements or findings with scientific support at all. Many claims and the general assessment was based on individual observation by the Audit. To try giving a more complete view of the cases and causes of failure, I will try to define certain

concepts and test them to the report. Besides that I will try to incorporate these missing concepts and theories in my own research, so this thesis may expand on the scope of the research by the Audit.

It is also important to explain the short term assessment en long term assessment in this thesis. Short term and long term don't refer to an universal span of time and can therefore be vague or unclear. Therefore short term in this case is the 2007-2013 assessment by the ECA. Only 5 of the 20 projects finished construction before 2007, so in many instances this assessment period is a lot shorter. The long term will be the period form 2013 onwards, with exclusion of the corona pandemic period, thus till 2019. Using this time frame this thesis will have a similar research period as the ECA and avoid deviations because of data affected by the COVID crisis. The pandemic has had an enormous impact on air travel and airports. With no insight in post pandemic trends, this period is excluded from the statistical assessment. When referring to short term, this report refers to the audit's assessment period of 2007-2013 and when mentioning the long term it refers to 2013-2019 period.

Relevance

This thesis tries to research the impact of poor EU investments in the long term as the ECA did for the short term, and expand on their research by trying to find an explanation for the downfall or revival of a project in the long term. This can be very relevant for poor performing project now and in the future. Every project has their own special conditions and circumstances under which it fails or succeeds. Conditions meaning the state of things directly related to the airport; management, passenger numbers, catchment area, etc. And circumstances being the state of things which are not directly related the airport; crises, tourism, politics, etc. Through researching revived projects, similar failing projects could get an overview of what to do and what not to do when they are trying to improve performance of their project (Jiang et al., 2002). Although, the focus here is on airports, but when assuming project revival is possible in the long term under certain conditions, with the right research, this should be possible in many other fields too. So its relevant for us to explain long term performance and look at which conditions and circumstances concluded in which outcomes. Of course we should strive to prevent project failure and poor project investment, but as this seems to be impossible to prevent entirely, project revival may offer a great solution for many cases. As project revival may seem primarily of social and policy relevance, further research on the subject can also achieve scientific relevance. Knowing the relevance of certain conditions and circumstances on airport/project failure or success, can make researching success and failure more straightforward. Also mapping out these conditions and circumstances in different sectors may be of great use when researching the failure, success, revival or decline of a project.

Research Questions

With that said, the following research questions are proposed:
'To what extent is project revival apparent while looking at the long term change in the failed airport projects in respect to the short term?'
With the subquestions:

- What is project revival?
- How does one measure if an airport has been revived?

- Is there a positive or negative long term trend when comparing statistics from 2007-2013 to those of 2013-2019,
- What conditions and circumstances contributed in the eventual situation of the airports in 2019?
- Which conditions and circumstances resulted in beneficial outcomes and which did not?

Structure

To answer these questions this thesis will first discuss the theories about project failure, project success and project revival. Then the methodological structure of the research and terms of assessment are explained. After which I will present and compare the data and findings on the four airports separately and consequently conclude whether my findings differ from the ECA statements from 2014. Finally I will present and try to explain my findings in a conclusion.

THEORETICAL FRAMEWORK

Introduction

To answer the first two sub questions some concept we need to know what is meant with project revival and how to measure when a project has been revived. To explore that we have to know what defines project failure and project succes.

To answer sub questions 4 and 5, explanation is needed on conditions and circumstances. What internal and external factors influence the performance of an airport and which impact project failure and success.

What is Project Failure and Success

According to De Wit (1988), project success and project management success are two separate subjects. Project management including how and by who a project is regulated. Although often intertwined, project management success does not always accomplish project success or vice versa. Other writers confirm management is key to project success (Prabhakar, 2008; Jiang et al. 2002). This difference is apparent in most airports' cases, but is not included by the ECA. The new assessments will try to include the differentiation between both subjects.

It seems most research agrees that success is a relative and subjective measurement and thus is not considered to be a simple definable concept (Prabhakar, 2008; Anderson et al., 2006; Prasser, 2007). They do agree on multiple premises; Project success is stakeholder dependent and thus a project can both be deemed a success and failure at the same time, by different stakeholders. Furthermore, success is dependent on performance and performance in its turn being dependent on previously set objectives or goals by said stakeholders. For this research to include stakeholder perceivance a qualitative research would be needed. Although, this research does not neglect the value of qualitative data when assessing airport success, but will not expand on it either as other research has already proven this link exist (Beak, 2019; Jiang et al. 2002).

Management and Facilities

De wit (1988) mentions the division between success and management success. Airport management is key to their performance (Beak, 2019) and includes several things such as the handling of staff, security and who is in charge. The latter is most interesting to us as we do not need to acquire qualitative data to research for our cases.

According to Losada et al. (2012) airports are heavily dependent on their revenue to uphold their maintenance and quality of facilities. Especially smaller airports have problems with this when the are not part of a larger airport group. Revenue is mostly generated from the passengers, so the amount of passenger passing through an airport is essential for its performance. Those facilities, such as a good functioning terminal, good connections with surrounding areas via public transport/taxi's and adequate runway and apron space are essential to the growth of the airport, which it needs to process passengers. An endless loop, which easily falls apart in smaller privatised airports. Being part of larger airport groups is therefore most beneficial for smaller airports (Losada et al., 2012).

Defining Project Revival

Project revival has been used as the literal resurrection of abandoned projects (Doraismay, 2017), but this definition does not apply to this thesis. Going by the literal meaning given by the oxford dictionary, revival means 'an improvement in the condition or strength of something'. The

definition used for project revival in this thesis will be as follows: 'A notable improvement in the conditions, circumstances and performance of an airport.'

Assessing success is difficult in a sense that success for one, does not necessarily means success for the other. Slight success or great opportunity to success might also be considered an improvement in performance an therefore considered as project revival. How notable such an improvement is will always be to the assessor, which should in every case strive to be independent. Conditions and circumstances are easier to define however. When assessing whether a project is revived an assessor should capture as much of the relevant internal and external factors in their assessment as possible.

Airports and Tourism

Even though it's not viable to look at the whole of tourism and the effects on airports, it's important to consider a couple of things.

Harvey et al. (2009) and Lei et al. (2011) note that financial crises are a massive contributor to tourism decline and because air travel mostly consists of tourism travel (Graham et al., 2008), we can assume that financial crises can indirectly have an enormous impact on vulnerable airports.

Because crises and (inter)national (financial, social or political) problems can influence tourism patterns and money flows so much, the aviation industry is a very unpredictable and changeable sector. Elaborate long term plans for airports have proven to be unsuccessful because of this, as the theatre of air travel is so susceptible to change that predicting the situation of an airport a decade in advance is very hard (Kwakkel et al., 2010). Consequently one can assume that a long term assessment can say more about an airports performance, than a short term assessment, because so much can have changed.

Conceptual Model

Using the above, the following model is made. When a project, in this case an airport project, is initiated goals are set by stakeholders. With the completion of the project several conditions determine success or failure. First off whether the goals are achieved and how the stakeholder perceive this. The projects time and cost overrun might influence the achieved goals and stakeholder perceivance. The overall performance of the project and the management during and after completion have their own share in the success or failure. Circumstances surrounding the project or external factors, such as a concurrent crisis, political unrest, etc. may also influence failure or success. Depending on all these conditions and circumstances a project is either declared or perceived as a success or a failure. Over time, the conditions and circumstances surrounding a project might change or stay the same, resulting in three possible outcomes; A project stays a failure or success; A failed project is revived and becomes a success; A project success falls into decline and becomes a failure.

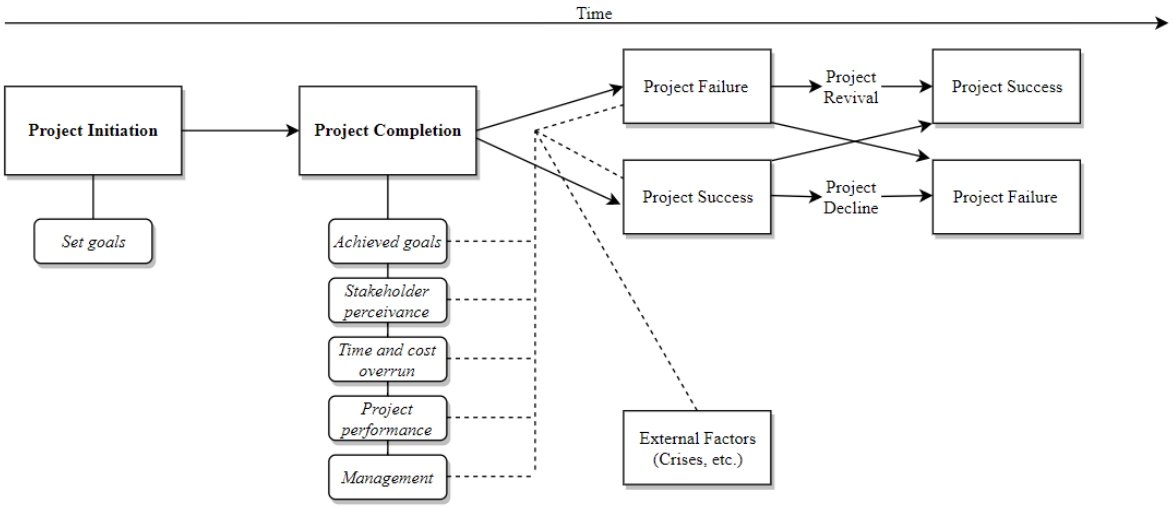

Figure 1: Arrows indicate the transition to a next stage in a project. Solid lines are part of or linked with the connected boxes. The dotted lines indicate how conditions and circumstances influence the success or failure of a project.

METHODOLOGY

Quantitative Research

To answer the question, 'To what extent is project revival apparent while looking at the long term change in the failed airport projects in respect to the short term?', we need to gather the short term data, search for the long term data and finally compare them to the conditions for success and projects revival.

It's vital to gather and organize existing data from all necessary cases to make comparison more approachable and sufficient. Thus this study will use a secondary quantitative research method, as it makes research with high quality data possible, which otherwise would not be viable (Healy, 2018). With this method, data can be acquired from various sources. After which a comparative approach will be conducted on the various cases and data points.

Cases

From the 20 airports assessed by the audit four of the most poor performing airports were chosen from the remaining countries. Córdoba Airport (Spain), Crotone Airport (Italy), Thessaloniki Airport (Greece) and Tartu Airport (Estonia). The location of the airports within Europe are visible on Figure 2.

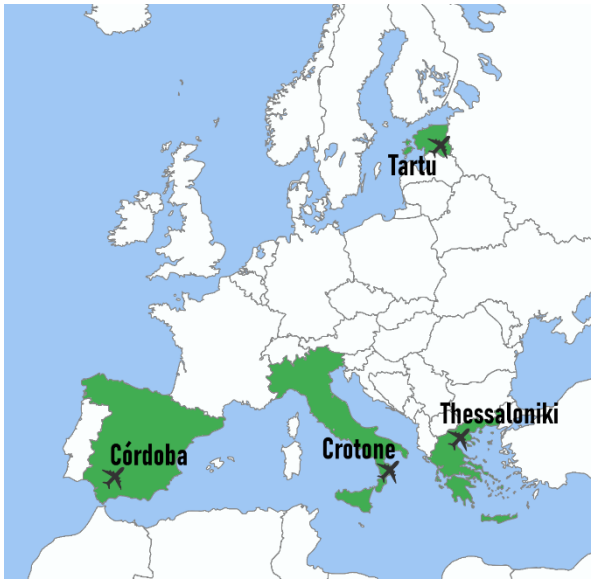

Figure 2: Map with the locations of the four airports.

Research and Quantitative Data

To answer the sub-question 3 to 5 this report will base its data points on those established in the report by the ECA. In Table 1 the first column shows the data from the report and in the second column the new data needed for comparison. Passenger trends are interesting as they show us how well an airport is doing in respect to previous years. Passengers/m2 per year give us indication of the use of the airport facilities and if they are too spacious or too small for the number of passengers passing through each year. In some cases a forecast is made for the coming years on how much passengers are expected. Seeing whether these expectation are met, gives us insight in the achieved goals and performance of the airport.

Statistical data from ECA-Report (2007-2013)	***New data and missing data from the report (2007-2019)***
Passenger trends (2007, 2010, 2013)	*Passenger trends (2007-2019)*
passenger / m2 per year(2013)	*passenger / m2 per year (2007-2019)*
Forecast Accuracy (based on forecast in 2013)	*Forecast Accuracy (based on forecast in 2013)*
Assessment and performance	***New assessment and performance***
General Assessment and supporting comments	*New assessment*

Table 1: Table with data from the report and the new data needed for comparative research

Research and Assessment

ECA Assessment

The Assessment by the ECA was based on several questions listed below.

- *Was the investment well planned?*
- *Were the physical outputs achieved?*
- *Were the investments needed?*
- *Are all outputs being used?*
- *Were expected quantitative results achieved?*
- *Were qualitative benefits achieved?*
- *Was any impact on regional economy evidenced?*
- *Is the cost per additional passenger reasonable?*
- *Is this a sustainable airport?*

To answer these questions the Audit made a colour rating system, which is included in Appendix 6. To compare the situation from 2013 with 2019 the same questions will be asked for 2019, with the same colour rating system in mind. But as mentioned in the theoretical framework to truly test the sub questions 4 and 5, the conditions and circumstances which let to the 2019 situation must be included too.

New Assessment

The new Assessment will include a research on the circumstances surrounding the airport from 2007 to 2019. To see which external factors let to which consequences for the airport and if they were of positive or negative impact on their situation. These circumstances include; the impact of crises, the impact of tourism rise, the regional opportunity and the economic and political situation of the region.

Besides external factors we will also look at the conditions in which the researched airports operated. So we can see how internal matters influenced the airports performances for the past years. These conditions include how the airport was management and by whom, development in passenger trends, catchment areas and competition and how airport facility expansions and renovations were concluded and were used.

Assessment Table

Although this thesis researches the whole period of 2013-2019, only for 2019 a general assessment is made. Making an assessment for previous years is unnecessary as the assessment of 2019 makes the old irrelevant. An assessment table is included for every airport. All colour ratings are in accordance with the criteria stated by the ECA, which is included in appendix 6.

Data Collection

Data collection will be done through collection via various online sources. For statistical data, the ECA report can provide a great deal of information, but all new data has to come from airport company data. Search terms include 'passenger numbers [Airport]','Annual Report [Airport]' and the main sites of the airports. For the conditions and circumstances various different sources were used: Info from the main websites, annual reports, news articles, various Wikipedia pages and other informative sites.

Comparative Analysis

As explained in the theory, project revival is mostly based on whether the performance has substantially bettered. The best way to do this is by comparing the 2013 data with 2019 data, therefore this thesis will do a comparative analysis. Analysing the data will be done with various tables, analysis of the passenger trends during the 2007-2019 period and a great amount of background data from that same period. This will then be reflected on the assessment by the ECA, after which I will conclude my own assessment on whether an airport has been revived or is still to be labelled a failure. I also will revisit the general assessment by the ECA, which was concluded in a table with colour rated criteria.

Discussion

In the end several data points included in the report by the ECA had no clear source or calculations and some even seemed like vague estimation (Includes cost per additional passenger). For other data points I found no information to replicate calculations and check certain assessment points as the report gave no information on how these values were achieved or gathered(Includes quality of forecasting, qualitative value of the airport and regional impact).

Furthermore the assessment by the ECA slightly touched upon economic crises as causes of failure, but does not connect this with the failure of specific airports. Words like '(mis)management', 'corruption' or 'takeovers' are never mentioned in the report although it seems these factors can influence airport performance and are in fact present in these countries (Charron et al., 2014). All critique seems focussed on the funding commissions, which lacked a clear supervising role over the funded projects. Most of these other factors are included in the new assessment and shine a new light on the causes of the failure of these projects.

RESULTS

CÓRDOBA AIRPORT

Aeropuerto de Córdoba is a small airport in Spain in the province of Andalusia, near the city of Córdoba. From 2006 till 2008 the airport received a total 13.468.562 euros of EU-funds, with additional funds by the Spanish government. In 2008 the already large runway of the airport was expanded even further costing more than 70 million euro of which 12,6 million came from the EU. The ECA stated that upon further investigation the Spanish institutions had never any reason to expand, as the runway was more than capable to handle the planes coming in and out for the following decade. When construction finished, the 2008 financial crisis hit the world and Spain was thrown into a great depression. In Cordoba, passenger numbers plummeted (Table 2; Figure 3) all the way till the end of the crisis in 2014. Cordoba was marked as the worst performing airport by the ECA-Report.

Data comparison

Data point	***2007***	***2010***	***2013***	***2016***	***2019***
Passenger trends	*22.410*	*7.852*	*6.955*	*7.636*	*10.700*
passenger / m2 per year			*67*		
Forecast Accuracy (based on forecast in 2013)	-		*4% (179. 000)*		*6% (179. 000)*

Table 2: Table of several data points for Córdoba Airport from the ECA Report and supplemented by new statistics. (ECA, 2014; AENA, 2021)

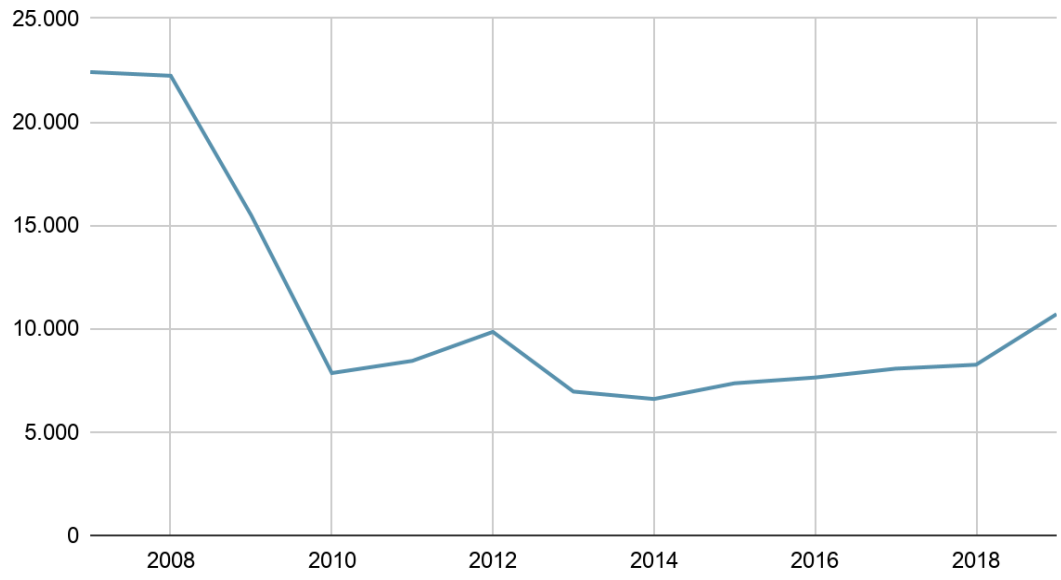

Figure 3: Passenger trends for Córdoba Airport 2007-2009 (AENA, 2021)

Assessment

ECA - 2007-2013

Córdoba scored so bad in the assessment (*See Table 3*) that the Audit was almost shocked how a project like this could have received EU-funding. The only positive score Córdoba received was because they completed their intended construction, although this was not without delay.

New assessment - 2013-2019

Spain is heavily dependent on tourism and tourism travel. As the crisis hit Spain, it hit the rest of Europe too, resulting in a decline in tourism in the region (Smeral, 2009). With this in mind the failure of Córdoba could not have been avoided. The large expansion of the runway and apron could have been avoided when the parties involved actually researched the need for it. As in many cases authorities were too optimistic about passenger increase. A study by Choy (1991) already showed that government tourism plans have little probability of influencing market forces to achieve economic success in destination areas. Although it seems that from 2014 onwards Cordoba has slowly, but steadily gotten back on their feet, but now the Covid pandemic has shut down the airport completely.

Córdoba is surrounded by large airports like Sevilla and Malaga, who both saw a decline in 2013 too, but since then Malagas passengers have risen from 13 to 20 million in 2019 and Sevilla saw a rise from 3.5 to 7.5 million in 2019 (AENA, 2021) further crippling chances of Cordoba gaining ground.

Taking into account the effect of Covid, AENA will most definitely put its resources into Sevilla, Malaga and other large airports, instead of its smaller assets as seems to be the most likely trend according to a study by Suau-Sanchez (2020). Thus, my conclusion is that Cordoba Airport has not been able to revive itself from failure and seems not to be able in the foreseeable future.

Assessment Table

As of 2019 none of the investment had proven necessary an were largely not in use. Quantitative results were also not achieved and were still far below the set goals. No information was available on qualitative benefits or regional impact. Concluding the above assessment current conditions and circumstances deem Córdoba Airport unsustainable.

Assessment point	***2013*** *(ECA, 2014)*	***2019***
Was the investment well planned?		-
Were the physical outputs achieved?		-
Were the investments needed?		
Are all outputs being used?		
Were expected quantitative results achieved?		
Were qualitative benefits achieved?		
Was any impact on regional economy evidenced?		
Is the cost per additional passenger reasonable?		
Is this a sustainable airport?		

Table 3: New and old assessment of Córdoba Airport next to the general assessment made by the ECA in 2014. In Appendix 6 you can find criteria for the colour rating for all the assessment points.

CROTONE AIRPORT

Aeroporto di Crotone-Sant'Anna is a small airport in the southern tip of Italy. In the period from 2006 till 2011 the airport received 4.736.007 euro from EU-funds. Almost 3.5 million was spent on expansion and renovation of the runways, taxiways and apron. The other funds went into the expansion of the terminal and safety systems. The renovation of the terminal was actually needed according to the ECA. Crotone also was one of three airports which did not have any delay in building and renovation schedules, cost per additional passenger was feasible and passenger numbers rose to an all time high in 2012. Despite these promising accomplishments, the airport made losses between 2007 and 2012. When passenger numbers dropped by 84% in 2013 (*Table 4 and Figure 4*), the economic crisis in Italy hit an all time low (Dw.com, 2014) and no money was available to save the small airport from bankruptcy. In early 2015 Crotone Airport was declared bankrupt and the airport closed in 2016. In 2017 the management of the airport was given to the Calabrian Airport Company (SACAL) and subsequently reopened, with great success, hitting an all time high of 169.780 passengers in 2019

Data Comparison

Data point	***2007***	***2010***	***2013***	***2016***	***2019***
Passenger trends	*106.122*	*103.828*	*25.180*	*0*	*169.780*
passenger / m2 per year	225	104	*25*	*0*	*69*
Forecast Accuracy (based on forecast in 2013)			*8% (306. 000)*		*55% (306. 000)*

Table 4: Table of several data points for Crotone Airport from the ECA Report and supplemented by new statistics. (ECA, 2014; Assaeroporti, 2021)

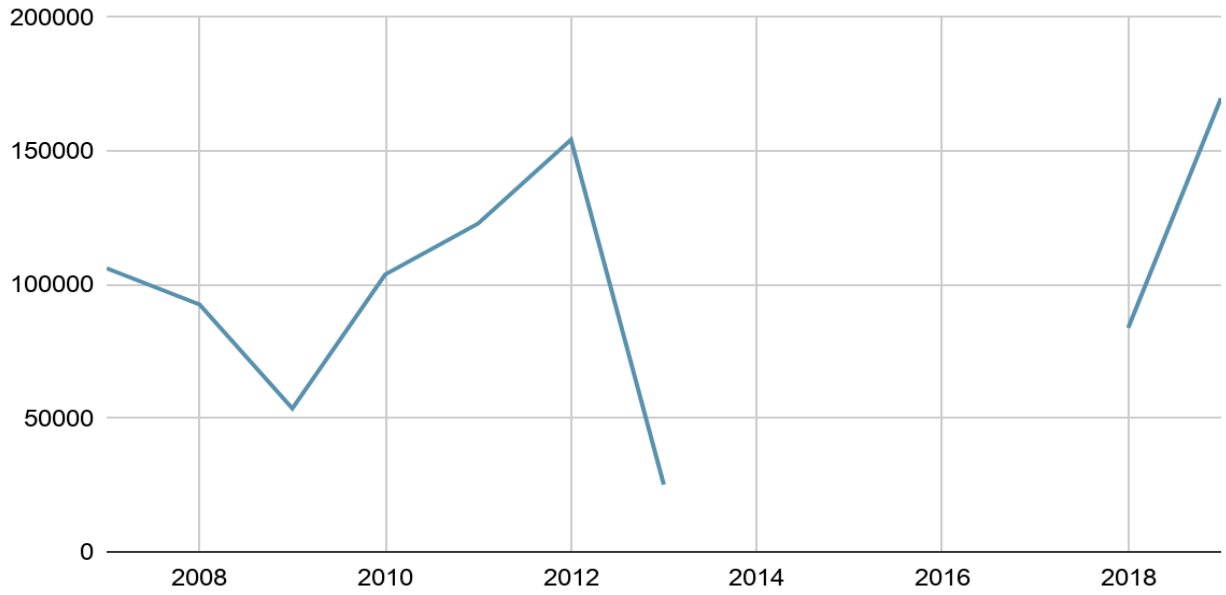

Figure 4: Passenger trends for Crotone Airport 2007-2009 (Assaeroporti, 2021)

Assessment

ECA - 2007-2013

Crotone received the worst score out of the 5 Italian airports included in the ECA report. Although some criteria were met, when the research ended in 2013 Crotone saw the worst decline in passenger numbers of all the cases and was deemed unsustainable by the Audit (Table 5).

New assessment - 2013-2019

According to the ECA report, Crotone Airport failed. It failed to reach its forecasted passengers and even with rising statistics the airport did not make any profit. From the report and other sources nothing makes us assume losses during the period 2007-2012. Mismanagement therefore seems the most likely problem for the failure at Crotone. After the Airport went bankrupt and SACAL took over, Crotone became bigger than it ever was within 2 years. If not for COVID and following the new trend, the airport would have reached its 2013 goal of 306.000 passengers in 2021. However, Crotone is situated in the southern tip of Italy, which makes the catchment area naturally rather small. Besides that the near and bigger airport of Lamezia also saw a steep rise in passengers in the past years.

Therefore I conclude that Crotone Airport has been able to revive itself, but can not yet be called a success. Although it has to be seen how the pandemic has affected tourism and how that in turn will impact SACAL, chances are likely that Crotone will bounce back as it did in the 2018-2019 period, eventually reaching its forecasted statistics.

Assessment Table

Not all the investments proved to be necessary, but all the outputs are as of 2019 used on a regular basis. Looking at current trends, quantitative results will be achieved in a few years. With SACAL now in charge, certain qualitative benefits are now in place, like better security and more regular flights. No regional impact was reported in relation to the airport. In correlation with the assessment above and the rising number of passengers, Crotone Airport might yet become a sustainable project.

Assessment	***2013*** *(ECA, 2014)*	***2019***
Was the investment well planned?		-
Were the physical outputs achieved?		-
Were the investments needed?		
Are all outputs being used?		
Were expected quantitative results achieved?		
Were qualitative benefits achieved?		
Was any impact on regional economy evidenced?		
Is the cost per additional passenger reasonable?		
Is this a sustainable airport?		

Table 5: New assessment of Crotone Airport next to the general assessment made by the ECA in 2014. In Appendix 6 you can find criteria for the colour rating for all the assessment points.

THESSALONIKI AIRPORT

Thessaloniki Airport "Makedonia" is a large airport in the Macedonia province in Northern Greece. It's the third largest airport of the country, after Athens and Heraklion. The airport lies near the city of Thessaloniki, which is the second largest city of Greece. The Airport received €54.054.434 million in the period from 2001 till 2009, of which 11.779.105 went to the terminal expansion, 25.433.541 went to apron and runway construction and the remaining 16.841.788 went into cargo related apron and facilities. Thessaloniki was actually 1 of 4 airports where expansion was deemed necessary by the ECA. Despite this, the expansion of the terminal had a delay of over 4.5 years and the whole cargo expansion was deemed unnecessary by the ECA-report. The airport passenger numbers rose from 2.2 million in 1994 to 4 million in 2007, but then stagnated till 2013. In late 2014, early 2015 the airport was acquired by Fraport, a German based company. Under Fraport the passenger numbers peeked at almost 7 million in 2019 (Table 6 and Figure 5). From 2015 Thessaloniki saw an enormous rise in cargo freight, with an astounding 10% increase in 2017

Data Comparison

Data point	***2007***	***2010***	***2013***	***2016***	***2019***
Passenger trends	*4,167,969*	*3.910.751*	*4.039.576*	*5.735.581*	*6.895.331*
passenger / m2 per year	*290*	*150*	*155*	*220*	*265*
Forecast Accuracy (based on forecast in 2013)			*not available*		*not available*

Table 6: Table of several data points for Thessaloniki Airport from the ECA Report and supplemented by new statistics. (ECA, 2014; Fraport Greece, 2021; Wikipedia, 2021)

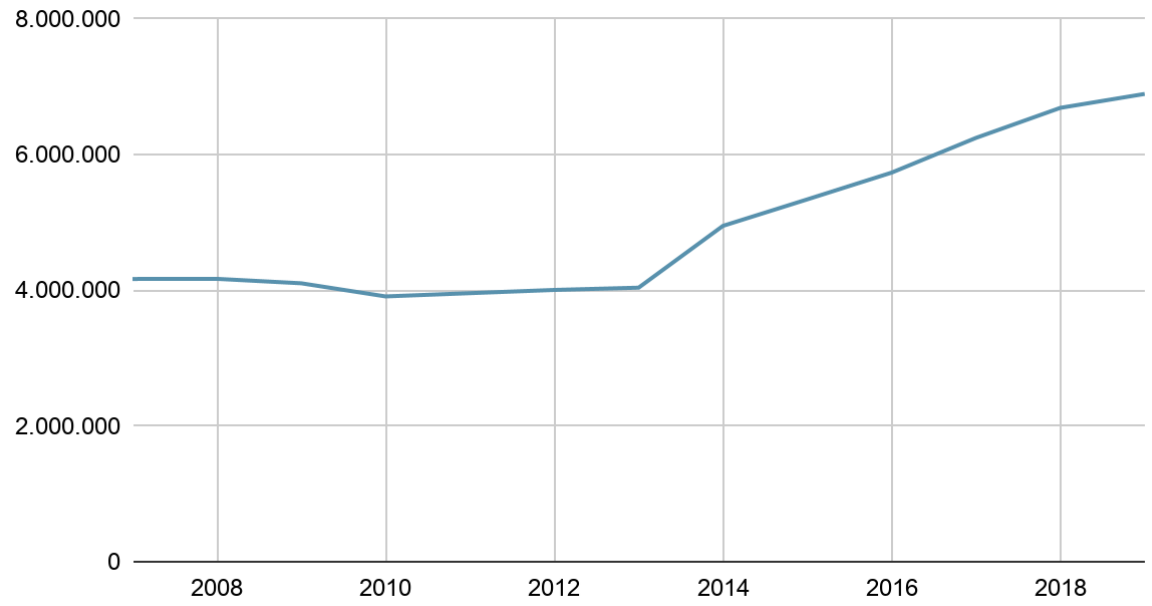

Figure 5: Passenger trends for Thessaloniki Airport 2007-2009 (Fraport Greece, 2021; Wikipedia, 2021)

Assessment

ECA - 2007-2013

Thessaloniki as one of the larger airports in the audit, but during the renewal projects there were many mistakes among the successes. The stagnation of passenger traffic did not see an upward trend after the completion of the new terminal and other facilities. Therefore the audit was not sure whether Thessaloniki would be considered sustainable (See Table7).

New assessment - 2013-2019

Although Thessaloniki Airport was not deemed a failure and actually showed quite positive numbers in various assessment points, the airport was definitely not called a success by the ECA. Expansion and renovation did not come with passenger increase and many new facilities stood empty in the early years of its construction. Therefore the airport was presented as not profitable. After the research by the ECA, Thessaloniki Airport was privatised, acquired by a new company, saw an almost 75% increase in passengers (till 2019) and saw a massive increase in freight transport. Thus making the cargo expansion years earlier a useful investment in the end. And with the Chinese now involved in the port of Thessaloniki (Van Leijen 2020), this rise will probably continue in the coming years. Looking at the graphs and both assessments, Thessaloniki Airport may be one of the best examples of how long term trends can not be neglected in research (De Wit, 1988). In the past years Fraport has expanded the airport and terminal even more and expects an 48% increase in passengers by 2026.

Covid has damaged passenger and freight traffic greatly, but with the current conditions and beneficial circumstances around Thessaloniki, I won't see any reason for the airport not bouncing back in a few years. Pre-Covid Macedonia saw the most tourism of mainland Greece (ELSTAT, 2018) and the two closest airports are so small that Thessaloniki does not have any strong competition nearby. Thus I conclude Thessaloniki airport has been able to prove itself a sustainable airport and can be considered a success after all.

Assessment Table

Eventually all outputs were achieved and were all still in use by the end of 2019. During the new assessment periods Fraport has expended the airport even more to hold up with capacity. The investments were needed, although the ECA was correct in saying freight storage was not needed or in use by 2013. These buildings have since seen another expansion and are now in full time use. Quantitative measures were achieved. Qualitative measures were achieved when the terminal expansion was completed. Tourism in the Makedonia province grew simultaneously to the expansion of the airports capacity and thus has a regional impact. In line with the assessment and favourable circumstances in regional development and China involved in trade, Thessaloniki has great opportunity to expand even further, but is deemed as a sustainable airport.

Assessment	***2013*** *(ECA, 2014)*	***2019***
Was the investment well planned?		-
Were the physical outputs achieved?		
Were the investments needed?		
Are all outputs being used?		
Were expected quantitative results achieved?		
Were qualitative benefits achieved?		
Was any impact on regional economy evidenced?		
Is the cost per additional passenger reasonable?		
Is this a sustainable airport?		

Table 7: New assessment of Thessaloniki Airport next to the general assessment made by the ECA in 2014. In Appendix 6 you can find criteria for the colour rating for all the assessment points.

TARTU AIRPORT

Tartu Airport is the second largest airport of Estonia. The airport of Talinn is the biggest in the country and was the only airport of Estonia receiving large passenger planes, till Tartu's expansion and renovation from 2008 to 2012. EU funds for the airport totalled to €11.805.499,- and were primarily used for a new larger runway and a new terminal.

Data from the report shows a more than 1000% increase from 2007 to 2013, the largest change in the research by the ECA. However, the same figures also show a decline from 2010 to 2013. This was due to several regional airlines breaking ties with the airport, which was never mentioned in the report. After 2013 Tartu Airport was absorbed by Talinn Airport and is now managed and maintained by them. The data from the ECA and the new data gathered by this research are presented in Table 8 and Figure 6.

After the takeover by Tallinn, Tartu has again expanded its passenger range resulting in a 2000% increase in passengers in the period 2007-2019. The passenger trends for the whole research period are presented in the graph in Figure 5. Because of the increase in passengers, the amount of passengers per m2 per year went up too and reached 46 in 2019, still a bit short from the margin of 50 passengers per m2 proposed by the ECA. Concluding this, the passenger forecast made for Tartu Airport has been reached and passed in the previous years.

Data comparison

Data point	***2007***	***2010***	***2013***	***2016***	***2019***
Passenger trends	1.182	23.504	13.790	29.594	28.322
passenger / m2 per year	*2*	39	22	-	46
Forecast Accuracy (based on forecast in 2013)			-71%		+59%

Table 8: Table of several data points for Tartu Airport from the ECA Report and supplemented by new statistics. (ECA, 2014; ECAA, 2021)

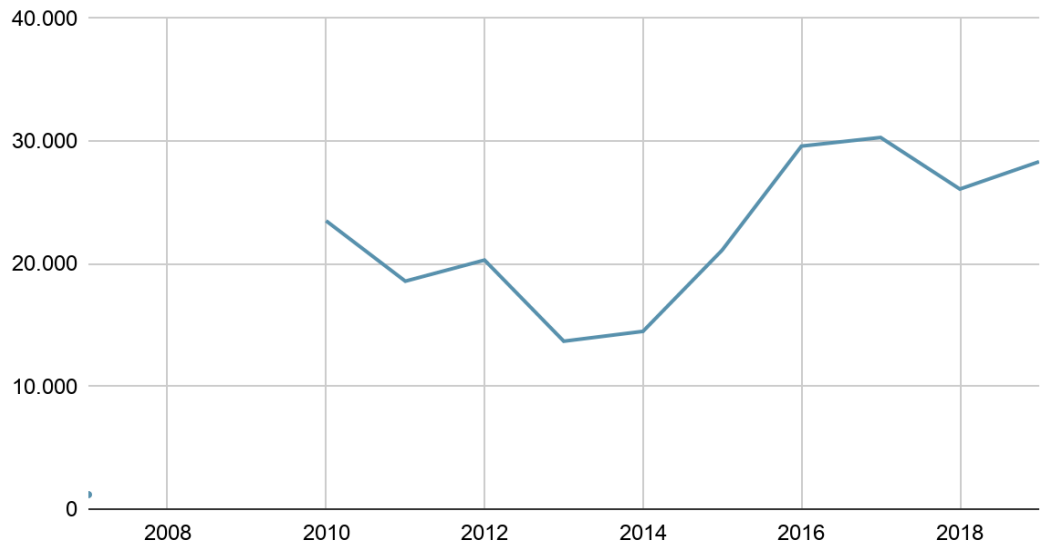

Figure 6: Passenger trends for Tartu Airport 2007-2019 (ECAA, 2021)

Assessment

ECA - 2007-2013

Considering the small size of Tartu the airport was assessed fairly positive (Table 9). Similarly sized airports in other countries performed worse. Nonetheless the ECA was not sure about Tartu and deemed the airport not sustainable, with any estimation of 7 years for return of investments. However Tartu's geographical position seemed optimal.

New assessment - 2013-2019

Tartu did not seem a failure to the ECA, but after the opening of the airports new terminal and expanded runway it saw a decline of passengers till 2013. The airport saw the largest increase of passengers of all airports. However, to call this a success is not fair. The airport only received commercial flights for the first time in 2010 and numbers before that moment should therefore not be used for comparing statistics with other airports. Still the takeover by Tallinn airport was a great success for the airport, according to an annual report by Tallinn Airport (2018).Tallinn was also include in the report and was the best scoring airport by the ECA and has since seen an almost 67% increase in travellers with almost 3,3 million passengers in 2019 (ECA, 2014 & TAT, 2020). In 2019 most flights in and out of Tartu are Regional (to Riga and Helsinki). If not for Covid and the Baltic states seeing a rise in tourism (Jacobsen, 2018), Tallinn would have had to expand or redirect flights to Tartu.

Thus my conclusion for Tartu is that it is doing fine under the wing of Tallinn Airport. But if it will expand or receive more flights is now in Tallinn's hands to. It is possible that the airport will remain a regional airport and will stagnate on the 40.000 passengers per year. But it's fair to say the opportunity is there and therefore Tartu is deemed a sustainable airport.

Assessment Table

Already by 2013 physical outputs were achieved and by 2019 all outputs are in use. Qualitative benefits have improved under Tallinn Airport, regular flights and public transport connections are now in place. Although the rise in passenger numbers cannot be directly linked to be impactful on the regional economy, it did coincide with a rise n tourism in the Baltics. Cost per additional passenger is now reasonable under Tallinn's wing. With the above assessment and beneficial conditions and circumstances surrounding Tartu, the airport is considered sustainable.

Assessment	***2013*** *(ECA, 2014)*	***2019***
Was the investment well planned?		-
Were the physical outputs achieved?		
Were the investments needed?		
Are all outputs being used?		
Were expected quantitative results achieved?		
Were qualitative benefits achieved?		
Was any impact on regional economy evidenced?		
Is the cost per additional passenger reasonable?		
Is this a sustainable airport?		

Table 9: New assessment of Tartu Airport next to the general assessment made by the ECA in 2014. In Appendix 6 you can find criteria for the colour rating for all the assessment points.

Conclusion of the results

Concluding the results of the data research and the assessment, the sub questions 3, 4 and 5 can be answered as follows.

Is there a positive or negative long term trend when comparing statistics from 2007-2013 to those of 2013-2019?

As can be seen in figure 2 through 5, Cordoba, Thessaloniki and Tartu saw positive trends in the past several years. Crotone too saw a rise in passengers from 2013 to 2019, but that number was lower than the initial number of passengers in 2007. Nonetheless, this shows us that, as was enticipated in the introduction, tourism rise and increase in passengers in the air travel sector (Law, 2018) is visible in graphs for all of the assessed airports and compard to the final numbers in 2013 all airports have seen an increase in passengers.

What conditions contributed in the eventual situation of the airports in 2019?

Management seems to play a great role in airport success in the long term (Beak, 2019; De Wit, 1988). Córdoba was and is part of the AENA, which controls most airports in Spain. Crotone and Tartu were privately owned and saw a takeover by a larger airport group. Where government owned Thessaloniki saw a takeover by a greater private cooperation. Larger cooperation's seem to bring new opportunity for international flights, which is an accessory of their size and reach. Besides that they bring security of existence, as Córdoba and Crotone would not have survived if not for their larger airport groups.

Passenger trends may not seem like a condition and more like a product of several conditions and circumstances. Although it indeed is, higher passenger numbers often results in a more stable source for revenue, which is vital to keep an airport operating (Losada et al., 2012).

Airport facility expansion/renovation, although in many cases seemed unnecessary according to the ECA, proved to be beneficial for eventual growth. The expansion of the runway in Crotone did not save it from bankruptcy, but made the airport more interesting to bigger corporations and eventually was taken over by SACAL. Thessaloniki's freight expansion stood empty for many years, but Fraport saw opportunity in the air freight infrastructure and has since their take over of the airport been in full use. We can however not assume that every 'unnecessary' expansion will result in opportunity and eventually be used. In Córdoba's case, none of the expansions to the airport were used since it's completion.

Which circumstances resulted in beneficial outcomes and which did not?

Various Crises have impacted the assessed airports. Financial crises impact the flow of tourism, which all our airports depended on. The private smaller airport endure the most severe problems from this (Losada et al., 2012).

Regional opportunity seems important too. too many competitors in the vicinity is not beneficial for growth. With less competitors there is more room for expansion and a bigger change of making deals with more airlines. Rising tourism numbers in the region around the airports also expand on this potential, because a rise in tourism may coincide with a rise in air travel.

CONCLUSION

- Only one airport can be considered a failure by assessment criteria.
- 3 of the 4 airports examined have seen absorption or takeovers by larger entities after 2013 and have considerably benefited from this.
- 3 of the 4 airports have been able to revive themselves and 2 of them can be deemed sustainable airports. Only Thessaloniki will be credited with being considered a success.

So to answer the question; 'To what extent is project revival apparent while looking at the long term change in the failed airport projects in respect to the short term?' It is apparent in 3 of the 4 airports, which clearly show a better performance in 2019 than in 2013. Although revival of only 2 of 4 airports can be directly linked to the 2000-2013 EU-funds, it is apparent that airports are very susceptible by many factors. In Cordoba and Crotone, failure could be directly linked to crises, mismanagement or ownership by small private corporations. Through the absorption of Crotone Airport by SACAL, the airport might still have a chance of success, which would seem impossible if you don't consider the long term data gathered in this research. Through the case of Thessaloniki we can verify that project success is in part a concept of time, but is also dependent on a dozen of other factors. Tartu's case now seems very dependent on tourism increase in the Baltic States.

During this research I also found that, the larger the airport, the larger the passenger increase was in the last few years (2013-2019). Not only was this evidenced in the graphs of the 4 airports I researched, but the neighbouring and competitor airports, which were also examined, all showed similar trends. This would suggest large airports are more susceptible to change and can thus grow their numbers far more rapidly in the right circumstances, but will consequently be hit harder in less fortunate times. Take overs by larger entities seem to have positive impacts on most of the cases. However, in the case of Córdoba, which was already part of a larger organisation, this did not benefit the airport. The significance of airport groups and larger corporations on airport success can be a topic for future research.

Reflection

Considering the scale of this research, researching more of the 20 airports would have given a far clearer answer to the research questions, but due time and word constraints that simply was not possible. Also this research does not account for the Covid pandemic and only some assumptions can be made about the trends and performance after tourism can slowly start again. Furthermore stakeholder satisfaction and other qualitative aspects are not used, because the ECA report did not have qualitative data, qualitative research could not have been reflected back on data from 2013.

Further research

As the pandemic has shown, the aviation sector is very unpredictable. So knowing how and why airports succeed or fail and how they revive themselves or decline over time, can help in gaining more strategic knowledge of airports and the aviation sector as a whole. Further research can build upon this statement. Applying the same research on more airports might give a broader and better scope of what is needed for revival. It might be useful to look more into the effect of catchment areas and management by larger corporations on airport performance, as both subjects have not been fully explored in this thesis.

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Appendices

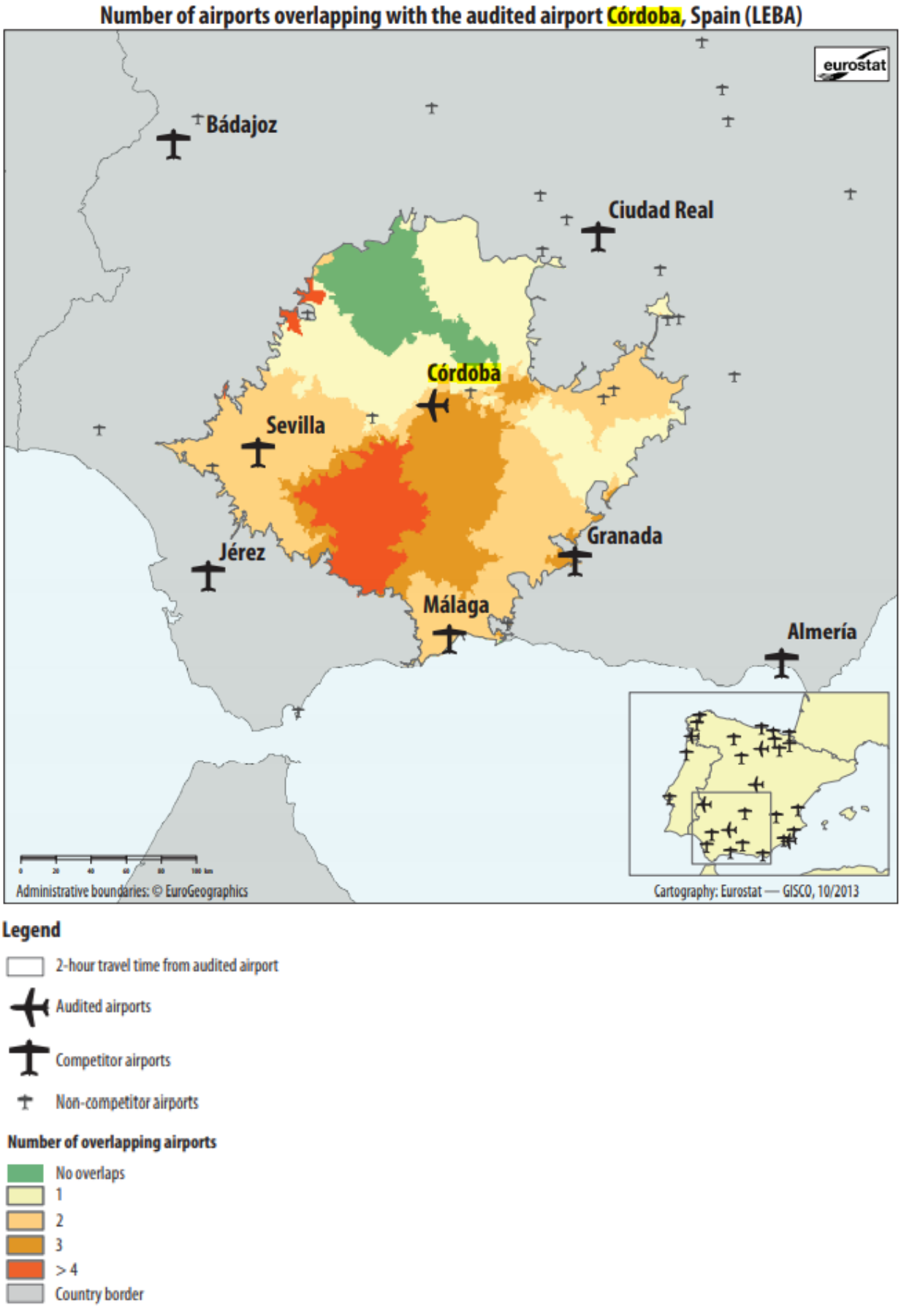
Table of Contents

1 - Córdoba Airport Additional Data

1a – Passenger Data with sources.

Year	Passengers	Source
2007	22.410	(AENA, 2021)
2008	22.230	(AENA, 2021)
2009	15.474	(AENA, 2021)
2010	7.852	(AENA, 2021)
2011	8.442	(AENA, 2021)
2012	9.844	(AENA, 2021)
2013	6.956	(AENA, 2021)
2014	6.598	(AENA, 2021)
2015	7.357	(AENA, 2021)
2016	7.636	(AENA, 2021)
2017	8.064	(AENA, 2021)
2018	8.254	(AENA, 2021)
2019	10.700	(AENA, 2021)

1b – Overlapping catchment area, map by the ECA (2014), with data from Eurostat.

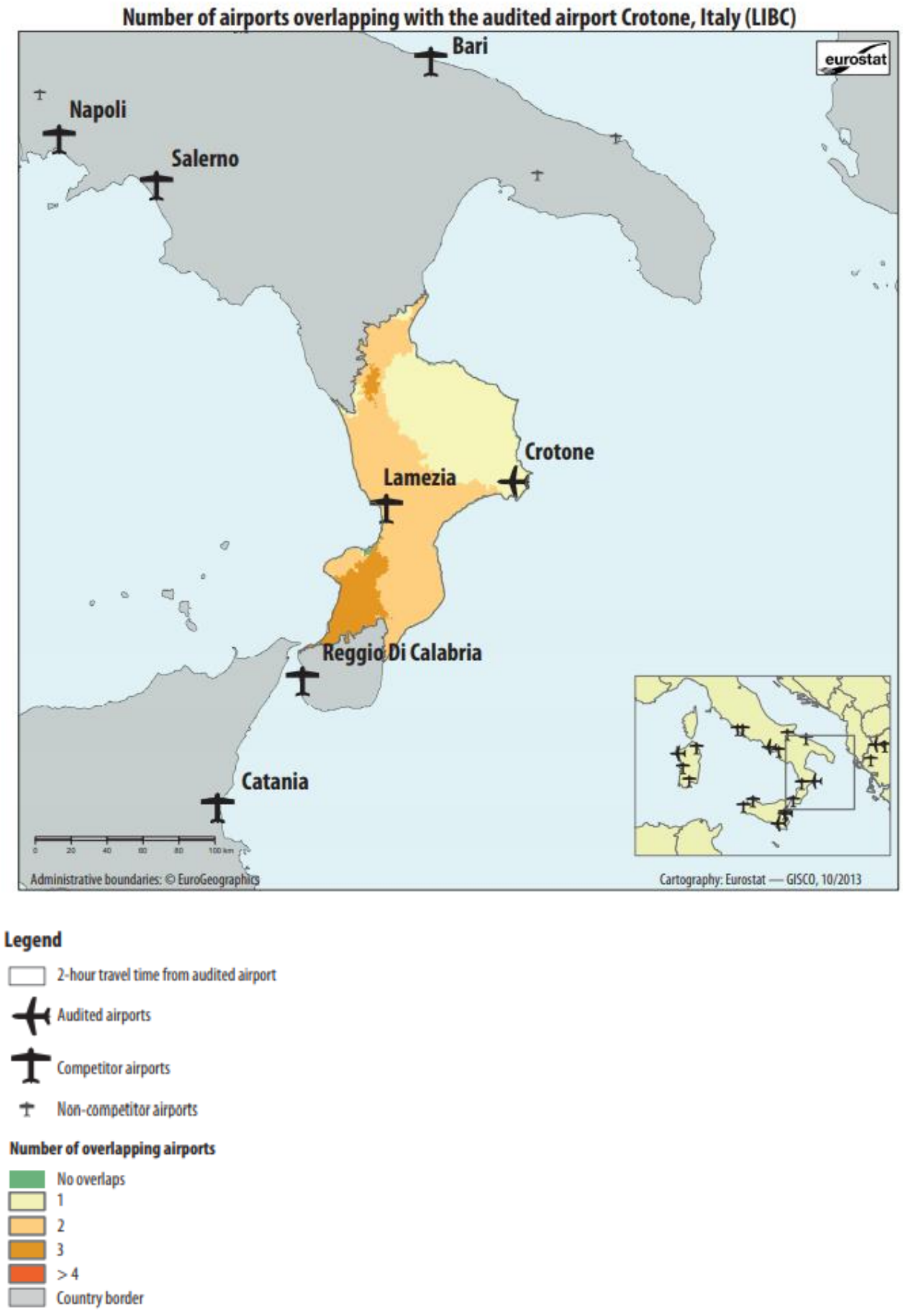


2 - Crotone Airport Additional Data

2a – Passenger Data with sources.

Year	Passengers	Source
2007	106.122	(Assaeroporti, 2021)
2008	92.586	(Assaeroporti, 2021)
2009	53.672	(Assaeroporti, 2021)
2010	103.828	(Assaeroporti, 2021)
2011	122.874	(Assaeroporti, 2021)
2012	154.250	(Assaeroporti, 2021)
2013	25.180	(Assaeroporti, 2021)
2014	- No Data	(Assaeroporti, 2021)
2015	- No Data	(Assaeroporti, 2021)
2016	- No Data	(Assaeroporti, 2021)
2017	- No Data	(Assaeroporti, 2021)
2018	83.854	(Assaeroporti, 2021)
2019	169.780	(Assaeroporti, 2021)

2b – Overlapping catchment area, map by the ECA (2014), with data from Eurostat.

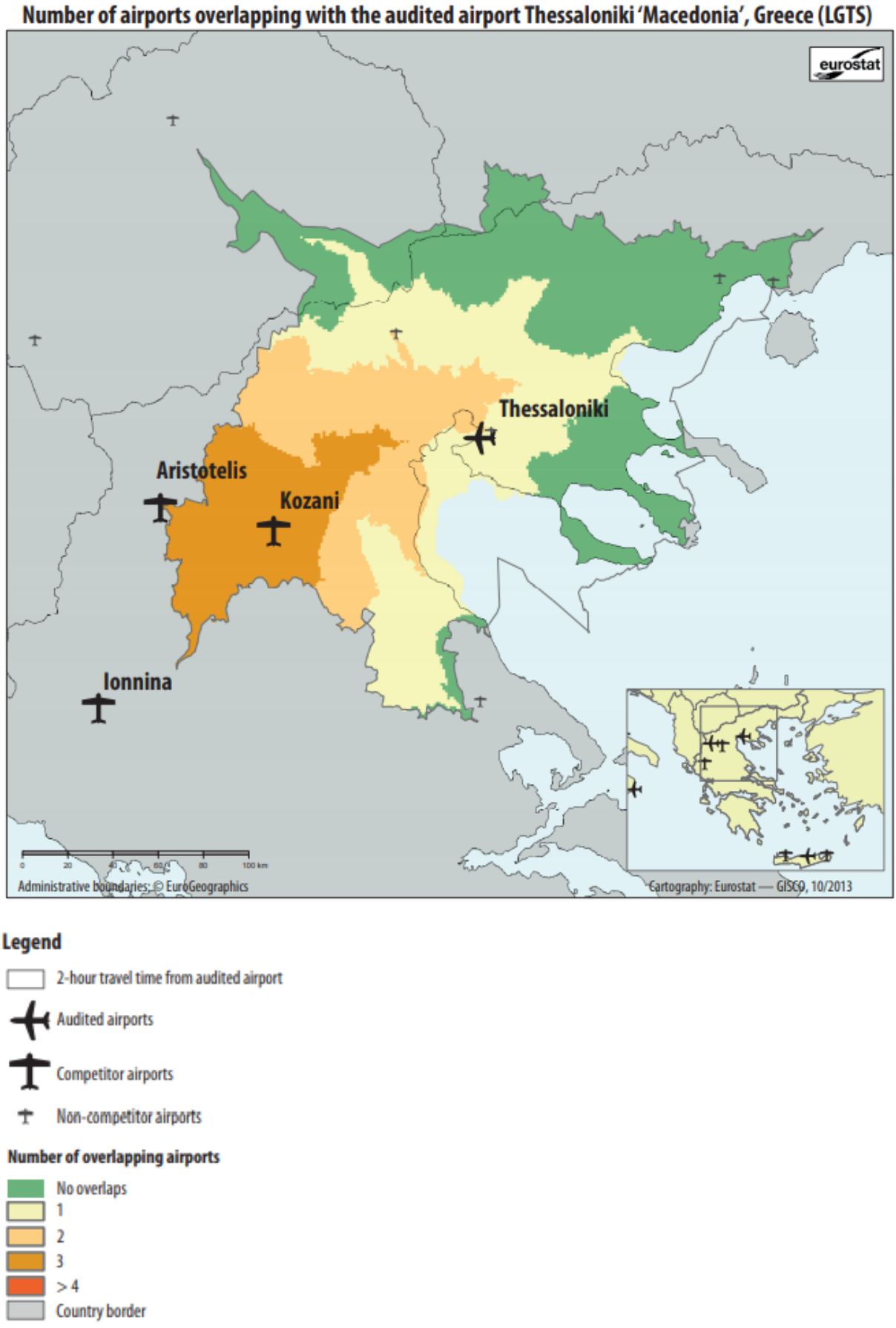


3 - Thessaloniki Airport Additional Data

3a – Passenger Data with sources.

Year	Passengers	Source
2007	4,167,969	Wikipedia (2021), without source to evidently prove or contradict these numbers, but is positively close to numbers presented by ECA.
2008	4.169.559	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2009	4.104.195	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2010	3.910.751	Wikipedia (2021), without source to evidently prove or contradict these numbers, but is positively close to numbers presented by ECA.
2011	3.958.475	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2012	4.006.204	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2013	4.039.576	Wikipedia (2021), without source to evidently prove or contradict these numbers, but is positively close to numbers presented by ECA.
2014	4.950.726	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2015	5.341.293	Wikipedia (2021), without source to evidently prove or contradict these numbers.
2016	5.735.581	Fraport Greece (2021)
2017	6.247.514	Fraport Greece (2021)
2018	6.690.269	Fraport Greece (2021)
2019	**6.895.331**	Fraport Greece (2021)

3b – Overlapping catchment area, map by the ECA (2014), with data from Eurostat.

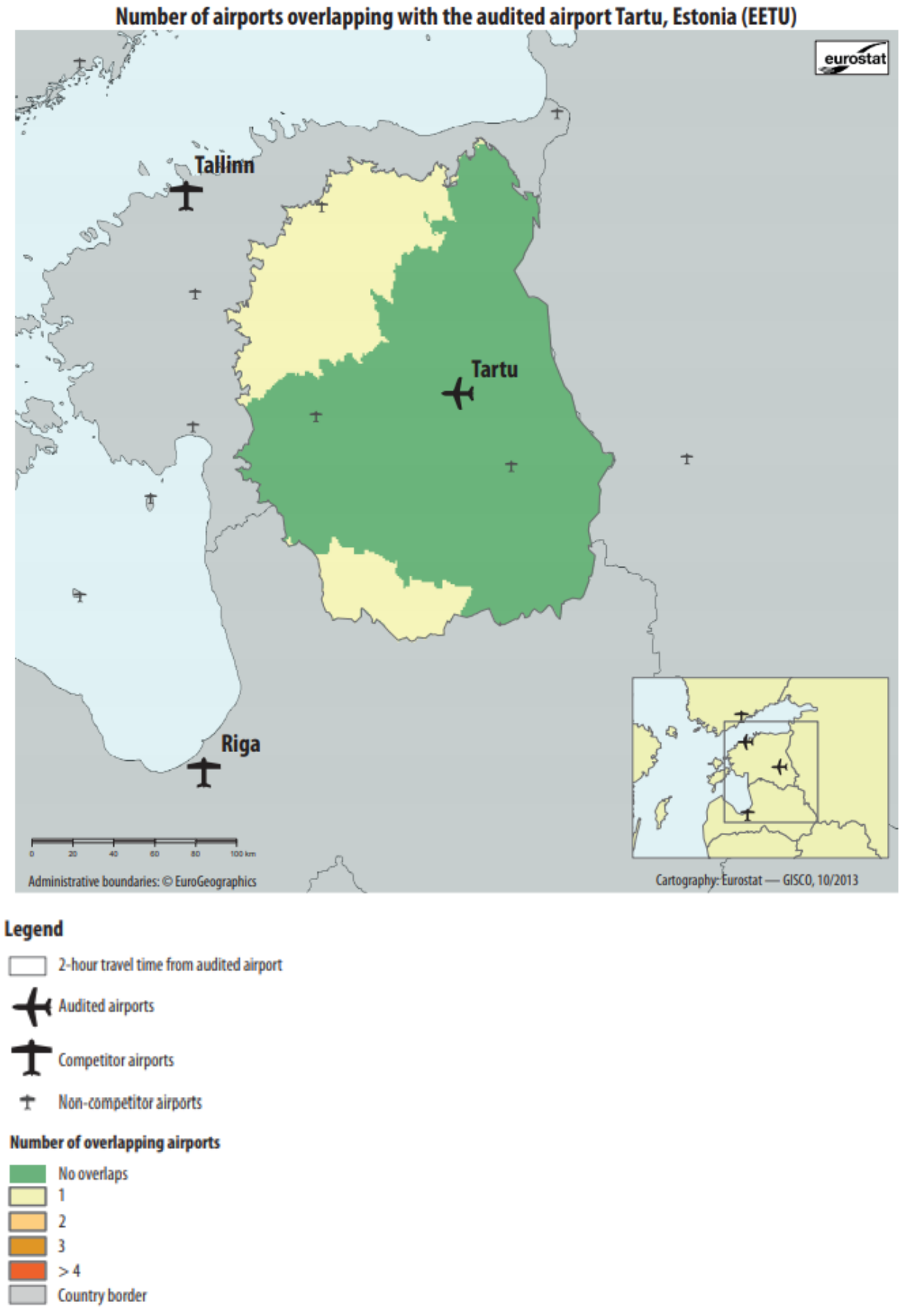


4 - Tartu Airport Additional Data

4a – Passenger Data and sources.

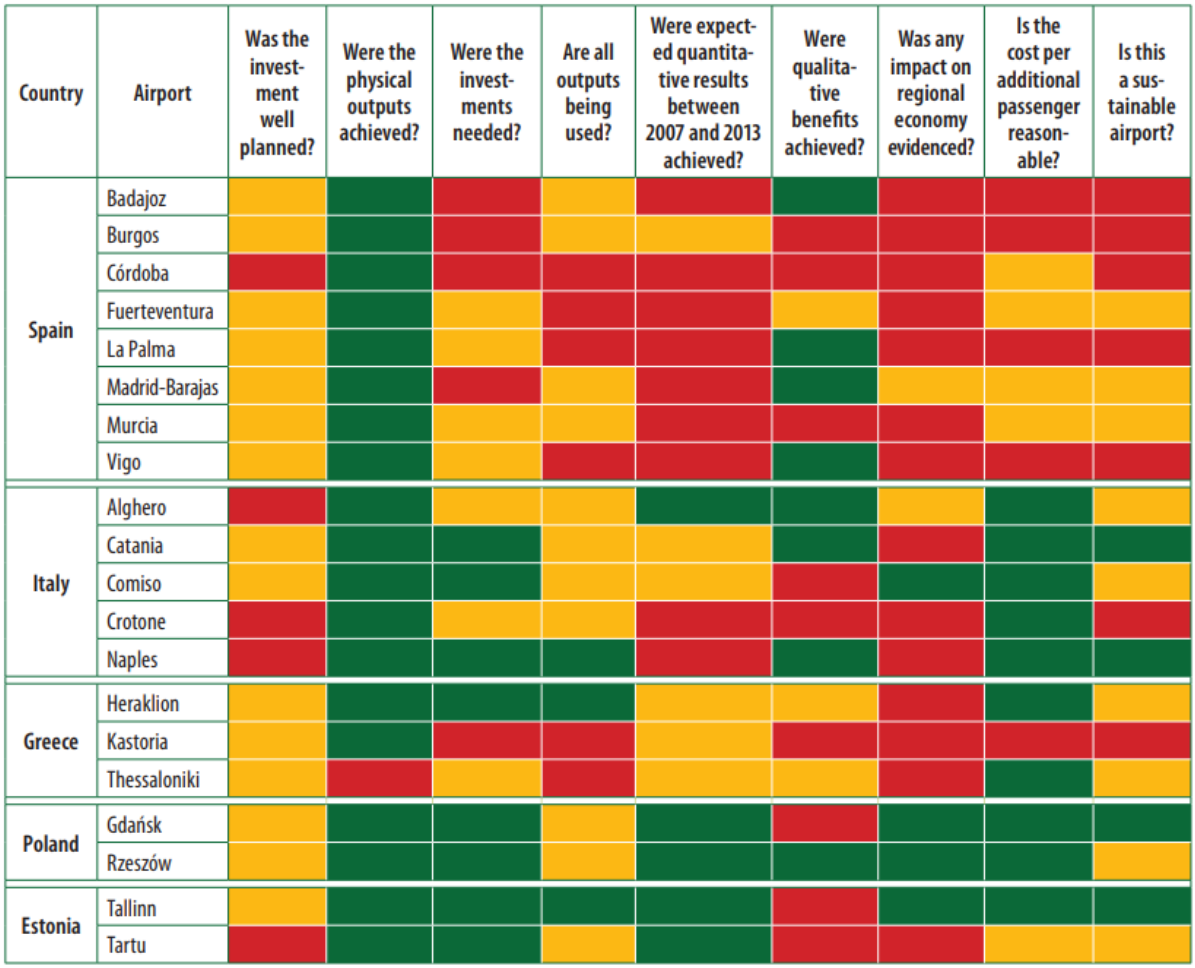
Year	Passengers	Source
2007	1.182	ECA Report
2008	No Data	-
2009	No Data	-
2010	23.504	ECAA (2021)
2011	18.583	ECAA (2021)
2012	20.302	ECAA (2021)
2013	13.690	ECAA (2021)
2014	14.493	ECAA (2021)
2015	21.117	ECAA (2021)
2016	29.594	ECAA (2021)
2017	30.296	ECAA (2021)
2018	26.092	ECAA (2021)
2019	28.322	Wikipedia (2021)

4b – Overlapping catchment area, map by the ECA (2014), with data from Eurostat.



5 - ECA-Report - General Assessment Table

Table by the ECA (2014)



Country	Airport	Was the investment well planned?	Were the physical outputs achieved?	Were the investments needed?	Are all outputs being used?	Were expected quantitative results between 2007 and 2013 achieved?	Were qualitative benefits achieved?	Was any impact on regional economy evidenced?	Is the cost per additional passenger reasonable?	Is this a sustainable airport?
Spain	Badajoz									
	Burgos									
	Córdoba									
	Fuerteventura									
	La Palma									
	Madrid-Barajas									
	Murcia									
	Vigo									
Italy	Alghero									
	Catania									
	Comiso									
	Crotone									
	Naples									
Greece	Heraklion									
	Kastoria									
	Thessaloniki									
Poland	Gdańsk									
	Rzeszów									
Estonia	Tallinn									
	Tartu									

6 - ECA Report – Grading Criteria for General Assessment

Table by the ECA (2014)

	Was the investment well planned?	Were the physical outputs achieved?	Were the investments needed?	Are all outputs being used?	Were expected quantitative results between 2007 and 2013 achieved?	Were qualitative benefits achieved?	Was any impact on regional economy evidenced?	Is the cost per additional passenger reasonable?	Is this a sustainable airport?
Green indicates a satisfactory situation	A long-term air sector plan exists; catchment area analysis and reliable forecasts are in an airport master plan	Outputs have been built as planned	Evidence of a proper needs assessment has been produced	Co-financed infrastructures were being used effectively	The expected quantitative improvements have been achieved	The expected qualitative benefits have been evidenced via passenger surveys	The positive impact on the regional economy has been evidenced	The real cost per additional passenger is below 20 euro	The airport is profit-making
Orange indicates an in-between situation	Some of the above indicated elements exist	Outputs have been built with differences compared to what was planned	There was no evidence that some of the investment was needed	Co-financed infrastructures were being used, but far below capacity	There were improvements, but lower than expected, or too early to tell (Comiso)	There were qualitative benefits, even though these were not measured	There were studies on the impact on the regional economy without a link to the investments	The real cost per additional passenger is between 20 and 80 euro	The airport is not profit-making but will be able to break even within the medium term (7 years), or there are no transparent accounts (two Greek airports)
Red indicates an unsatisfactory situation	None of these elements either exist or are taken into account for the investment decision	(Part of the) outputs planned have not (or not yet) been built	There is evidence that the investment was not needed	(Part of) the infrastructures were not being used	There were no quantitative improvements	There was no evidence of qualitative benefits	The positive impact on the regional economy has not been evidenced	The real cost per additional passenger is above 80 euro	The airport depends on a continuous support for its operations