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Prishtina International Airport: capacity expansions and service standards : [presentation given August 20, 2010]

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Prishtina International Airport

Terminal Capacity Expansion

And Service Standards

Capstone Project Report

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Abbreviations and Acronyms

ACI	Airport Council International
ATO	Airline Ticket Counter
BAA	British Aviation Authority
BHR	Busy hour rate
CAA	Civil Aviation Authority
DBFOT	Design Build Finance Operate Transfer
ECAA	European Common Aviation Agreement
EU	European Union
FAA	Federal Aviation Authority
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HVAC	Heating, Ventilation, and Air Conditioning
IATA	International Air Transport Association
ICAO	International Civil Aviation Authority
KPI	Key Performance Indicators
Pax	Passengers
PIA	Prishtina International Airport
PPP	Private-Public- Partnership
SBR	Standard Busy Rate
SDT	Standard Departure Time
VIP	Very Important Person

Executive Summary:

Prishtina International Airport (PIA) has experienced high increase in its passenger turnover from 396,717 passengers in 2000 to 1,191,978 passengers in 2009(PIA ,2010). As a result, over the past nine years the traffic increased up to 200%. Currently, PIA has already exceeded its capacity limits which affected negatively the quality of services. Compromise with the quality of services provided to passengers resulted in a standard which is below international standards and passengers' expectations. PIA should ensure that its future physical space expansions at its terminal building are in compliance with international service standards for passengers.

Advancement of aviation capacities requires on time drafting of adequate plan for future capacity expansion which would reflect upon the needs of the passengers. The government of Kosovo, through Government Decision 05/68 has authorized PIA to enter into a Public-Private-Partnership (PPP) in order to deliver its future operations and expansion strategies. One of the articles among a number of requirements set in the PPP contract requires that PIA capacity expansion must meet at least service standard level C(Good level of service) under the International Air Traffic Associations (IATA) classification.

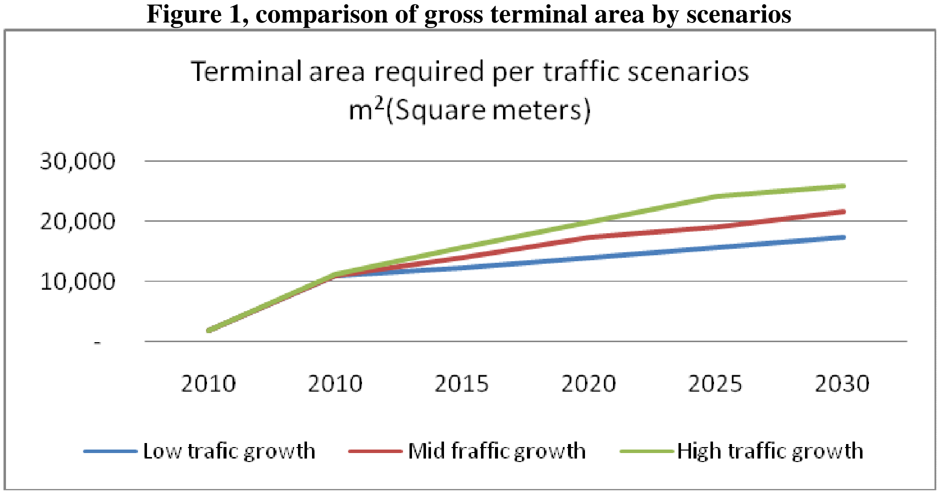
The air traffic forecast was performed using two main methods: trend analysis and expert judgment. This project involves three scenarios on the forecast of future development: low traffic scenario forecast which suggests that by the year 2030 airport traffic reaches no more than 2 million passengers; middle traffic scenario forecast up to 2.5 million passengers; and high scenario forecasts up to 3 million passengers.

This project uses International Air Traffic Association IATA formula to calculate the requirements for the terminal space and processes as set under the service level C, methodology of IATA uses the letter classification to define service level standards. Below you will find capacity extension requirements for terminal area as forecasted under all three traffic

scenarios in accordance with calculations based on IATA formulas on the demand per main section areas in arrival and departing terminal used for processing passengers.

Calculation of the total gross terminal area needed for adequate future traffic services includes terminal area, commercial area, support areas, and non usable public areas. Under the low traffic scenario the total gross terminal area needed by 2030 is 17,463 square meters, middle traffic scenario is 21,698 square meters, and high traffic scenario is 25, 917 square meters. The figures show that there is significant change in total calculated area as per different air traffic forecast.

Figure 1, comparison of gross terminal area by scenarios



Considering investment cost to expand terminal area and also the cost of operations and maintenance (O&M) being linked to total area of terminal, the capacity expansions planning per scenarios shows what depend on the chosen scenarios there with be a different investment and O&M cost per different scenarios, therefore this project recommends to develop strategies what balance the demand for air traffic and capacity expansions.

PIA will require more in-depth engineering and phasing studies as this capstone project provided only comprehensive information on planning for extension of passenger terminal and reaching the expected service quality level. Finally the recommendations were made on future planning regarding the capacity extension and managing efficient service quality at PIA.

Introduction

1.1 Problem definition:

Over the next 20 years air transport demand (measured in revenue passenger kilometers, RPKs) is forecasted by the aircraft industry to increase by about 5% per year worldwide and between 4% and 5% per year in Europe (Airbus 2008; Boeing 2007). Thus RPKs may double within the next 15 to 18 years. Eurocontrol (2008) expects the number of flights to increase at an annual rate of 2.2% to 3.5% in Europe until 2030, depending on the future development of various political, environmental and economical factors. The need to enhance capacity at an airport is clear at many airports within Europe. Increased demand for airport slots cannot be met, delays are increasing and growth is restricted. In many cases, investment in new infrastructure takes time in order to resolve environmental, political and cost issues and the potential for significant increases in capacity appears limited.

Prishtina International Airport (PIA) has experienced high increase in its passenger turnover from 396,717 passengers in 2000 to 1,191,978 passengers in 2009(PIA ,2010). As a result, over the past nine years the traffic increased up to 200%. Currently, PIA has already exceeded its capacity limits which affected negatively the quality of services. Capacity at Prishtina airport is limited by a variety of constraint. In order to sustain growth, the PIA must engage in capacity planning to meet future demands. Therefore, the primary objective of this project is to provide a structure for identify and target the capacity constraints that are limiting service quality provided to passengers. It starts by quantifying the capacity requirements for the short and medium term and then determines what constraints will impact on the ability of the airport to achieve those requirements.

Overall objectives of this project are:

1) Provide an in-depth study on current airport capacity restrains.
2) Forecast the capacity requirement for short term and long term.
3) Provide a service oriented approach to capacity buildings and planning.
4) Provide optimum capacity investment plan for future development.

1.2 Background:

Today, Prishtina International Airport has a flight average of 20 aircrafts per day whereas passenger numbers continuously increase. During 2008, for the first time ever, over one million passengers was reached. Altogether, there were 1.137.000 civilian passengers and approximately 100 thousand military passengers. During the mentioned year, The Prishtina International Airport also had a marked improvement in management, both in quality of the provided services for passengers and for airlines, and in increase of the revenues, also. Net revenues of the Company were estimated at 7 million Euros.

The improvement of services has been significant and so PIA was selected by the prestigious Company “British Airways”, as ‘golden station’, in a competition with many other international airports of different countries.

Management and employees of the Company during 2008, managed to reduce the time of aircraft handling from 1 hour and 8 minutes, which was a last year average, to 37 minutes. From Prishtina to another countries and/or vice-versa most recognized airlines of Europe operate in scheduled lines and chartera. These include: British Airways, Austrian Airlines, Malev, Swis, Turkish Airlines, Hamburg International, Bell Air, Adria Airways, and Croatia Airlines etc.

Taking into the consideration that in the case of Kosovo almost 90% of the traffic is towards Western Europe, and that the Eurocontrol forecasted the annual traffic growth for the period 2008-2014 in the region to be around 6% , it is reasonable to expect new services and stimulated traffic to and from Kosovo. The main drivers of passenger traffic in the region are expected to be migrant communities, business travelers due to investment opportunities in Kosovo after the status resolution and the international community temporarily working in Kosovo.

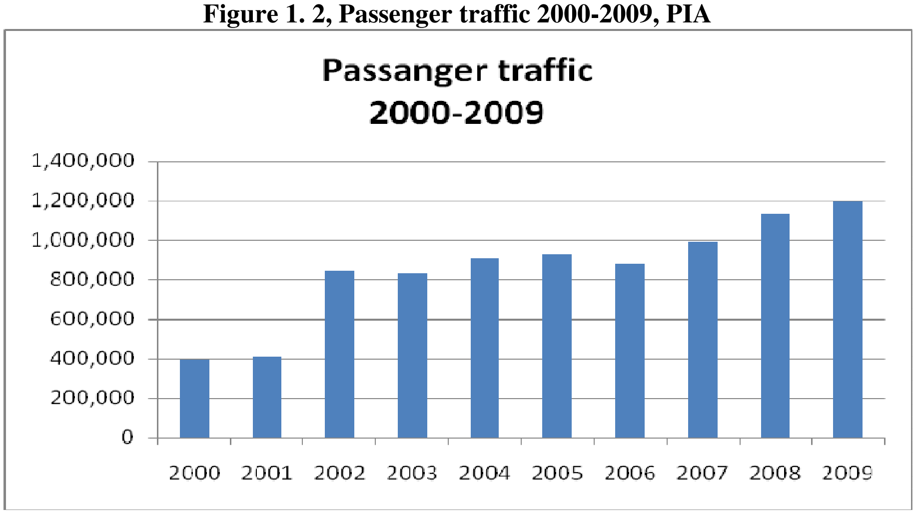
The total of 9 country destination are served by airlines at year round bases covering all 12 months of the year, while other destination are served very poorly with only 1 to 3 months operation. The passenger flow is dominant in the summer season, the month June to September have the doubly of traffic comparing to the other months of operations.

Passenger Growth Statistics:

Table 1.1, Passenger traffic 2000-2009, PIA

Year	Total Passenger	Growth
2000	396,717	
2001	403,408	1.7%
2002	844,098	109.2%
2003	835,036	-1.1%
2004	910,797	9.1%
2005	930,346	2.1%
2006	882,731	-5.1%
2007	990,259	12.2%
2008	1,130,639	14.2%
2009	1,191,978	5.4%

Figure 1. 2, Passenger traffic 2000-2009, PIA



1.3 Economic Outlook Kosovo

Kosova is a relatively small territory in the centre of the Balkan Peninsula, bordered by Macedonia, Albania, and Serbia and Montenegro. Its total area is less than 11,000 square kilometres or approximately one third the size of Belgium. It is constituted by a geographical basin situated at about 500 meters above sea level, surrounded by mountains, and divided by a central north-south ridge into two sub-regions of roughly equal size and population. The population of Kosova is estimated at 1.9 million in 2003(SoK, 2010)

In previous years, Kosovo has made remarkable progress in establishing the foundations of a modern market-led economy. The real economic growth in 2009 was estimated by the International Monetary Fund (IMF) to be over 3.5 percent, and for 2010 the real growth is estimated to be 4%.. The macroeconomic stability is maintained continuously with an inflation rate below 2 percent and a continued increase in exports. According to the International Monetary Fund (IMF), Kosovo's GDP per capita is €1,726 ($2,346), a number that reflects only 6.9 percent of the EU-27 average..

The inflow of FDI is also rising. Estimations indicate that in 2007 alone some 300 million Euro were invested in Kosovo. Among foreign investors operating profitably in Kosovo are Raiffeisen, Uniqa, Vienna Insurance Group, Xella, BNP Paribas, Telekom Slovenia, Holcim, Nova Ljubljanska Banka, Strabag, etc.

Great investment opportunities will also be available in the years to come. The Government of Kosovo is planning to proceed with the project for the construction of the new power plant Kosova C, an investment amounting to 3.5 billion Euro. In addition, the privatisation process will continue, offering great opportunities in the sectors of agriculture, tourism, energy, mining, and metal processing. Kosovo is planning to invest 1.3 billion Euro for the construction of new highways to Albania, Serbia, and Macedonia, and has announced the privatisation of the mobile telephone network operator Vala.

With the independence declaration of Kosovo and the subsequent international recognition, the last obstacle for economic development and thus the continuous inflow of foreign investments has been removed. Now, in Kosovo, it is all about economy.

Tourism

The natural values of Kosovo represent high quality tourism resources. The description of Kosovo's potential in tourism is closely related to the geographic position of Kosovo. Its position in southeastern Europe, with a central position in the Balkan Peninsula, represents a crossroad which historically dates back to Illyrian and Roman times.

The mountainous south of Kosovo has great potential for winter tourism. One of the most interesting opportunities for foreign investors in this region is the skiing resort Brezovica in the Sharr Mountains. The resort, situated between 1,700 and 2,500 meters above the sea level, has been offered for privatization by the Kosovo Trust Agency. It offers excellent weather and snow conditions as well as long ski seasons from November to May.

Also in the Sharr Mountains in the very south of the country, bordering Macedonia and Albania, Kosovo is offering for privatization about 22,000 hectares of largely untouched land in the mountainous area, belonging to the socially owned enterprise "Sharrprodhimi". The region offers excellent tourism opportunities, such as skiing, ecotourism, paragliding, mountain biking, rock climbing, trekking, kayaking, horse riding, etc. The Sharrprodhimi land in the municipality of Dragash is stunningly beautiful. It is clearly a remarkable property for eco-tourism, and will only be sold to a proven investor who is committed to a sustainable and rational development program which will have strong local support.

Apart from the above-mentioned tourism resorts, Kosovo is generally rich with mountains, artificial lakes and rivers and therefore also offers prime possibilities for hunting and fishing.

The wellness-tourism in Kosovo also offers great potential for development.

Foreign Direct Investments (FDI)

Taking into consideration the favorable business climate, stable macroeconomic environment and the excellent opportunities across different business sectors, Kosovo is increasingly becoming a very attractive place for doing business. As result, the interest of foreign investors has been increasing steadily during the past years and together with it also the inflow of FDI. Kosovo has so far attracted over 1 billion Euro of FDI. Apart from investment pioneers such as the Raiffeisen Bank and Procredit, which entered the Kosovar market at the beginning of the transition phase, there are many other foreign companies engaged in a wide range of business sectors. According to the Business Registry data for 2007, there are 2,012 companies of foreign and mixed ownership that have already used the opportunity to invest in Kosovo. The large amount of foreign companies operating in Kosovo is a living proof of the opportunities and benefits that the country offers, and also represents a base of quality products and a sufficient service-providing community.

Transport and distribution

Located in the heart of the Balkans, Kosovo is a connecting bridge between the countries of South Eastern Europe. Through its unique geographical position and its liberal trade regime, it offers instant access to the interesting and growing market in the Balkans and Central Europe, compromising 100 million potential customers.

Kosovo's capital Prishtina is within one hour's distance of driving to any neighboring country (Albania, Montenegro, Macedonia, and Serbia), thereby providing a connection for all countries in the region.

Table .1.2, Travelling distance from Prishtina to major Centers, Source: PAK 2010)

Regional centers	Travelling distance from Prishtina(Km)
Skopje	86
Sofia	279
Thessaloniki	312
Tirana	265
Belgrade	355
Durres	290
Sarajevo	390
Bar	570
Zagreb	741
Budapest	747

The railway network in Kosovo has a combined length of 330 km. It covers the entire territory, connecting both the south with north and east with west. On the south side as well as the north side the railway line provides access to the international railway network. The ongoing rehabilitation and modernisation of Kosovo railways is providing a solid base to satisfy the growing demand on logistical services.

Cultural attractions

The cultural heritage in Kosovo is very rich, especially in the south and west of Kosovo, including the Dukagjin region and towns of Peja, Gjakova, and Prizren. The small fortresses such as the Albanian “Kullas”, mills and bridges, the mosques, the Catholic and Orthodox churches, and the Turkish baths, the castles and archaeological settlements, all make up a part of the extraordinarily rich history of the region

Kosovo presents a rich ethno-cultural, material and spiritual heritage treasure- house of various historical periods. With their unique characteristics, features, and qualities, each culture has contributed its diverse values to the cultural heritage of Kosovo.

In the figurative-applicative establishment (composition) of Kosovo, the influence of Illyrian, Byzantine, Helen, Roman, Western and Eastern, and Ottoman cultures are present.

Diaspora

Kosovar Diaspora are of key importance for stimulating growth reducing macroeconomic imbalances in Kosova. The results of the surveys made by the (forum 20015) indicate that about 17% of Kosovars live abroad. Assuming a total population (resident and diaspora) of 2.5 million, it is estimated that the size of the Diaspora at about 315 000 Albanian Kosovars plus 100,000 Kosovars of Serbian and other ethnicities. About 30% of Kosovar households have one or more their members living abroad. Most of emigrants live in Germany 39%, Switzerland 23%, Italy and Austria each 6-7%, UK and Sweden each 4-5%, USA 3.5%, and France, Canada, Croatia each around 2%.

Diaspora may be divided according to the time of emigration: Old Emigration, during the 1960s through 1980s, accounts for 14%; those emigrating during the oppressions of the 1990s account for 59%, and the remaining 27% of the Diaspora have left Kosova since the War. About 5% of the Diaspora was born outside of Kosova.

Regions of Kosova from which unusually large proportions of the population have emigrated include Ferizaj, Gjakovë, Gjilan and Prizren. Similar to the home country, the Diaspora is very young, with an average age of 28 years. More than 22% have obtained at least part of their education in other countries. The majority of the Diaspora (60%) have citizenship in their resident countries, another 34% have temporary (i.e., 2-10 year) resident permits, out of which 1.3% are on student visas. Some 4% have not specified their legal status. Around 58% of the Diaspora are employed in their resident countries.

Diaspora impact/contribution on Kosova is significant. About 70% of emigrants send remittances to their families in Kosova. Just under a fifth of all Kosovar households receive remittances. Of these households, about 13% have received cars, 48% clothes and textiles, and 13% electronics and other appliances. Seventy percent of emigrants visit Kosova contributing to increases in aggregate consumption with their spending during the stay Based on research made by FORUM 2015, it is estimated that annual inflows from the Diaspora are: (a) cash remittances, €170 million, (b) in kind contributions, €22 million and (c) visitors contribution – "Diaspora Tourism," about €125 million. The total annual inflow is around €317 million, or approximately 14% of Kosova GDP. According to focus group discussions, until 2004, remittances have decreased by around 30% compared to the pre-war period. During the last two/three years, remittances have recorded a slight decrease. In the next medium-term period, the opinion among the Diaspora prevails that remittances will remain at the same level. The main determinant of the frequency and size of remittances is emigrants' perceptions about the economic situation and needs of their families in Kosova.

1.4 PIA under the DBFOT contract

While it is evident that PIA can function adequately as a publicly owned and operated enterprise, the Government of Kosovo seeks to ensure that the Airport meets its full economic and operational potential. For this reason, on June 12, 2009, via Government Decision 05/68, the Government of Kosovo formally authorized proceeding with a Public-Private-Partnership for the operation and expansion of PIA.

The main reason for this process is making PIA simultaneously remaining competitive with other airports in the region. For this reason, and on the basis of an investment grade feasibility study prepared by Netherlands Airport Consultants B.V. ('NACO') and Innova Aviation Consulting LLC ("Innova"), on June 12, 2009, via Government Decision 05/68, the Government of Kosovo formally authorized proceeding with a Public-Private-Partnership for the operation and expansion of Pristina International Airport.

The Project is envisioned to take the form of a 20-year Design-Build-Finance-Operate-Transfer (DBFOT) contract and will involve the operation and maintenance of Pristina International Airport, as well as the design, construction, and financing of required infrastructure improvements.

ANTICIPATED TRANSACTION STRUCTURE

1. Contract Structure: Design-Build-Finance-Operate- Transfer (DBFOT)
2. Contract Duration: 20-years
3. Required Minimum Investment Plan: Master Plan, including, amongst others:

• New Landmark Terminal (25,000m2)

• New control tower and related facilities

• Relocation of the NAVAIDS equipment (radar, localizer)

• New apron: 9 Code C (B 737) aircraft parking positions

• New automobile parking (1,750 new bays)

• New taxi and bus staging areas

• New airport access lane

• New water treatment plant

• Airport equipment

• Widening of taxiway shoulders (to accommodate code E aircraft)

4. Minimum Performance and Capacity Levels: IATA level C (within 2 years of contract inception)

5. Scope of Service: All airport services, excluding Air Navigation Services.

6. Concession Fee: Payments by the Private Operator to the Government in the form of a percentage of gross revenues.

7. Rates and Charges: Aeronautical rates and charges are to be capped at current levels over the term of the contract, with potential inflation adjustments subject to regulatory approvals.

8. Employment Considerations: Private Operator will honor existing employment contracts for a predefined period of time.

9. Ownership: Moveable and immovable assets will be leased to the Private Operator, while ownership of all assets remains with the State.

Under the PPP contract the PIA will be to transferred to the private operator, the main requirement set by PPT and challenge for the coming year for PIA will be to fulfill the performance service standard level C under the IATA service level standards.

1.5 Service Category and Planning Goals:

Accordingly to IATA capacity assessment plan:

A – An excellent level of service. Conditions of free flow, no delays and excellent levels of comfort.

B – High level of service. Conditions of stable flow, very few delays and high level of comfort.

C – Good level of service. Conditions of stable flow, acceptable delays and good levels of comfort.

D – Adequate level of service. Conditions of unstable flow, acceptable delays for short periods of time and adequate levels of comfort.

E – Inadequate level of service. Conditions of unstable flow, unacceptable delays and inadequate levels of comfort.

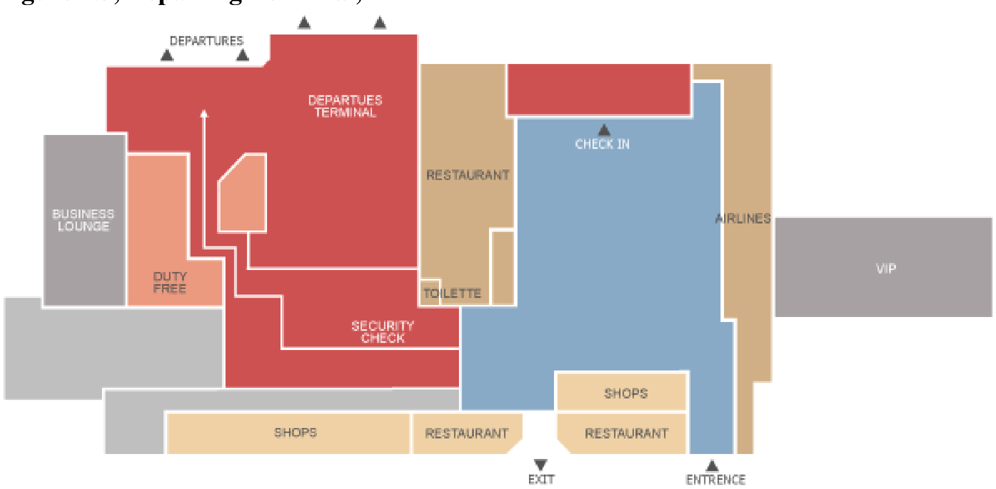
F – Unacceptable level of service. Conditions of cross-flows, system breakdowns and unacceptable delays; an unacceptable level of comfort.

The current situation if Prishtina International Airport shows what the capacity is not sufficient to provide the service level at appropriate level, since it is reqired by the PPT contract that airport must insure the capacity to provide the IATA service level letter C, in the future references in this project, level C(good service) with be taken as a baseline to planning and further analyses.

1.6 Prishtina International Airport Current Capacity:

Departing Terminal

Figure 1.3, Departing Terminal, PIA



SOURCE: PIA

Arrival terminals:

Figure 1.4, Arriving Terminal, PIA

SOURCE: PIA

1. TRAFFIC FORECAST FOR PRISHTINA INTERNATIONAL AIRPORT:

2.1 Forecasting and planning interrelation:

Forecasting is the heart of planning and control processes. Forecasts are necessary to define the facilities that will be required, the scale of such facilities, and the time at which they will be required. The objective of forecasting is not to predict the future with precision, but to provide information that can be used to evaluate effects of uncertainty about the future. (Alexander, 2006)

Forecasting peak hours:

As already mentioned, facility requirements are defined by peak period throughput, and mainly by that in the "typical peak hour". In order not to cater unnecessarily for rare occurrences, the "typical peak hour" is not defined as the peak hour for the year, but is commonly accepted as the 30th or 40th busy hour. Similarly the "typical busy day" is the 30th or 40th busy day. There are also other methods of defining peak hours.

Forecasting Period:

Actual capacity expansions should be carried out as proven necessary by the growth of traffic and short-term forecasts which are less susceptible to major errors. Thus long-term forecasts provide the broad guidance necessary for master capacity planning. Shorter-term forecasts, say three to five years in advance, provide the basis for-actual development work, while medium-term forecasts (from 5 to 20 years, usually in five-year intervals for convenience) bridge the gap to the long-term and provide interim information on probable subsequent phases of development.

Forecasting methods:

There are numerous forecasting manuals existing on techniques; only a brief resume of some of those which are relevant to airport capacity planning are given here.

Informed judgement of an individual or group of people is the original forecasting "method", and it is still the most comprehensive in that it usually implies the consideration of a wide range of variables. A large amount of personal judgment is inevitable, whatever the basic forecasting method used. Judgement can introduce subjective and often unsubstantiated bias, but is useful for checking that the results of other forecasting methods make sense, and in estimating effects of factors which are difficult to quantify. One specific feature which might be worth incorporating in the forecasting process is a check that the evaluation of the long term is not influenced too greatly by recent or current short-term events.

Trend extrapolation consists of trying to identify some long-term underlying growth pattern of a form which fits the behaviour of air traffic in the past. The growth pattern considered over time is usually a straight line (implying a constant absolute change between successive time periods), or asymptotic (implying that development proceeds towards some limiting level at a gradually decreasing rate). A time series of historical data has first to be smoothed to account for unusual effects such as labour strikes, special events, etc. The chosen growth pattern is then fitted to the smoothed data and projected. Fitting can be done using statistical techniques, but can also be carried out roughly by eye on graphical plots of historical traffic data. Trend extrapolation assumes that all factors influencing air traffic in the past (except the unusual effects mentioned above) will continue to operate in the same way in the future. This is often not the case.

Econometric modelling is one approach used to attempt to explain air traffic developments in terms of underlying causes. By using statistical techniques, it has been shown that just a few of the quantifiable major factors influencing air transport demand can explain most of the variation in this demand, and the contributory effect of each factor can be isolated to a certain extent. The method can be used both for historical time-series data and/or for cross-sectional-data. Forecasts of the contributory factors, which are generally less sensitive than those of air transport demand itself, can then be used to produce an air transport forecast. Econometric modelling has technical limitations.

Market survey methods are used to obtain primary data from the source of the demand for airport facilities - the users themselves. Surveys are probably the only methods that have universal application, and surveys of passengers, shippers and airlines can be a very effective tool for the airport planner. However, satisfactory and meaningful surveys depend upon properly structured questions, the elimination of bias, and last but not least, the calibre of the individuals devising and carrying out the surveys. Surveys are also relatively expensive. Market surveys have been used, both directly in the design of airports to reduce subjective bias in other forecasting methods by testing theories, and as a basis themselves for forecasting airport traffic.

2.2 Choosing forecasting methods to be used for PIA.

Evaluations forecasting methods to be used for Pristine International Airport

Table 2.1, Forecasting Method Assessment

Methods	**Data availability**	**Data Reliability**	**Final Conclusions**
Judgement	Implies wide range of variables.	Judgment might be effected be the short term growth and present subjective bias.	*Recommended,* Useful to be used together with other methods, not as only method.
Trend	The traffic data from 2000 to 2009 show a reasonable period of time to be used for trend analyses.	Trend do not take into the consideration the changes what might incur in political or economical environments, and reflect more the current situation on the state	*Recommended* to be used, together with other methods
Econometric Methods	Absence of data for the traffic structure and also the country data for economical indicators	Not reliable enough, poor factor independency knowledge.	Not Recommended
Market Survey	Not available, and was never done in Kosovo, the actual survey takes months to complete.	Very reliable but hard to complete	Not available for the moment, but good to be made in future.
FINAL CONCLUSIONS	**1) Using of the trend analyses to show the trend line for the future traffic** **2) Using the expert judgment as alternative to trend analyses.**		

2.3 Trend analyses:

Trend extrapolation is a useful tool, in that it introduces a degree of objectivity into forecasting. It is also relatively easy to carry out and imposes a discipline in presenting the situation in a simple form which can aid further analysis and/or provide a basis from which to check the validity of forecasts developed independently by other techniques. Indeed if described as trend analysis it becomes a valuable analytical tool in its own right. The statistics provided by the Airport for period 2000-2010 provide a decent set of data to be used for trend analyses, but when analysing the trend it can be observed what the year 2000 and 2001 showed a considerable low traffic data, since this two years figures were thought that do not represent the real traffic potential, since in period after the war the air traffics was not yet developed in its natural potential. Taking this into the account the year 2000 and 2001 were not taken as reference data in the trend analyses,

Historical data:

Table 2.2, PIA traffic data

Data		
Period	***t***	Z_t
2002	1	844,098
2003	2	835,036
2004	3	910,797
2005	4	930,346
2006	5	882,731
2007	6	990,259
2008	7	1,137,000
2009	8	1,193,850
2010*	9	1,265,481

SOURCE: PIA

The year 2010 was projected by current six month trend, which show what in this year the average traffic growth was at 6%. The traffic projected for 2010 was though to be 1,265,481 passengers.

Regression analyses:

Regression analysis answers questions about the dependence of a response variable on one or more predictors, including prediction of future values of a response, discovering which predictors are important, and estimating the impact of changing a predictor or a treatment on the value of the response (Weisberg 2005). The R^2 coefficient of determination is a statistical measure of how well the regression line approximates the real data points, R^2 = 1 indicates that the fitted model explains all variability in *y*, while R^2 = 0 indicates no 'linear' relationship. Using MS Excel program the linear regression analysis were perform for the PIA traffic data and the linear regression line for period 2002-2010 had a R^2 (coefficient of determination) of 0.7359, this can be interpreted as the liner trend line for PIA data can be explains approximately at 73,5% by the variation of time series in yearly period, while remaining 26.5% can be explained by unknown variables not covered in the trend.

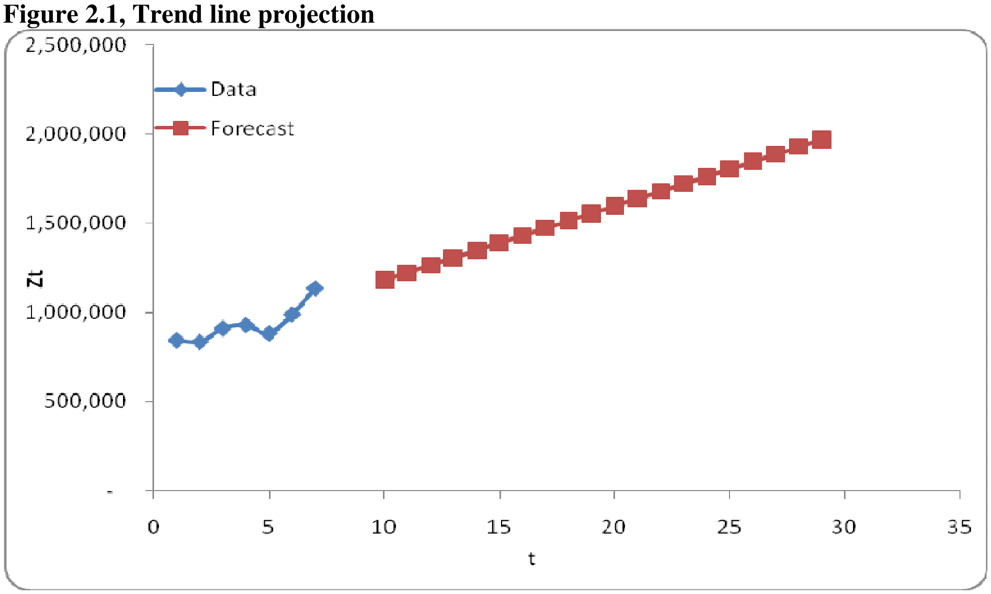
Table 2.3, Regression Statistics

Regression Statistics	
r^2	0.7359
Slope	41467.36
Intercept	767025.9

Source:PIA

However, when interpreting result using R^2, the conclusions is what correlation between time periods and traffic growth is present, but the 73.5% of correlation is not enough to conclude what the linear trend analyses is a trusted method for forecasting.

Figure 2.1, Trend line projection



Projected trend forecast:

Table 2.4, Projected trend

	Forecast		
Period	***T***	**Z-hat(Passengers)**	***Growth***
2011	11	1,223,167	
2012	12	1,264,634	3%
2013	13	1,306,102	3%
2014	14	1,347,569	3%
2015	15	1,389,036	3%
2016	16	1,430,504	3%
2017	17	1,471,971	3%
2018	18	1,513,438	3%
2019	19	1,554,906	3%
2020	20	1,596,373	3%
2021	21	1,637,840	3%
2022	22	1,679,308	3%
2023	23	1,720,775	2%
2024	24	1,762,242	2%
2025	25	1,803,710	2%
2026	26	1,845,177	2%
2027	27	1,886,645	2%
2028	28	1,928,112	2%
2029	29	1,969,579	2%
2030	30	2,011,047	2%

The projection made using trend analyses show that traffic growth with continues in yearly 3% growth rate until 2023, and after year 2023, it will continue with slide lower growth of 2%. Using trend analyses the following are the forecasted figures for traffic for selected 5 year planning period.

Table 2.5, Forecast for selected years

Forecast for selected ***t***	
t	**Z-hat**
2015	1,389,036
2020	1,596,373
2025	1,803,710
2030	2,011,047

2.4 Expert judgment forecasting

Data collection

The qualitative data collection for the purpose of compiling analysis of the Kosovo air transport traffic forecast has been achieved through interviewing of persons considered to be expert in Kosovo Aviations and getting their judgment on aviation traffic forecast, for the practical purposes the open ended questionnaire was used in the interviewing. The following is a brief introduction to each of the persons interviewed representing the main aviation stakeholders in Kosovo.

The following stakeholders were selected for interviewing:

1. **Civil Aviation Regulatory Office**: Head and Deputy Head of the Office have been interviewed. Head of CAA is an international expert recruited through ICAO and has an extensive experience in aviation. Head of CAA holds an LL.M. degree in Air and Space Law and is a leading official in the transposition of the EU aviation legislation into the Kosovo legal order.

2. **Prishtina International Airport**: Director of Airport Services and Terminal Operations, Commercial director and Duty Ops and Slot Coordination Manager were interviewed. The Director of Airport Services and Terminal Operations has worked at this airport for almost thirty years. He reached this position after having held many earlier positions at the airport starting from basic responsibilities. During the last 15 years he was actively involved in the management of terminal operations. His knowledge and experience, especially in the field of capacity constraints, ground handling, specific programmed charter operations present at PIA, clientele and so on, were very relevant for the purposes of this research.

3. **Potential Kosovar airline** and EU carriers operating at PIA: First respondent is the Operational Manager of Kosovo Airline, the most active tour operator in Kosovo, and has extensive experience in specific "programmed charter" traffic present in Prishtina

since almost 10 years. Furthermore, he has knowledge on the European aviation legislation as well as current trends. Being a tour operator for most of the charter airlines serving PIA, he knows the behavior of the Diaspora customer very well, being their key client. However, the respondent required his responses to be considered as personal opinions and not as official statements. Questions were sent to also to, Austrian Airlines and Adria Airways. Austrian Airlines operates 12 flights per week to and from PIA and is the largest carrier taking into the account the number of passengers carried. Adria Airways operates daily flights to and from Prishtina and is the second largest scheduled carrier with the largest number of passengers carried to and from PIA

Analysing the results:

Table 2.6, Analysis on expert judgments

Opportunities	**Threats**
• Increased traffic due to market liberalization • Increased competition • New potential routes to be open by incumbent airlines or new entrant airlines • Lower travel fares and better services for passengers due to more offers from airlines • Emergence of low cost airlines at PIA • Positive impact on the Kosovo economy • Public private partnership to cover the additional investments needed for expansion • Increased competition (EU carriers • Getting Operating License from any of the ECAA	• Competition from Skopje/Tirana airport • Continuation of visa regime for Kosovars • Stagnation of economic situation • Population living in the airport vicinity might complain • Lack of sociopolitical stability • Limited number of population in country • Development on modern road transport • Decreased traffic from the emigrants due to change in the emigrants generations connected to Kosovo.

Analysing predicted future traffic growth:

Table 2.7, Projection based on expert judgments

Airport		
Year	**Growth Rate**	**Passengers**
2015	5%	1,600,000
2020	5%	2,000,000
2025	3%	2,200,000
2030	2%	2,500,000

CAA		
Year	**Growth Rate**	**Passengers**
2015	7%	1,800,000
2020	5%	2,200,000
2025	3%	2,500,000
2030	2-3%	2,800,000

Airlines		
Year	**Growth Rate**	**Passengers**
2015	3%	1,400,000
2020	3%	1,600,000
2025	2%	1,800,000
2030	2%	2,000,000

2.5 Final Forecast:

Analyses from the forecasting method shows what there are quite different estimation for traffic forecast and many factors what would likely determine the future of traffic growth. In order to plan and prepare for the different scenarios, this project projected three different forecasting estimations:

Low traffic growth scenario:

There is potential for development but because of political uncertainties, strong competition from the modern motorway, decrease in number of Diaspora travelling, there would be a slow growth in air traffic, as suggested by the airline representatives this scenario forecasts the traffic growth of 2-3% and by the year 2030 to reach 2 million passengers. This scenarios is supported also by the trend regression analyses what suggest the approximate traffic.

Medium traffic growth scenario:

Under this scenario the future development in economic and political area with effect the traffic growth positively and unleash the potencies for air travel, the membership in EU, visa liberalisation, growth on business travel, tourism etc, are some of the factors what with contribute to this steady growth, but under this scenario also some negative factors are taken into the consideration therefore the forecast under this scenario is closer to forecast given by the airport personnel with growth of 5-4% annually and reaching 2.5 million by 2030.

High traffic growth scenario:

Under the optimistic scenario the Kosovo with become member of EU and also reach at high development level attracting foreign investment and become favourite destination for emigrants and tourism, under this scenario the air traffic with keep the steady growth of 7% and reach 3 million passengers by 2030. The estimations made by the CAA experts are optimistic and close to this forecast.

Final Projected forecast for three scenarios:

Table 2.8 Final forecast

	Low Scenario	Mid Scenario	High Scenario
2015	1.400,000	1.600.000	1,800,000
2020	1,600.000	2.000.000	2.300.000
2025	1,800.000	2.200.000	2.800.000
2030	2.000.000	2.500.000	3.000.000

2.6 Calculating Peak hours:

Traffic at prishtina International Airport is characterized by the monthly, by seasonal patterns and cyclical patterns arising from flight schedule, overlaid with a variety of special events and random variations, knowing of such peaks variation are essential for the efficient management of the facilities (Mattthes, 1995), to the long term where planning decisions relate to infrastructure investment spread over decades. The airport income and revenues are based on the annual passengers but the costs are largely associated with the fixed cost coming from the facilities and investments to provide services at peak times.

The traffic demand patterns imposed upon airport exhibit considerable variations on a monthly, daily, and hourly basis. These variations result in periods, known as peaks, when the greatest constant amount of demand is placed upon facilities required to accommodate passenger and aircraft movement. These peak periods of demand must be considered in the determination of airport facilities so that effective utilization of the facilities can be realized. The objective of developing peak forecasts is to project a design level such that if airport facilities were planned to accommodate that level of demand, the facilities would neither be underutilized nor overcrowded too often.

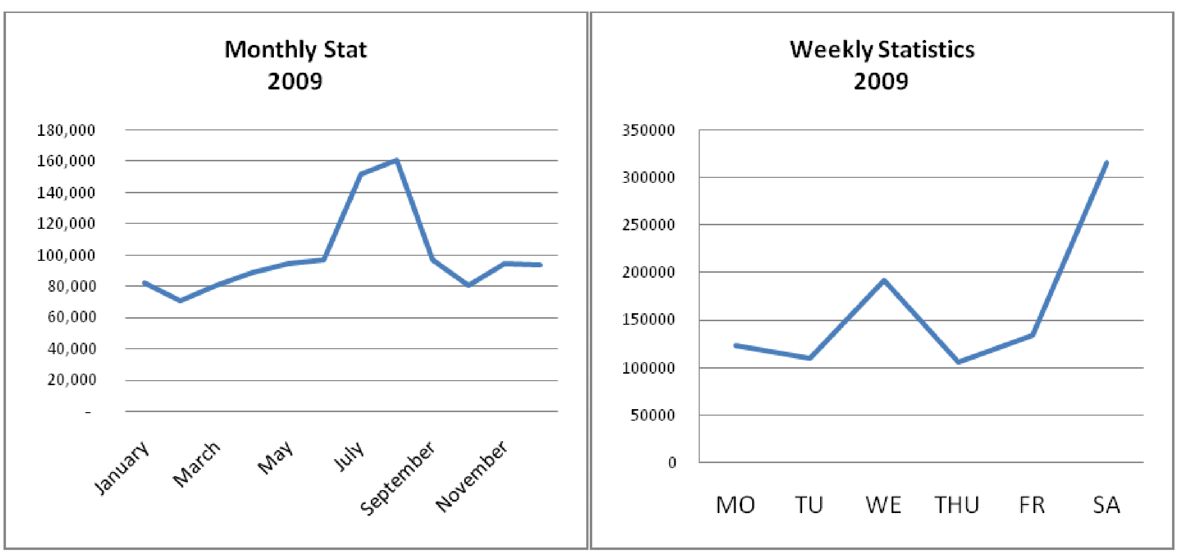


Figure 2.3,,Traffic seasonality: PIA

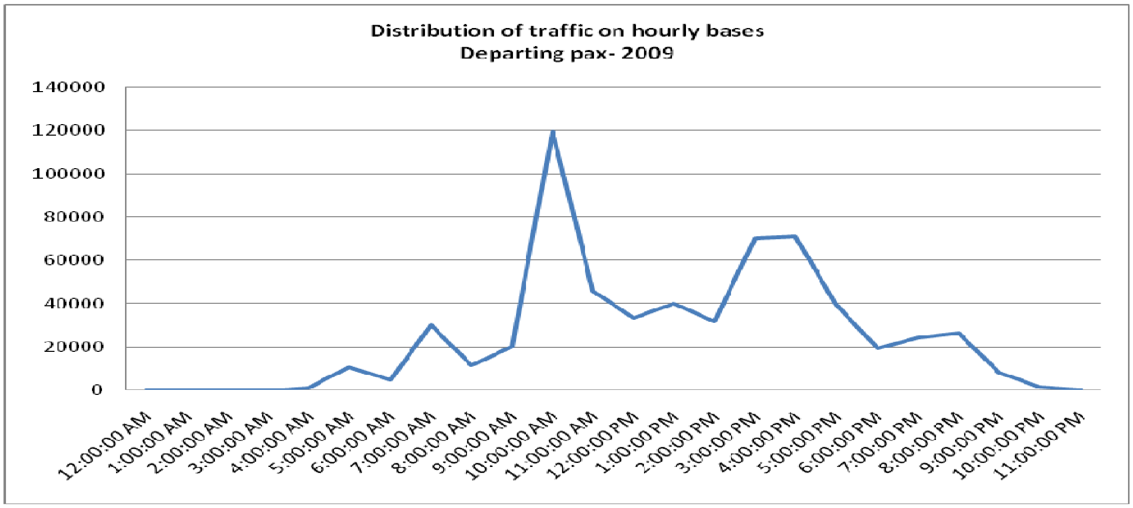
The peak can by defined at hour period or longer period but usually are referred to an hour period and also the international guidelines related to peaks are considering the one hour period to define a peak demand.

The busiest hour of the year is the absolute peak hour, but the absolute peak hour can occur as result of unexpected and non ordinary circumstances, natural catastrophes like a volcanic ash during this year April, 2010, or for demand related to specific event of happening, but all these circumstance cannot be taken into the account into the planning the capacity for peak demands, this lead to the idea of finding the optimum peak demand what the airport must build its capacity to serve. Practically to calculate and forecast the peak hour there are several methods applied by airports, the final aim is to calculate the peak hour in order to design the facilities to serve the passengers "most of the times" and at acceptable and preferable level (Matthes 1995).

There is no agreed standard used in the airport design worldwide (Matthew 1995), the most used and adopted system is the IATA sytem of SBR(Standard Busy Rate) (IATA ,1998) where the 30th busiest hour in the year is considered to be the peak hour, Under this criteria, the total hours on the airport are 8760 (365x24=8760) then the facilities should be able to serve the traffic for all but 29 hours out of 87600 hours. The other used method is also the 40th busies hour, or measures such as the busiest hour in the second busiest month.

One other method worth considering is the approach by the BAA (British Aviation Authority) which uses the BHR (busy hour rate). The BHR is defined as value of passengers for which 5% of the passengers encounter flow rate at this level or above. By this method the facilities and design must be ready to process efficiently 95 % of passengers. Is the Airport designs is capacity to meet the forecasted BHR then is will meet 95% of service standard, but is the airport adopts the SBR then the passengers percentage above the SBR can easily vary from 2% to 10 Percent at smaller airports.

Figure 2.4, Traffic seasonality PIA



Source:PIA

To calculate the peak hour for traffic at Prishtina Internationa Airport in this study we will calculate the two options discussed above as most frequent used method and then analyze the result from these two methods so we can finally decide on the peak hours patters and peak ration to be used for the traffic forecast.

The absolute busiest hour are much higher than the calculated peak, following is the 5 most business hours in PIA for 2009

Table 2.9 Busiest hours at PIA

Nr	DATE	Weekday	ROUND TIME	Count of №	Sum of D-PAX
1	1/11/2009	1	4:00:00 PM	6	885
2	1/10/2009	7	3:00:00 PM	6	873
3	1/11/2009	1	3:00:00 PM	5	852
4	8/16/2009	1	4:00:00 PM	5	848
5	1/4/2009	1	3:00:00 PM	5	840

1) As per IATA recommendation the Standard Busy Ratio (SBR) is calculated as 30th busiest hour, the statistics from PIA where sorted in MS Excel and the table of most busiest days of the year were created (see annex 3) , the absolute busies day had a traffic flow of 885 passengers per hour, were all 30 busiest days had more than 668 passengers, leaving that the peak hour can be considered to be **661** passengers per hour and 4 flight per hours.

Table 2.10, The 31th busiest hour at PIA

SDR

Nr	DATE	Weekday	ROUND TIME	Flights	Sum of D-PAX
31	4/12/2009	Sunday	10:00:00 AM	4	661

2) As per BAA method the 5% of passengers flow where operated in the 41 most business hours, and the passengers flow below the most business hour of 5% had a passenger's flow of 625 passengers and 4 flight per hours, as per this method the peak hour per PIA is **625** passengers.

The cumulative number of passengers at most busiest hours which form the 5% of total departure passengers is (Total dep passengers X 5%= 613527 x 5% = 30676 passengers, calculation from the list of most busiest hours the 5% ration is achieved at 41th business hour, leaving what the calculated peak accordingly to this method is the peak hour of 42th business hour respectively **625** passengers per hour and 4 flight per hour.

Table2.11, The 41th busiest hour at PIA

Nr	DATE	Weekday	ROUND TIME	Flights	Sum of D-PAX
41	10/17/2009	7	11:00:00 AM	4	**624**
42	10/24/2009	7	11:00:00 AM	4	623

PEAK HOUR FOR PIA:

FAA Advisory Circular 150/5070-6A, Airport Master Plans, provides typical peaking characteristics against which the forecast should be compared. These typical peaking characteristics are:

- The ratio of peak hour operation to average daily passengers traffic (for the busiest month), may range from 7% to 11%
- The ratio of average daily passengers flow to annual passengers flow, may range from 0.29% to 0.34% (FAA Advisory circular)

Table 2.12, Peak ratios for PIA traffic

Peka Hour Ratios	2007	Ratios
Annual Passengers	1,191,978	
Annua Dep Pax	613,527	51%
Peak month dep pax	104,100	17%
Average day	3,358	3%
Busy Day	6,057	6%
Peak Hour	625	19%

These ratios are directly related to the size and demand level of the airport, with the lower percentages common to the busiest commercial service airports and the highest percentages common to the lower activity airports. These ratios for PIA are shown on table above. Peak month departing passengers are 17%, average day 3%, busy day 6%, and Peak hour represent the 19 percent from a average day departing passengers.

2.7 Forecasting peak hour for period 2010-2030

Using calculated ratios of peak hours comparing to total number of passengers, the peak hour for forecasted projection was calculated to be used for planning purposes.

Table2.13, Forecasting peak hours for period 2010-2030

2015	Low Scenario	Mid Scenario	High Scenario
Annual Passengers	1,400,000	1,600,000	1,800,000
Annua Dep Pax	721,000	824,000	927,000
Peak month dep pax	122,570	140,080	157,590
Average day	3,922	4,483	5,043
Busy Day	7,109	8,125	9,140
Peak Hour	730	834	938

2020	Low Scenario	Mid Scenario	High Scenario
Annual Passengers	1,600,000	2,000,000	2,300,000
Annua Dep Pax	824,000	1,030,000	1,184,500
Peak month dep pax	140,080	175,100	201,365
Average day	4,483	5,603	6,444
Busy Day	8,125	10,156	11,679
Peak Hour	834	1,042	1,199

2025	Low Scenario	Mid Scenario	High Scenario
Annual Passengers	1,800,000	2,200,000	2,800,000
Annual Dep Pax	927,000	1,133,000	1,442,000
Peak month dep pax	157,590	192,610	245,140
Average day	5,043	6,164	7,844
Busy Day	9,140	11,171	14,218
Peak Hour	938	1,146	1,459

2030	Low Scenario	Mid Scenario	High Scenario
Annual Passengers	2,000,000	2,500,000	3,000,000
Annua Dep Pax	1,030,000	1,287,500	1,545,000
Peak month dep pax	175,100	218,875	262,650
Average day	5,603	7,004	8,405
Busy Day	10,156	12,695	15,234
Peak Hour	1,042	1,303	1,563

Table 2.14, Final peak projection

Peaks Projections:

Year	Low traffic	Mid traffic	High traffic
2010		625(actual)	
2015	730	834	938
2020	834	1042	1199
2025	938	1146	1459
2030	1,042	1,303	1,563

2. SERVICE LEVEL

3.1 Definitions of service quality

There are many different possible measures of quality of service. It is quite likely that different parties will have different views about what constitutes quality of service at an airport. This will arise because of differences in the preferences of different parties. Even where parties have similar preferences, they may reach different conclusions about how best to address the practical problems associated with measuring service quality.

The relative importance of these different measures of quality will vary between users. Some airlines' business models may place a very high premium on the airport being able to process passengers and their baggage quickly; some individual passengers may be most concerned with the "feel" of the airport. There is the possibility that some interested parties may be concerned about both aspects of service quality.

Even when parties agree that a certain quality measure matters, they may not agree the best way to measure it. For example, minimizing time spent queuing at security checks might be considered a desirable property at an airport. Some might consider the average time spent in queues to be a reasonable measure of the inconvenience of queuing. Others might wish to focus on the percentage of people required to queue for more than a certain number of minutes.

Practical concerns may also influence how service quality is measured. Some measurements will be easier and cheaper to collect than others. There may be a trade-off between a measure that best captures the interested parties concept of service quality and a less perfect but cheaper to collect alternative measure.

3.2 Airport Council International (ACI) surveys of satisfaction

The ACI survey seeks to measure passengers' overall satisfaction with an airport by ranking its performance against other airports in terms of various aspects of an airport's services. The survey is circulated to departing passengers and asks them to complete it based on their experience at the airport. ACI views its results as useful to airport managers, helping them to identify service areas needing improvement.

Table 3.1, Measures of service quality included in the ACI

ACI Global Monitor Measures of Satisfaction	Quality Elements
Overall passenger satisfaction	For all, business and leisure passengers
The quality of airport services	Availability of baggage carts/trolleys, courtesy, helpfulness of airport staff (excluding check-in and security), restaurant/eating facilities, shopping facilities, computer/telecommunications/ e-facilities, availability of washrooms, cleanliness of washrooms, comfortable waiting/gate areas
Experiences at security and immigration	Passport and visa inspection, courtesy and helpfulness of security staff, thoroughness of security inspection, waiting time at security inspection, feeling of being safe and secure
The overall airport environment	Cleanliness of airport terminal, ambience of the airport
Value for money	Restaurant/eating facilities value for money, shopping facilities value for money, parking facilities value for money
Arrival services at an airport	Speed of baggage delivery service (based on previous experience), customs inspection (based on previous experience), passport and visa inspection (based on previous experience)
Airline services	Waiting time in check-in queue/line, efficiency of check-in staff, courtesy/helpfulness of check-in staff, business/executive lounges

Airport Service Quality identifies the areas where investment will most improve customer satisfaction. Understanding what is most important for passengers' satisfaction helps to identify where to focus your service improvement and also to plan for future development.

Further information is available on the ACI website for airport service benchmarking, http://airportservicequality.ch/

3.3 IATA service standards

The International Air Transport Association (IATA), a trade body representing over 200 airlines, has developed its own measurements for defining airport service standards. It defines six levels of service standard, from "A" for excellent level of service to "F" for unacceptable level of service. At service level F, there are no measurements recommended for each service level

IATA Service level classification:

A – An excellent level of service.

B – High level of service.

C – Good level of service.

D – Adequate level of service.

E – Inadequate level of service.

F – Unacceptable level of service..

The six IATA standards from A to E measure, in terms of m^2 per occupant. Table below presents the meter squared per occupant for each facility at each standard level.

Table 3.2, M^2 Per Occupant For Each Level Of Service(IATA)

	A	B	**C**	D	E	F
Check-In Queue With 2+ Bags (Counter)	2.6	2.3	**2.0**	1.9	1.8	0
Check-In Queue With Few Bags (Self Service)	1.8	1.5	**1.3**	1.2	1.1	0
Wait/Circulate (With Carts)	3.3	2.8	**2.3**	1.8	1.2	0
Wait/Circulate	2.6	2.2	**1.8**	1.4	0.9	0
Holdroom	2.6	2.1	**1.6**	1.3	1	0
Bag Claim Area	2.6	2	**1.7**	1.3	1	0
(Excluding Claim Device)						

Departing terminal

Table 3.4 Departing terminal planning sections

NR	Description	Unit
1	DEPARTURE CURBS	m2
2	DEPARTURE CONCOURSE	m2
3	QUEUING AREA-CHECK-IN	m2
4	CHECK-IN DESKS	pcs
5	PASSPORT CONTROL	pcs
6	SECURITY CHECK	pcs
7	DEPARTURE LOUNGE	m2
8	SECURITY CHECK – GATE HOLD ROOM	pcs
9	GATE HOLD ROOM:	m2

Arrival Terminal

Table 3.4 Arriving terminal planning sections

NR	Description	Unit
2	ARRIVAL QUEUING AREA	m2
3	PASSPORT CONTROL –ARRIVAL	m2
4	BAGGAGE CLAIM AREA	m2
5	NUMBER OF BAGGAGE CLAIM DEVICES	pcs
6	QUEUING AREA- ARRIVAL CUSTOMS	M2
7	ARRIVAL CUSTOMS	pcs
8	ARRIVING CONCOURSE WAITING	m2
9	ARRIVAL CUBS	M2

IATA Formulas

IATA offers a mathematical capacity methods to determine the required capacities, IATA acknowledges what the assessment of capacity can be very complex involving for example queuing theory statistical analyses, delay studies and people movement, However the IATA provided a structural formula based method to obtain fairly fairy quickly some idea either on capacity of existing facility or of the size that facility needs to be in order to handle a given throughput, these formula(IATA manual, 1995) employ many simplicity and approximation and cannot be generally used and care must be taken to ensure that all local factors are included. As e general rule the calculated space should be increased by 10% to take these factors into the consideration.

The values of the following table variables must be established prior to using capacity calculation formulas.(IATA, 1995), the values of these variables for PIA were taken from the rough estimate make by the airport department managers for their responsible areas. However these variables might change dependant of special conditions and different flight destinations, for example the flights from a certain destination like turkey will have different values for passport control processing time, portion on passengers checked at custom point, and number of greeters and meters per passengers. The final values per these valuables were average figures and do not present the absolute figures.

IATA, Values used for capacity calculations:

Table 3.5, values used for capacity calculations, IATA

No	Description of variables	Data Gathered	Value
1	Peak Number of passengers	Peak calculation and forecast	625,
2	Proportion of passengers using car/tax	PIA Data	0.7
3	*Average Number of passengers per car/taxi*	PIA Data	1.7
4	*Average occupancy time per passengers/visitors (minutes)*	PIA Data	20
5	*Average curb occupancy time per car/taxi (minutes)*	PIA Data	1.5
6	*Number of visitors per passengers*	PIA Data	1.5
7	*Average processing time per passengers CHECK-in (minutes)*	PIA Data	2
8	*Average processing time per passengers- passport (minutes)*	PIA Data	0.3
9	*Number of hand baggage item per passenger-security(pcs)*	PIA Data	2
10	*average processing time per passengers Arrival passport (minutes)*	PIA Data	0.5
11	Proportion of passengers arriving by wide body aircraft	PIA Data	0.8
12	Proportion on passengers arriving by narrow body aircrafts	PIA Data	0.2
13	Time of arrival of first passengers at gate hold room (minutes before departure at largest aircraft handled)	PIA Data	50
14	Number of visitors per departed passengers	PIA Data	1.5
15	Number of visitors per arriving passengers	PIA Data	0.7
16	Average occupancy time per departure lounge per long haul (minutes)	PIA Data	50
17	Average accupancy time per departure per short haul (minutes	PIA data	30
18	Proportion of passengers to be costumes checked	PIA Data	0.25

3. PASSENGERS PROCESSING CAPACITY PLANNING

4.1 Passengers processing section and elements

In order to classify the processes correctly it is necessary to divide them into appropriate sections and elements. To distinguish between the processes either externally or internally within the Terminal Building it is necessary to specify the areas which are open to the general public (Public), those for passengers processing, commercial activities, and suppoer areas.

As per IATA the main section what the planning must focus are the following:

Departure Terminal:

Table 4.1 Departing terminal planning section

NR	Description	Unit
1	DEPARTURE CURBS	m2
2	DEPARTURE CONCOURSE	m2
3	QUEUING AREA-CHECK-IN	m2
4	CHECK-IN DESKS	pcs
5	PASSPORT CONTROL	pcs
6	SECURITY CHECK	pcs
7	DEPARTURE LOUNGE	m2
8	SECURITY CHECK – GATE HOLD ROOM	pcs
9	GATE HOLD ROOM:	m2

Arrival Terminal

Table 4.2 Arriving terminal planning section

NR	Description	Unit
2	ARRIVAL QUEUING AREA	m2
3	PASSPORT CONTROL –ARRIVAL	m2
4	BAGGAGE CLAIM AREA	m2
5	NUMBER OF BAGGAGE CLAIM DEVICES	pcs
6	QUEUING AREA- ARRIVAL CUSTOMS	M2
7	ARRIVAL CUSTOMS	pcs
8	ARRIVING CONCOURSE WAITING	m2
9	ARRIVAL CUBS	M2

4.2 Formula based capacity planning (IATA)

4.2.1 Departure Terminal

Peak hour calculations	625

1) DEPARTURE CURBS

a = peak hour Number of originating passengers	*625*
p = Proportion of passengers using car/taxi	*0.7*
n = Average Number of passengers per car/taxi	*1.7*
l = Average curbs length required per car	*6.5*
T = Average curb occupancy time per car/taxi (minutes)	*1.5*

Curb length required:

L = $\frac{aplt}{60n} = 0.095 \text{ a p meters } (+10\%)$

L=DEPARTURE CURBS	**41.6**
L + 10%	**45.7**

2) DEPARTURE CONCOURSE

Data required:

a = Peak Hour number of passengers	625
y = Average occupancy time per passengers/visitors (minutes)	20
s = Space required per person (m2)	1.5
o = Number of visitors per passengers	1.5

$$\frac{y}{60} \text{ x } \frac{3\,(a\,(1+o)+b)}{2} \quad 0.75\,(a(1+o)+b)\text{m2}$$

	1.5
A = DEPARTURE CONCOURSE	1171.875

3) QUEUING AREA-CHECK-IN

a = Peak hour number of passengers	625

s= Space required per passengers (m2)	1.5

$$A = s \times \frac{20}{60} \times \left(\frac{3(a+b)-(a+b)}{2}\right) = 0.25\ (a+b)m2$$

A= QUEUING AREA-CHECK-IN	171.9

4) CHECK-IN DESKS

Data required:

a = Peak hour number of passengers	625
t1= Average processing time per passengers (minutes)	2

$$N = \frac{(a+b)t1}{60}, \text{Desks}(+10\%)$$

Desk Required:

N=	20.83
N + 10%	22.92

5) PASSPORT CONTROL:

a = Peak hour number of passengers	625
t2= Average processing time per passengers (minutes)	0.3

$$N = \frac{(a+b)t2}{60}, \text{positions } (+10\%)$$

N= PASSPORT CONTROL	3.125
N= PASSPORT CONTROL + 10%	3.44

6) SECURITY CHECK

a = Peak hour number of passengers	625
y= capacity of X-ray Hand Baggage Unit (pcs/hour)	6000
w= Number of hand baggage item per passenger	2

Assumption:

Y= 300 pcs/hour

W= 2 pcs

x-ray unit required:

N= $\frac{(a \times w)}{y}, \quad \frac{a}{300},$

N=	2.08

7) DEPARTURE LOUNGE (EXLUDING BAR/SNACKS FACILITIES)

c = Peak hour number of departing passengers	625
s = Space required per passengers (m2)	2
u = Average occupancy time per long haul passengers (minutes)	50
v= Average occupancy time per short haul passengers (minutes)	30
I = Proportion of long haul passengers	0.6
K= Proportion of short haul passengers	0.4

$A = s \times (\frac{CUi}{60} \frac{CVk}{60}) = c \times (\frac{ui+vk}{30})\ m2\ (+10\%)$

DEPARTURE LOUNGE	875
DEPARTURE LOUNGE + 10%	963

8) SECURITY CHECK – GATE HOLD ROOM

m = Maximum number of seats on larger aircraft handled at gate	210
y = capacity of x- ray hand baggage unit (pcs/Hour)	600
w = Number of hand baggage items per passengers	2
g = time of arrival of first passengers at gate hold room (mins, before STD)	50
h = time past passengers should board (minutes before STD)	5

$N = \frac{60\ mw}{y(g-H)0} = \frac{0.2\ m\ units}{g-5}$

SECURITY CHECK – GATE HOLD ROOM	**0.93**

9)GATE HOLD ROOM:

Data required:

M= maximum number of seats on largest aircraft handled 210

S= Space required per passengers (m2) 1

A= m x S m^2

A= GATE HOLD ROOM: 210

Departure Terminal:

Table 4.3, Departing terminal capacity comparison

NR	Description	Unit	Actual	Calculated	Gap
1	DEPARTURE CURBS	m 2	30	46	/
2	DEPARTURE CONCOURSE	m 2	240	1,172	932
3	QUEUING AREA-CHECK-IN	m 2	240	172	/
4	CHECK-IN DESKS	Pcs	14	23	9
5	PASSPORT CONTROL	pcs	4	3	/
6	SECURITY CHECK	Pcs	2	2	/
7	DEPARTURE LOUNGE	m 2	480	963	483
8	SECURITY CHECK – GATE HOLD ROOM	Pcs	1	*1*	/
9	GATE HOLD ROOM:	m 2	100	210	110

4.2.2 Arriving Terminal:

Peak hour calculations		625

1) ARRIVAL QUEUING AREA- PASSPORT CONTROL

Data required:

d = Peak Hour number of passengers	625
s = Space required per passengers (m2)	1.00

Assumption:

S = 1 m2 (separated between control positions and thus queues (average 1.8 m2)
multiplied by lateral space required per passengers * 0.55) = 1 m2

- 50% of peak hour number of passengers arrives within the first 15 minutes.

Area Required:

A= s x $\frac{15}{60}$ s ($\frac{4(d+b)-(d+b)}{2}$ $= 0.25\,(d+b)m2$

PIA:	156.25

2) PASSPORT CONTROL –ARRIVAL

Data Required:

d = Peak Hour number of passengers	625
t3= average processing time per passengers (minutes)	0.50

Control Positions required:

N = $\frac{d\ X\ t3}{60}$ positions $(+10\%)$

PIA:	5.73

3) BAGGAGE CLAIM AREA

Data Required:

e = Peak Hour number of passengers	625.00
w= Average occupancy time per passengers (minutes)	30.00
s = Space required per passengers (m2)	1.80

A = $\frac{ews}{60} = \frac{e \times 30 \times 1.8}{60} = 0.9\ e\ m2\ (+10\%)$

A =	618.75

4) NUMBER OF BAGGAGE CLAIM DEVICES

Data required:

e = Peak hour number of terminating passengers	625.00
q = Proportion of passengers arriving by wide body aircraft	80.00
r = Proportion of passengers arriving by narrow body aircraft	20.00
y = Average claim device occupancy time per wide body aircraft (minutes)	45.00
z = Average of passengers device claim occupancy time per narrow aircraft(minutes)	20.00
n= Number of passengers per wide-bidy aircraft at 80% load factor	320.00
Number of passengers per narrow body aircraft at 80% load factor	100.00

5) NUMBER OF BAGGAGE CLAIM DEVICES

Wide Body Aircraft	1.18
Narrow Body Aircraft	0.42
Woide body length= 60-70	76.47
Narrow Body Length= 30-45	14.58

Wide body Aircraft

N = $\frac{egy}{60\ n} = \frac{eg}{425}$

Narrow Body Aircraft:

N=$\frac{erg}{60m} = \frac{er}{300}$

TOTAL LENGTH	91.05

Total Number	1.59

6) QUEUING AREA- ARRIVAL CUSTOMS

Data Required:

E = Peak hour of terminal passengers	625.00
F = Proportion of passengers to be customs checked	0.25
S = Space required per passengers (m2)	1.50

A =f x s x $\frac{20}{60}$ ($\frac{3\ e-e}{2}$) = 0.25 E x F

A=	42.97

6) ARRIVAL CUSTOMS:

Data Required:

E = Peak hour number of passengers	625.00
F = Proportion of passengers to be customs checked	0.25
T4 = average processing time per passenger (minutes)	2.00

N= (E x F x T4/60) x 4

N= Positions	5.73

7) ARRIVING CONCOURSE WAITING AREA (EXCLUDING CONCESSIONS)

Data Required:

D = Peak Number of passengers	625.00
W = Average occupancy time per passengers	15.00
Z= Average occupancy time per visitor	30.00
S= Space required per person (m2)	1.50
O = Number of visitors per passengers	0.70

A = s $\left(\frac{W(b+d)}{60} + \frac{z\,d\,o}{60}\right) = 0.375\ (d + b + 2\ do)m2\ (+10\%)$

A=	618.75

8) ARRIVAL CUBS

Data Required:

D = Peak hour number of *Terminating* passengers	625.00
P = Proportion of passengers using car/taxi	0.60
N = Average curb length required per car/taxi (m)	1.70
I = Average curb length required per car/taxi	6.50
T= Average curb occupancy time per car/taxi	1.50

L = $\frac{D\,P\,I\,T}{60N} = 0.095\ dp\ m\ (+10\%)$

L=	39.19

Table 4.4, Arriving terminal capacity comparison

	Arrival Terminal				
	Description	**Unit**	**Actual**	**Calculated**	**Gap**
1	ARRIVAL QUEUING AREA- PASSPORT CONTROL	m 2	50	**156.25**	106.25
2	PASSPORT CONTROL –ARRIVAL	pcs	4	**5.73**	1.73
3	BAGGAGE CLAIM AREA	m 2	480	**618.75**	138.75
4	NUMBER OF BAGGAGE CLAIM DEVICES	pcs	2	**1.59**	/
5	QUEUING AREA- ARRIVAL CUSTOMS	m 2	30	**42.97**	12.97
6	ARRIVING CONCOURSE WAITING AREA(EXCLUDING CONCESSIONS)	m 2	100	**618.75**	518.75
7	ARRIVAL CUBS	m 2	30	**39.19**	9.19

Table 4.5 , Future capacity extension planning- Low scenario

Low scenario

	Departure terminal							
	Year		2010	2010	2015	2020	2025	2030
	Peak	Unit	actual	625	834	1042	1146	1303
1	DEPARTURE CURBS	m2	30	48	53	61	69	76
2	DEPARTURE CONCOURSE	m2	240	1,219	1,369	1,564	1,759	1,954
3	QUEUING AREA-CHECK-IN	m2	240	179	201	229	258	287
4	CHECK-IN DESKS	pcs	14	24	27	31	34	38
5	PASSPORT CONTROL	m2	4	4	4	5	5	6
6	SECURITY CHECK	pcs	2	2	2	3	3	3
7	DEPARTURE LOUNGE	m2	480	1,001	1,124	1,284	1,445	1,605
8	*SECURITY CHECK – GATE HOLD ROOM*	*pcs*	*1*	*1*	*1*	*1*	*1*	*1*
9	GATE HOLD ROOM:	m2	100	210	210	210	210	210
Arriving terminal								
1	ARRIVAL QUEUING AREA- PASSPORT CONTROL	m2	50	163	209	235	261	326
2	PASSPORT CONTROL –ARRIVAL	m2	4	6	8	9	10	12
3	BAGGAGE CLAIM AREA	m2	480	644	826	929	1,032	1,290
5	NUMBER OF BAGGAGE CLAIM DEVICES	pcs	2	2	2	2	3	3
6	QUEUING AREA- ARRIVAL CUSTOMS	pcs	30	45	57	64	72	90
7	ARRIVING CONCOURSE WAITING AREA (EXCLUDING CONCESSIONS)	pcs	100	644	826	929	1,032	1,290
8	ARRIVAL CUBS	pcs	30	41	52	59	65	82

Table 4.6, Future capacity extension planning- middle scenario

Middle scenario

	Departure terminal							
	Year		2010	2010	2015	2020	2025	2030
	Peak	Unit	Actual	625	834	1042	1146	1303
1	DEPARTURE CURBS	m2	30	48	61	76	84	95
2	DEPARTURE CONCOURSE	m2	240	1,219	1,564	1,954	2,149	2,443
3	QUEUING AREA-CHECK-IN	m2	240	179	229	287	315	358
4	CHECK-IN DESKS	pcs	14	24	31	38	42	48
5	PASSPORT CONTROL	m2	4	4	5	6	6	7
6	SECURITY CHECK	pcs	2	2	3	3	4	4
7	DEPARTURE LOUNGE	m2	480	1,001	1,284	1,605	1,765	2,007
8	*SECURITY CHECK – GATE HOLD ROOM*	*pcs*	*1*	*1*	*1*	*1*	*1*	*1*
9	GATE HOLD ROOM:	m2	100	210	210	210	210	210
Arriving terminal								
1	ARRIVAL QUEUING AREA- PASSPORT CONTROL	m2	50	163	209	261	287	326
2	PASSPORT CONTROL –ARRIVAL	m2	4	6	8	10	11	12
3	BAGGAGE CLAIM AREA	m2	480	644	826	1,032	1,135	1,290
5	NUMBER OF BAGGAGE CLAIM DEVICES	pcs	2	2	2	3	3	3
6	QUEUING AREA- ARRIVAL CUSTOMS	pcs	30	45	57	72	79	90
7	ARRIVING CONCOURSE WAITING AREA (EXCLUDING CONCESSIONS)	pcs	100	644	826	1,032	1,135	1,290
8	ARRIVAL CUBS	pcs	30	41	52	65	72	82

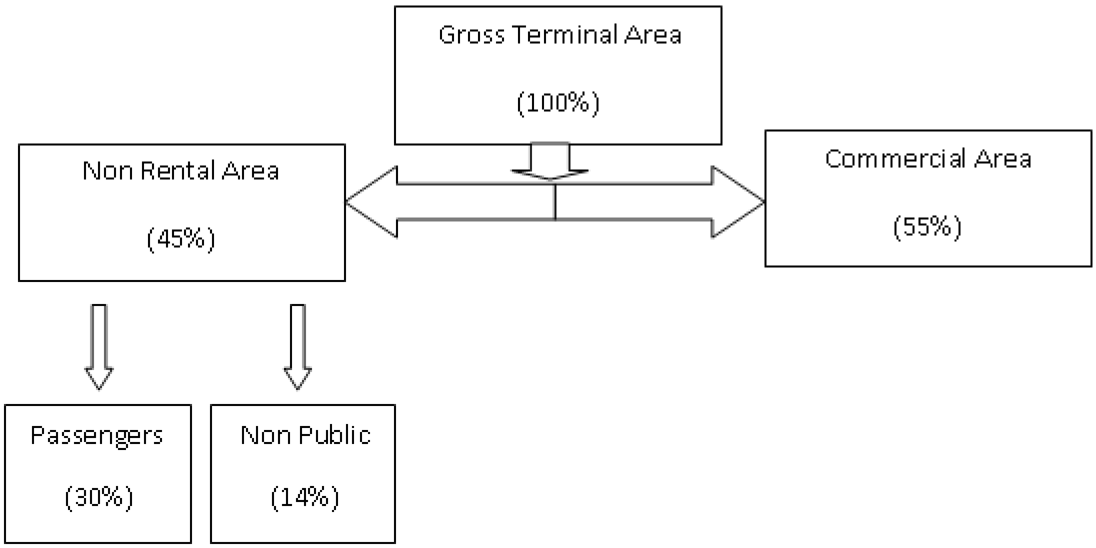
Table 4.7, Future capacity extension planning- High scenario

High scenario

	Departure terminal							
	Year		2010	2010	2015	2020	2025	2030
	Peak	Unit	Actual	625	834	1042	1146	1303
1	DEPARTURE CURBS	m2	30	48	69	88	107	114
2	DEPARTURE CONCOURSE	m2	240	1,219	1,759	2,248	2,736	2,931
3	QUEUING AREA-CHECK-IN	m2	240	179	258	330	401	430
4	CHECK-IN DESKS	pcs	14	24	34	44	53	57
5	PASSPORT CONTROL	m2	4	4	5	7	8	9
6	SECURITY CHECK	pcs	2	2	3	4	5	5
7	DEPARTURE LOUNGE	m2	480	1,001	1,445	1,846	2,247	2,407
8	*SECURITY CHECK – GATE HOLD ROOM*	*pcs*	*1*	*1*	*1*	*1*	*1*	*1*
9	GATE HOLD ROOM:	m2	100	210	210	210	210	210
Arriving terminal								
1	ARRIVAL QUEUING AREA- PASSPORT CONTROL	m2	50	163	235	300	365	391
2	PASSPORT CONTROL –ARRIVAL	m2	4	6	9	11	13	14
3	BAGGAGE CLAIM AREA	m2	480	644	929	1,187	1,444	1,547
5	NUMBER OF BAGGAGE CLAIM DEVICES	pcs	2	2	2	3	4	4
6	QUEUING AREA- ARRIVAL CUSTOMS	pcs	30	45	64	82	100	107
7	ARRIVING CONCOURSE WAITING AREA (EXCLUDING CONCESSIONS)	pcs	100	644	929	1,187	1,444	1,547
8	ARRIVAL CUBS	pcs	30	41	59	75	91	98

4. GROSS TERMINAL AREA PLANNING:

Figure 5.1, FAA Terminal design, Area proportions



5.1 Commercial Activities:

FAA guidelines recommend that **50 to 55 percent of a passenger terminal** facility's usable area be revenue-generating. Revenue-generating spaces usually include areas leased by airlines for ticketing counters and offices, baggage make-up, baggage claim input, Concessions and other lease spaces within the passenger terminal facility are also included in this category.

The Airline Ticket Counter (ATO) area is the primary location for passengers to complete ticket transactions and check-in baggage. It includes the airline counters, space and/or conveyors for handling outbound baggage, counter agent service areas, and related administrative/support offices. In almost all cases, ticket counter areas are leased by an airline for its exclusive use. Therefore, the planning, design, and sizing of these areas should be closely coordinated with individual airlines

Airlines Office support The airline ticket counter/office provides space for a number of airline support activities. These activities include: accounting and safekeeping of receipts; agent supervision; communications; information display equipment; and personnel areas for rest, personal grooming, and training. At low activity locations, the ticket counter area may provide space for all company administrative and operational functions, including outbound baggage. Figure 5-9 depicts two typical layouts for low activity airports with single-level terminals. At high activity locations, there is more likelihood that additional space for airline support activities will be remotely located from the ticket counters.

Airline operations areas.

a. Airline operations areas are those areas occupied by airline personnel for performing the functions related to aircraft handling at the gate. Composition of functions will vary among individual airports. The following areas are most commonly required:

- **Cabin Service or Commissary** - an area for the storage of immediate need items for providing service to the aircraft cabin.
- **Cabin Service and Ramp Service Personnel** - an area for training facilities and a ready/lunch room.
- **Aircraft Line Maintenance** - for supplies, tools, storage, personnel, etc.

Food and beverage services.

a. These services include snack bars, coffee shops, restaurants, and bar lounges. The basic service offered at small airports is the coffee shop, although separate restaurants at some smaller city airports can be successful, depending on the community and restaurant management. Large airports usually can justify several locations for snack bars, coffee shops, bar lounges, and restaurants. Requirements for more than one of each type are highly influenced by the airport size and terminal concept involved. Unit terminals, for instance, may require coffee shops and/or snack bars at each separate terminal.

Current level of commercial activities at PIA is below the average figures at developed countries airports, only 15% of revenues at PIA are commercial and only 20% of terminal space is for commercial purposes. PIA can introduce other commercial activities such as concessions to increase the commercial activities, this will require more terminal space for commercial purposes, for planning purposes the total commercial space at terminal is planned to be between 55% recommended by FAA and current 20%, therefore a ratios of **35% commercial** space from total terminal space is reasonable figure to be considered for planning purposes.

5.2 Non-public Area

This category includes the “back of the house” area that is not accessible to the public. It generally consists of airport administration, airport police, CAA, other airport-oriented tenants, facilities maintenance, receiving and loading dock, mechanical/ electrical/building systems facilities, and other miscellaneous areas. The size and configuration of these spaces is not a function of peak hour data, but is determined by the specific requirements for each component

Support space

Airport support spaces include areas serving users indirectly, such as security, training, janitorial and space for mechanical, HVAC, electrical, plumbing and communication equipment.. FAA guidelines suggest a **15 percent** occupancy ratio of a building’s usable area for support spaces Support spaces, except for security, should increase proportionately with expansions.

Airport Administration

This category represents the total area devoted to airport administration functions. It currently consists of a reception area, offices, conference rooms, storage areas, work areas, and rooms for special events such as VIP press conferences, etc. The requirements for airport administration are a function of staffing and are generated by the airport.

5.3 Non-usable space and building structure

Building structure typically occupies **five to ten percent of the gross square** footage of a building. This includes wall thicknesses, atriums and chases that were not accounted for in square footage take-offs.

5.5 Total Terminal area:

PIA planned Space required:

- Commercial space: 35%
- Passengers processing: 40%
- Support space 25%
- Other non usable: 5%

Table 5.1, Total terminal area required by scenarios

Low Scenario

	Year	2010	2015	2015	2020	2025	2030
	Procesing Space(40%)	690	4,170	4,724	5,367	6,009	6,652
	Revenues space (35%)	604	3,649	4,133	4,696	5,258	5,821
	Airport Support officies (25%)	431	2,606	2,952	3,354	3,756	4,158
	Non Usable area (5%)	86	521	590	671	751	832
	TOTAL Terminal Space	1,811	10,946	12,400	14,087	15,775	17,463

Middle Scenario

	Year	2010	2015	2015	2020	2025	2030
	Procesing Space(40%)	690	4,229	5,367	6,652	7,295	8,266
	Revenues space (35%)	604	3,700	4,696	5,821	6,383	7,233
	Airport Support officies (25%)	431	2,643	3,354	4,158	4,560	5,166
	Non Usable area (5%)	86	529	671	832	912	1,033
	TOTAL Terminal Space	1,811	11,101	14,087	17,463	19,150	21,698

High Scenario

	Year	2010	2015	2015	2020	2025	2030
1	Procesing Space(40%)	690	4,229	6,009	7,623	9,230	9,873
2	Revenues space (35%)	604	3,700	5,258	6,670	8,076	8,639
3	Airport Support officies (25%)	431	2,643	3,756	4,764	5,769	6,171
4	Non Usable area (5%)	86	529	751	953	1,154	1,234
5	TOTAL Terminal Space	1,811	11,101	15,775	20,010	24,229	25,917

5.6 Terminal building scenarios:

The total terminal area including public area, support area, and commercial area are calculated for each scenario, the chart shows the different in terminal area required between the scenarios. The difference between low and high scenario on up to 50% of total area required.

Table 5.2, Gross Terminal area planned

GROSS TERMINAL AREA	2010	2015	2015	2020	2025	2030
Low traffic scenarios	1,830	10,946	12,400	14,087	15,775	17,463
Mid traffic scenario	1,830	11,101	14,087	17,463	19,150	21,698
High traffic scenarios	1,811	11,101	15,775	20,010	24,229	25,917

Figure 5.2, Comparison of gross terminal area by scenarios

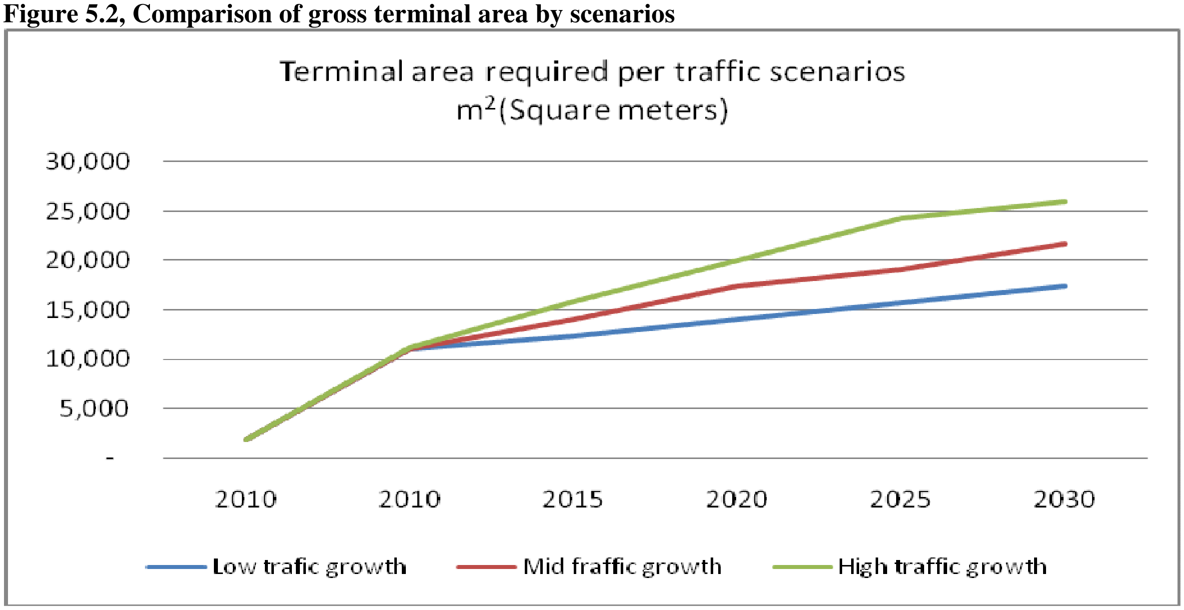


Table 5.3, Difference between scenarios by percentage

Difference between scenarios	2015	2015	2020	2025	2030
Low					
Middle	1%	14%	24%	21%	24%
High	1%	27%	42%	54%	48%

5.7 Investment Cost

The total cost per designing and building the terminal varies between specific designs and architectural structure, but is the essence it is determined by the square meter on total areas and selected areas of terminal. As mentions the cost per building terminal varies greatly and is around 2,000 Euro per square meters up to 4,000 Euros per square meters, for the evaluations purposes of each scenarios the average of 3,000 Euro per square meters is taken to project the cost per terminal buildings, the below are projections:

Table 5.4, Investment estimated by scenarios (In euros)

Investment Schedule	2010	2015	2020	2025	2030	TOTAL
Low		37,198,813 €	5,062,907 €	5,062,907 €	5,062,907 €	52,387,534 €
Mid		42,261,720 €	10,125,814 €	5,062,907 €	7,643,042 €	65,093,483 €
High		47,324,627 €	12,705,949 €	12,657,268	5,062,907 €	77,750,751 €

Except for the investment cost, the terminal size also influences the cost of maintenance and operations (O &M), for instance the staff and equipment to clean and maintain the terminal is a function of the size of the terminal, cost for security, utilities, heating, air conditions are also a function of terminal size. (Mahmoud, 1995). The O&M cost per to erminal buildings is between 115$ to 860$ per square metter, of the gross terminal area annually (Mahmoud 1995).

As seen from the financial assumption the largest investment should be made to build the initial capacity for the 2015 projection, and later the investment for extensions represent a considerable small amount to be invested. The difference in between the scenarios on the total investment cost is up to around 25 million between high and low scenarios and 12 million between middle and low scenarios.

From the financial point is it important to carefully plan the optimum capacity size and plan the financial sources of funding, the air traffic level with not only make determine the capacity and cost on investment in those capacity but also the amount of revenues to be collected by the airport.

6. CONCLUSIONS AND RECOMMENDATION:

6.1 Conclusions

Considering the Kosovo political and economical situation there are many factors which can influence the future traffic growth, taking into account these uncertainties the scenarios base forecast was necessary to consider the alternatives in air traffic growth. The forecasting scenarios are analyzed separately and developed to plan for the capacity expansions, the difference between low traffic scenarios and high traffic scenarios is up to 50% of the total required capacity, therefore building capacity accordingly to only one scenario represent a great risk in proper capacity planning.

The capacities are planned to meet the demand of air traffic and serve the passengers with appropriate level of services, the planning process itself is based on the service quality measured in term of m2 per passengers. The IATA system in term of m2 per passengers also takes into the consideration the process characteristics such as average processing time during check-in, average processing time in passport control, average processing time in customs etc. These variables therefore must be systematically monitored and measured to see how they reflect in service level provided

Final gross terminal area is determine by the passenger processing areas, non-public support areas and commercial areas, there are FAA recommended proportion between these area, but local circumstances and actual PIA structure of commercial activities are also determined factor.

Considering investment cost to expand terminal area and also the cost of O&M being linked to total area of the terminal, the capacity expansions planning per scenarios shows what dependent on the chosen scenarios there with be a different investment and O&M cost per different scenarios, therefore this project recommends to develop strategies that balance the demand for air traffic and capacity expansions.

6.2 Recommendations

This capstone project provides planning parameters for capacity extensions what will provide appropriate level of services to passengers and meet the air traffic demand. There are three main recommendations that derive from this project and tree secondary recommendations.

Primary recommendations:

- **Phasing expansion**- Construction phasing shall be critical for optimum building of capacity, for the 20 year period the construction and building of capacity is recommended to be done in 5 year phases, therefore to insure that no over or under capacity is being built, the construction of extensions should be technically done in phasing and allow a phase bases extension. Scenarios explore potential futures and there are different scenarios with significant variations from each other, the flexibility means that the planning process will operate in the optimum scenarios and continuously monitor the changes necessary to jump into the appropriate scenarios if necessary. For this purpose the 5 year period planning milestone has to be adopted
- **Systematic measurements of service level-**Key Performance Indicators (KPI's)- Monitor performance of airport terminal in regards to service level by systematically measuring the variables affecting the passengers service levels, such as: peak hours, processing time in check-in, processing time in passport control, processing time in customs etc. All these variables are recommended to be systematically monitored to insure that service quality is provided as per preplanned service level.
- **Stimulate spreading traffic on off peaks hours-** spreading traffic from peak hours to non peak hours would solve few problems. It would lower the peaks and respectively lower demand for capacity building based on peaks, it would spread the traffic to non peak periods and contribute to the efficient use of resources at non peak periods, for example: use of human resources over its official working hour and not only at peak

hours. There are different strategies recommended to be used for traffic spreading at off peak hours, 1) Peak Pricing, 2) Incentive program for off peak operations, 3) Penalties for slot abuses, and 4) slot auctions.

Secondary recommendations:

- **Use of high-tech technology** - The space given over to passenger processing could be used more efficiently by the use of new technology. The most promising advance is likely to be through information technology leading to machine readable passports, and self-ticketing at the gate or at home via the internet. These innovations will undoubtedly speed up the processes and bring some space efficiency benefits. The space gained may well be used for more concession space unless congestion levels become intolerable. The adaptive view is being interpreted as having to 'do more with less'.
- **Adoptable structure of terminal**- The one way of adding capacity is to build an initial terminal, which is replicated with additional identical units as demand grows, to require greater capacity. This can be done by adding additional modular section to a main building or by adding additional replica unit terminals. Modifications within the actual structure are also recommended to be possible for the purpose of extension of certain area by demand.
- **Future Research**- the survey based research on passengers will provide more in-depth information on passenger's expectations and their references regarding service level. The passengers perception on service level at the Airport can provide the management and planning with insight for areas to improve and there to add additional capacity.

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Annex 1 Capstone Project Consultant

During our capstone project, I am going to have three consultants, a PhD candidate in Economics, Managing Director of Prishtina Airport and commercial director of Prishtina airport.

Contact details of the consultant are as follows:

Family name, Name: Gazmend Ahmeti
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Academic degree: Professional MBA
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Annex 2 Forecasting: Expert judgment

The sample Questionnaire:

As part of the study regarding the future needs in developing airport capacity, I am doing work in the projection of air traffic forecast, having considered the importance of expert judgment in assessing the future traffic you have been selected to give your feedback and your personal perspective and thought on future development on air traffic in Kosovo.
Your sincere answer while help us to better analyses the problem and general growth on civil aviation in Kosovo.

You are kindly requested to fish the following:

Those are the factors what with effect the future growth of air traffic:

1)	2)	3)
4)	5)	6)

Etc.

What are the factors what negatively affect the future growth of air traffic?

1)	2)	3)
4)	5)	6)

Etc.

Please fill out the form for your individual prediction on future traffic growth:

Please insert your prediction		
Year	**Growth Rate**	**Passengers**
2015		
2020		
2025		
2030		

Expired judgment analyses of results:

Best Regards,

Deputy Commercial Department

Prishtina International Airport

Annex 3 Peak hours per year 2009

NR	DATE	ROUND TIME	Count of №	Sum of D-PAX
1	8/16/2009	4:00:00 PM	6	885
2	1/4/2009	3:00:00 PM	6	873
3	10/4/2009	10:00:00 AM	5	852
4	8/30/2009	10:00:00 AM	5	848
5	9/5/2009	8:00:00 PM	5	840
6	8/9/2009	8:00:00 PM	5	798
7	8/29/2009	11:00:00 AM	5	797
8	8/16/2009	10:00:00 AM	5	796
9	9/5/2009	12:00:00 PM	4	783
10	8/8/2009	11:00:00 AM	5	778
11	8/20/2009	4:00:00 PM	5	770
12	8/8/2009	5:00:00 PM	5	765
13	8/23/2009	4:00:00 PM	4	740
14	9/26/2009	10:00:00 AM	4	740
15	8/15/2009	9:00:00 PM	4	735
16	10/3/2009	11:00:00 AM	5	735
17	10/10/2009	10:00:00 AM	4	727
18	10/18/2009	10:00:00 AM	4	722
19	10/17/2009	10:00:00 AM	4	717
20	10/25/2009	10:00:00 AM	4	716
21	8/2/2009	4:00:00 PM	5	699
22	8/22/2009	4:00:00 PM	5	695
23	4/18/2009	10:00:00 AM	4	695
24	10/21/2009	1:00:00 PM	4	692
25	1/7/2009	12:00:00 PM	4	679
26	8/14/2009	1:00:00 PM	4	673
27	11/18/2009	12:00:00 PM	5	668
28	4/12/2009	10:00:00 AM	4	661
29	8/27/2009	4:00:00 PM	4	657
30	5/17/2009	10:00:00 AM	4	656