

Landing an airport? Airport development and strategic land use planning in the EU

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1 ABSTRACT

Most of the world's largest airports are situated in densely populated metropolitan areas and both the metropolitan agglomerations and the international airports, are characterised by excessive growth. International trends and structural changes in the aviation industry will need to be accommodated locally, keeping in mind that the (future) accommodation of civil aviation is strongly linked to the acceptability of the developments at regional and local level. The debates on noise, safety and health tend to evolve into debates on "acceptable" limits. Planning policies often thus actually deal with implementation of the airport and airport-effects, instead of addressing the strategic planning issues.

The debate on the future development of airports in metropolitan regions is an illustration of the growing dualism between administrative space and economic space within these regions, as Friedmann (1995) noticed; A growing social schizophrenia resulting from the double covering of, on the one hand, regional societies and local institutions, and, on the other hand, the rules and operations of the economic system at the international level. This leads to the question: With which goals, to what extent, by whom and on which base can spatial planning in these cases be done, and which opportunities for sustainable economic development can be created?

This article is structured in three parts:

- First the trends in the aviation industry and its need for future capacity are outlined. This sets the framework for the potential spatial impact at and around airport sites and shapes the investment strategy of airports and planning authorities.
- Secondly airport planning is discussed. More often than not the consequences of sector policies and, obviously market forces on space are more important than the actual economic or spatial planning policy. A distinction is made by airport planning as done by the aviation sector itself and the airports as object in state-of-the art of planning policies across the EU. There is a tendency to address land side development through institutional channels of the aviation sector. An example is the Airport Package of the European Commission.
- Thirdly, and concludingly an alternative framework is presented by means of which one can assess the stakes in the planning debate on the territorial insertion of airports in their regions.

2 AIRPORT SITES: GROWTH AND IMPACT

Capacity needs and the financing of airport capacity

The European air transport industry has seen the demand for air travel increase three-fold between 1980 and 2000, and is set to double by 2020 (ACI, ATAG 2006). A general rule of the thumb is that the air traffic growth is in line with world wide economic growth, but just a few (2-3) percentage points higher. Much has been said about the link between worldwide GDP growth, the fact that more and more of this growth is realised through international trade and the role of aviation. Aviation is not only a necessary industry to enable the growth of the tourism industry (the worldwide fastest growing sector) through the shipment of passengers, but cargo, and especially high value/low bulk cargo plays a pivotal role in a globalised economy.

Within the European Union the growth of aviation is such that there is an looming 'capacity crunch', an insufficient capacity to accommodate the air traffic growth in the longer term (European Commission, 2007).¹ Even for the technically well-planned airports, this means that capacity limits are never far away. Airport Council International (ACI) forecasts a capital expenditure of €8.1 to €8.5 billion per annum until 2015 needed for airport infrastructure.

¹ The prediction is that there will be a shortage of capacity, even when all current projects are implemented. The capacity gap is predicted to be most serious at the largest airports. These airports accommodate for the largest part of the intercontinental traffic and have a feeder/distributor function for the European network of air linkages.

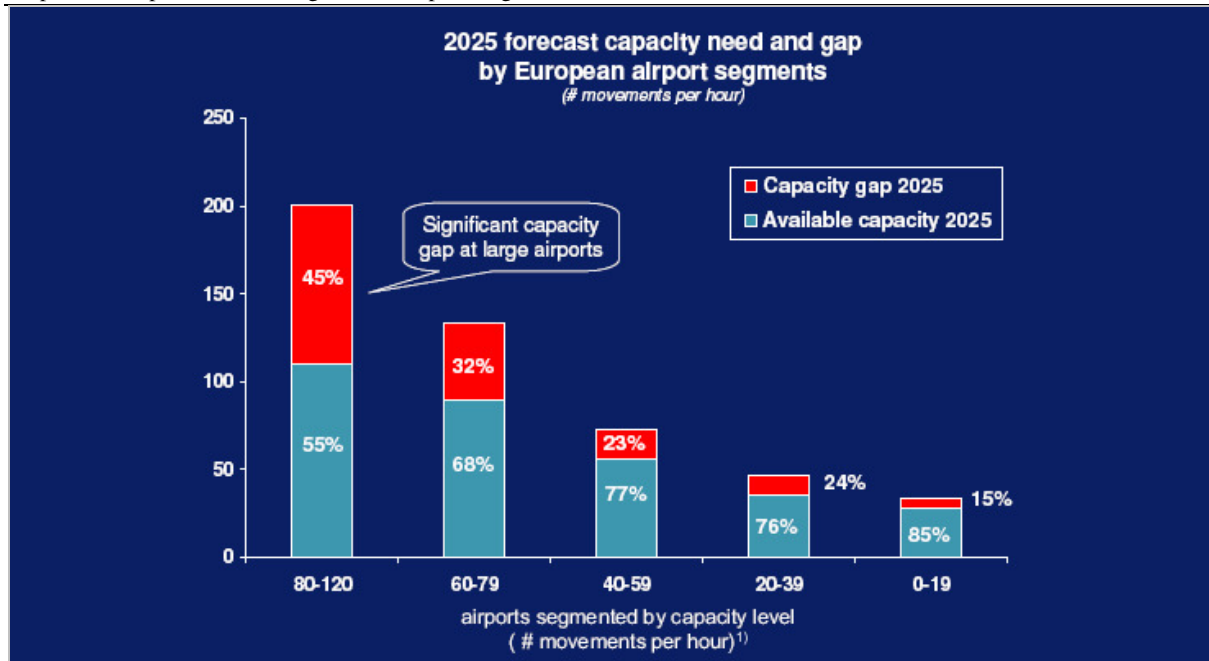


Figure 1. Forecasted capacity gap (Eurocontrol, ACI 19-06-2007)

Additional capacity will increasingly need to be funded by airport authorities themselves. Basically airport authorities have two ways to increase revenues; via the aeronautical or via the non-aeronautical activities. Aeronautical revenues (mainly landing fees and concessions) remain the largest revenue source, but their share in the total operational results is diminishing.

Airport charges in particular are increasingly subject to stringent regulatory policies. On January 15 2008 the European Parliament voted a Commission proposal on airport charges. The legislative report sets out common principles for levying airport charges at Community airports. The directive applies to airports with an annual traffic of more than 5 million passengers. It foresees more transparency on the calculation of the charges set by airport authorities and the implementation of a national regulator with a controlling function.²

Although in some countries (ex. Spain) an increase in airport charges can be expected; it will not cover the total capital expenditure needed to finance additional infrastructure (ACI, 2007). Moreover the aeronautical revenues are vulnerable to market swings; events like the Gulf War or 9/11 or a worldwide recession have a direct impact on traffic volumes, and thus on landing fees. Although these effects prove to be temporarily, the industry always shows a resilience and returns to the predicted growth figures, it underlines the importance of non-aeronautical revenues to airport authorities.

The percentage of non-aeronautical revenues is in the EU on average between 40% and 50% of the total revenues. Following the example of the Schiphol Group we divide non-aeronautical revenues in the consumer related revenues (parking, concession fees for retail contracts, management and advertising) and real estate related. The latter encompasses revenues from rents (including ground rents), sales, release of land for development and the fair value gains or losses on property. Real estate development has proven a profitable activity for Schiphol, accounting over the past years for the largest increase in operational results per book year.

² The European Parliament introduced at the date of voting a new amendment saying: "The airport managing body may pre-finance new infrastructure projects by increasing airport charges accordingly..." This sparked reactions from both the ACI and the airlines, in particular the International Air Carrier Association (IACA). ACI would have liked to see another type of policy, rewarding airports that address capacity problems rather than adding a controlling regulator. ACI states that airport size is not necessarily indicative of market power; airlines are at many airports the dominant party, able to strongly negotiate the terms under which they operate.

On the other hand IACA responded that the relation between the deregulated airlines and the monopolistic airport service provider needs rebalancing. They believe the possibility of levying charges in order to pre-finance infrastructure gives airports the possibility to start building while shifting part of the risk onto the airlines. The vote, according to IACA, further equals granting the airports a blank cheque in respect to the choice between a single till/ dual till business model. As airports develop more non-aeronautical activities via retail and real estate, airlines should be able to benefit from these activities (generated by their passengers) through lower charges (single till model).

2.1 Opportunities for airport sites: airport cities?

Over the last decade we have seen many airport concepts arise that focus on the development of real estate. The airport city concept seems to be prevailing at the moment; similar terms like *aéroilles*, *aerotropolises* and airport regions are coined at regular intervals. What evidence do we have of airports in this respect? In the early days of airports, the 1950s, people came to airports to watch planes take off and land and to eat in elegant restaurants. During the two decennia that followed, air travel became less exclusive and this tradition waned. Airports became transit-points. More recently airports re-develop into multiple function centres, destinations for mixed-use. To illustrate some of the above, some tangible examples on the stages of airport development and the type of firms you can expect to locate at the airport are summarised in a scheme that Fraport uses for its development (see figure 2).

The combination of the overall spread of the urban field and the increase in volume of employees and passengers facilitates the development of airports towards airport cities or regions. The mix of activities and services is less exclusive and than at the airports of the 1950s and more like an urban development. The revenues per square meter tend to decline the further away the location from the core of the airport (a similarity shared with many urban centres). The top British airports tend to obtain a high level of non-aeronautical revenues per square meter. This is partly due to the relatively small size of the UK airports. Most mainland European airports, some exceptions aside (for example Zürich), have much more land available. The major EU-airports outside the UK obtain similar or higher levels of non-aeronautical revenues per pax but (still) need more square meters to achieve this. It is generally assumed that there through densification and diversification at airport higher levels of non-aeronautical revenues can be generated (Booz Allen Hamilton, 2007).

The local economic impact of airports has been subject to study ever since the debates on the necessity of additional runways, terminals and night flights started. To offset the negative impact of air traffic growth, the aviation industry has underlined the economic benefits to society. This means that many studies undertaken in to measure economic impacts are designed to prove a maximum impact, in particular via the use of a multiplier to calculate the spin-off effects. By now an accepted figure for the economic potential of an international hub airport is estimated to be in the order of 1.000 jobs per million passengers and 900-1.000 jobs per 0.1 ton cargo (ACI, 1998; York Consulting, 2005).

This figure is the average of the impact measured around larger airports in Europe. However, after the initial expansion phase of an airport an optimum is reached; the number of jobs created per million passengers will start to decrease. The internal efficiency of the airport platform, even by sufficient technical capacity, is increasingly optimised. This means that a larger quantity of persons and goods can be handled without creating the impressive external economic effects from the begin-period, and thus slowing down the curve of the direct effects. Simultaneously the number of firms at the site multiplies, profiting of the volumes that transit the site. Over time the larger traffic volumes permit the localisation of more and more indirect and derived economic activities. The spin-off effects start to increase. In other words, a 'location'-threshold is passed; the airport becomes an interesting location for non-air traffic related activities. Figure 3 schematises this development.

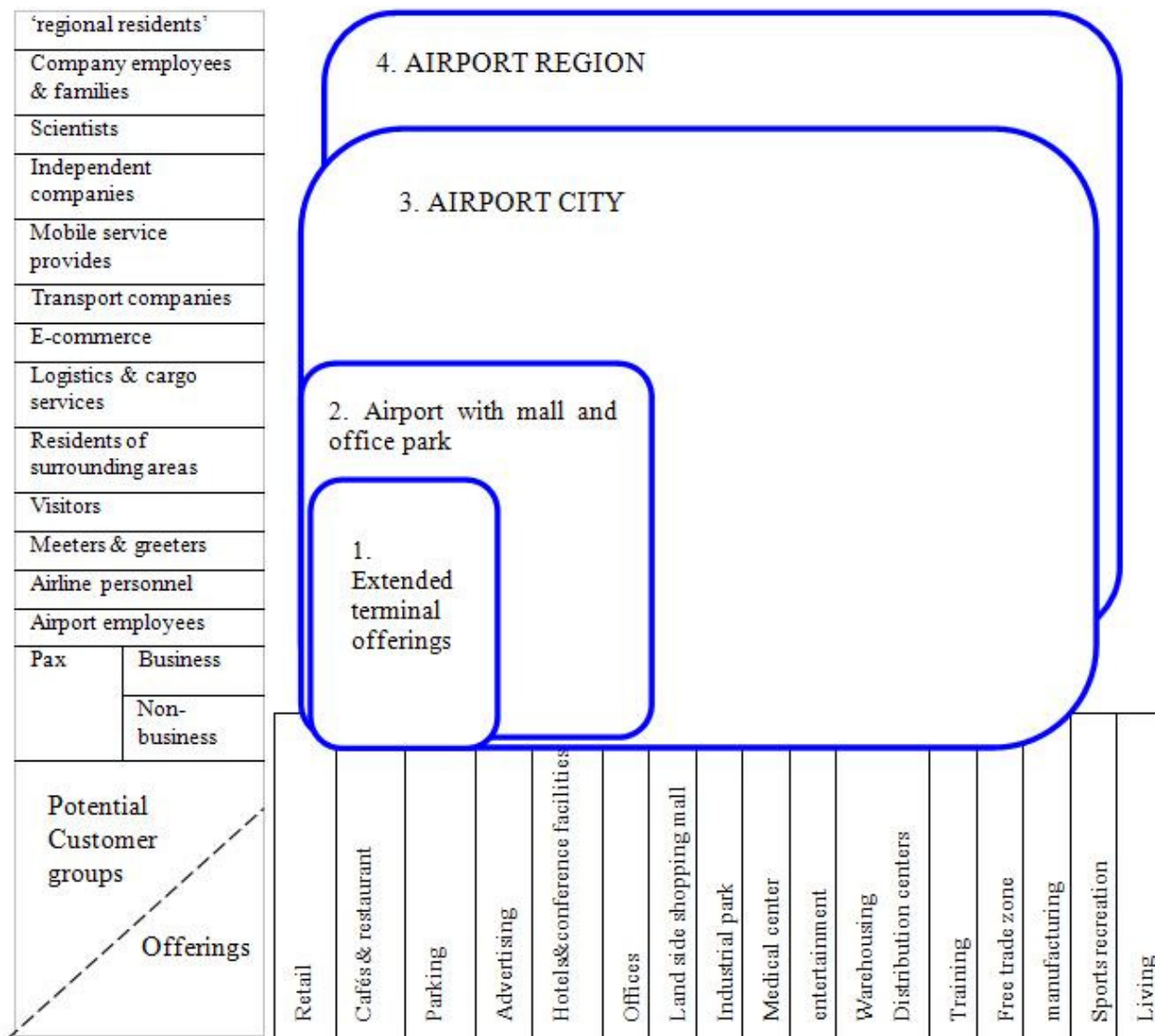


Figure 2. The importance of real estate to airport city development; the Fraport concept (Fraport,2007)

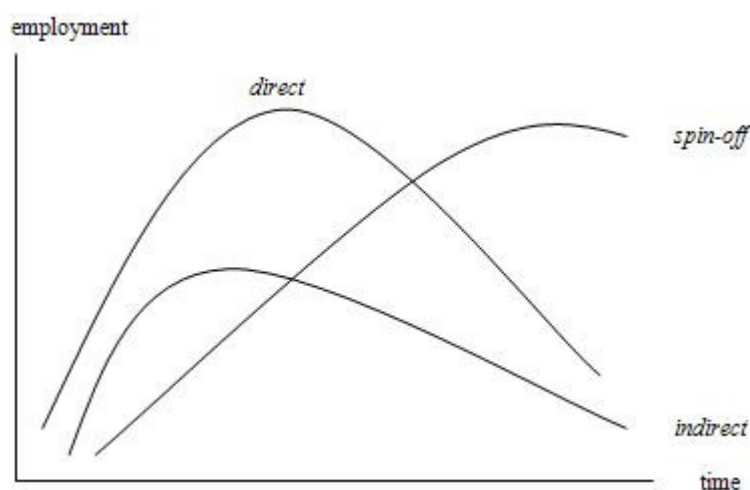


Figure 3. Direct, indirect and spin-off effects over time (Button, 1995)

When the spin-off effects start to multiply, many more parties consider that they have an interest in the airport's development than in the initial development stage. The development of a commercial airport is then determined by four factors: the flows of passengers and goods, the agents that operate within the airport, the

nature of the airport as productive and business generator unit and the physical, social and economic environment in which it operates (Betancor & Rendeiro, 1999).

Although the underlying driver for growth in the airport area remains the activity of the direct economic actors, the aviation business, the situation for a mature airport has changed significantly. Airport authorities themselves are no longer mere transport suppliers but full-fledged economic actors. The airport site is used by groups of economic actors, including the airport authorities themselves, for indirect and derived economic activities that are not necessarily directly linked to the transportation by air of persons and cargo.

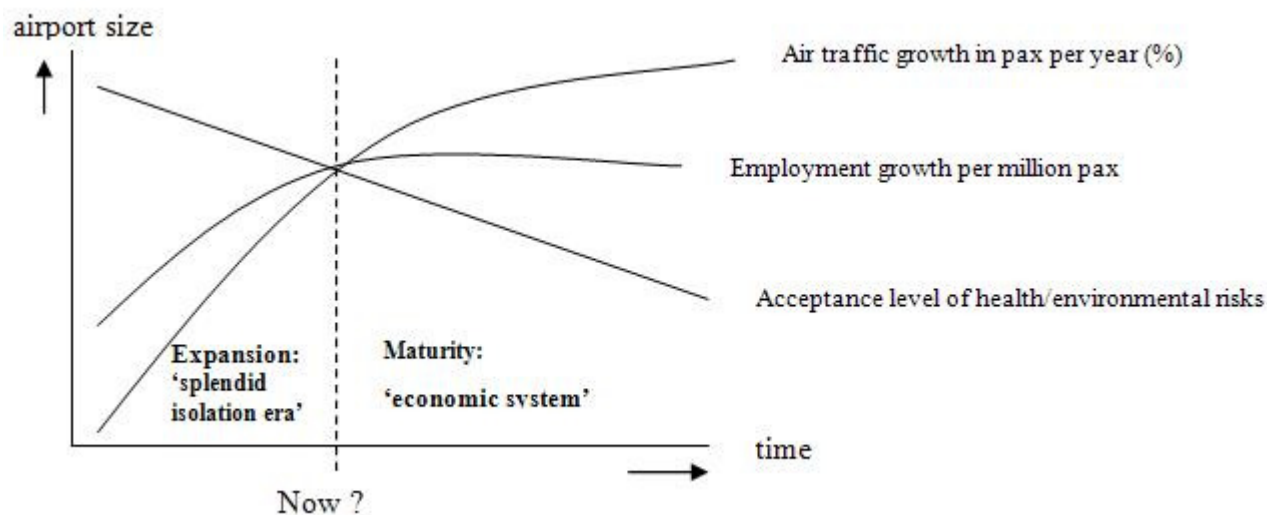


Figure 4. Airport growth and its effects over time

The forces at work once an airport transforms from a facility to an economic system are complex and in contradiction (such as the development of housing around the platform) and furthermore economic geography theory suggest that the essential feature of its attraction lies in the concentration of a large diversity of economic activities at one site. The intrinsic 'platform'-value of the airport lies in its complexity.³ The review of the features of and trends at airports reveals that when airports change from transport node into a full-fledged hub, they seem to come at a turning point; they transform from an infrastructure facility to an economic system.

As long as an airport remains but an airport, the roles of the different actors are clear: Airport authorities provide the infrastructure capacity, airlines guarantee the transport of goods and persons, the different governmental levels proscribe operational standards (environmental limits, controls, landside access). This period of airport development can be labelled 'splendid isolation', meaning that every actor has its role and interaction is purely on functional issues (ADP, Millour, 2001). The actors do not need to spend much time or budget in justifying their actions or strategies. They can do their jobs in relative isolation to the surrounding territory as long as they fulfil their technical requirements and do not compete with city centres as office or retail locations.

This all changes once an airport reaches maturity; the airports location becomes an economic, and to some extent urban centre that competes at least with other regional centres in the office, retail and to some extent even housing market. We face a situation where a need for infrastructure expansion coincides with the increase in territorial claims (of firms, public authorities and the general public). The development of a commercial airport is not only determined by the flows of passengers and goods, but also and increasingly by the agents that operate on site.

The airports territorial capacity then moves from being a supply factor, and concern of the airport authority, to a concern of many. In this sense the issue of territorial capacity turns into a planning issue, the idea of planning being the challenge on finding ways in which citizens, through acting together, can manage their collective concerns with respect to the sharing of space and time (Healey, 1992). As the Dutch Scientific Council states (WRR, 1998): '*Spatial policy is more than just accommodating societal phenomena that*

³ See also Porter, 1999 on value chains and the importance of platforms.

can appear as autonomous features...Spatial policy does not only concern the decoration of physical space but foremost deals with the intertwining social spaces. This fact renders the solution for spatial problems complicated; one cannot just redistribute the responsibilities'.

3 AIRPORT PLANNING; THE END OF THE 'SPLENDID ISOLATION ERA'

Airports are no longer the mere providers of infrastructure for airlines. Not only has the character of airports changed, also the business drivers for optimising the location value of the airport site have changed. Developing airports as economic centres places them equally at the heart of regional and national economic and spatial planning policies. Airports and airport development are one of the major dilemmas, one of the issues on which a conflict of interests emerges when it comes down to the formulation of a longer term spatial planning policy.

The term airport planning covers in general both the planning of the technical facility as well as broader master planning. In order to see clearer the term airport planning will be used for the planning of a technical facility (with economic spin-off effects) operated by an airport authority. Spatial planning concerns policy-making whereby across the European Union the most binding plans are produced by local governments. To divide between the different forms of planning, we use the following definitions (Ineco, 2006):

- Airport master planning: The planning of the airport infrastructure and lay-out (including the real estate component), as done by the airport authority
- Spatial planning: In order to operate a commercial airport or to develop other uses at existing airports inevitable planning permissions and operating licenses are required. We enter here the realm of spatial planning; Plans that are prepared by the responsible public authority as part of their spatial, economic and social policies. These plans can have a legally binding status.

Airport planning traditionally focused on the airport lay out plan. It covers providing the adequate facilities based on the technical requirements of successive generations of aircraft, to terminal design including retail routing and a *plan de masse*; a map of the site where building volumes are represented. Off-site airport effects are mostly published separately in the form of planning restrictions such as noise contours. Indeed ICAO guidelines and FAA- and other similar aviation authorities published manuals on airport planning that included recommendations on issues like environmental impact assessments and public meetings; but in practice airport plans are mostly airport lay out plans with a medium term horizon (4-10 years). These airport plans have in general no regulatory status but are in the best cases instrumentalised in regulatory spatial plans.

The original vocation of airport planning is to fulfil a supply-function: the demand for air travel needs to be accommodated on adequate infrastructure facilities. In the early stages of airport development the essential factors are adequate infrastructure accompanied with a sufficient reserve in available land for the development of future infrastructure. In this early stage of development the majority of airports are considered public utilities. A recent example is Munich airport (MUC) where a return on investment is expected by 2017.

Flying an aircraft from one airport to the other raises a set of issues that have been subject to regulation. In its turn this regulation has a major impact on airport planning and lay-out. We can summarize the regulation that is in place broadly as dealing with:

a) the freedom of movement of goods and persons; Standardisation and harmonisation of technology, information, but also of the types of agreements with airports (as suppliers of infrastructures) and the removal of any impediments obstructing the free flow of goods and persons (terminal design, health issues, crime prevention...),

b) the control of states over their (air-)space; the jurisdictional rights and obligations (security), the playing field of the bilateral and/or multilateral agreements between states, as well as market issues (alliances, slot distribution...).

The international bodies that address these issues are the ICAO, IATA, Eurocontrol and the like. Recent EU directives, such as the decision to create a Single European Sky (SES) or the discussions on the disclosure of information that can be regarded as private as a prerequisite to access the US continue to change the settings

for airports. The growth of civil aviation is in other words regulated by a constantly revised system of standards and rules that set the conditions under which growth of the sector takes place.

The capacity of airport infrastructure is supposed to follow the increase of the demand. It is therefore only logical that any exercise in airport planning starts with a thorough analysis of the network of airside connections, both from a regulatory and a commercial (airline strategy) point of view. To accommodate air traffic in the longer run implies creating the infrastructure to deal with the European capacity crunch as well as a vision of the optimal use and function of a specific airport in the wider airport network. Through various channels (the ICAO, privatised or commercially operating airport authorities, the European Commission) the pressure to view airports as part of a larger airport system is mounting. This implies that the local, regional or even national agenda will no longer be the sole 'setting' factor, airport plans will be obligatory have to be rethought at the international scale.

The European Commission announced in its airport package of January 2007 that the a much more efficient use of existing capacity will be demanded. Practically one could envisage a form of capacity check, whereby investments in a site will need to be measured against the impact on the system as a whole; a capacity impact assessment next to an environmental impact assessment (EIA).

However airport planning does not stop at technical standards and capacity issues, in order to grow the limit for many, if not all airports is the public and political acceptance of this growth. In the words of the European Commission; we need a much better co-ordination of airport plans and land-use planning. There is a problem; spatial policy is no competence of the European Commission, the ICAO, the IATA or any other of the international institutions. The impact of their regulation translates into planning restrictions at a site, but this does not mean that they are the adequate institutions that try and deal with longer term planning, nor that they have a formula for reaching a optimal development at a specific airport site.

Creating airport cities is in the end a local affair. Put in different words: airport city development is all about creating an optimal mix of uses at the airport site. Here we enter the realm of spatial planning: we deal with issues that presume a sound strategic vision of the airport as a location in a longer term scenario. What will the airport look like in 15-20 years from now? The airport in its mature phase is a productive and business generator unit and needs to actively influence and is influenced by the physical, social and economic environment in which it operates. Airport lay-out and location in the wider region are crucial elements in the airport development strategy as well as spatial planning policies. This presumes a strategic vision on the longer term development of the airport site. In other words what is the territorial capacity of, the optimal mix of activities at an airport site?

In planning policies of most European countries airports are not only considered an infrastructure facility, but also as investment to attain social or economic goals. Infrastructure facilities are seen as instruments for regional planning in order to attain targets that surpass a reasoning based solely upon efficiency for the transport sector. Infrastructure has, in this vision, a 'structuring' effect on spatial and economic developments.

For example, the main airport of New York, JFK International, is considered foremost as an infrastructure *facility*, important for the economy of Manhattan. However, it is not considered to be the 'economic engine' for the regional economy, nor as a spatial structuring economic complex. Contrarily, in most (although not exclusively) European countries, infrastructure is not only considered a facility, but also an investment in a more comprehensive social-political-economic development process. The policy directed towards regional development or policies with social and/or economic targets are strongly influenced by this idea. It leads to an instrumental use of infrastructure facilities by governments of different levels.

Spatial planning systems in Europe share many common traits, but there is no harmonisation of spatial planning systems (Ineco 2005). Member States will have different national or even regional systems. Almost all Member States have a legally binding local land use plan and some sort of national strategy on airport planning. In all EU-countries some sort of permit for the construction or operating of airports is required, in most countries permits must conform to plan. There is something of a European trend towards a less formal and detailed local land-use plan. Local plans increasingly drafted as visionary documents with a plan attached, stating that developments that are not contradicting the overall objectives of the planning policies can be permitted.

Airports are, it seems almost a tradition, located on administrative boundaries. A general rule of the thumb is that the further located from the city centre, the larger the platform, with the exception of the major British

airports. What is off-site development at a London airport might well be located on site elsewhere. The off-site airport effects are in general translated into a set of planning restrictions. Regardless the size of the platform, the effects of airports obviously transcend the local level.⁴ In practical terms; a change in runway use does not involve a revision of one local plan, but several. This creates a gray zone since regional or sub-regional level planning documents tend to lack regulatory power in almost all EU countries.

The other important consequence for airport development is that, unless there is a strong national co-ordination policy, the coherence between the various local plans can be and in many instances is sub-optimal. This implies that contrasting the airport business plans with the regulatory spatial plans is a necessary element of predicting future airport development and the potential of the site. Some observations on key issues which have appeared to be lacking in planning documents throughout the EU (Ineco, 2005):

- Planning or changing the use of an airport entail all kinds of changes in the spatial effects, in terms of necessary restrictions and land reserves. Is there a forward looking longer term perspective in the local land-use plans, or do they mere accommodate existing uses?
- Does the airport authorities have a strategic vision on the larger airport area development?
- Do local and regional planners have the necessary technical information of expected or planned airport site developments?

4 CONCLUSION

The planning of airports is a true growth management issue. On the one hand, the continuing growth and severe impact of civil aviation activities on the environment can no longer be neglected. On the other hand, the contribution of airports to the functioning of the economy in a much wider area calls for the continuation of the growth of the civil aviation sector. The growth of aviation in the decades to come will be such that there is a need to have a sound growth management strategy.

In order to evaluate the potential of airport-sites, a thorough understanding of the economic and spatial processes and trends at work at airports is not sufficient; one needs to include an understanding of the relationships of the actors involved. Deregulation, privatisation, and globalisation in the economy in general and the air transport sector in particular have transformed the policy context in which the impacts are considered. For example, while airlines have acquired an increased freedom to expand their business, airports are constrained in addressing the environmental effects of the airlines' success (Perl, 1997).

The traditional and international institutional bodies dealing with airport infrastructure are increasingly recognising the importance of the landside effects of airports. First, noise and safety were core issues, then the notion that there is a causal link between air transport and sustainable development. There is since the instalment of the Single European Sky in 2005 also a change in the institutional balance in favour of the European Commission. The EC can officially represent European aviation.

The result is visible in many sector regulations that serve as prevailing planning restrictions at the site. Although spatial planning is not a competence of ICAO or the European Commission, the body of regulation that is stemming from these levels is shaping the framework for development. Eurocontrol states in a recent study that the process of reshaping the air transport industry at European level has already started and decisions and new measures should be expected. Within the European spatial planning systems however, the power to decide upon planning permissions and operating permits of airports traditionally lies at the local level. In figure 5 the bottlenecks in the development of the aviation industry are pictured next to the relevant actors and institutional bodies. The question of airport development, here labelled as territorial capacity is an issue that is moving into the focus of the international institutional levels and economic players (upward mobility in the figure).

⁴ Next to environmental issues, one should think of the adequate provision of road and rail access, the permission and distribution of commercial real estate, the development of housing areas...These are all subjects one should be aware of; although located off airport the external effects on the quality of the airport location are crucial.

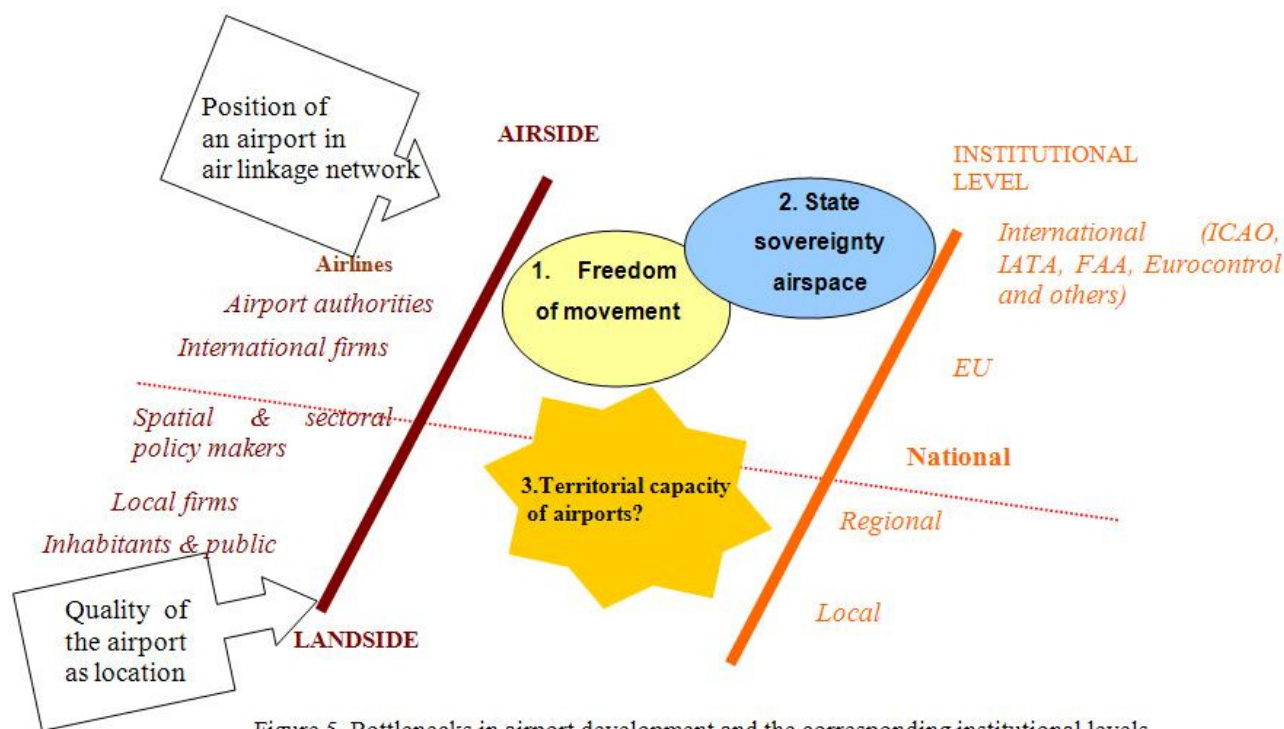


Figure 5. Bottlenecks in airport development and the corresponding institutional levels

The intrinsic 'location'-value is worth the challenge to get the planning right; foresee, develop and allocate space in way that you optimize the territorial capacity of the airport. There is considerable room for improvement. The daily practice shows an incompatibility of airport and spatial plans, poor (or considered strategically not possible) communication on strategic visions, different basic assumptions on trends in aviation...

An alternative framework to understand the issue of territorial capacity is proposed in order to tackle the discrepancy between the traditional regime with its infrastructure supply-focused approach of the airport and the assumption that there is not only an added value in the presence of a diversity of economic actors at the airport site, but also a necessity to explore the strategic impact of investments and policy measures at the site.

The characteristics of the traditional view can be summarised as follows: Pressure on the carrying capacity for air transport in a specific area is in the traditional view an infrastructure supply problem. The traditional view supposes a clear definition of technical and environmental limits for further development set by an external authority. However this does not have any implication on whether there should be a public or private management of the air business, both will seek a guarantee that the technical and environmental limits are a fixed set within which they can operate. The nature of the development pursued is in the first place to safeguard the accommodation of an increased air traffic volume. The technical and environmental standards are valid for all airports, the role of the local governments is at most to apply and control. The fact that airports generate wider economic development is an argument that is used to underline the need for air traffic infrastructure, however it is often not the first goal.

The characteristics of the alternative framework follow from the assumption that the total capacity is a variable resource. As such it takes into account the ideas of dynamic strategic planning of airports as described by De Neufville and Odoni (2003). A pressure on the capacity is not merely a supply-problem but the outcome of the tension between public and private interests, actors and citizens. Air traffic infrastructure is not only a technical and environmental resource, but it has a role to play in the socio-economic development of the region. The debates on either aspects of this capacity (such as environment) as well as the total carrying capacity are reflected in this balance and can change over time. Equally in this framework the provision and management of air traffic infrastructure can be in public or private hands, and in both cases there is a search for long-term stability of the operating conditions.

However in trying to assure this stability, socio-economic development becomes a major target of airport development, since in this alternative framework the real trade-off between the international and national guidelines takes place in the local situation (home-grown solutions). As such this alternative framework

takes a view of development that is in line with the trends in development aid where equally the focus shifts from providing infrastructure to a ‘scan global – reinvent local’ strategy (Fukuda-Parr et al, 2002).

TERRITORIAL CAPACITY	
<p>Traditional view:</p> <ul style="list-style-type: none"> - Airport infrastructure is a fixed resource, the value of which is determined by the volume within technical and environmental limits - These limits and conditions are set (and controlled) by an external party - Pressure on capacity is a supply problem, - The nature of development pursued is one of increasing the accommodation of traffic - Decision making arena: international guidelines on technical and environmental standards and requirements, local application and control, - Limited or no focus on socio-economic aspects, except as argument to underline the need for accommodation of air traffic, no specific rules or guidelines on the implementation of other than air business firms at and around the airport site. 	<p>Alternative framework:</p> <ul style="list-style-type: none"> - Airport infrastructure is a variable resource of which the total value is determined by its local carrying capacity, meaning: - The limits and conditions are the temporary results from the balance between interests of public and private actors and citizens, - Pressure on capacity indicate changes in this balance, - The nature of development pursued is optimizing the socio-economic development potential - Decision making arena; the context is set by international rules and guidelines, but the real trade-off is different per situation, - Socio-economic aspects are crucial to the debate, it co-determines the total value of the territorial capacity and represents the added value of the airport to the participants in the debate.

Figure 6. Territorial capacity: the traditional view and the alternative framework

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