CRITICAL FACTORS FOR THE DEVELOPMENT OF AIRPORT CITIES

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Word count: 5.488 words; 1 Table; 6 Figures (7.238 words)
Submission date: November 15, 2010

ABSTRACT

This paper addresses the recent trends of airport-centered real-estate development, with emphasis in the concept of airport city. Airport cities are major economic hubs exhibiting over the past decades substantial growth and profits. However, the process of evolution towards an airport city revealed being difficult, as airports worldwide have failed in the attempt.
The purpose of this research was to identify the essential conditions or critical factors necessary for the emergence of an airport city. The authors conducted a key informant survey to thirty respondents complemented with personal interviews to eight of them. The results suggest the existence of four main critical factors for the development of an airport city, being: the connectivity of the airport and its surroundings; the economic potential of the hinterland; a sustainable development context; and a commercial attitude by the airport operator.

Keywords: critical factors, agents, airport city, airport corridor, aerotropolis.

INTRODUCTION

Air transport was traditionally a highly regulated sector (1)(2)(3)(4), where airports were essentially seen as transport infrastructure providers where aircraft operated and flows of passengers and cargo circulated. However, the last three decades witnessed several structural changes in air transport systems, as important reforms took place and substantially changed the context within which all actors operate. The most impacting and far-reaching reforms were the extensive liberalization measures that took place (and continue to do so nowadays) worldwide (3).

Figure 1 summarizes the impacts of such reforms in airports' business, which were in the roots of the concept of airport city. Owing to space restrictions, we will not explain in detail the process of evolution. The interested reader is referred to (5) through (16). Liberalization, paralleled with globalization and other phenomena, triggered new trends, such as: advent of low cost carriers (17), emergence of hub and spoke networks (9), establishment of global airlines alliances (18) or progressive privatization of airports (8), that caused profound impacts in the airport business: governments began privatizing or limiting governmental aid to airports; unknown airports offering lower fees and higher performance entered in the market, stimulated with the advent of the low cost companies; or airlines' market power increased as they established alliances worldwide. As a consequence, airports have diversified the sources of

revenues, engaging in non-aeronautical business activities. Gradually, they entered in the real estate business in the airport's landside and surrounding lands, whereas leading to the emergence of new development concepts, among which the airport city.

Airports have become new dynamic centers of economic activity, incorporating several commercial and entertainment services inside passenger terminals, while simultaneously developing their landside areas with businesses such as shopping clusters, hotels and accommodation, office complexes, conference and exhibition centers or leisure facilities. Nowadays, they are vital logistics and distribution centers, as well as major centers of employment and sites for business contacts. Moreover, they are key decisive transport infrastructures in the transformation of the metropolitan area, taking on many features of metropolitan central business districts and establishing themselves as new regional development poles.

Airport-centered development may occur at different spatial scales (from the micro scale of the passenger terminal, to the regional or metropolitan scale), thus assuming different shapes and manifestations. Different concepts to address these developments can be found in the literature, the most discussed being the concepts of ”airport city”, “airport corridor”, and “aerotropolis” (12)(19)(20).

This paper has the objective of contributing to the body of knowledge on airport-centered development, with the main end-purpose being the identification and discussion of the critical, underlying factors for airport city development. In this process, it is also an objective to provide a brief description of the conjuncture that led to the emergence of this type of development, and also the identification of the agents involved, along with a characterization of their main goals and interactions.

It is structured as follows. Section 2 explains the research method used in the identification of the critical factors; Section 3 presents a framework of the actors involved in the development of an airport and, eventually, an airport city. Section 4 provides a review of the most relevant urban development concepts found in the literature, namely: the airport city, the airport corridor and the aerotropolis. Section 5 presents the findings of the research pointing out the critical factors. Finally, Section 6 presents the conclusions of this paper.

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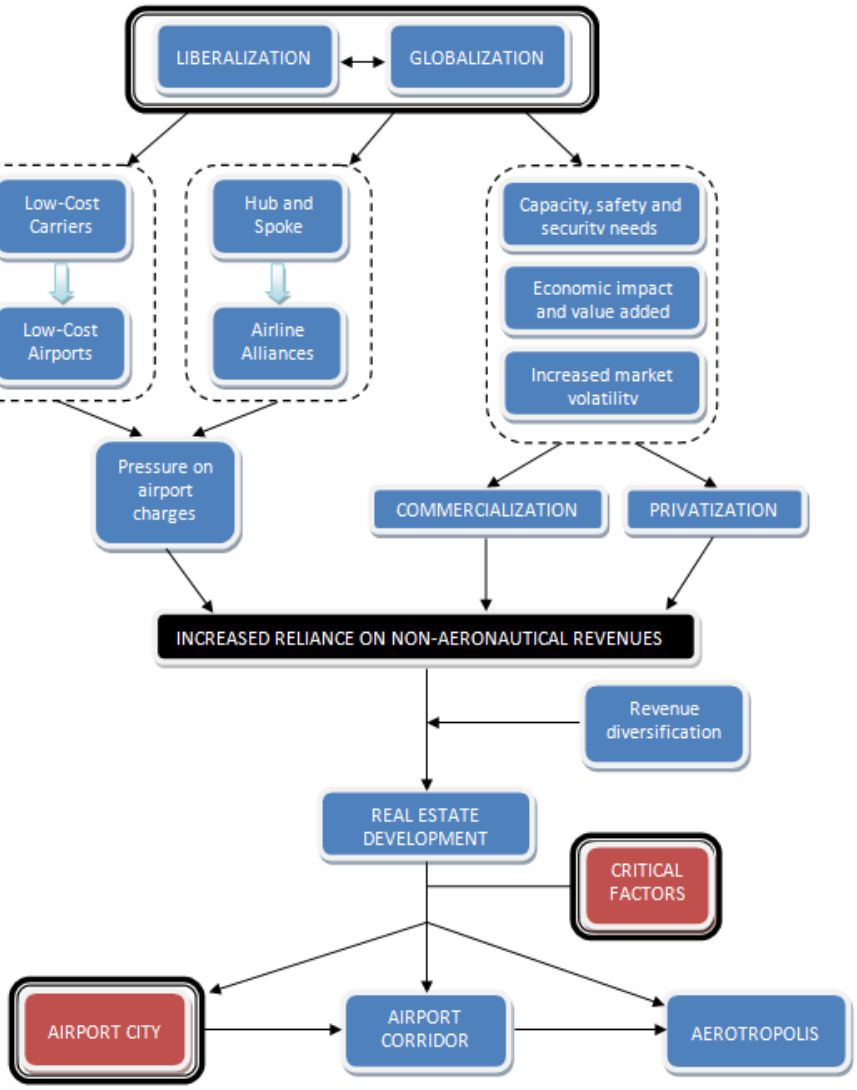

FIGURE 1 Airport-centered real estate development as a consequence of major trends in the aviation sector. Source: (5, p.42).

METHODOLOGY

The "key informant survey" is a method of obtaining data from persons whose professional and/or organizational roles imply they have knowledge about specific characteristics of the subject being studied (21). The surveying process took place during February 2010, and was addressed to a list of approximately thirty contacts that had been previously compiled by the author. This list was put together with the intention of gathering a set of expert agents, representing as many stakeholder groups as possible. A wide array of agents were contacted, including academic experts and researchers, urban planners and architects, airport operators and real estate developers, aviation consultants, citizen organizations and community groups forums, and territorial authorities.

The survey was structured in four sections (and it is available upon request to the corresponding author), being:

- Section 1 – aimed to assess the respondent's involvement in airport city planning and/or management;
- Section 2 – aimed to rank the different definitions of the airport city concept found in the literature;
- Section 3 – aimed to identify the airport city's components, in terms of infrastructure and markets;
- Section 4 – aimed to evaluate the relevance of different factors in the development of an airport city.

This survey served three main objectives, being:

- To discuss the concept of airport city;
- To identify the components that constitute an airport city model;
- To assess the factors that underlie airport cities' development.

The survey returned a set of fourteen complete responses, and the information gathered was later complemented by eight personal interviews to some of the surveyed agents. Analysis of the results was based on the frequency distribution of the responses, adjusted with the information obtained in the interviews. The components of the airport city and the critical factors for its development are identified based on the information collected; it should be pointed out, however, that no relevant statistical analysis is performed, given the small responses' sample.

STRUCTURING AN AGENT FRAMEWORK

The air transport business involves a highly heterogeneous array of agents. Some remain subject to some form of state control, others are fully privatized, and others operate under a mixed regime. Understanding the rather complex airport-neighborhood interactions (in what concerns an eventual development towards the concept of airport city) requires the identification of the stakeholders involved and an awareness of the relationships between them.

The framework conceived encompasses five stakeholder groups: Politicians; Airport; Users; Non-users; and Investors and Developers. The agents that compose each of these groups are listed in Table 1, and the relationships between these groups are illustrated in Figure 2.

The airport's main task is the provision of infrastructure and services to the dual market of airlines and travellers. As such, its primary interaction consists of the supply and demand relationship with the Users stakeholder group (passengers and airlines), which results (in broad terms) in the airport's aeronautical revenues. It is worth pointing out that airport-airline interaction is the most complex relationship identified in this framework. On this matter, (22)(23)(24)(25) all provide comprehensive studies of such interactions.

Furthermore, non-aeronautical (commercial) revenues also result from the interactions between Airport and Users, namely from agents such as cargo- and passenger-oriented organizations who pay rents or concession fees to the airport authority, depending on the commercial arrangements binding these agents.

TABLE 1 Stakeholder groups in airport city development. Source: (5, p.68).

Stakeholder	Airport Operator	Users	Non-Users	Politicians	Developers and Investors
Agents	• Real Estate division • Strategic Management (Master Planning)	• Passengers • Transport and infrastructure providers (airlines, bus, taxi, rail...) • Passenger-oriented business organizations (retail, hotel, conference...) • Cargo-oriented organizations (logistics, warehousing, distribution...) • Workforce (inside and outside the fence) • Business visitors/clients	• Neighbor organizations • Local community groups • Anti-noise groups • Environmental activists • Neighborhood residents • Surrounding landowners • Commuters using the airport intermodal station	• Territorial authorities (national, regional, local) • Supra-national authorities • Sector regulators	• Long-term investors (internal and external) • Short-term investors (internal and external) • Real estate developers

Significant interactions occur between the agents that compose the Users stakeholder group. The reason for such interactions is the fact that this group includes passengers, business visitors and hinterland workforce on one hand; and transport providers and business organizations on the other hand. This results in a multitude of relationships between different User agents, including: service provision (e.g. between passengers and businesses); business transactions; supply-and-demand (e.g. between public transport providers and passengers or visitors); and employer-employee relationships (businesses and workforce).

The Airport stakeholder is a component of structural policy. In this sense, the Politicians stakeholder group influences the airport operation through directives, legislation and regulation. The airport, in turn, can influence political agents by lobbying and sometimes litigating for their interests – a right it shares with the Users and Non-Users groups (26). Moreover, the airport's operation generates spin-off economic benefits that serve the Politician's objectives of social welfare maximization. Finally, airport strategic and master planning is performed in coordination with the political agents (namely the relevant territorial authorities). This is particularly important for airport city planning, especially in what concerns land use and surface network planning (12).

The relationship between Airport and Investors is largely dependent on the airport's ownership model. Strategic alignment between the Airport stakeholder and Politicians will naturally be facilitated in the cases where the territorial authorities are actual shareholders of the airport authority, thus stimulating joint and coordinated development.

The Non-Users stakeholder group relates to all other stakeholders, especially because it comprises the agents most seriously affected by the negative externalities generated by their activities. However, non-users have very limited influence on the remaining agents, mainly consisting of lobbying, litigation and political action. Moreover, most of these relationships are indirect, through the Political stakeholders on to the remaining groups (27)(28).

Despite the limited influence on agents other than Politicians, the Non-Users' impact on the system should not be neglected. Public opposition can cause delays or constraints to the

implementation of airport development projects (resulting in high monetary costs), operational restrictions, or even capacity constraints (29).

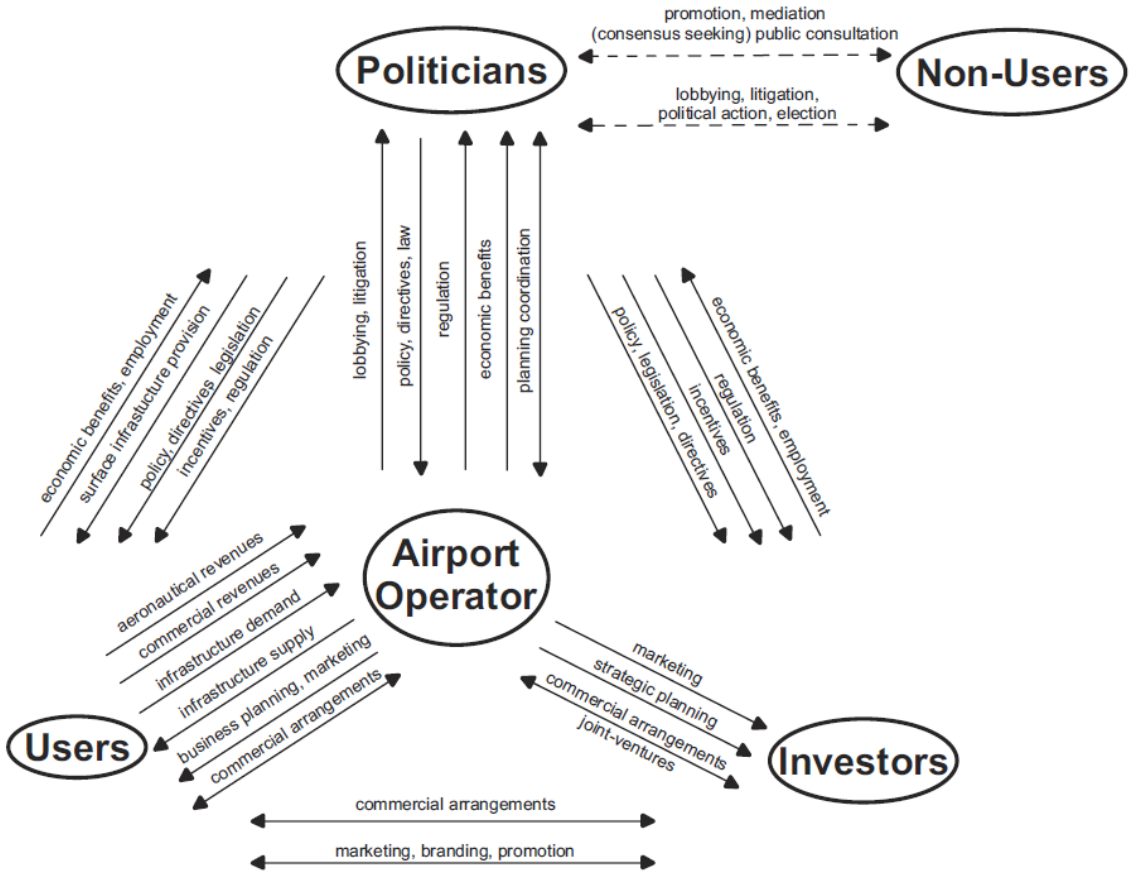

FIGURE 2 Main relationships between Stakeholder groups. Source: (5, p.73).

AIRPORT-CENTERED URBAN DEVELOPMENT CONCEPTS

Airport-centered urban development assumes different spatial manifestations, according to geographical scale, airport operator's business approach, and the maturity of commercial activities at the airport (30). As businesses cluster further outward (primarily along connecting transportation corridors), more expansive development models take place. The most widely used concepts to describe this type of broader, landside development are the aerotropolis (airport-integrated urban economic region), the airport corridor and the airport city. Figure 3 sketches the geographical scope of each concept and the relations amongst concepts.

The concept of aerotropolis made way to public knowledge through the work of John Kasarda (31). The aerotropolis (also known as the Airport Economic Region) describes the sum of all airport-related developments that appear around airports (20). It is an area that centers its economy on the airport, which in turn serves as the community's economic engine. Analogous in shape to the traditional metropolis made up of a central city and outlying corridors and clusters of aviation-oriented businesses and their associated mixed-use residential developments.

Kasarda's aerotropolis concept is a logistics-based model of airport city outwards development (31)(32)(33)(34). It arises as a new urban form, with a multi-modal commercial

core (the airport city) which anchors a more extensive mix of warehousing precincts, e-fulfillment centers, industrial and office parks, free trade zones, hotels and entertainment districts. The only non-commercial land use consists of the residential districts, located between the motorways and away from the main flight paths.

There still isn't any example of a mature aerotropolis born out of premeditated planning strategies. What can in fact be observed is that "outside the fence" development is strongly pulled by airport infrastructure expansion, in a more or less coordinated manner. Up to recent years, this type of development has consisted of spontaneous, market-driven and entrepreneurial real estate development around airport cities, seeking to capitalize the land-use value added by the airports' proximity. Nevertheless, Kasarda (19) points out examples of aerotropolis-like developments, in airports such as Dallas-Fort Worth, Chicago's O'Hare and Washington Dulles International in the United States; São Paulo's Viracopos International Airport in Brazil; Amsterdam's Schiphol and Frankfurt Airport in Europe. Moreover, this author states that the broader aerotropolis model is emerging most rapidly around Asia's newer international gateway airports, namely Beijing Airport, Singapore's Changi, Hong Kong International, South Korea's Incheon, Kuala Lumpur International, and India's emerging gateway hubs (Delhi and Hyderabad).

The concept of airport corridor, in turn, made way to the literature through the works of Schaafsma, Amkreutz and Güller (20)(35), and van der Blonk et al. (36). It stands for a planned and integrated real estate development between the city and the airport, arising as a result of the interactions between global flows and players, and local conditions. It manifests as linear urban development occurring alongside major surface infrastructure, in the (previously) underdeveloped areas between airports and the major cities they serve.

Schaafsma et al. (20, p.80-100) enumerate several examples of airport corridors throughout re world, such as the highway-oriented airport corridor of Denver, the transit-oriented airport corridor of Zurich, or the city-oriented airport corridor of Copenhagen.

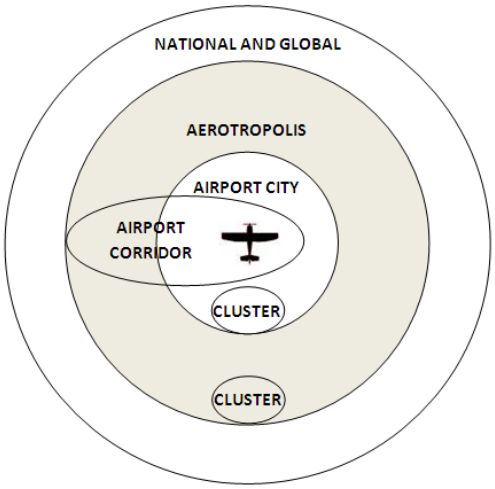

FIGURE 3 Airport-centered urban development concepts. Source: adapted from (37).

The functions that locate in airport corridors are mainly connected to five markets (20, p103):

- Passengers: airport terminals, hotels, retail;
- Airport employees: housing, services;
- Air cargo: logistic parks;
- Business community: office and technology parks, conference and exhibition facilities, hotels, golf courses, expat housing;
- Passengers-visitors: tourism, leisure, entertainment, health, education, theme parks, casinos, clinics, shopping malls, sports stadiums, universities.

According to these authors, the most clearly defined corridors have appeared in city regions where either specific governance structures for the corridor have been put in place (e.g. Zurich and Paris); or a massive investment in infrastructures, subsidies and marketing of the corridor is guaranteed by public authorities (Kuala Lumpur, Singapore, Dubai, Hong Kong).

The concept of airport city first appeared in the USA in the 1970s. At this time, it tended to refer simply to the industrial and business parks located right next to an airfield (12). Nowadays, different actors have different perspectives regarding this concept.

Urban planners and architects acknowledge it as a new urban form, emerging as the spatial manifestation of the interaction between airport-centered commerce, real estate development, and multi-modal transportation. In order to be qualified as an airport city, this urban form must show the qualitative features of a city, such as density, access quality, environment, and services (12). Economists, on the other hand, disregard the urban dimension of the areas surrounding the airport, and define the airport city simply as the clustering of economic functions at and around the airport (27)(38). Airport operators, in turn, view the airport city as a business strategy and a marketing tool, aimed at taking advantage of the business opportunities created by its own operations, by attracting companies to the airport's territory and surroundings: the operators not only provide slots and facilitate air traffic, but also include more or less variety of commercial and real estate services as a part of their value proposition (39)(40). This particular view of airport cities considers it as merely real estate rather than urban development. It focuses on the business model and disregards the spatial dimension, suggesting that no form of urban character is necessary (although desirable), in order to be in presence of an airport city model of development. This seems to go in line with the definition of Poungias (41, p.15), who defines airport cities as "multifunctional business agglomerations of property projects at airports. Typically, these include office premises, shopping centers, conference and exhibition buildings, leisure and healthcare complexes, and cargo and logistics services". This author continues by rejecting the need for housing provision as a part of the airport city model: "The 'city' part of the term refers to the fact that it is only cities of the more traditional kind which bring together such a spectrum of different forms of business". Even though the word 'city' suggests that an airport city can encompass any conceivable form of utilization, residential settlements – the oldest and most obvious feature of 'city life' – are not compatible with airport cities' activities.

The different airport-centered development concepts may be regarded as part of a sequential process, in which the airport progressively increases its territorial impact. This process manifests in the development of the airport's business model through time, in regard to the infrastructure's maturity, the relevance of commercial activities, and integration in the local and regional networks, in a search for new and reliable strings of income. Figure 4 illustrates how different business approaches by airport operators result in different urban scales of airport impacts, and translate into each of the development concepts mentioned.

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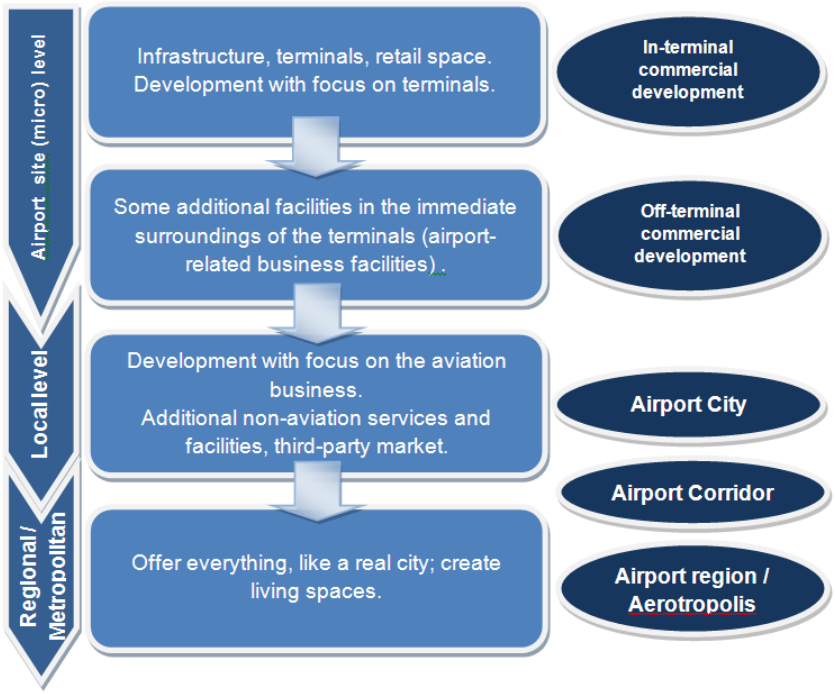

FIGURE 4 Airport business approaches, spatial scale and respective development concepts. Source: adapted from (30).

THE AIRPORT CITY: COMPONENTS AND CRITICAL FACTORS

As mentioned, a survey process was conducted, directed to a set of chosen individuals who work or do research in the area of airport-centered development. This survey served three main objectives: to discuss the concept of airport city; to identify the components that constitute an airport city model; and to assess the factors that underlie airport cities' development.

Discussion of the concept did not lead to consensus, but rather reinforced the different perspectives of agents towards this type of development. The main conclusion from this part of the survey is that the airport city is seen by most actors as not much more than the agglomeration of mixed-use property developments in and around airports, and that, in fact, the "city" part of the term seems to relate only to the variety of land-uses present, which can typically be seen only in cities; this is aligned with the definition by Poungias (41) presented earlier.

In turn, the identification of airport cities' components turned out to be much more consensual. Analysis of the components with highest ratings by the respondents, allowed the identification of the pillars of airport city activity, both in terms of the main infrastructure components that must be in place, and in terms of the markets towards which these components are aimed. These results are summarized in Figure 5.

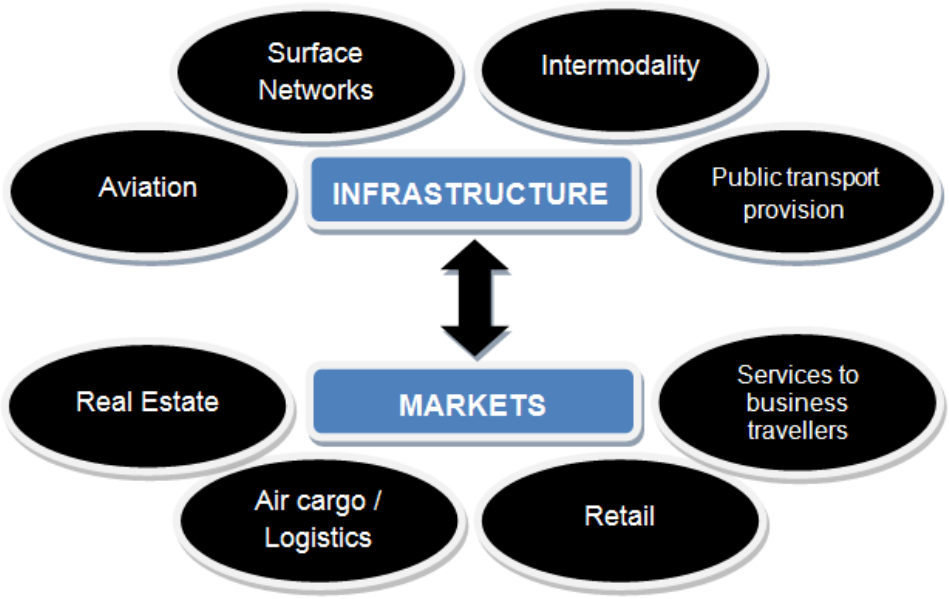

FIGURE 5 The main pillars of airport city activity. Source: (5, p.85).

Assessment of the importance of different factors as catalysts for airport city development was the last part of the survey. Respondents were presented with a list of possible factors, derived from an extensive literature review process, and (as in the previous part regarding the components) were asked to rate these factors according to their relevance. The results led to the emergence of thirteen factors as the highest rated. Analysis of these elements, along with all the additional information collected in the interviews, led to their grouping into what will be considered the four critical factors for airport city development (Figure 6), being:

- Connectivity;
- Economic Potential of the Hinterland;
- Commercial Attitude of the Airport Operator;
- Sustainable Development Context.

These factors should not be regarded as independent from one another; on the contrary, mutual interactions can be quite significant.

Connectivity is clearly and unanimously considered as a critical factor for airport city development. In this context, it relates to physical infrastructure (road and rail) providing unrestricted access to and from the airport, and constituting the basis around which development is clustered and connected (42). It also regards air connectivity, both in number and frequency – the more connections and services offered, the more companies are likely to locate in the proximity of the airport (43). Moreover, the issues of the airport's centrality (both geographic and aviation network-wise) are also a part of the connectivity factor.

The second factor relates to the *Economic Potential of the Hinterland*. On the labor market, there should not only be a reserve quantity, but it is also necessary that it contains a good quality of labor (44). Furthermore, airport city operators need to select functions which are consonant with, and enhance, the economic profile, labor supplies, and location of their hinterlands. Each will have different passenger demography, enterprise networks, and mixes of

shipments. According to Appold and Kasarda (45), this is what leads to the great diversity of airport cities, in terms of facilities and physical forms. On this behalf, economies maturing into the tertiary sector and high-tech industries (which are very important generators of passengers and cargo air traffic flows, respectively), are pointed as the most attractive economic profiles for airport city development (38).

Regions with low production costs are, in principle, the most adequate for the development of export-oriented production and logistics platforms; while hinterlands with large, well-educated labour forces are more suited to evolve into centers of business service supply (45). Furthermore, strong local and regional economies provide a solid base for traffic, which will further fuels agglomeration and employment effects (27)(39)(40)(46).

The *Commercial Attitude of the Airport Operator*, in turn, is in this context considered as independent of its ownership structure. It is embodied through the corporate organization of the operator's activities, aggressive marketing strategies, and pro-active land acquisition for real estate development. Moreover, the creation of a real estate division to deal exclusively with these matters, and where both the airport authority and public bodies are represented, also arose as a very important factor for airport city development. In fact, airport real estate business is in a normal regional competitive situation; hence the rules, know-how and specificities of the overall real estate market apply to airports as well (41). This means that business planning, land procurement and acquisition, real estate development, and marketing of the airport city should be conducted professionally.

The final factor identified consists of a *Sustainable Development Context*. This is the broadest factor, encompassing dimensions such as political prioritization, minimization of externalities, and the capture of spin-off economic benefits. The highest ranked elements included in this factor regarded the consideration of airport city developments in national and regional strategic planning; the elaboration of comprehensive planning to integrate transport infrastructure and landside development, both on and off the airport's territory; the joint and coordinated development of airside operations and real estate; and the coordination between the different tiers of territorial governance. Moreover, issues such as the availability of land for expansion (both for airside infrastructure and real estate development) and the engagement of surrounding communities, also arise as important factors to be taken into account.

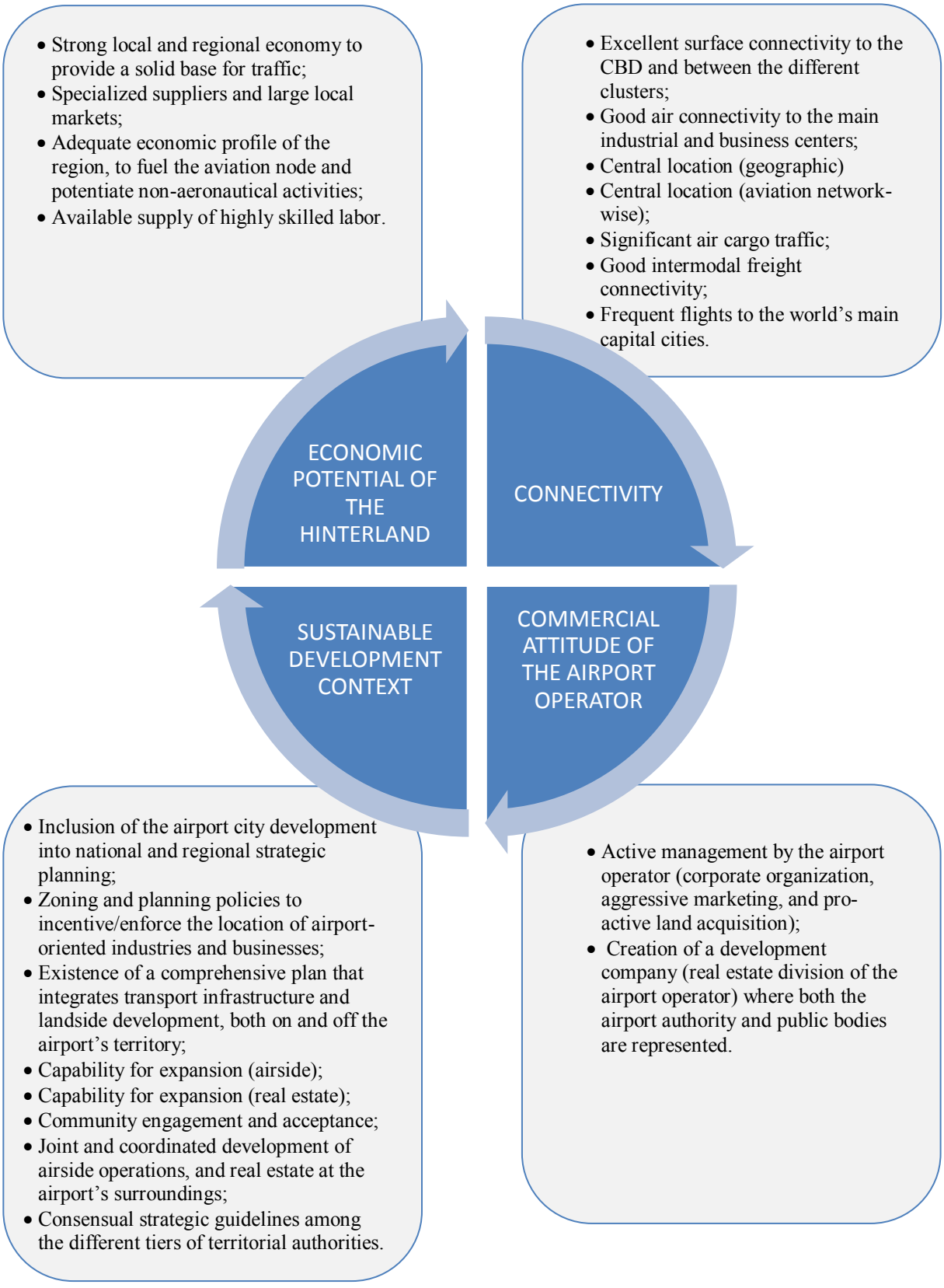

FIGURE 6 The main underlying factors for airport city development. Source: (5, p.93).

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CONCLUSIONS

Revenue maximization and diversification strategies by airport operators, and the subsequent increasing reliance on non-aeronautical revenues, constitute the birth of the modern airport city concept. This concept encompasses multiple dimensions, related to the different perspectives of the actors involved for its development: it is a business model of airport-centered real estate development; it is a marketing and branding tool to promote the attractiveness of the airport area for the location of companies and businesses; and it is also the spatial form, manifested by the creation of working, shopping, meeting, and leisure spaces, as a result of the development of multifunctional business clusters taking place at and around the airport.

Airport cities enjoy wealthy development and record substantial profits, which has naturally attracted the attention of others. However, the development towards an airport city has proved being far from simple. Indeed, this process remains nowadays fairly unknown and difficult to interpret. The research in this paper aimed to shed some light in the essential conditions or critical factors required to the emergence of an airport city.

The research method consisted in a key informant survey to a group of experts from different fields (such as academicians, urban planners and architects, airport operators, aviation consultants and territorial authorities) complemented with a set of personal interviews to some of them. This survey aimed at contributing for the existing body of knowledge in this area. With this objective in mind, it served three main purposes: to discuss the concept of airport city; to identify the components that constitute an airport city; and to assess the critical factors that underlie airport cities' development; nevertheless, the focus of this work is on the latter.

The results show no consensus regarding the definition of the airport city concept. In fact, results end up reinforcing the idea that different agents perceive the airport city concept differently. Conversely, in what concerns the components of an airport city, the research was able to identify the main pillars of airport city activity – in terms of infrastructure supply and target markets. On one hand, the infrastructure offer is composed of the aviation node, the surface networks to and from the airport, intermodal facilities, and the provision of public transport. The scope of its activity, on the other hand, lies within these four markets: real estate, air cargo and logistics, services to business travelers, and retail.

Four critical factors for airport city development were identified. These factors should not be regarded as independent from one another; on the contrary, mutual interactions can be quite significant:

- Connectivity;
- Economic potential of the hinterland;
- Commercial attitude of the airport operator;
- Sustainable development context.

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