



03, 04 e 05 de Setembro de 2008
São Paulo - SP - Brasil

Flying High? Real Estate in Airport Sub-Markets: How do South American Centres Compare Globally
For LARES VIII International Conference

¿Volando alto? Los Sub-Mercados Inmobiliarios de los Aeropuertos: Dónde Se Encuentra Sudamérica Desde una Perspectiva Global

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Keywords: Logistics, airport submarkets, South American prospects

ABSTRACT

Several South American airports have exhibited exceptionally strong growth in air cargo volumes handled over the past several years and forecasts for the sector appear positive, in spite of currently high fuel costs. We find that elsewhere in the world, in several key cities, a strong positive relationship can be found between air cargo volumes handled at airports and rental growth of the real estate in nearby industrial sub-markets. As many South American cities have assumed increasingly important roles in the global economy we surmise that a similar relationship may be observed in this region. International, institutional investors have been slow to significantly allocate to the industrial sector in South America. However demand fundamentals in airport submarkets suggest that this exclusion may be unfounded. Multinational owner-occupiers and cross-border logistics operators have led the way in new development of investment-grade stock yet a more mature phase of investment may be required as the market opens up to international interest. If further air trade efficiencies in many South American economies are to be realized, continued investment may be required.

RESUMEN

Varios aeropuertos sudamericanos han mostrado un crecimiento excepcional en volumen de carga manejada en los últimos años y las proyecciones para el sector parecen ser positivas, a pesar de los actuales altos costes del combustible. En varias ciudades clave del resto del mundo se observa una relación positiva entre el volumen de carga aérea manejada en el aeropuerto y el crecimiento de rentas en el mercado inmobiliario industrial contiguo. Muchas ciudades sudamericanas están asumiendo un papel cada vez más importante en la economía global, por lo que presumimos que una relación similar puede darse en la región. Los inversores institucionales internacionales han tardado en destinar cantidades significativas al sector industrial en Sudamérica. Sin embargo, los fundamentos de la demanda en los submercados de los aeropuertos sugieren que esta demora puede haber sido infundada. Los desarrollos de nuevo inventario industrial de grado A han sido liderados principalmente por operadores logísticos internacionales pero según se abre el mercado al interés internacional se requiere una fase de inversión mas madura. Si se pretende una mayor eficiencia en el comercio aéreo se requiere una inversión continuada.

1. INTRODUCTION

Since the development of air transportation in the early 20th century, the speed at which goods can be moved over long distances has dramatically improved. At the urban level, the growth of associated logistical functions has created new industrial precincts in close proximity to airports, or in areas with easy and fast access via freeways. The growth of air-cargo traffic has risen in tandem with the emergence of several economies in South America on the world stage. In recent years, investment interest in global industrial/logistical real estate has expanded among international institutional investors, as has heightened interest in expanding real estate investment allocations to South America. An agenda for better understanding the connections between broader macro-economic trends and specific sub-market fundamentals in industrial real estate in the region is required.

This exploratory research seeks to begin an assessment of industrial/logistics real estate markets in South America by understanding some basic demand drivers which have been present in other markets around the world. The focus is on airport submarkets as far as available data will allow, with air freight growth being the key demand-side variable analyzed.

Concentrations of logistics functions in key facilities at strategic locations characterize the geography of global trade. Larger scale flows of goods are directed through major gateways and hubs with large seaports, airports and highway intersections being the key locations. Air freight accounts for around 35% of global merchandise trade by value equivalent to USD 4.2 trillion of the USD 12 trillion value of trade in 2006 (IATA, 2007).

This research lies at the junction of several different fields of knowledge and research endeavors – which are currently beset by empirical weaknesses and limited theoretical basis. Within the real estate field, better linkages between global drivers and their national/local manifestation in the industrial sector must be made, especially in emerging markets. Matsumoto (2007) has led recent research in the fields of economic geography and regional science to determine the spatial orders or rules determining flows of air passengers and air cargo and although the body of research is not new¹ yet the connections with real estate demand has not been made.

2. METHODOLOGY

Air freight volumes² are used in this analysis to represent that part of a city's growth that is directly related to the industrial sector. We have found that air freight volume is a variable closely related to multitude of indicators (such as economic growth, trade evolution or employment in the industrial sector) relevant for the industrial property markets. Rental growth is generally the more stable part of the real estate total return and it reacts more directly to changes in the fundamentals of local markets. This

¹ The aims of such studies have been to reveal the degree of air traffic density for major cities worldwide. Gravity models employing population and distance variables have been used to predict passenger numbers for decades (Harvey, 1951, Richmond, 1955) and have been modified more recently to include numerous other variables. Among those other variables are income, accumulation of enterprises, locational advantages etc (see for example Lansing et al, 1961).

² and not passenger volumes or financial turnover

contrasts with capital market conditions and the maturity and competitiveness of the investment market, which dominate changes in the capital values.

We used freight volume series and rents in the specific submarkets to run regression analyses to determine if the relationship between those two variables is significant. This was to help establish if the freight growth in a specific airport can be used as a predictor of the evolution of rental growth the industrial real estate sector in the submarket. It is important to note that key supply-side variables – most importantly, levels of construction, were not incorporated into this analysis.

To illustrate this relationship and to judge the applicability of the results to other cases, five different airports were chosen. The selection was made on data availability both in terms of freight volumes and rental growth for the specific submarket and the required geographic and airport type diversification to judge the results as a general trend. Heathrow in the UK and three very different airports in the US, Las Vegas, Miami and Los Angeles, are analyzed in the paper along with Melbourne, Australia and Johannesburg, South Africa which, like many centres in South America are known for their distance from other global centres and are thus long-haul destinations.

The sources for the air freight data are the International Civil Aviation Organization (ICAO) as well as the statistics division of each specific airport when the ICAO data were incomplete or out of date. The rental growth figures came from the most appropriate recognized broker agent in each market (Torto Wheaton Research for the American submarkets, Cushman & Wakefield for the UK and Jones Lang LaSalle for Australia and Colliers for South Africa). Data points in all cases were annual, except for South Africa where quarterly data were available. Data on GDP growth, export and import volumes and growth and employment in the industrial or manufacturing sector are used to support the analysis of the macroeconomic drivers of the airport growth³.

3. RESULTS

The results of the analysis show that air freight growth and industrial rent growth in these markets hold a positive, significant relationship in all cases studied, although the degree of dependency varies widely across countries and type of airport.

Among our examples, and measured in terms of USD increase in the rent per Sq.M. when an air freight increase of 10,000 MT is assumed, Las Vegas show the strongest response (equivalent to an increase of 4.9 USD/Sq.M.) and the submarket of Isando⁴, in Johannesburg, South Africa, the lowest (with an equivalent of just 0.15 USD/Sq.M.). Although these figures show the different degrees of effect from the freight in the rental growth in an airport, it must be noted that both locations are very different in terms of wealth, freight handled and absolute rent level, so they are not directly comparable. For Las Vegas, it means that currently, a 11% increase in freight would translate into a 5% increase in the rent and a similar relation (a 4.7% increase in rents by an increase of 10.3% in air freight) can be observed in Isando.

³ The Economist Intelligence Unit (EIU) is the source for GDP growth, export and import volumes and growth and freight data at country level. Torto Wheaton Research (TWR) is used as a source for supply and demand data of the American industrial submarkets.

⁴ For warehouses larger than 5,000 Sq.M.

Two cases where the best fit was found and can be good examples for our purposes of our exploratory study were Miami Airport and Las Vegas McCarran International Airport. In both cases the Adjusted R^2 for the regression analysis is above 60% with the freight as the sole independent variable to explain rent evolution. In both cases as well both the constant and the variable (freight) are significant at confidence levels higher than 95%. Further advantages of considering these results are the quality of the data and the opportunity to compare two different airports (Miami a big internationally-focused airport and Las Vegas a smaller one).

Miami Case Study

Table 1: Summary regression statistics for Miami Airport Industrial Rent and Freight growth

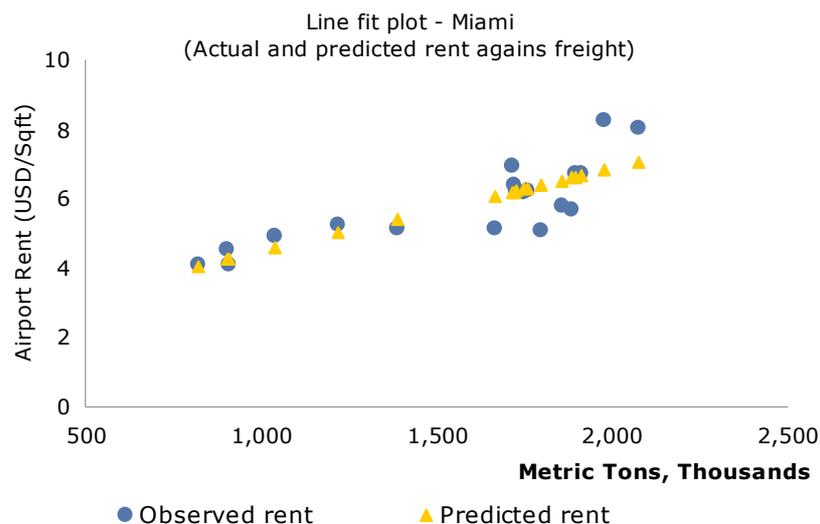
Regression Statistics	
Multiple R	82%
R Square	67%
Adjusted R Sq.	65%
Standard Error	0.69
Observations	19

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	2.12	0.654	3.24	0.005	0.74	3.50
Freight (MT)	2.4E-06	4.0E-07	5.91	0.000	1.5E-06	3.2E-06

ING Real Estate Research & Strategy with ICAO, Miami Airport and TWR data as of July 2008

In the Miami airport, rents in the industrial submarket would rise 0.255 USD / Sq.M. per each further 10,000 MT of freight handled in the airport. Around 67% of the variation of the rent is explained through the variation in freight, so we can confirm the relevance of freight as explanatory variable for industrial rents.

Figure 1: Miami Airport Industrial Rents.



ICAO, Miami Airport, TWR, ING Real Estate Research & Strategy as of July 2008

Las Vegas Case Study

Table 2: Summary regression statistics for Las Vegas McCarran International Airport Industrial Rent and Freight growth

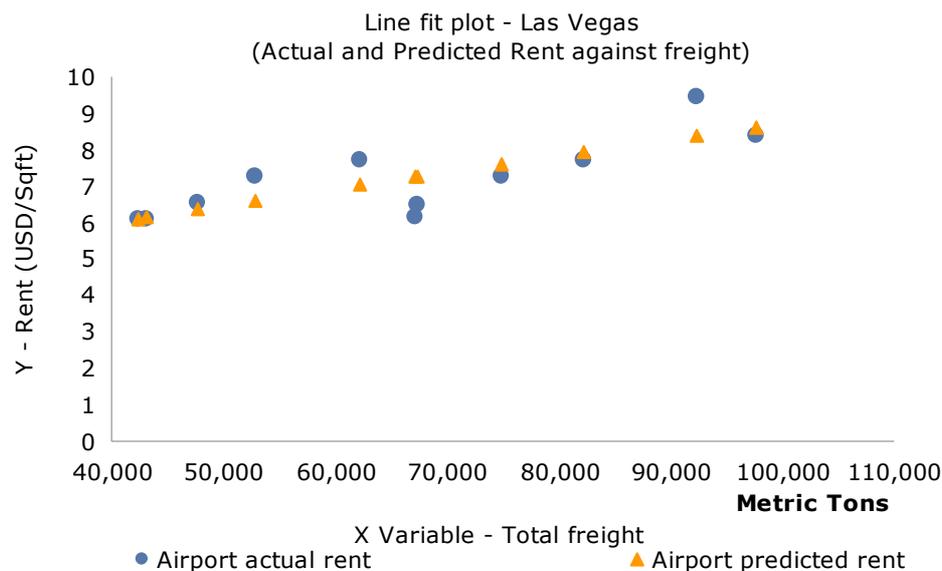
Regression Statistics	
Multiple R	80%
R Square	65%
Adjusted R Sq.	61%
Standard Error	0.7
Observations	11

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	4.18	0.77	5.43	0.000	2.4	5.9
Freight (MT)	4.5E-05	1.1E-05	4.07	0.003	2.0E-05	7.1E-05

ING Real Estate Research & Strategy with ICAO and TWR data as of July 2008

In Las Vegas McCarran Airport an increase of 10,000 MT would mean an increase of 0.45 USD/Sq.ft. This is a relatively sharp increase, but we caution that Las Vegas is a relatively small airport, and it currently handles slightly less than 100,000 MT.

Figure 2: Las Vegas McCarran Airport Industrial Rents.



ICAO, McCarran Intl. Airport, TWR, ING Real Estate Research & Strategy as of July 2008

In the remaining cases we can confirm that the relation between freight and growth is significant for several airport types. However, the scarcity of data makes the estimated constant not significant at the standard 95% confidence level.

Los Angeles Case Study

In the case of Los Angeles the freight appears as a significant variable (at very high levels of confidence) to explain rent evolution, with a relatively high R^2 . We have no evidence, to assume that the constant might be different from 0.

Table 3: Summary regression statistics for Los Angeles International Airport Industrial Rent and Freight growth

Regression Statistics						
Multiple R	82%					
R Square	67%					
Adjusted R Sq.	63%					
Standard Error	0.7					
Observations	11					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-5.92	3.26	-1.82	0.102	-13.29	1.45
Freight (MT)	7.8E-06	1.8E-06	4.24	0.002	3.6E-06	1.2E-05

ING Real Estate Research & Strategy with ICAO and TWR data as of July 2008

Note: Los Angeles - South Bay assumed as the airport submarket

Melbourne Case Study

Freight is also significant in the case of Melbourne Airport, although it seems to have less relevance, since the R^2 is quite low (below 40%). This could be due partially to the relatively short series available and to the fact that the airport submarket is less well defined.

Table 4: Summary regression statistics for Melbourne International Airport Industrial Rent and Freight growth

Regression Statistics						
Multiple R	61%					
R Square	37%					
Adjusted R Sq.	30%					
Standard Error	4.0					
Observations	11					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	29.8	13.2	2.3	0.050	-0.08	59.73
Freight (MT)	1.7E-04	7.2E-05	2.3	0.046	4.1E-06	3.3E-04

ING Real Estate Research & Strategy with ICAO and JLL data as of July 2008

Note: Melbourne North assumed as the airport submarket

Heathrow, London Case Study

Rents in the Heathrow submarket depend largely on freight evolution, according to our regression analysis. The freight alone explains 70% of the variance in the rent evolution, so it is a very relevant variable.

Table 5: Summary regression statistics for Heathrow Airport Industrial Rent and Freight growth

Regression Statistics						
Multiple R	84%					
R Square	71%					
Adjusted R Sq.	70%					
Standard Error	17					
Observations	24					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	15.1	11.7	1.3	0.211	-9.21	39.45
Freight (MT)	8.5E-05	1.2E-05	7.3	0.000	6.1E-05	1.1E-04

ING Real Estate Research & Strategy with ICAO and CW data

OR Tambo International Airport, South Africa Case Study

In the OR Tambo International Airport (Johannesburg, South Africa), the freight and the rents have a significant relationship but freight explains just about one third of the variance of the rents in the industrial airport submarkets. According to our analysis, a current increase of 10,000 MT would mean a 4.7% increase in the current rent level.

Table 6: Summary regression statistics for OR Tambo International Airport Industrial Rent and Freight growth

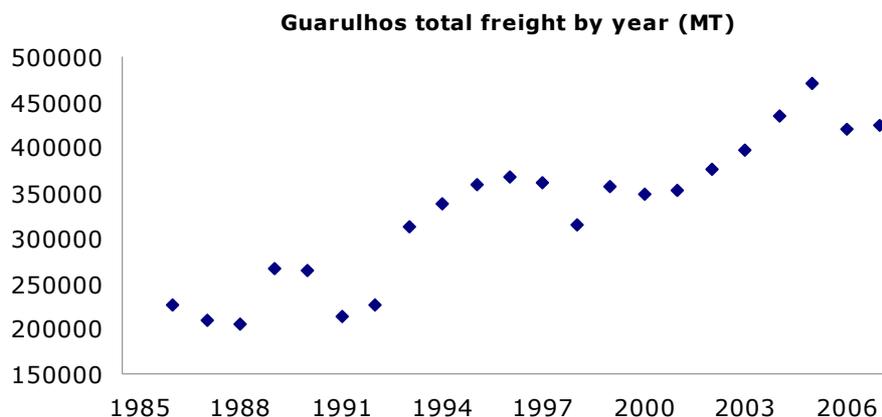
Regression Statistics						
Multiple R	59%					
R Square	35%					
Adjusted R Sq.	34%					
Standard Error	3.5					
Observations	64					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	3.54	1.36	2.61	0.011	0.83	6.25
Freight (MT)	1.1E-04	2.0E-05	5.81	0.000	7.5E-05	1.5E-04

ING Real Estate Research & Strategy with ICAO, OR International Airport and Colliers data as of July 2008

Guarulhos, Brazil

No data for the airport submarkets are available for the South American main airports. However, the freight data available through the ICAO and the national airports are evidence of a relatively strong growth in volumes of freight handled in these airports. According to the evidence we have from other airports, industrial rents should have grown as well to some extent. Although no specific data for the airport submarkets are readily available, some of the main brokers' documents report strong rental growth for the South American industrial markets in general terms.

Figure 3: Guarulhos total freight



Source: ICAO, Infraero, ING Real Estate Research & Strategy

The available documents about future air freight volumes suggest that the South American Airports will grow above the world average (Tab.7) so, according to the evidence presented above, further rental growth may lay ahead in the airports industrial submarkets.

Table7: Forecast Growth of Air Freight

South America Freight growth forecast		2006-2025	Avg.
Origin	Destiny	% p.a	
South America	Africa		6.3%
South America	Asia		5.7%
South America	Central America		7.4%
South America	CIS		6.6%
South America	Europe		6.0%
South America	Indian subcontinent		7.8%
South America	Japan		5.5%
South America	Middle East		3.6%
South America	North America		4.8%
South America	Pacific		6.1%
South America	China		7.7%
South America	South America		6.7%
Africa	South America		5.6%
Asia	South America		6.4%
Central America	South America		6.1%
CIS	South America		4.1%
Europe	South America		5.1%
Indian subcontinent	South America		7.2%
Japan	South America		3.2%
Middle East	South America		4.0%
North America	South America		6.1%
Pacific	South America		9.0%
China	South America		8.0%

Global Market forecast 2006-2025, Airbus

Note: figures in red indicates flows below the World average growth rate

4. DISCUSSION

One of the key barriers to large international institutional investors from allocating to emerging markets is market opacity⁵. Hence understanding those drivers which may underpin demand and result in rent growth is necessary and here we find tentative evidence that air freight may be one such driver (provided South American markets are similar to those of other key global centres). Given that prime industrial rents rose just over 6% globally in 2007, (Cushman Wakefield, 2008) some investors are keen to identify those markets where stronger rents and potentially higher returns may be gained. Three South American cities – Bogota, Colombia; Sao Paulo, Brazil and Montevideo, Uruguay - were among the world's top ten best performing industrial markets in 2007 with rent growth of between 30 and 55% (Cushman Wakefield, 2008). Continent-wide, South American locations attained rental growth of 25% in 2007. How can we start to determine that such strong growth may continue?

Those cities well positioned to handle air connectivity demand may enjoy stronger economic progress and be more attractive for investment; this follows from a sizable literature examining growth poles⁶ and similar nodes which stimulate growth. Real estate submarkets in closest proximity to the air or sea terminals or with easy freeway access usually have a premium, given their locational advantage. Further and more detailed work must be undertaken to forecast future volumes of air cargo if it is to be used as a reliable predictor of demand for industrial real estate in selected markets⁷. Correa da Rocha (2008) has found that the evolution of the Brazilian airport network was highly dynamic with a constant change in the relevance of some airports and routes.

Air cargo infrastructure and the supporting real estate form essential components of the economic development for a given region. The role of the government and that of the private sector is an important part of this discussion. In a Brazilian context, legislation was put in place in 2001 and 2002 by the Ministry of Finance to establish the country's first industrial airports (Kasarda, 2007). The primary objective of the legislation was to create a speedy, flexible, cost-saving business environment at and around selected airports to attract new industry and expand trade⁸.

Close monitoring of economic conditions and energy prices are necessary in determining the outlook for industrial properties, particularly as transport modes and hence locations are affected. In some countries there had been a modal shift away

⁵ Of the five main investment-grade property types, industrial is generally less transparent and in some instances less than residential and hotels as well, thus posing challenges in the construction of time series to allow analysis.

⁶ Early work by Hoare (1973) suggested that growth poles stimulate other economic activity through a variety of backward and forward linkages. Using a broad definition of 'linkage', airports may be linked directly to those companies specifically serving the airport and airport traffic (such as freight agents) and indirect linkages may develop with firms that locate or expand close to the airport for easy access to its freight and passenger services.

⁷ Matsumoto's main body of work to date (2004, 2007) has been descriptive in nature but useful in separating air network structures for passengers and cargo and explains air traffic volumes largely using three basic factors of GDP, population and distance.

⁸ For example, in 2004 the Tancredo Neves International Airport (TNIA) in Belo Horizonte was selected among four others to move forward with the new strategy. A special economic zone was established there to provide investment promotional privileges – including the suspension of taxes on imported parts and components to firms located in customs- regulated zones on airport industrial property. A key goal was greater operational efficiency for the import, storage and export of goods.

from rail and water transport to road and air nodes (Hesse and Rodrigue, 2004; 176). Whereas intercity truck ton-miles grew by 124% in the US between 1970-1995, air carrier ton-miles grew by 468% (Lakshmanan and Anderson, 2020; 9). IATA (2007) finds that air freight accounts for around 35% of international merchandise trade by value, but less than 1% in terms of volume; it is the mode of preference for high-value, time-sensitive and compact goods⁹. However in the current climate of record-high fuel costs, the calculus for the logistics sector is changing as transportation costs for all modes soar. Air freight is highly susceptible to other risks (epidemics, security threats etc) which have resulted in brief and comparatively mild setbacks to the sector.

Airport management issues are also important in assessing prospects of related real estate markets and are worthy of further study¹⁰. The competitiveness of the airports of the region is also a key variable of discussion if the region's industrial markets are to become more attractive. Da Mata et al (2007) note the need to meet backlogs in infrastructure, service delivery and amenity provision to accommodate further growth. Such capacity issues are present in the region outside of Brazil. Da Mata et al (2007) incorporate key concepts from new economic geography and find that transport costs and access to domestic markets are critical in analyzing comparative urban growth. Their main finding was that (2007: 254) "increases in local market potential ... have an enormous and dominating impact on differential city growth rates, along with improvements in inter-regional transport connectivity".

The growing global trend to outsource logistical functions is another trend which may have important and beneficial impacts on the development of the sector in the region¹¹. By global standards, the region has a lack of high quality, modern space and with expansion being undertaken by the logistics sector, standards are being raised (Cushman Wakefield, 2008; 3) with the refurbishment of old stock and development in new zones.

5. CONCLUSION

Relative to other property types, industrial real estate returns in developed economies have been quite attractive over the long term according to returns from key indices such as NCREIF and IPD. International institutional investors have shown considerable interest in large, state-of-the-art industrial/logistical facilities. Such facilities aim to improve the distributional efficiencies of major corporations. The space needs of tenants are diverse and change rapidly, especially in the current period of global economic turmoil. This presents both risk and opportunity.

⁹ However IATA (2007) also notes that air freight faces increased competition from other modes, especially container shipping, even for high-value, time-sensitive goods – with container shipping has become more competitive as route networks and frequencies have increased.

¹⁰ Pacheco et al find that (2006; 329) traditionally, airport passenger and cargo movements in Brazil can be seriously affected by external factors which may be associated with political, economic, social or technological factors. But the focus of their work was on the deregulation of the air transport sector in Brazil did not initially yield the expected results – passenger movement grew only in the domestic market, while international movement fell slightly. They report that cargo transport stagnated during the period studied.

¹¹ According to Wanke et al. (2007) Brazilian shippers have intensified their use of outsourced logistics functions since the mid 1990s and according to a survey by Fleury, cited in Wanke et al (2007) increased demand is being met by an extraordinary growth in the 3PL (third party logistics or contract logistics) industry: annual turnover in the industry grew from 0.5 to 2 billion USD between 2000 and 2003 alone. Fleury also indicated that about 60% of logistics functions of Brazilian companies were being outsourced by 2003.

The rise in air commerce has had an important impact on economic systems at the global, regional and local levels. Global structural changes to manufacturing systems and their geographic location, together with new metropolitan hubs of consumption have given rise to new patterns of distribution. New modes of distribution, together with the real estate that house these goods, have changed and continue to alter the calculus of time/space/cost linkages. Airports link locally-based economic activities to new markets and products around the world thus underpinning the trade and commerce of all major global metropolitan regions. The industrial and logistical hubs located by airports, or those with easy access to them, generate jobs and serve as important catalysts for local economic development. This real estate may be of investment grade and may increasingly be sought by institutional investors.

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