

SITE SELECTION PREPAREDNESS FOR THE AIRPORT CITY: A CASE STUDY OF
ORLANDO INTERNATIONAL AIRPORT

BY

SANTIAGO M. FERNANDEZ

A TERMINAL PROJECT PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF URBAN AND REGIONAL PLANNING

UNIVERSITY OF FLORIDA

2016

© 2016 Santiago M. Fernandez

To my mother and father who are always with me in mind and spirit. To my brothers and sister who inspire me to achieve and my son and daughter of whom I am so proud.

ACKNOWLEDGMENTS

I thank Mr. Richard 'Zip' Zipperly who mentored me throughout two decades of my life and to whom I owe a debt of gratitude. Together we learned as we planned and innovated on many public projects in multiple markets. Each project was a unique challenge and an opportunity for learning. This is especially true as it pertained to the planning of airports, spaceports, and cities in the Central Florida Region. Thank you Zip for making me a better planner and human being.

TABLE OF CONTENTS

	<u>page</u>
LIST OF FIGURES.....	7
LIST OF ABBREVIATIONS.....	9
ABSTRACT	10
CHAPTER	
1 INTRODUCTION.....	11
FAA Airport Classification	12
Airport Planning Classifications	13
Non-Aeronautical Revenue at Airports.....	15
The Airport City Classification.....	16
The Value Proposition.....	20
2 LITERATURE REVIEW.....	22
Aerotropolis Publications	22
FAA Publications	24
Planning the Airport City	25
Site Selection Preparedness.....	27
Land Development Constraints.....	28
Externalities and Land Development	32
Economic Development Factors	34
Large Hub Comparative Market Overviews	34
National Benchmarking- Case Studies – (CLT, LAS, PHX, RDU, SBI, 2013) ..	34
Charlotte-Douglas (CLT).....	34
Las Vegas-McCarren (LAS).....	35
Phoenix-Sky Harbor (PHX).....	35
Raleigh-Durham (RDU).....	36
Economic Development Analysis Factors.....	36
Site Selectors.....	37
Air service and Catchment	38
Urban Centrality and Quality of Life.....	38
Market Acceleration, Speed to Market, or Time is Currency	39
Site Certification.....	39
Example EDC efforts from competition	40
Charlotte-Douglas (CLT)	40
Phoenix-Sky Harbor (PHX).....	41
Raleigh-Durham (RDU)	41
3 METHODOLOGY	42

Case Study Work Flow	42
Orlando International Airport (MCO)	50
Tampa International Airport (TPA)	50
Orlando Sanford International Airport (SFB)	51
Melbourne International Airport (MLB)	52
Kissimmee Gateway Airport (ISM)	52
ANALYSIS AND FINDINGS.....	53
Cargo Operations	53
Available Property	54
Leveraging Policy	55
The Foreign Trade Zone.....	56
Tax Incentives	59
Airport City Indicators	60
4 DISCUSSIONS.....	61
Recommendations	63
Airport City Progress Index	64
5 CONCLUSIONS	65
LIST OF REFERENCES	67
BIOGRAPHICAL SKETCH.....	71

LIST OF FIGURES

<u>Figure</u>	<u>page</u>
Figure 1-1: Showing FAA planned improvements up to the year 2030 according to the FACT 3 assessment (FAA, p. 20, 2015)	12
Figure1-2: Chart showing the diversity of airport classifications and types. (FAA, 2014)	13
Figure 1-3: Aeronautical and non-aeronautical revenues compared. (FAA/ACI/NA, 2013)	15
Figure 1-4: List showing the diversity of airport cities as ranked by Kasarda. (Table by Author from Kasarda. 2013).....	17
Figure 1-5: Diagram of the Airport City. (Kasarda, Aerotropolis Website, 2012)	19
Figure 2-1: Aerotropolis Schematic by Kasarda with Red, Blue and Green Zone Overlays as presented by McKinley Conway (1995). (Kasarda, with edits by author, 2016)	23
Figure 2-2: Airport City Master Research Objectives Chart. (By Author, 2015).....	27
Figure 2-3. Noise Contour Map of Chicago Midway International Airport. (Dabrownstein, 2013)	30
Figure 2-4. Showing the Impact on Rents by noise contours. (Cohen et al, 2008).....	30
Figure 2-5. Chart showing comparative Floor Area Ratios. (By Author, NW Tradeport Study 2015).....	32
Figure 2-6: P-Q chart showing the anticipated effects of government intervention on airport rents. (Fernandez, 2015)	34
Figure 3-1: Proposed Research Methodology and Flow. (Fernandez, 2014)	42
Figure 4-1: Ranking of top U.S. airports by landholdings. (Chart by Author, 2016 from 2013 FAA Data).....	44
Figure 4-2: OIA Aeronautical v. Non-Aeronautical Revenues. 2014	45
Figure 4-3: Orlando International Airport, Budgeted Revenues in Thousands. (GOAA, FY 2015)	46
Figure 4-4: Orlando International Airport as an Emerging Airport City. (By Author, 2015)	47
Figure 4-5: Showing Florida FDOT Districts. (FDOT, 2016).....	49

Figure 4-6: Comparing Cargo Freight. (By Author from FAA Data, 2013) 54

Figure 4-7: Comparing Airport Acreage. (By Author from FAA Data, 2013) 55

Figure 4-8: How a Foreign Trade Zone Works, (By Author, 2016) 56

Figure 4-9: Comparing Available Property. (By Author from FAA Data, 2013) 57

Figure 4-10: Comparing Available Property. (By Author from FAA Data 2013) 57

Figure 4-11: Comparing FTZ Exports. (By Author from FAA Data 2013) 58

Figure 4-12 Comparing Available Property. (By Author from FAA Data 2013) 59

Figure 5-1: Hypothetical Airport City Progress Index (By Author, 2015) 64

LIST OF ABBREVIATIONS

ACI	Airports Council International
ACP	Airport City Progress
EDO	Economic Development Organization
FAA	Federal Aviation Authority
FSIS	Florida Strategic Intermodal Systems
NAS	National Aviation System
TAF	Terminal Area Forecast
TRB	Transportation Research Board
USDOT	United States Department of Transportation
FSIS	Florida Strategic Intermodal Systems

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Master of Urban Planning

By

SANTIAGO M. FERNANDEZ

DECEMBER 2016

Chair: Dr. Ruth L. Steiner, Ph.D., MBA
Cochair: Professor Stanley Latimer, M.A.
Major: Urban and Regional Planning

Airports have evolved over the past half century from simple airport terminals that serve to connect passengers to aircraft, into complex facilities that have varying configurations and land holdings. One contemporary concept of airport classification that transcends the traditional classification of the Federal Aviation Admonition (FAA) is that of the Airport City or Aerotropolis. Non-aeronautical revenue at airports has grown from 30% annually to 54% annually on average. Larger hub airports like Orlando International Airport are generating non-aeronautical revenues beyond 60% of the annual intake (ACI, 2013).

The research served to examine the externalities, diseconomies and restrictions that face airports as they emerge from airports, into airport cities, and ultimately aerotropolises. Described in the research are some of the positive and negative effects of the regulatory implications, externalities, diseconomies, and restrictions on airports as they serve to commercialize property? It then proposes, as a recommendation for analysis of airport city progress, an objectives matrix of key factors for consideration in airport city planning; airport catchment, airport city progress and emphasizes site selection preparedness as airports delve into the future economic development efforts.

CHAPTER 1 INTRODUCTION

Airports have evolved over the past half century from simple airport terminals that serve to connect passengers to aircraft, into complex facilities that have varying configurations and land holdings. Provision of passenger and cargo service has evolved from a basic service to differentiate airport classifications and types over the past quarter century. Contemporary airports have realized how to leverage their geographic and economic resources available to promote commercial and economic development of airport and airport adjacent property. Airport nomenclature, according to the Federal Aviation Administration (FAA), is primarily based on airport throughput. The FAA identifies and ranks airports by their capacity to service the two major revenue streams of passenger and cargo demand. This demand driven approach favors larger airports in consideration of program funding by the FAA to maintain and develop infrastructure at strategic system airports. Methods such as demand forecasting, and the ranking of airports on the national and regional system's primary needs basis of accountability as represented in the Future Airport Capacity Task (FACT) Core 30 Airports Report, and Terminal Area Forecast (TAF) reports. Prioritization of project funding by a federal set of standard adds complexity in consideration of airport infrastructure planning funding priorities. The Image in Figure 1-1 below shows the FAA FACT-3 (FAA, 2015) assessment of airports that will require priority funding to relieve congestion up to the year 2030. Most of these airports are Large Hub airports and service a significant portion of the U.S. National Airspace System (NAS). Airports that are actively seeking to compete in the market and maintain a sustainable business model will be required to develop alternative strategies for revenue growth that go beyond the traditional aeronautical revenue streams of ticketed passengers and cargo billet as recognized by the FAA.

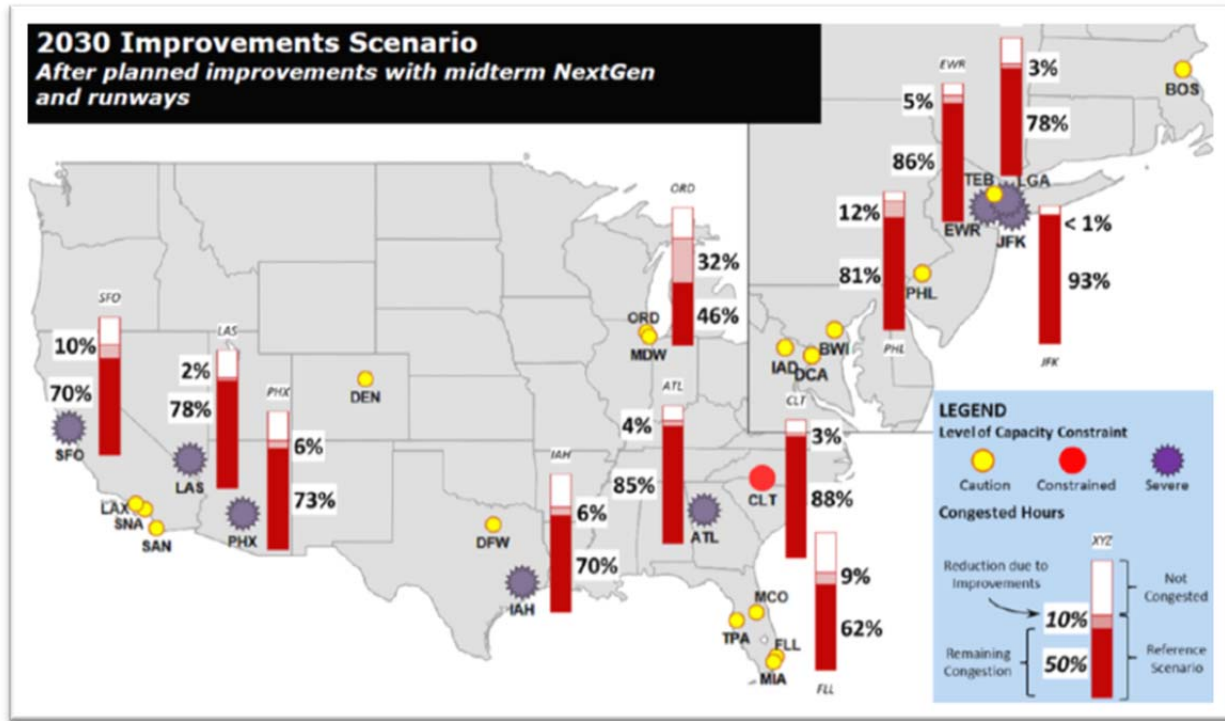


Figure 1-1: Showing FAA planned improvements up to the year 2030 according to the FACT 3 assessment (FAA, p. 20, 2015)

FAA Airport Classification

The following chart serves to provide the categories of airports as they are understood by the FAA and the commercial aviation industry. Commercial service at publicly owned airports that have at least 2,500 enplanements and are further subdivided into primary and non-primary categories. Primary categories of airports serve more than 10,000 enplanements annually. Airports are further subdivided into hub and non-hub airports. Hub Airports have long term and substantial gate lease agreements with major airline service carriers. The five common names for airports are based on commercial passenger traffic counts and percentage of the total U.S. system that each airport's catchment represents and are shown in the table below shown as Figure 1-2 (FAA, 2014). Large hub airports serve millions of passengers annually and generally acquire large tracts of land in order to properly buffer their airport growth. In conventional airport

planning, most airports associated with a larger metropolitan area fall under the classification of hub airport but can be further classified in planning by their unique operational characteristics.

Airport Classifications		Hub Type: Percentage of Annual Passenger Boardings	Common Name
Commercial Service: Publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service §47102(7)	Primary: Have more than 10,000 passenger boardings each year §47102(11)	Large: 1% or more	Large Hub
		Medium: At least 0.25%, but less than 1%	Medium Hub
		Small: At least 0.05%, but less than 0.25%	Small Hub
	Nonprimary	Nonhub: More than 10,000, but less than 0.05%	Nonhub Primary
Nonprimary (Except Commercial Service)		Nonhub: At least 2,500 and no more than 10,000	Nonprimary Commercial Service
Nonprimary (Except Commercial Service)		Not Applicable	Reliever §47102(18)
See Definitions of Airport Categories below for more information.			

Figure1-2: Chart showing the diversity of airport classifications and types. (FAA, 2014)

Airport Planning Classifications

Hub airports can be further defined by the mode of passenger travel. Passenger modes of travel are either in enplaning (departing) or deplaning (arriving) modes. Passenger modes and volumes are factors that airport planners consider when right-sizing airports. Hub airports can service two operational types of enplaning passengers, enplaning passengers are either considered to be using the airport as in-transit or as an origination and destination (O&D) airport. This functional and operational classification is important to the discussion of the airport city because it considers the type of enplanements that are occurring at each airport. Opportunities for revenue generation differ depending on the operational characteristics of the airport.

In-transit Hub airports generate revenues that are primarily based on airline leases in service to the temporary visitor, the in-transit transfer passenger that uses the facility. Currently servicing in excess of 49 million annual enplanements, Atlanta Hartsfield-Jackson International Airport (AHJIA) is the best example of a major NAS U.S. in-transit airport in respect to air carrier service. The majorities of passengers that visit AHJIA do not visit the city of Atlanta but simply visit the airport on route to a final destination. We see in the case of AHJIA that there is autonomy between the airport and the city it represents with regard to patronage. According the AHJIA Comprehensive Annual Report, this airport generates \$ 9.85 per enplaning passenger in FY 2014-15 (AHJIA, p. III, 2015a). Airport Industry planners consider AHJIA an outlier in planning in that it does not primarily accommodate the O&D passenger. O& D type airports likewise benefit directly from enplanements as a revenue source but are able to generate revenue beyond enplanement and aeronautical revenue. Orlando International Airport (MCO) is an example of a large hub O&D airport that serves a variety of passenger types from business travelers to the tourist. MCO is services over 18.83 million annual enplanements (GOAA, p.12, 2015a). MCO showed budgeted revenues of \$471,415,000 in FY of 2015. At \$25.03 per enplaning passenger, MCO is able to triple the revenue generation per enplaning passenger in comparison to AHJIA even though its aeronautical catchment is less than 40% in comparison. This suggests that MCO generates a significant amount of non-aeronautical revenues as an O&D airport. The research serves to identify these areas of non-aeronautical revenue and evaluate whether there are opportunities for growth in non-aeronautical revenues at Orlando International Airport as it serves

Non-Aeronautical Revenue at Airports

One contemporary aspect of airport land planning is that airport authorities have moved to establish commercial land development departments. Non-aeronautical revenue at airports has gone from 30% annually to 54% annually on average. Larger hub airports like Orlando International Airport are generating revenues beyond 60% of the annual intake (ACI, 2013). Figure 1-3 below depicts the percentage breakdown of revenue sources for all hub airports as reported by the 2013. The chart shows that according to the ACI report, non-aeronautical revenue accounted for 45 percent of total operating revenue, or \$8.22 billion compared with \$10 billion, or 55 percent in regular aeronautical revenues. The majority of the revenue came from parking and ground transportation, which clocked in at \$3.36 billion, or 41 percent of the total, with rental cars and retail and duty-free making up \$1.6 billion and \$664 million, respectively. At 8% of total average revenues (up from 7% in 2012), commercial land development is a small but increasing component of the revenue at airports as managing authorities organize to generate alternative revenue sources (ACI, 2013).

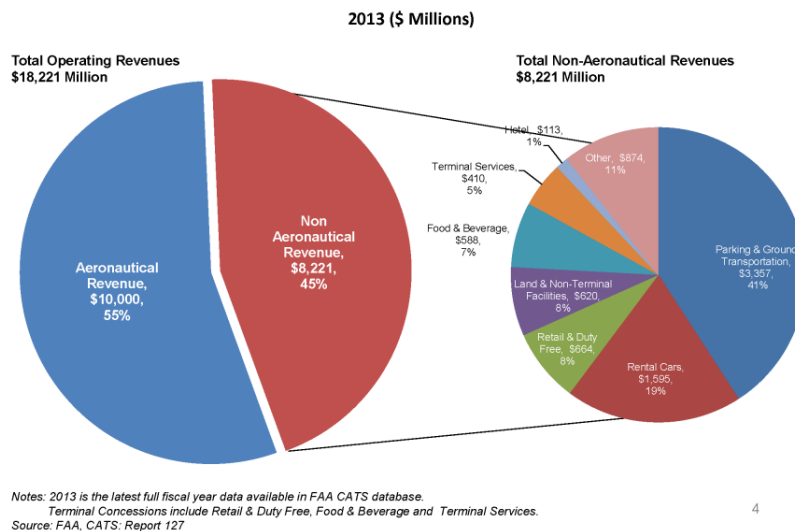


Figure 1-3: Aeronautical and non-aeronautical revenues compared. (FAA/ACI/NA, 2013)

The Airport City Classification

One concept of airport classification that transcends the classification of the FAA and traditional planning conventions is that of the Airport City or Aerotropolis. Twenty-First Century airports are actively being classified and ranked by John Kasarda of the University of North Carolina who is monitoring airports worldwide as they grow and embrace economic development. This list is shown below as Figure 1-4 below. In defining the core elements of airport cities Kasarda notes that “Airport Cities have evolved with different spatial forms predicated on available land and ground transportation infrastructure, yet virtually all emerged in response to four basic drivers” (Kasarda, 2008):

1. Airports need to create new non-aeronautical revenue sources, both to compete and to better serve their traditional aviation functions.
2. The commercial sector’s pursuit of affordable, accessible land.
3. Increased gateway passengers and cargo traffic generated by airports.
4. Airports are serving as a catalyst and magnet for landside business development.

The airport city according to Kasarda (2008) occurs when an airport has in place significant inside the fence line capabilities to generate non aeronautical revenues.

- In defining the airport city, Kasarda notes that:

“In addition to incorporating a variety of commercial and entertainment venues into passenger terminals, airports are developing their landside areas with hospitality clusters, office and retail complexes, conference and exhibition centers, logistics and free trade zones and facilities for processing time-sensitive goods. Revenues from such developments are being reinforced by major financial streams from advertising and parking. Consequently, many airports now receive greater percentages of their revenues from non-aeronautical sources than from aeronautical sources (e.g., landing fees, gate leases, passenger service charges)” (Kasarda 2008). He also notes that “airports are evolving from basic aeronautical infrastructures into complex multi-functional enterprises serving both aeronautical needs and profitable commercial development under the Airport City model” (Kasarda, 2008).

Airport	Class	Type	Continent	Call	City
Amsterdam Airport Schiphol	Aerotropolis	Operational	Europe	EHAM	AMS
Baltimore-Washington International Airport	Aerotropolis	Developing	North America	KBWI	BWI
Bangkok Suvarnabhumi Airport	Aerotropolis	Operational	Asia/Pacific	VTBS	BKK
Beijing Capital International Airport	Aerotropolis	Operational	Asia/Pacific	ZBAA	PEK
Belo Horizonte International Airport, Brazil	Aerotropolis	Operational	South America	SBCF	GNF
Bengaluru International Airport	Aerotropolis	Developing	Asia/Pacific	VOBL	BLR
Chicago O'Hare International Airport	Aerotropolis	Operational	North America	KORD	ORD
Clark International Airport	Aerotropolis	Developing	Asia/Pacific	RPLC	CRK
Cleveland Hopkins International Airport	Aerotropolis	Developing	North America	KCLE	CLE
Cochin International Airport	Aerotropolis	Developing	Asia/Pacific	VOCI	COK
Dallas-Ft. Worth International Airport	Aerotropolis	Operational	North America	KDFW	DFW
Delhi Indra Gandhi International Airport	Aerotropolis	Developing	Asia/Pacific	VIDP	DEL
Denver International Airport	Aerotropolis	Developing	North America	KDEN	DEN
Detroit Metropolitan Wayne County Airport	Aerotropolis	Developing	North America	KDTW	DTW
Dubai Al Maktoum International Airport	Aerotropolis	Developing	Middle East	OMJA	DWC
Dubai International Airport	Aerotropolis	Operational	Middle East	OMDB	DXB
Durban King Shaka International Airport	Aerotropolis	Developing	Africa	FALE	DUR
Edmonton International Airport	Aerotropolis	Developing	North America	CYEG	YEG
Fort Worth Alliance Airport	Aerotropolis	Operational	North America	KAFW	AFW
Guangzhou Baiyun International Airport	Aerotropolis	Developing	Asia/Pacific	ZGGG	CAN
Hartsfield-Jackson Atlanta International Airport	Aerotropolis	Developing	North America	KATL	ATL
Helsinki-Vantaa Airport	Aerotropolis	Operational	Europe	EFHK	HEL
Hong Kong International Airport	Aerotropolis	Operational	Asia/Pacific	VHHH	HKG
Hyderabad Rajiv Gandhi International Airport	Aerotropolis	Developing	Asia/Pacific	VOHY	HYD
Incheon International Airport	Aerotropolis	Operational	Asia/Pacific	RKSI	ICN
Indianapolis International Airport	Aerotropolis	Developing	North America	KIND	IND
Jackson-Evers International Airport	Aerotropolis	Developing	North America	KJAN	JAN
Johannesburg-Ekurhuleni OR Tambo International Airport	Aerotropolis	Developing	Africa	FAJS	JNB
Kuala Lumpur International Airport	Aerotropolis	Operational	Asia/Pacific	WMKK	KUL
LA/Ontario International Airport	Aerotropolis	Operational	North America	KONT	ONT
Lambert-St. Louis International Airport	Aerotropolis	Developing	North America	KSTL	STL
Las Vegas/McCarran International Airport	Aerotropolis	Operational	North America	KLAS	LAS
Louisville International Airport	Aerotropolis	Operational	North America	KSDF	SDF
Memphis International Airport	Aerotropolis	Operational	North America	KMEM	MEM
Miami International Airport	Aerotropolis	Operational	North America	KMIA	MIA
Milwaukee General Mitchell International Airport	Aerotropolis	Developing	North America	KMKE	MKE
Moscow Domodedovo Airport	Aerotropolis	Developing	Europe	UUDD	DME
Northwest Florida Beaches International Airport	Aerotropolis	Developing	North America	KPFN	PFN
Orlando International Airport	Aerotropolis	Operational	North America	KMCO	MCO
Paris Charles de Gaulle Airport	Aerotropolis	Operational	Europe	LFPG	CDG
Phoenix-Mesa Gateway Airport	Aerotropolis	Developing	North America	KIWA	AZA
Piedmont Triad International Airport	Aerotropolis	Operational	North America	KGSO	GSO
Raleigh-Durham International Airport	Aerotropolis	Operational	North America	KRDU	RDU
Shanghai Pudong International Airport	Aerotropolis	Operational	Asia/Pacific	ZSPD	PVG
Singapore Changi Airport	Aerotropolis	Operational	Asia/Pacific	WSSS	SIN
Stockholm Arlanda Airport	Aerotropolis	Operational	Europe	ESSA	ARN
Subic Bay International Airport	Aerotropolis	Developing	Asia/Pacific	RPLB	SFS
Taiwan Taoyuan International Airport	Aerotropolis	Developing	Asia/Pacific	RCTP	TPE
Tocumen International Airport - Panama Panatropolis	Aerotropolis	Developing	South America	MPTO	PTY
Washington Dulles International Airport	Aerotropolis	Operational	North America	KIAD	IAD
Zhuhai Jinwan Airport	Aerotropolis	Developing	Asia/Pacific	ZGSD	ZUH
Abu Dhabi International Airport	Airport City	Developing	Middle East	OMAA	AUH
Athens International Airport Eleftherios Venizelos	Airport City	Operational	Europe	LGAV	ATH
Barcelona El Prat Airport	Airport City	Developing	Europe	LEBL	BCN
Bremen Airport	Airport City	Operational	Europe	EDDW	BRE
Brisbane Airport	Airport City	Operational	Asia/Pacific	YBBN	BNE
Budapest Ferenc Liszt International Airport	Airport City	Developing	Europe	LHBP	BUD
Cairo International Airport	Airport City	Operational	Africa	HECA	CAI
Charlotte Douglas International Airport	Airport City	Developing	North America	KCLT	CLT
Dublin Airport	Airport City	Developing	Europe	EIDW	DUB
Frankfurt Airport	Airport City	Operational	Europe	EDDF	FRA
Frankfurt-Hahn Airport	Airport City	Operational	Europe	EDFH	HHN
Huntsville International Airport	Airport City	Operational	North America	KHSV	HSV
Jeddah King Abdulaziz International Airport	Airport City	Developing	Middle East	OEJN	JED
John C. Munro Hamilton International Airport	Airport City	Developing	North America	CYHM	YHM
John F. Kennedy International Airport	Airport City	Operational	North America	KJFK	JFK
Kansas City International Airport	Airport City	Developing	North America	KMCI	MCI
London Heathrow Airport	Airport City	Operational	Europe	EGLL	LHR
Los Angeles International Airport	Airport City	Operational	North America	KLAX	LAX
Manchester Airport	Airport City	Developing	Europe	ECCC	MAN
Minneapolis-Saint Paul International Airport	Airport City	Operational	North America	KMSP	MSP
Munich Airport	Airport City	Operational	Europe	EDDM	MUC
Newark Liberty International Airport	Airport City	Developing	North America	KEWR	EWR
Oslo Airport, Gardermoen	Airport City	Developing	Europe	ENGM	OSL
Paris Vatro Airport	Airport City	Developing	Europe	LFOK	XCR
Philadelphia International Airport	Airport City	Operational	North America	KPHL	PHL
Phoenix Sky Harbor International Airport	Airport City	Operational	North America	KPHX	PHX
Pittsburgh International Airport	Airport City	Operational	North America	KPIT	PIT
Rickenbacker International Airport	Airport City	Operational	North America	KLCK	LCK
Ted Stevens Anchorage International Airport	Airport City	Operational	North America	PANC	ANC
Vancouver International Airport	Airport City	Operational	North America	CYVR	YVR
Vienna International Airport	Airport City	Operational	Europe	LOWW	VIE
Warsaw Chopin Airport	Airport City	Developing	Europe	EPWA	WAW
Zurich Airport	Airport City	Operational	Europe	LSZH	ZRH

Figure 1-4: List showing the diversity of airport cities as ranked by Kasarda. (Table by Author from Kasarda. 2013)

The aerotropolis emerges from out the airport city similar to the manner in which firms agglomerate around metropolitan areas as such spatial economics is relevant to the aerotropolis and land values by nature exhibit the same characteristics at the aerotropolis center as they do in the metropolis.

This approach to airport planning understands a city or regions airport to be a viable economic engine for the community. In Twenty-First Century planning we are faced with the question and the viability of the airport city according to Kasarda. More specifically, whether the relationship between the Airport City and the City it serves is a zero sum economic condition where they are in competition or whether they can unite resources and attract the larger economic development effort in benefit to all. Airports continue to evolve from simple origination and destination points for commercial air travel into complex commercialized ventures offering the communities and businesses they thrive in with alternatives to traditional business.

Mr. Kasarda has also served to establish a graphical representation of the ideal airport city as shown below in Figure 1-5 below. The image below simplifies airport city development by providing a visual and component based understanding of the definition of the airport city and evolving aerotropolis. The component based approach serves as a guideline presented by Kasarda for airports to attract potential tenants in consideration of airport city and aerotropolis progress. Airports should consider specific componential market and economic development components, according to Kasarda, as they serve to promote themselves globally, regionally and locally. Kasarda is the promoter of this concept of the properly planning for the 'airport city' and provides a constant awareness of the phenomena as it emerges within contemporary planning

culture. Kasarda further introduces the ‘aerotropolis’ which embraces the concept of spatial economics in relationship to future airport growth.

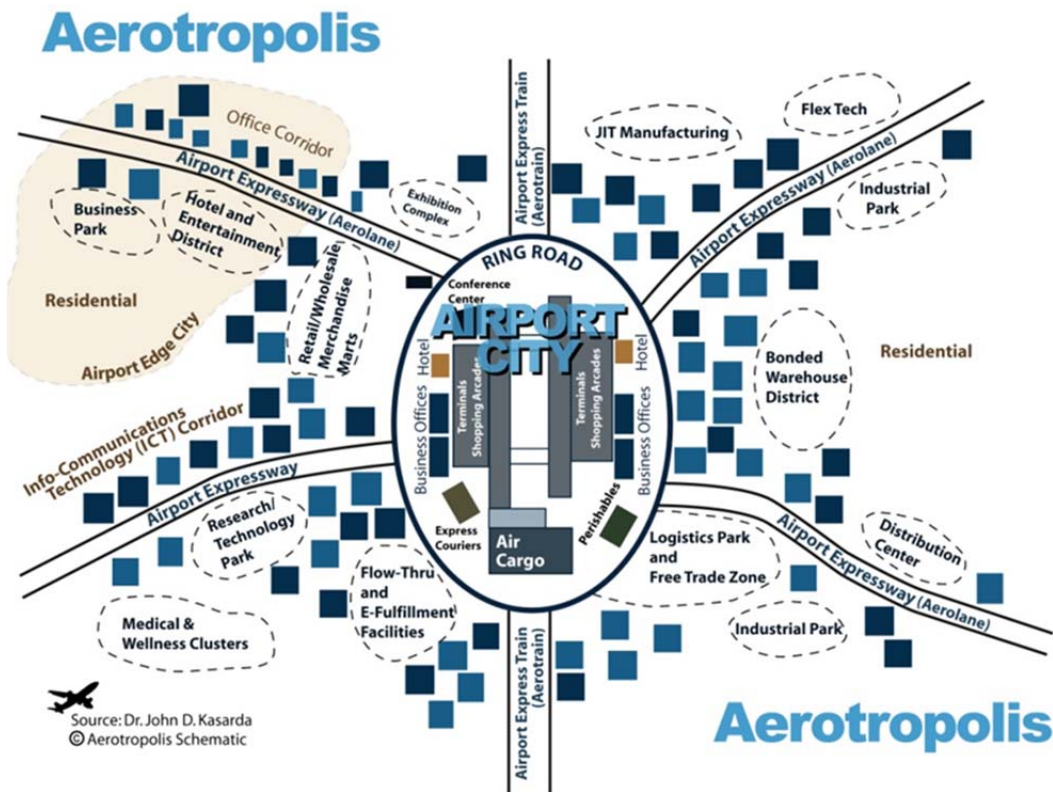


Figure 1-5: Diagram of the Airport City. (Kasarda, Aerotropolis Website, 2012)

Kasarda notes that ‘Although most aerotropolis development to date has been organic, spontaneous and haphazard’, there is an opportunity for airports and the cities they represent to embrace this concept and plan accordingly in order to ensure their global competitiveness. The key to business success in the 21st century will rely on ‘economies of speed’ and reduced ‘last cost mile’ capabilities to deliver product (Kasarda, 2014, p5).

The larger question that remains is the ability for airport cities and ultimately the aerotropolis to maintain competitiveness and a sustainable future similar to the urban center. We have seen the cyclical erosion and resurgence of the urban centers

throughout the last century. Can we expect this same cyclical economic ebb and flow from airport cities? Will the success of the aerotropolis in effect cannibalize economic activity in the city it serves?

The main factor of importance in the preparedness of airport cities is to ensure that the factors which affect corporate site location can be enhanced by proper promotion and planning of airport cities. Four factors regularly appear to be of higher importance in the decision-making process by corporate executives when considering relocation of their firms on or near an airport. These are primary considerations with respect to aerotropolis business siting by firms (Kasarda et al., p.24):

1. Air Service and Catchment
2. Skilled Labor force or Low Cost Labor Force
3. Urban Centrality and Quality of Life
4. Market Acceleration, Speed to Market, or Time is Currency

Decision making with regard to corporate site selection is more often being made on the basis of accessibility, and speed to market, rather than location. The inclination is for high tech and high quality production firms to embrace property on and around airports. Firm agglomeration similar to urban centers is occurring at airports. Fortune 500 companies are locating within short distances to airports rather than inside of urban centers.

The Value Proposition

Aerotropolis planning, as in urban planning, is comprised of key fundamental planning considerations. Spatial analysis applies to airports as it applies in city planning. This similarity can serve as a benchmark for the aerotropolis on a local, regional and global economic scale. Transportation planning, land-use planning, and strategic

business modeling that embraces valuation of the property based on its organizational planning is necessary.

- To this need for this formalization Kasarda notes that:

“The formalization and commitment to the aerotropolis allows for a creation of wealth beyond haphazard implementation of facilities.” This ‘value proposition’ as Kasarda notes provides “wealth creation, boosts employment and regional income, accelerates regional economic growth, induces demand for facilities, and generates returns on real estate investment.” (Kasarda, 2014 p.21)

The research examines this formalization and commitment to wealth creation by airports. It also examines the externalities, diseconomies and restrictions that face airports as they emerge from airports, to airport cities, and ultimately aerotropolises. Described in the research are some of the positive and negative effects of the regulatory implications and restrictions on airports by government controlled land as they serve to commercialize property. It then proposes as a recommendation for airports, as an objectives matrix of key factors for consideration. These factors are presented herein as 1) airport catchment, 2) airport city progress and 3) site selection preparedness. This research uses Orlando International Airport, which is designated as an emerging aerotropolis according to Kasarda, as a case study airport by which to examine and relatively compare with other airports in regard to these three airport city planning objectives. The study comparatively benchmarks four national O&D hub airports that exhibit similar characteristics to MCO, as well as four airports in the Central Florida Region that share a catchment market with Orlando international Airport. The ultimate goal is to understand Orlando International Airport’s position in the market as an operational aerotropolis.

CHAPTER 2 LITERATURE REVIEW

There is substantial literature on airport cities and much of this literature has surfaced over the past fifteen years. The concept of the Airport City originated with America's first core airports and the cities they represent over a quarter century ago. One such case is the City of Chicago which is now serviced by two airports, Midway and O'Hare. These airport cities, as presented by McKinley Conway, the forefather of the concept of the airport city, are showcased in *Airport Cities 21* (1995) as 'landlocked' or 'boxed in' by commercial development and unplanned growth by the 1960's and 1970's respectively. Mr. Conway presented this concept and the need to properly plan the airport city in 1978. The concept was developed further over a series of books and documentation over the last quarter century.

Aerotropolis Publications

Several documents by John Kasarda, today's leading proponent of the concept of the Aerotropolis, serve to support Conway's original theories. *The Aerotropolis* is a book co-authored by Greg Lindsay and John Kasarda. Most of these articles were articles directly written by Kasarda or written as interviews with Kasarda. The Articles were *Airport cities and the Aerotropolis: New Planning Models*, *The Rise of the Aerotropolis*, *Time-Based Competition & Industrial Location in the Fast Century*, *Innovative Infrastructure for Agile Manufacturers*, and *Planning the Aerotropolis*. *Planning the Aerotropolis* was an actual thesis paper written by Kasarda and his co-authors. The thesis paper elaborated on the concept of the aerotropolis and the benefits of planning airport growth within this 'airport city' and 'aerotropolis' ideal (Kasarda, 2000). The authors make pertinent arguments especially regarding economic development.

Kasarda's focus in this thesis serves to provide the relevance to pre-plan the growth of an airport and around airport property to compete in an evolving global market. What Kasarda ignores in his ideal are the myriad of restrictions and guidelines that are in place on airport property due to regulation and restrictions.

Airport Cities 21 (1995) is one of the main sources on the Airport City, the Aerotropolis, and the relevance of planning used in this current observation. With regard to commercialization of airports and the surrounding areas, McKinley Conway identifies the understanding of three distinct zones of intensity around airports (see Figure 2-1 below), the Red Zone, the Blue Zone and the Green Zone.

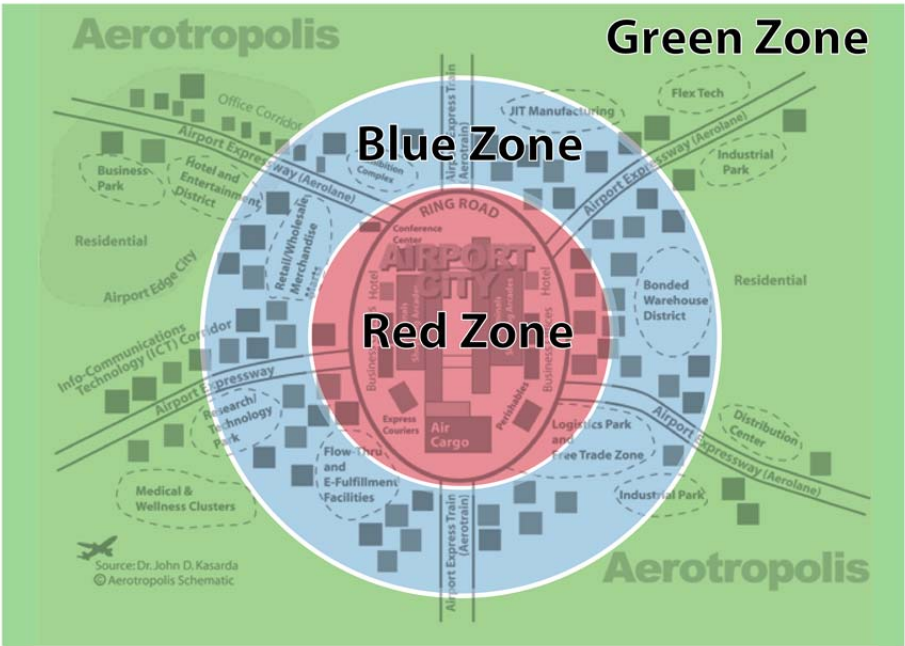


Figure 2-1: Aerotropolis Schematic by Kasarda with Red, Blue and Green Zone Overlays as presented by McKinley Conway (1995). (Kasarda, with edits by author, 2016)

Red Zone areas are considered primarily for airport operations. Blue Zone areas are considered for airport related uses. Green zone areas according to Conway would

transition from airport support to other uses as shown in the diagram below (Conway, 1995, p.47). This concept will be useful as we benchmark airports for analysis.

Conway's diagrammatic interpretation is in response to airport market externalities as imposed by federal, state, and local restrictions with regard to land use and commercial development at airports.

- He notes that:

“When this activity is on the rise it requires more support and increases the airport's ability to generate alternative revenues to offset their aeronautical revenues and gate costs” (Conway, 1995, p. 45).

- Conway also points out however that:

“as a government selects a site to build an airport, there is a gradual transition where residential creeps upon the airport. As the airport grows the noise factor increases causing public opinion to guide the outcome of development” (Conway, 1995, p. 46).

FAA Publications

Related publications and Federal Aviation Authority (FAA) circulars we used as resources to further describe the specific restrictions and allowances at airports as they serve to develop and lease airport property. The FAA sponsors the Airport Cooperative Research Program (ACRP) and it is managed by the Transportation Research Board (TRB). In *Land Use Compatibility at Airports: A Guide for Effective Land Use*. This guidebook was developed by the Transportation Research Board (2011) of the national academies in Washington D.C. The study is sponsored by the FAA. The 130 pages guidebook describes all aspect of lease coordination related to airport commercialization. Chapter 4 discusses the project development considerations that should be understood in commercialization of property. The document expounds on the roles of marketing, funding, land development, valuation, airport revenue maximization

and stakeholder resources. The document also discusses financing and provides recommendations of best practices by showing case study airports as examples. There is sufficient documentation with regard to FAA airspace restrictions and guidelines for a proper understanding at <http://www.faa.gov/>. The Airports Council International (ACI) releases information on the revenue generation of our national airports that is sourced from FAA report data. Airports report directly to the FAA and to their individual communities in annual reports on their revenue generation and operational expenses. This data was used to establish a baseline understanding of the revenue generation at airports from small to large hub size as well as all hub sizes.

Planning the Airport City

The ultimate goal when planning airport cities should then be to establish criteria for judgment in defining threshold potentials for economic growth at subject airports. Strategic planning for airport cities in kind should then embrace the diversification of revenue sources that are needed to optimize and promote the sustainability of the infrastructure investment at airports. As subject airports evolve from being airport neighborhoods, to airport towns, to airport cities and ultimately aerotropolises, key componential elements will need to be in place to sustain the venture. Developing a categorical system of accountability in carrying out these airport city strategies is the focus of this research. The gathering of information for this research was focused on identifying and defining key concepts that can serve contemporary airport planner as they serve to organize airport city planning.

The objectives matrix promoted in this research, shown as Figure 1-7 below, attempts to define factors that influence planning and economic development decisions towards the promotion of commercial and economic development at airports. The ability

to comparatively benchmark subject airports as they implement airport city planning and developable projects can be facilitated by this organized approach. This approach allows for both quantitative and qualitative data to be introduced into the research discussion and ultimately to be indexed for comparison. Through this analysis matrix, we can place annual passenger volume of an airport city that is a numeric variable together with a quality of life indicator of the airport city that is a categorical variable and use this information to develop a standard of comparison by which to directly compare and contrast a subject set of airports.

Factors that are placed under airport catchment and airport city progress were, after initial research, considered to be more general and common core elements of airport city data for compilation and analysis. This data is fundamental and helpful in consideration of airport city potential but is not always applicable on a broader scale as we serve to include medium and small hub airports into competitive scenarios. Small and medium hub airports find it difficult to compete on population alone and acreage alone. It is important then to examine other aspects of economic development attraction that serve to allow the small and medium hub airports the ability to compete nationally, regionally and globally regardless of size. This is the true case over the past decade in a down economy in the U.S. The necessary information that falls under the category of site selection preparedness as presented in Figure 2-2 below attempts to do so.

Objectives/ Research Questions/ Hypothesis	Major Concepts	Indicators	Variables	Unit of Measurement
Airport Catchment	Enplanements	Annual Volume	International/ Domestic	Passengers
	Airport Classification	Classification/ Airfield	Number/ Size/ Capacity	Operations
	Air Carrier Diversity	Foreign/ Domestic	Passenger / Cargo	Enplanements/ Tons
Airport City Progress	Land Developemnt	Available Land	Developable/ Constrained	Acreage
	Non Aeronautical Revenue	Tourism/ Industrial	National/Regional/ Local Competition	Dollars
	Firm Diversification	Agglomeration of Types	Skilled Work Force	Time Cost/ Supply Chain
Site Selection Preparedness	Speed to Market	Shovel Ready Property	Land Constraints/ Carrying Capacity	Developable/ Available
	Economic Development	EDC Structure	Geographic/Policy/ Incentives/ FTZ	Tax Percentages/ Grant Dollars
	Regional Attractants	Lifestyle/ Amenities	Income/ Real Estate/Amenities/ Schools	Quality of Life
	Transportation Infrastructure	Multimodal	Air/ Sea/ Land/ Rail/ Space/Proximity	Distance/ Modes

Figure 2-2: Airport City Master Research Objectives Chart. (By Author, 2015)

Likewise, the research to support this matrix was executed along three paths resulting in the establishment of an objectives analysis matrix that can serve future airport city planners. The first is the accumulation and review of existing documentation regarding current land and economic development policies to establish a current day status of land development at subject airports. Second is the comparative benchmarking of airports along several categorical definitions of operation and land use. The third is the establishment of an airport city index by which to input both quantitative and qualitative data so that we may ultimately categorically rank an airport's commercialization capabilities in the generation of non-aeronautical revenues. Due to the limitation of resource information, this potential to index airport city progress is a recommendation and not a result of this research. Indexing can be a useful tool of accountability for emerging airport cities and aerotropolises as they assess and plan their future.

Site Selection Preparedness

The research focuses on site selection and preparedness of these significant and subject airports. It investigates the positive and negative effects of the regulatory

implications, externalities, diseconomies, and restrictions on airports as they serve to commercialize property. It understands that the traditional commercial real estate spatial analysis may not always yield a positive scenario. Although 'red zone' proximity to the airport terminals centers do yield higher rents blue zone and green zone developments might forego the traditional rent to support the broader economic development effort.

This research also serves to identify the institutional, physical and political externalities that face airport cities as they serve to bring airport commercial property to the market. The ultimate goal is to provide a categorical weighting as to the relevance of the three research objectives identified below, airport catchment, airport city progress, and site selection preparedness. Today's airports are becoming increasingly complex and traditional models need to be altered to accommodate these complexities.

Land Development Constraints

Land development as itemized in the objectives matrix, considers both physical and political land constraints. The basis of focusing on this analysis as it pertains to the case study airport chosen, and the related cross section of airports is to understand more clearly how land constraints imposed in the purchase of land by governmental agencies, such as the FAA, during the area of deregulation has served to impose layers of regulation on airport and airport adjacent property. The establishment of 'aviation' easements over airports, although necessary are a restriction on the development of the airport. Noise abatement programs have served to buffer the interaction between airports and the citizen landholder. The FAA assists airports in the purchase of land through Airport Improvement Program (AIP) funding, Noise Abatement Program funding and other sources. With this assistance come restrictions of use that are both physical, ensuring safety of the general public, and policy based, requiring just value transactions

for property leases. Under these guidelines airports are prohibited from performing fee simple transactions. It is anticipated that the research will show how these restrictions are a hindrance to the competitive pricing of airport property against adjacent non-aviation property.

This example from Chicago Midway shows the effects of noise contours on the city of Chicago over twenty five years as aircraft size has served to increase the effects of noise at airports and into surrounding neighborhoods. As part of the master planning process, the FAA requires proof of compliance with FAA Part 150 noise guidelines and standards for approval of the E-ALP Master Plan. The limitations of three dimensional airspace restrictions are imposed for safety reasons at airports. Primary surface restrictions around runways restrict airfield adjacent development while ratio base glide slope restrict height of buildings around airfields both on and off the airport. Figure 2-3 below depicts mapped aerial image that shows how noise contours have intensified around Chicago Midway Airport over the past quarter century. This serves to exacerbate the difficulties of development around airports. Noise abatement programs have served to influence the ultimate use of airfield adjacent land at airports in cases where airports chose have accepted AIP dollars from noise abatement programs. The ability to develop mitigated property is often a zero sum proposal, as airports would have to return just value for FAA investment of this property. This concept holds the uncomfortable truth that the FAA, although not the final decision maker, has by policy, the ability to restrict development.



Figure 2-3. Noise Contour Map of Chicago Midway International Airport. (Dabrownstein, 2013)

In a 2003 study, Jeffrey P. Cohen and Cletus C. Coughlin on housing values near the Atlanta airport. The authors realized that the “spatial effects are best captured by a model including both spatial autocorrelation and autoregressive parameters estimated by a generalized moments approach.” And that “in the preferred model, houses located in an area in which noise disrupts normal activities (defined by a day-night sound level of 70-75 decibels) sell for 20.8 percent less than houses located where noise does not disrupt normal activities (defined by a day-night sound level 65 decibels, shown in Figure 2-4 below) (Cohen, 2008).

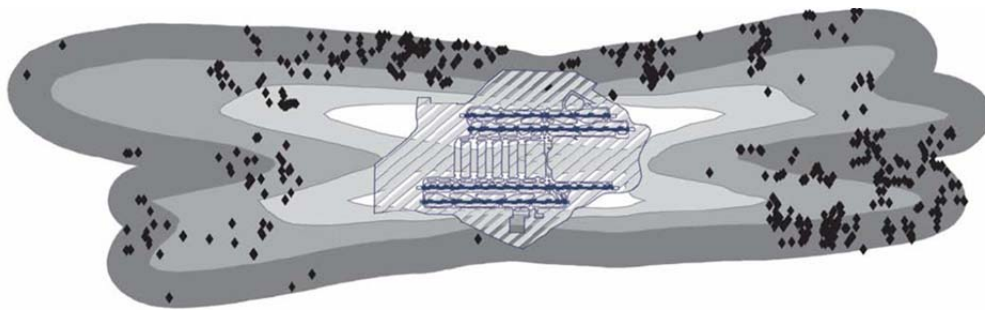


Figure 2-4. Showing the Impact on Rents by noise contours. (Cohen et al, 2008)

According to Cohen and Coughlin (2008), the inclusion of spatial effects magnifies the negative price impacts of airport noise. Finally, after controlling for noise, houses farther from the airport sell for less; the price elasticity with respect to distance is -0.15, implying that airport proximity is an amenity.

Likewise, airports have the ability to activate a foreign trade zone (FTZ). These designations serve to bring foreign companies to shore in the U.S. and are a successful tool for job creation. The FAA allows for alternatives sites framework options for FTZ designations. The FAA also allows airports to develop annexed properties under the FTZ guidelines. The goals of the research will serve to identify the advantages and disadvantages of commercialization of property and define where changes should be made to better the competitiveness of airports in the real estate market.

Some airport management structure are underfunded or parochial in nature and often do not have the resources or organization to take advantage of the tools at their disposal. The third outcome is to show that successful development on and around airport property does not always follow the traditional urban economic commercial market model and should look to alternative approaches to economic development. Simple land use and comprehensive planning approaches that might apply to urban centers and cites for organization and prioritization of infrastructure funding are not always the most effective method of promoting airport development. Airport real estate managers need to truly be innovative in the promotion of their property. Some of these methods such as Foreign Trade Zone initiatives are established already in use the airports that were studied. In some cases airport property managers are taking

advantage of these tools that are supported by the FAA as well as other federal, state and local agencies.

Externalities and Land Development

Beyond the physical constraints, there are a broad range of externalities that affect land development around airports. For instance, development of airport land around airfields is categorically restricted as aviation support due to FAA guidelines (FAA, 2015a). This is sometimes in conflict with intended densities and uses as planned by city or county requirements. The City of Orlando for instance, owns and manages Orlando International Airport. The intended overlay by the City of Orlando on airport property shows an MAC-3 designation. The Floor Area Ratios (FARs) as prescribed by this designation requires a minimum and maximum density of .5 FAR minimum and 3.0 FAR maximum. When sites are further examined as to their true market potential and truer carrying capacity, the potential for development often falls short of the value of the land based on comprehensive planning. Site offsets and right of ways as well as height restrictions tend to limit the development potential imposed by code. The figure 2-5 below shows an example of this complexity.

PARCEL	LAND USE			ZONING			PARCEL				PROPOSED USE								
	TYPE	FAR		TYPE	FAR		ACRE	SQ FT	FAR SF		LAND USE	ASSUMP	PARK REQ. MIN.	FAR		SURFACE PARKING			
		MIN	MAX		MIN	MAX			MAX SF	MIN SF				#PARK MAX	#PARK MIN	PROVIDED	MAX SF	FAR	DELTA P
A1	MAC	0.75	3	AC-3/AN	0.75	1.5	4.87	212,194	636,582	159,146	HOTEL-123KEYS	88,642SF - (4) S	5:1RM			171	88,640	0.42	
A2	MAC	0.75	3	AC-3/AN	0.75	1.5	11.64	507,059	1,521,177	380,294	DATA CENTER		1.5:1000	2,282	570	763	508,667	1.00	(193)
A2	MAC	0.75	3	AC-3/AN	0.75	1.5	11.64	507,059	1,521,177	380,294	OFFICE - G		2.5:1000	3,803	951	763	305,200	0.60	188

PROPOSED USE					
FAR			SURFACE PARKING		
#PARK MAX	#PARK MIN	PROVIDED	MAX SF	FAR	DELTA P
		171	88,640	0.42	
2,282	570	763	508,667	1.00	(193)
3,803	951	763	305,200	0.60	188

Figure 2-5. Chart showing comparative Floor Area Ratios. (By Author, NW Tradeport Study 2015)

The importance of this chart above is that it shows that although airport property might have a certain expected site yield and market value in comprehensive planning, governmental restrictions and regulation affects airport land value through imposed restrictions and guidelines. The true value of airport property often differs from traditional real estate value due to diseconomies and do not always concur with real market value and the expected potential for development at and around airports. This can be further exacerbated when airfield access advantages are not a factor in site selection. Lack of proximity to roadway of certain sites, and lack of vehicular trip counts can also adversely affect the value of land at airports. In some cases airports do not have the dollars to properly develop the infrastructure necessary to establish a pad ready scenario for land.

Figure 2-6 below represents a P-Q chart explanation of how the research anticipates the answer the overarching question of land values at most airports will result due to restrictions and governmental intervention on land. The research anticipates that the effects of the regulatory implications, externalities, diseconomies, and restrictions on airport property will have a negative effect on the commercialization of airport and airport adjacent property. The equilibrium price of property for airports will generally be significantly lower due to the government intervention. In some cases the value of the land will be zero. This will be especially true where adjacent lands with no externalities and allowable for fee simple transactions is readily available for development.

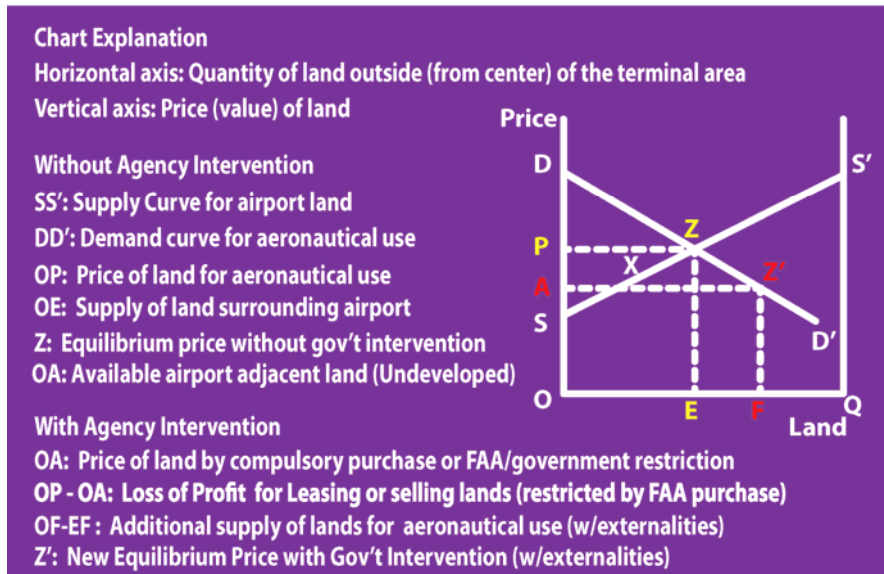


Figure 2-6: P-Q chart showing the anticipated effects of government intervention on airport rents. (Fernandez, 2015)

Economic Development Factors

As airports move to commercialize property in the 21st century, their competitiveness depends upon the ability to respond to the decision makers of corporations seeking to expand or relocate. Corporate site selection factors ultimately influence the final decision-making in economic development efforts. Concepts such as mitigating risk, speed-to-market and shovel-ready property, as Kasarda notes, are essential to a competitive and strategic commercial land development program. The objectives matrix and approach based on the major concepts as espoused by Kasarda as the key factors for airport cities.

Large Hub Comparative Market Overviews

National Benchmarking- Case Studies – (CLT, LAS, PHX, RDU, SBI, 2013)

Charlotte-Douglas (CLT)

Charlotte-Douglas International Airport (CLT) serves a two-state 16 county metro area. Financial services anchors industry as Charlotte is the 2nd largest financial center

in the US, which in turn supports a strong information technology (IT) and international business sector. Charlotte is home to film and the motorsports industry and rounds out the economic base with energy, aerospace/defense and a cluster of health and life sciences firms. Charlotte is a practical comparison due to similar demographics and passenger counts.

Las Vegas-McCarren (LAS)

McCarran International Airport (LAS) serves a region that rivals Orlando's climate and foothold on tourism and conventions with the added attraction of gaming. A growing foreign trade sector and the EB-5 program are good comparisons as well. A unique twist on the healthcare sector is health and wellness tourism. Las Vegas targets similar globally competitive sectors in aerospace/defense and manufacturing/logistics while adding clean tech as a focus. Las Vegas in parallel to Orlando is a major origination and destination airport and services a large tourist market.

Phoenix-Sky Harbor (PHX)

Phoenix Sky Harbor International Airport (PHX) serves the largest metro area in this study with a population twice that of Orlando metro area at 4.2 million. Arizona and Florida are both desirable locations for retirees. A strong asset for Phoenix is low catastrophic risk and predictable climate coupled with a dependable infrastructure and more than 156,000 miles of fiber optic network capacity. This type of infrastructure is attractive to data centers and other mission critical companies and is a competitor to Charlotte in some respects. In addition, the greater Phoenix area focuses on energy, biomedical, emerging technologies, and aerospace and defense. Of particular note is the manner in which they have packaged all infrastructure assets, land, tax incentives,

business climate, and other related assets at the airport into an attraction campaign titled Advanced Business Services.

Raleigh-Durham (RDU)

Raleigh-Durham International Airport (RDU) is a bit of an outlier from a population standpoint as depicted in the included demographics comparison, yet has twice the education attainment of the other four metro areas. Given the myriad of economic development factors at RDU's disposal; the availability of skilled labor (as the number one decision factor for expanding and relocating communities); a neighboring internationally renowned research & development park (RTP); and available land for development on airport RDU a good benchmark airport for comparison to MCO. Proximity to the Carolina beaches is less than 2 hours. Additionally, the regions' targeted sectors include extensive emphasis on interactive software/games and photonics, as well as, advanced medical technology and defense industries.

Economic Development Analysis Factors

Site location consultants, corporate real estate executives and design-led architecture and engineering firms are playing a significant role in the decisions made by companies wishing to locate on airport properties or in adjacent airport commercial/industrial parks. For instance, the largest competitive project in the US in 2014, Northrop Grumman's expansion

- *All four states are Right to Work states*
- *Similar populations with the exception of Phoenix being double of comparison markets*
- *Median Household Income ranges from \$49k to \$54k with Charlotte and Orlando at the low end and Las Vegas leading.*

at Melbourne International Airport in Melbourne, FL was led by the site location firm of McCallum-Sweeney Consulting. When Honda Jet expanded from aircraft design to manufacturing they engaged the site location consulting firm of McGuire Woods

Consulting. As a third example, when Boeing decided to conduct a search for the 777x program they chose their long time trusted partnerships with architects-engineering firms to lead their search.

Site Selectors

Annually, Area Development Magazine surveys corporate real estate executives and site selection consultants to rank the decision factors in a company's expansion or relocation. The most recent survey was released in January 2014 (ADM, 2014).

Availability of Skilled Labor is the #1 decision factor, up from number 3 a year ago and replacing Labor Costs, followed by:

#2. Highway Accessibility

#3. Labor Costs

#4 Occupancy or Construction Costs

#5 Accessibility of enhanced ICT

Telecommunications Infrastructure

Leveraging the available skilled workforce of a large metropolitan area is a plus for airport development. Labor force analysis coupled with

existing industry inventory and infrastructure asset inventory are required inputs to a community's economic development strategy. It helps define and direct the workforce training options as well as the types of industries that the community will target for business attraction. This in turn will contribute to future land use planning – percentages of industrial (warehousing, distribution, manufacturing), high-tech (R&D, simulation &

Raleigh stands out in skilled labor force with 41.7% having a bachelor's degree or higher:

Orlando – 27.6%

Charlotte – 30.1%

Las Vegas – 22.1%

Phoenix – 28.5%

Orlando (MCO) – 35.5M / 334.3M

Charlotte (CLT) – 40.1M / 217.6M

Las Vegas (LAS) – 39.7M / 204M

Phoenix (PHX) – 39.1M / 513.9M

Raleigh (RDU) – 8.9M / 159.4M

Raleigh is statistical outlier in annual passenger count and air cargo non-mail freight (lbs):

modeling, data centers), and commercial (back office, corporate headquarters, financial services, professional services) and amenities (retail, fuel service, public transportation).

This data is readily available to airports through a close working relationship with the regional economic development organization.

Here is how the survey addresses several additional airport development factors:

Air service and Catchment

Accessibility to a major airport is #21 in the survey with inbound/outbound shipping costs ranked at #18.

Urban Centrality and Quality of Life

Proximity to a major urban market ranks #15, while low crime rate and healthcare top the Quality of Life factors. In contrast, cultural offerings are the lowest quality of life factor receiving a response of Very Important or Important behind housing, education, recreation and climate. Airports serve passengers and seek a quality experience for their customers. The top ranked quality of life factors in site selection in order of importance are as follows:

- Crime rate
- Access to healthcare
- Affordable housing
- Education including colleges and universities in the area
- Recreation, climate, and cultural offerings

- *Skilled labor force is the number one ranked location decision factor for expanding and relocating companies.*
- *High taxes are the number one ranked reason for companies considering relocation to a new market.*

These factors pertain to airports in the sense of developing an airport city. Public transit should be added to this list to enhance the airport's ability to complement, not compete with, the urban core on quality of life factors.

Market Acceleration, Speed to Market, or Time is Currency

Most relocation decisions are made within 3 to 12 months of initial contact with a prospective site. The majority of the search is done online through available buildings and sites databases representative of the target market or territory. Approximately 40% of companies use an outside consultant to assist in the decision making process. The services requested include location studies, comparative analyses, incentives negotiation, real estate transactions and construction management. These consultants will make first contact with either the state economic development agency or the lead agency in the market of interest. Therefore, it is essential for the airport to have a close working relationship with the economic development project managers and to have their available sites in a shovel-ready state (ADM, 2014).

Companies are increasingly risk averse, particularly as it relates to supplier-to-market connections. Site location decision-making durations continue to compress, as indicated by a 9 percent increase over 2012 in the number of respondents who reached a decision within 3 to 6 months. Sixty-one percent of survey respondents list shovel-ready/pre-certified sites as very or somewhat important with an increasing amount of respondents listing available buildings as very important. (ADM, 2014)

Site Certification

Site certification, which is a third party assessment that a site is truly shovel ready, is an increasingly important trend in economic development because it means the company can eliminate considerable risk to the timing of the project. This process requires planning, engineering, time and money and signifies that an airport is ready to do business. For the community and the airport it means their available property will be at the top of a prospect's list for consideration. Many infrastructure intensive projects,

such as those with manufacturing, warehousing, and multi-modal distribution requirements, will only consider certified industrial mega-sites or parks. Elements of a shovel-ready or certified site include that a property is under control of a city, county, airport authority or an economic development corporation and the sale or leases terms are defined. Most state infrastructure funds can only be applied to property that is publicly controlled. In the case of privately owned land, option agreements can be executed.

Airports with FAA land grants will need to factor in fair market value for real estate. Utilities (electric, natural gas, water, wastewater, and telecommunications) must be in place or designed and engineered with accurate costs and timeframe necessary to extend to the location at the capacity required by the prospect. Land use and zoning should be appropriate having updated the comprehensive plan and related development codes. Permitting should be in place to include wetlands delineation, phase 1 and 2 environmental studies, geotechnical studies and mitigation plans as determined by the studies should be completed. With regards to airports, the authorities or governing entity should also have in place building size and height restrictions per FAA guidelines. Major and minor arterial highway access should be defined and engineered to the extent possible. Additionally, proximity to rail and seaports should be documented. If rail is adjacent to the airport property, then sidings and turnouts need to be designed showing options for prospects.

Example EDC efforts from competition

Charlotte-Douglas (CLT)

In partnership with Norfolk Southern, Charlotte Douglas International is completing a new 200 acre intermodal logistics terminal located along the southern end of CLT's

center parallel runway and 40 feet beneath two taxiway bridges. The facility is expected to generate \$7.6 billion in regional economic development throughout the next 20 years. 20,000 jobs are expected to be created in the region by 2030. This project will create a hub that links air, rail, and trucks to east coast seaports. There has also been speculation about a large amount of land that could be developed west of the airport for mixed-use purposes.

Phoenix-Sky Harbor (PHX)

The Greater Phoenix Economic Council has developed a mega-sites marketing campaign centered around both airports. The marketing clearly shows the possibilities and benefits to locating businesses in the Greater Phoenix region. The airports benefit tremendously by being a component in the overall economic development plan of the region.

Raleigh-Durham (RDU)

To meet the air transportation needs of the growing, vibrant Research Triangle Region, Raleigh-Durham International Airport is studying the airport's 5,000 acres to identify future uses. Some uses identified were warehouse facilities to support cargo operations, multi-family residential, open space for parks, and a consolidated rental car facility.

CHAPTER 3 METHODOLOGY

Case Study Work Flow

The intention of the case study approach and the competitive benchmarking is to establish a set of key variables and values by which to categorically measure and rank airports amongst other airport city competitors. Benchmarking the competitiveness of five U.S. based airports and their related markets will serve to develop a baseline for comparison for airport land development efforts. The approach includes basic air service factors with an emphasis on the airport as an attractant for business and industry, jobs and capital investment. This benchmarking process is shown below in Figure 3-1.

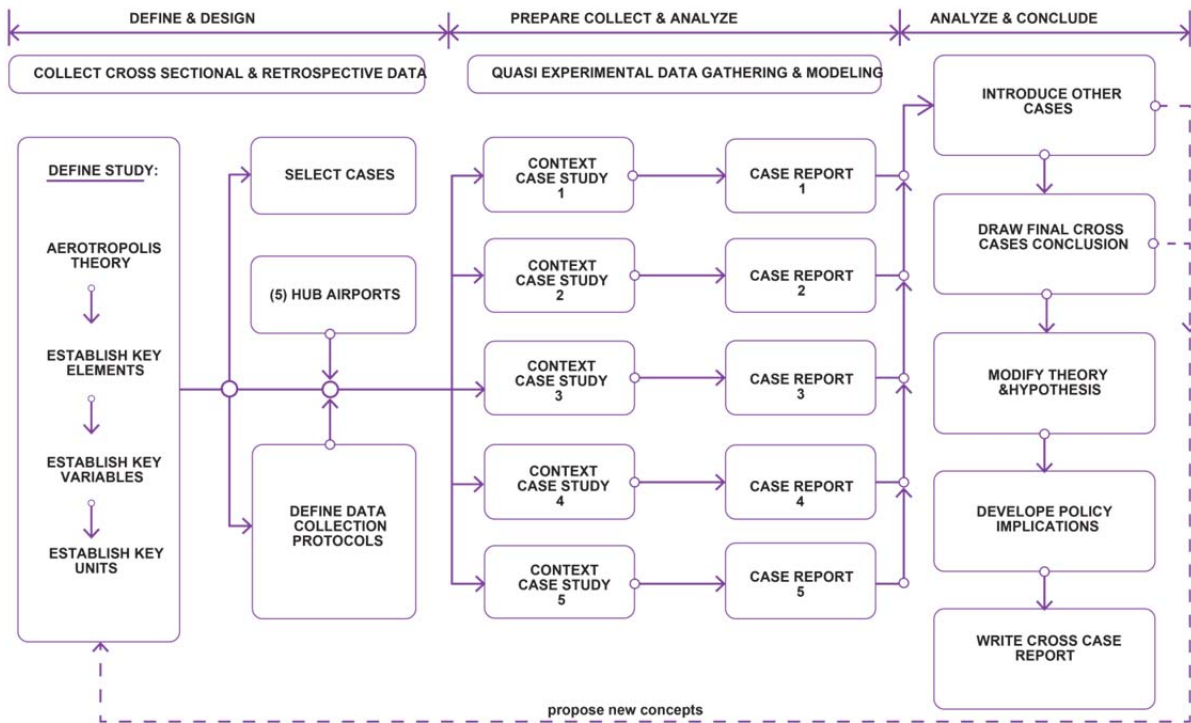


Figure 3-1: Proposed Research Methodology and Flow. (Fernandez, 2014)

Expected Outcomes

The expected outcomes of the research are first, to gather information from airports as it relates to the commercialization of airport property. This is to inform and assist in the properly framing an objective understanding that informs the Airport City Comparative Matrix. Second, is to show that the simple valuation models for calculating land values and rents become more complex as land use restrictions and other development restrictions are imposed. The research shows how these governmental restrictions are often a hindrance to the competitive pricing of airport property and often gives the advantage to adjacent off airport property. Some airport management structure are underfunded or parochial in nature and often do not have the resources or organization to take advantage of the tools at their disposal. The third outcome is to show that successful development on and around airport property does not always follow the traditional urban economic commercial market model and should look to alternative approaches to economic development.

Simple land use and comprehensive planning approaches that might apply to urban centers and cites for organization and prioritization of infrastructure funding are not always the most effective method of promoting airport development. Airport real estate managers need to truly be innovative in the promotion of their property. Some of these methods such as Foreign Trade Zone initiatives are established already in use the airports that were studied. In some cases airport property managers are taking advantage of these tools that are supported by the FAA as well as other federal, state and local agencies.

CHAPTER 4
RESULTS
Orlando International (MCO)

Orlando International Airport (MCO) is located in the 3rd largest state in the nation and serves the number one tourism and modeling, simulation & training (MS&T) industries in the world. The airport is adjacent to a new mixed use development punctuated by the medical research and professional services sector. One county to the south will soon be home to the first-of-its-kind Florida Advanced Manufacturing Research Center through a UCF and Osceola County partnership. It is the catalyst for a UCF bid for \$200 million in federal and private funds to house a national Integrated Photonics Manufacturing Institute for Manufacturing Innovation. With the addition of All Aboard Florida and Sunrail intermodal hubs, MCO is integral to the leading US Quinta-modal region (air, highway, sea, rail, and space).

MCO is the fourteenth ranked air service airport in the country and has the fourth largest land holding of any airport in the United States (FAA, 2015) as shown in Figure 4-1 below.

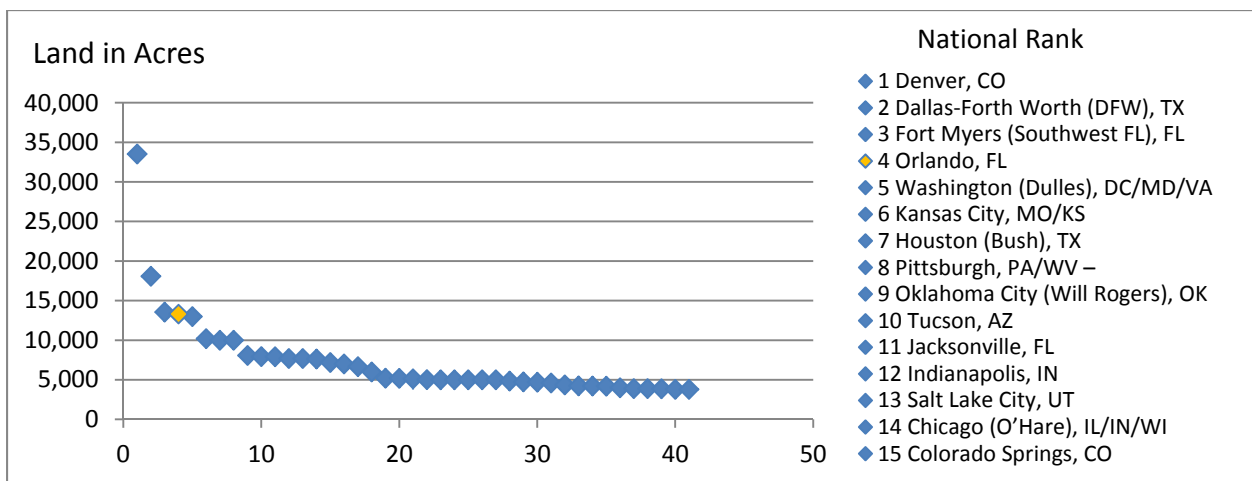


Figure 4-1: Ranking of top U.S. airports by landholdings. (Chart by Author, 2016 from 2013 FAA Data)

Orlando International Airport excels at several areas from the Research matrix. One area is non-aeronautical revenue. Non-aeronautical revenue generated is going to be an important indicator moving forward for the successful implementation of the aerotropolis concept. Figure 4-2 below shows that Orlando International Airport is doing well in comparison to its regional and even national competitors. MCO is a leader in generating non-aeronautical revenue at 67% of its revenue generated from non-aeronautical sources. The average large-hub airport only generates 43% of its revenue through non-aeronautical sources.

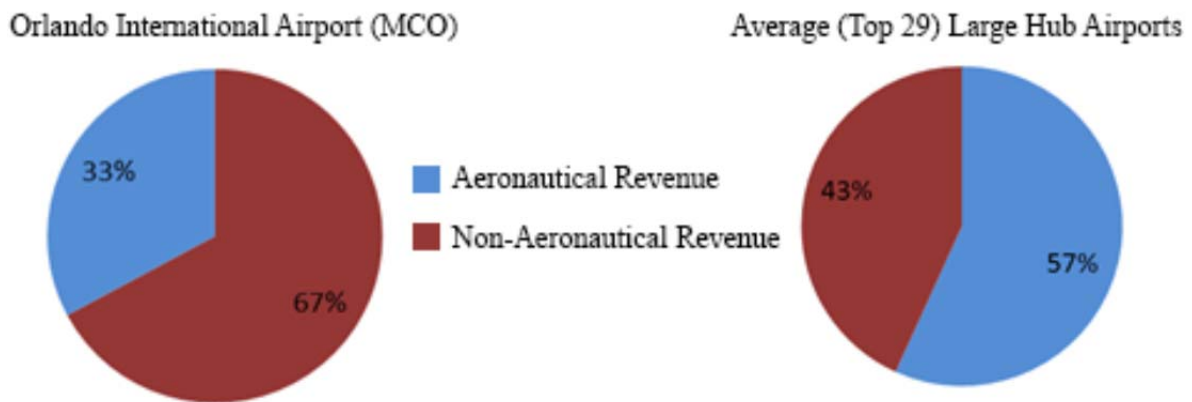


Figure 4-2: OIA Aeronautical v. Non-Aeronautical Revenues. 2014

MCO Airport Catchment

Airport catchment is also another strong indicator of a desirable business site location. Orlando has the largest airport catchment in Florida, with an estimated 13 Million residents in its catchment area which is over half of the population of the State of Florida. There are no other airports in the state the draw a significant number of passengers from MCO's primary market. In fact, MCO draws many passengers from outside of Orange County, including Seminole and Brevard Counties, who both have commercial airport alternatives. Out of all the passengers that depart from MCO, 12.9%

come from Seminole County, 11.2% come from Brevard County, and 7.1% come from Volusia County. That is 31.2 % of all passengers departing from MCO that come from those three counties alone. All of these numbers indicate that the growth potential of the airport and the region around the airport is very high.

Revenue Generation

Orlando international airport is host to the largest rental car market in the country. Rental Car revenues are 19% of the airports revenue. Airport concessions account for 10% of revenues at MCO as shown in Figure 4-3 below. Orlando Currently uses a portion of its undeveloped land for overflow lots in lease structure to the rental car companies.

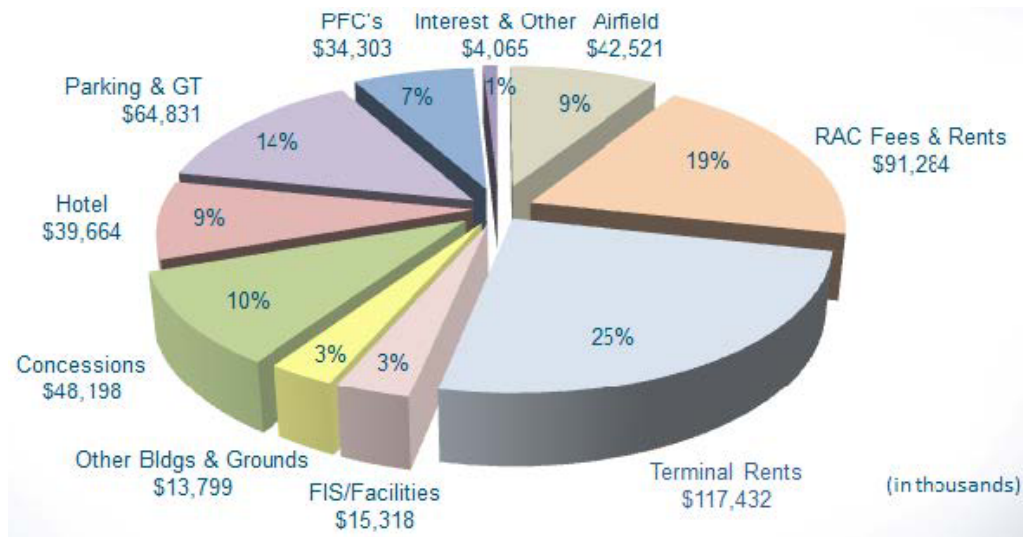


Figure 4-3: Orlando International Airport, Budgeted Revenues in Thousands. (GOAA, FY 2015)

Aerotropolis Status

Figure 4-4 below shows the relationship of Orlando International Airport to major component destinations and development. Area attractions and convention business serve as a major economic driver for the region and the airport. The airport is

surrounded by abundant aviation support and airport industrial development. Currently 62 million patrons visit Orlando annually.

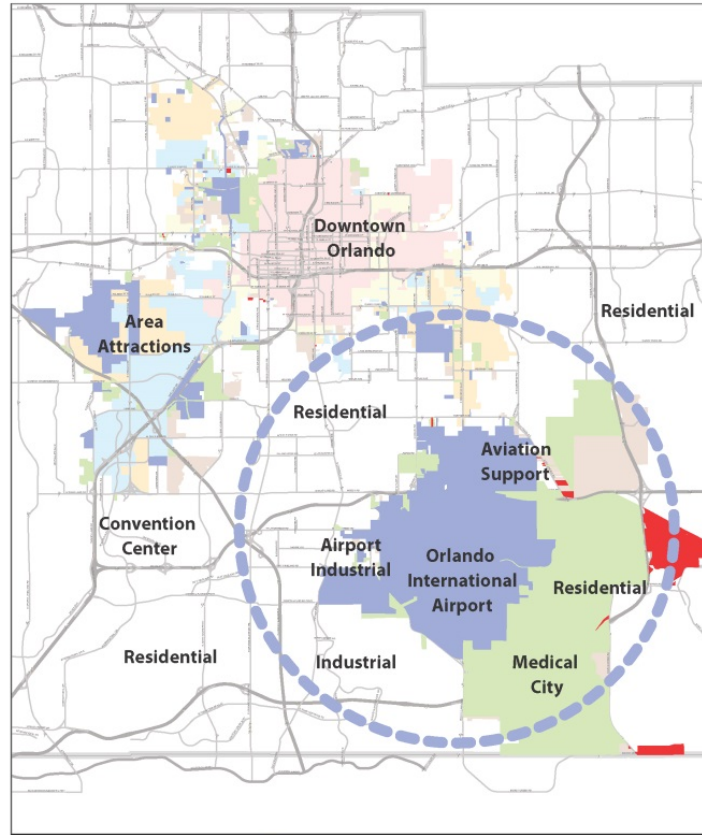


Figure 4-4: Orlando International Airport as an Emerging Airport City. (By Author, 2015)

Regional Partnerships

Recent success in development of the medical city has served to attract an agglomeration of medical research facilities and will facilitate continued growth in the southeast sector of Orlando, the immediate neighborhood of MCO. The University Of Central Florida (UCF) has partnered with Osceola County to establish a high-tech manufacturing research campus south of the airport. This economic development effort will also serve to stimulate growth in high tech manufacturing in the region. It is important to note that this development has occurred on airport adjacent property and not on airport property. It is the intent of this research to define some of the current

conditions that have served to minimize commercialization efforts at Orlando International Airport in order to promote site readiness preparedness.

In addition to self-promotion by each airport, within the study geographical area there are four (4) regional economic development marketing organizations that promote the competitive assets of Central Florida and encourage public-private initiatives and campaigns to position the Central Florida Super-Region as an attractive location for business and industry. The targeted sectors for new and expanding business are similar across each organization including, but not limited to, modeling, simulation & training (MS&T), advanced manufacturing, international trade, aviation/aerospace/defense, life sciences/medical technologies, optics & photonics, sustainable energy, financial services (SBI, 2013).

Regional Competitiveness

Benchmarking- Case Studies – (SBF, MLB, ISM, TPA)

This regional benchmarking case study looks at commercial land development approaches and opportunities among five Central Florida region airports. The study emphasizes available commercial and industrial land development at or near each airport. The study acknowledges the use of Foreign Trade Zones as afforded by each airports designation. Engaging and leveraging regional economic development partners and initiatives is important to best position airport land and to attract commercial and industrial opportunities. The airports analyzed in this benchmark study pertain to what can be considered a larger super region in planning. The airports chosen represent District 5 of the Florida Department of Transportation (FDOT). The following Map shown as Figure 3-11 shows the FDOT District 5 related counties geographically as they are located within the state. All of the airports with the exception of ISM offer international

and domestic commercial flights and FTZ services.

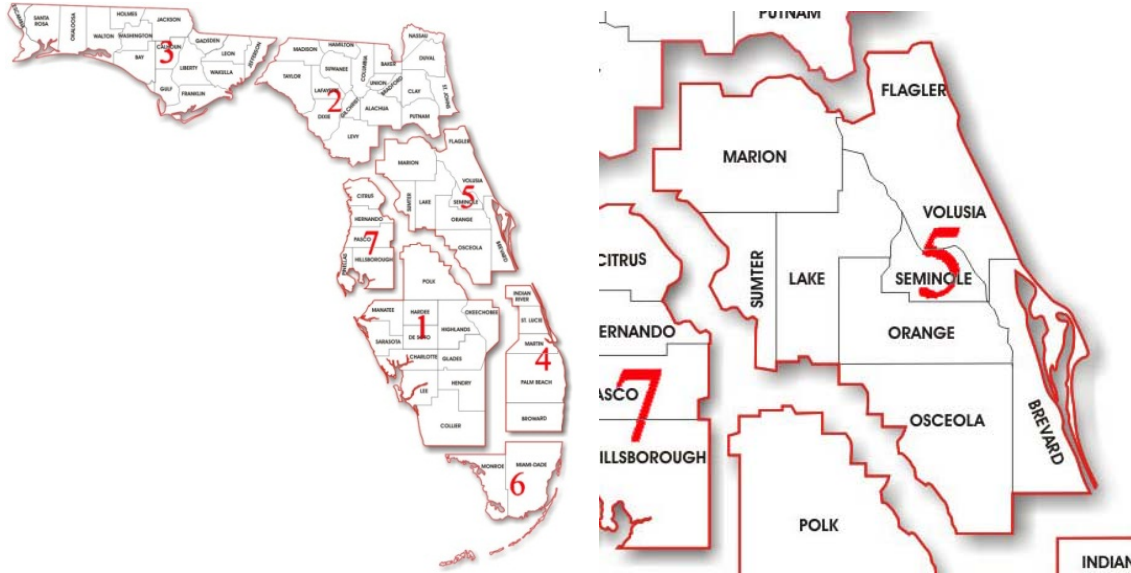


Figure 4-5: Showing Florida FDOT Districts. (FDOT, 2016)

The Competitive Benchmarking Approach

Regional Competitors (TPA, SFB, MLB, ISM)

The national benchmarking and comparative analysis identified an area of airport city planning that combines issues of policy and tax incentives with location and regional preference. This is the ability for airports to leverage property as a Foreign Trade Zone. The national benchmarking effort showed that leveraging the FTZ designation had an effect on business retention. Benchmarking on the regional level served to realign the comparative analysis to include an overlay of policy taking advantage of the FTZ designation. The remainder of this analysis looks at commercial land development approaches and opportunities among five regional airports in proximity to Orlando International Airport. The report emphasizes available commercial and industrial land development at or near the airport, the use of Foreign Trade Zones, and leveraging regional economic development partners and initiatives to best position airport land to

attract commercial and industrial opportunities. Although ISM has the ability to leverage MCO's FTZ # 36 designation, all of the airports with the exception of ISM offer international and domestic commercial flights and FTZ services.

Airport management structures and use of Foreign Trade Zone (FTZ)

Orlando International Airport (MCO)

Orlando International and Executive Airports are managed by the Greater Orlando Aviation Authority, which is governed by a seven-member board; the mayor of the City of Orlando, the Chairman of the Board of County Commissioners, and five other members who are appointed by the Governor of the State of Florida, subject to confirmation by the senate.

Orlando International Airport is home to FTZ #42 as described in detail in the attached spreadsheet. The FTZ is promoted through the airport website. The total acreage of FTZ #42 is 195.82 acres.

Tampa International Airport (TPA)

Tampa International Airport is a public airport six miles west of Downtown Tampa, in Hillsborough County, Florida, United States. This airport is publicly owned by Hillsborough County Aviation Authority. The Aviation Authority is governed by a five-member Board of Directors. Three members are residents of Hillsborough County appointed by the Governor of the State of Florida for four-year terms. The Mayor of the City of Tampa and a board member of the County Commissioners of Hillsborough County serve ex officio on the board. The gubernatorial appointments occur at two-year intervals, and at these times the Board reorganizes itself, electing officers for the ensuing two years.

Tampa is home to FTZ #79 as described in detail in the attached spreadsheet. The FTZ is promoted through a website specifically dedicated to the FTZ. The website includes an interactive map, through which users can view current properties and available properties. FTZ #79 includes all of Hillsborough and Polk counties through use of Alternative Site Framework (ASF). Tampa will host the NAFTZ's Spring Seminar on May 17-19, 2015. Total acreage of FTZ #79 (not included ASF) is 1191.60 acres.

Central Florida FTZ size in acres:
Orlando (MCO) FTZ #42- 195.82
Tampa (TPA) FTZ #79- 1,191 + ASF in all of Hillsborough & Polk counties
Sanford (SFB) FTZ #250- 1,800 out of 2,445 total
Melbourne (MLB) FTZ #136- 1,820 out of 4,129 total

Orlando Sanford International Airport (SFB)

SFB is managed by the Sanford Airport Authority which is comprised of nine members appointed by the Sanford City Commission. The Authority elects its own chairman, vice chairman, and treasurer. The airport is operated by the authority appointed President/CEO who in turn has a staff of 50 full-time employees.

SFB is operated through a public/private partnership between the Sanford Airport Authority and Airports Worldwide. Airports Worldwide has been contracted by the Sanford Airport Authority to manage both the international and domestic terminals, develop additional air service, and provide ground handling and cargo services.

Sanford Airport Authority is the grantee of FTZ #250, a 2445 acre zone of which 1800 acres is Orlando Sanford International Airport/Airport Commerce Park, as described in detail in the attached spreadsheet. The FTZ is promoted through Seminole County's website in the form of PDF marketing collateral.

Melbourne International Airport (MLB)

The Melbourne Airport Authority was established by ordinance on May 2, 1967, to plan, operate, maintain and develop what would later become Melbourne International Airport. The authority is charged with the airport's fiduciary and oversight responsibilities. Its seven-member board is appointed, and each board member serves a two-year term. Terms are staggered and representation is intended to reflect a variety of interests served by the airport. Three of the board members are appointed from the Melbourne City Council. The city's Chamber of Commerce and tenants of the Airport Industrial Park appoint one member each. Two members are selected by the remainder of the board. The full board selects a chairman each year at its December meeting. MLB is managed by an Executive Director and support staff. 1820 acres of MLB is a site within FTZ #136 (4129 total acres) managed by Port Canaveral as described in detail in the attached spreadsheet. Concept of a FTZ is explained on the Melbourne airport website along with marketing and information about business opportunities within the FTZ.

Kissimmee Gateway Airport (ISM)

ISM is a municipal airport with a Director of Aviation that reports to the City Manager of Kissimmee. ISM has an Airport Advisory Board made up of five volunteers.

There is no FTZ associated with ISM.

ANALYSIS AND FINDINGS

With the understanding that the basic principles of surplus, geography, and access apply to airport cities as they do to their counterpart the urban center or city, we can comparatively performed our analysis of these benchmark airports. The surplus achieved by these airports is understood as being the direct relationship to the airline service to catchment population. The geography is directly related to airport catchment area and the geographical region. Access to the airport is a multimodal enterprise in our contemporary market of air, sea, land, and rail, are all the systems of transportation access necessary to achieve a successful system of delivery of airport city firms and patrons. In Central Florida a fifth consideration, the 'quinta-modal' element, access to space can be considered in the dialog of transportation readiness.

The airports were compared and contrasted in accordance to the research plan and the key factors the serve to describe the airport city; airport catchment, airport city progress, and site selection and preparedness. Infrastructure in relation to these subject airports is considered reasonable as the U.S. system of interstate roads is as expansive and interconnected in each of the regions that these airports are located in geographically. All airports that were chosen for the national benchmarking serve significant populations (more). The Central Florida region as a whole is an established and significant population that continues to grow (more). Orlando's transient population is significant as well. Orlando host's 57 million patrons to the region and considers itself the premier intermodal gateway to the Central Florida Region in service to the world.

Cargo Operations

Delivery of goods and services is a factor as airport cities grow. We see by the Figure 4-6 below the Orlando ranks four in our mix of subject airports. Miami

International Airport is one of our nation's larger cargo airports bringing in 7,630,761,702 lbs. (3815380.851 tons) annually. It is anticipated that Orlando will remain a secondary cargo airport in rank to MIA in Florida over the next century.

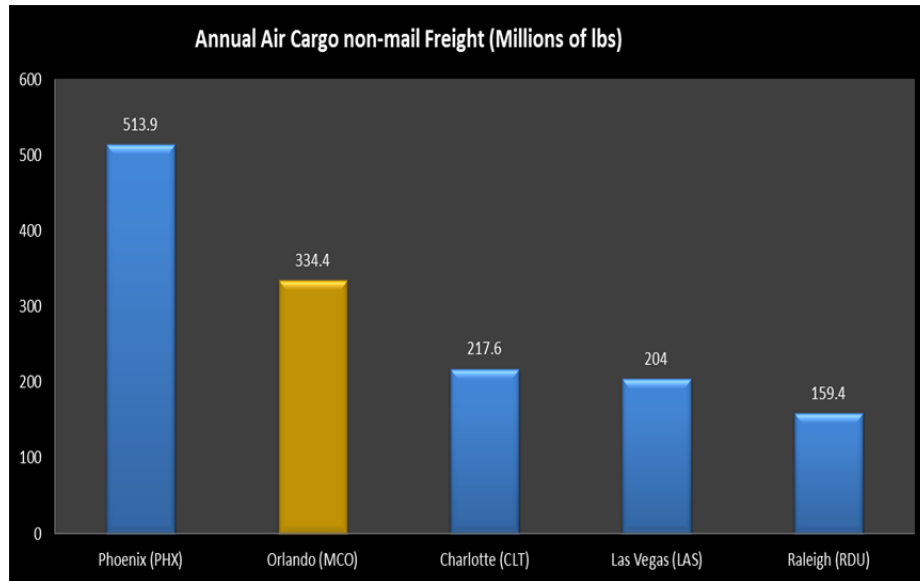


Figure 4-6: Comparing Cargo Freight. (By Author from FAA Data, 2013)

Available Property

Available Property is a key indicator in our matrix as to the potential for growth and development of an airport. As shown in Figure 4-7 below, Orlando ranks number one above Charlotte-Mecklenburg and Raleigh Durham Airports in our comparative benchmarking. Ultimately, the amount of available property for development is the resultant of total acreage minus the necessary acreage to maintain airfield operations. Orlando has 8,000 acres of developable property. Policy restricting the use of property at MCO will also limit some of this available land. Available infrastructure and access to major roadways will affect the viability of the land for development in the current market. Commercial values are a reflection of multiple factors that range from access to airfield to the number of rooftops within a radial proximity to the subject property. Another factor

is pad readiness and the cost of bringing the necessary infrastructure to the site.

Available property does not always mean the developer will yield a reasonable return on investment.

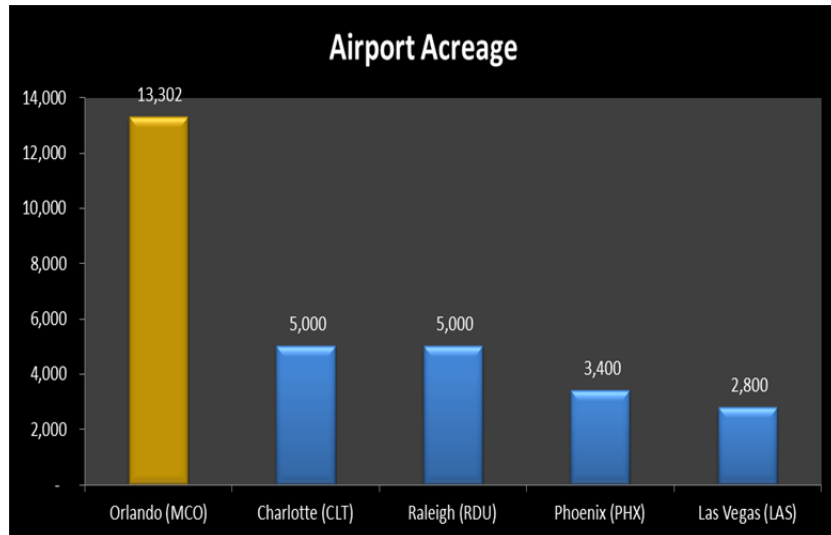


Figure 4-7: Comparing Airport Acreage. (By Author from FAA Data, 2013)

Leveraging Policy

Leveraging policy to land as assets at airports allows for tax incentives and regulation to promote the development of land at airports. This is especially true in consideration of foreign direct investment. The success of this policy at airports also relies in the ability and will of airports to enact and promote the tools available in order to incentivize the economic development effort. Foreign trade zones (FTZ) are example of advantages for airports (and seaports) as they serve to attract foreign investment that is seeking tax or tariff free advantages. Figure 4-8 below explains the basic flow of the FTZ advantage to companies.

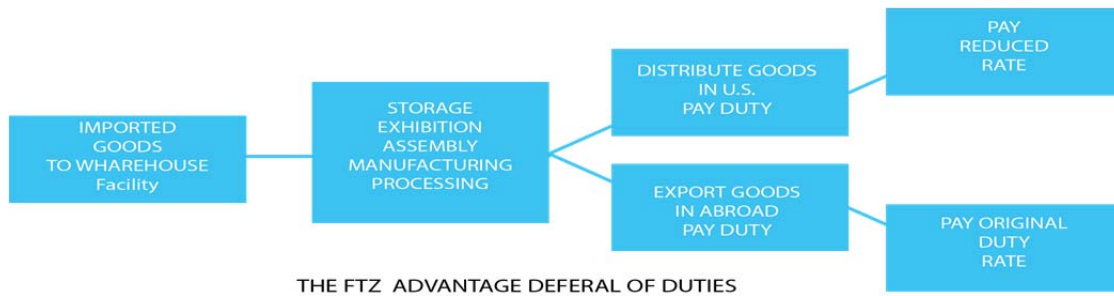


Figure 4-8: How a Foreign Trade Zone Works, (By Author, 2016)

The Foreign Trade Zone

There are several metric factors result from FTZ activity and the implementation of these zones. The measurable components are total acreage, active acreage, employment, merchandise received, and merchandise exported. The following Figures 4-9 and 4-10 below serve to benchmark all subject airports that were identified in this research in comparison to Orlando International Airport with regard to the FTZ metrics. In contrast to Orlando International Airport (MCO), Charlotte-Douglas International Airport (CLT), and Melbourne International Airport (MLB) have leveraged their entire airport boundary as a foreign trade zone. Raleigh-Durham like Orlando, only considers a portion of the airport a foreign trade zone.

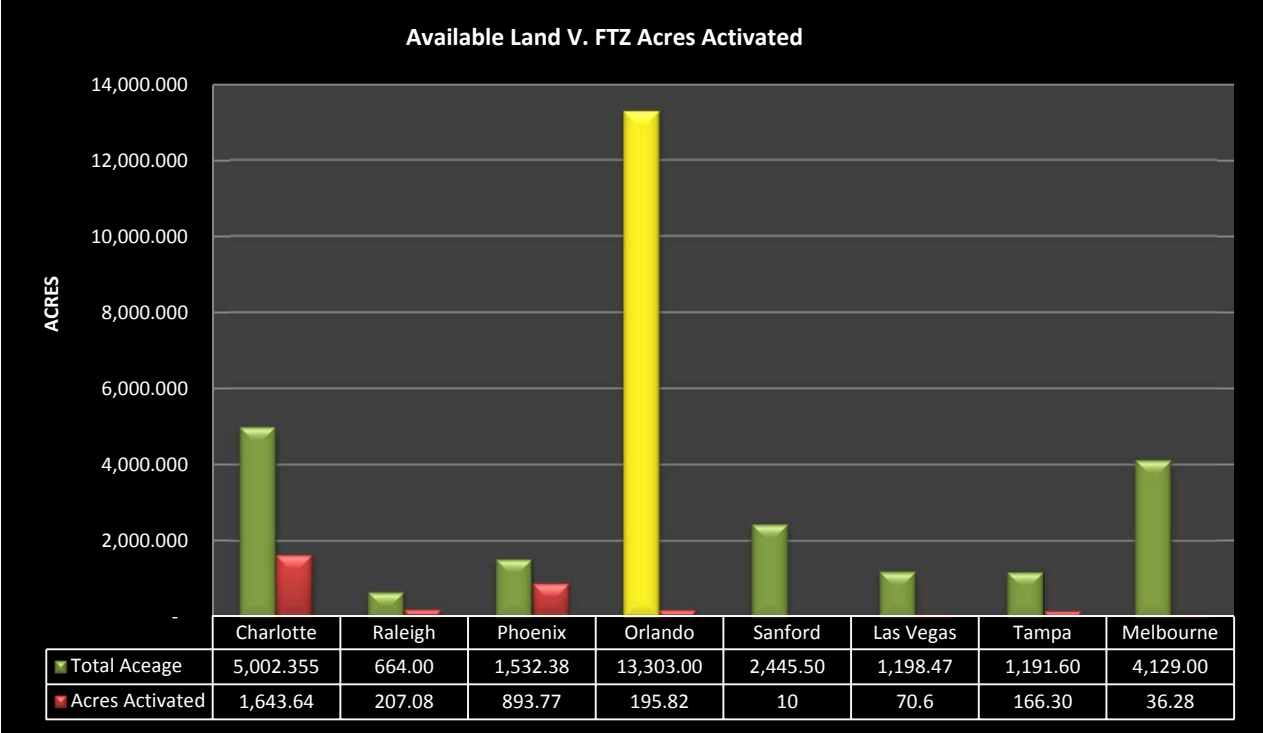


Figure 4-9: Comparing Available Property. (By Author from FAA Data, 2013)

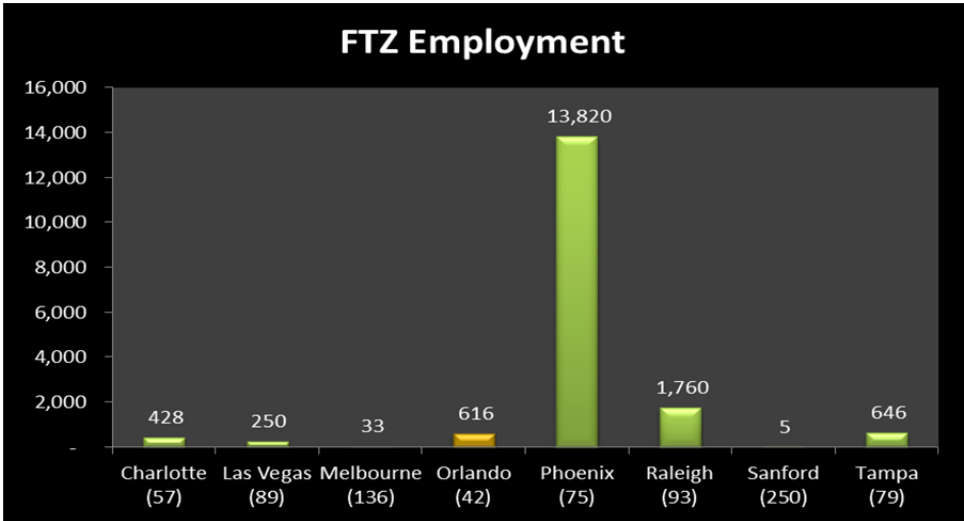


Figure 4-10: Comparing Available Property. (By Author from FAA Data 2013)

Phoenix only uses about half of the airport as their FTZ and manages to create 13,820 jobs within this zone. Second to Phoenix is Raleigh with 1,760 and then Tampa with 646 and Orlando with 616. Job creation is an economic goal of the Airport City.

Airports have realized that it is important to be a catalyst in job creation rather

than become landlords for simple rental revenue generation. Figures 4-11 and 4-12 below serve to compare imports and exports between the subject cities of this comparison. Melbourne International Airport is an example of this approach. Although Melbourne has the ability to activate FTZ # 136 at Port Canaveral, they continue to manage this on a case by case basis. Efforts at MLB however over the past decade have been successful in bringing in sizeable economic development efforts. Over the past decade MLB has become home to the Embraer Aircraft Manufacturing and delivery center, The Northrop Grumman Center for excellence, and the Harris Corporation amongst other tenants. These efforts were successful regardless of the activation of the FTZ.

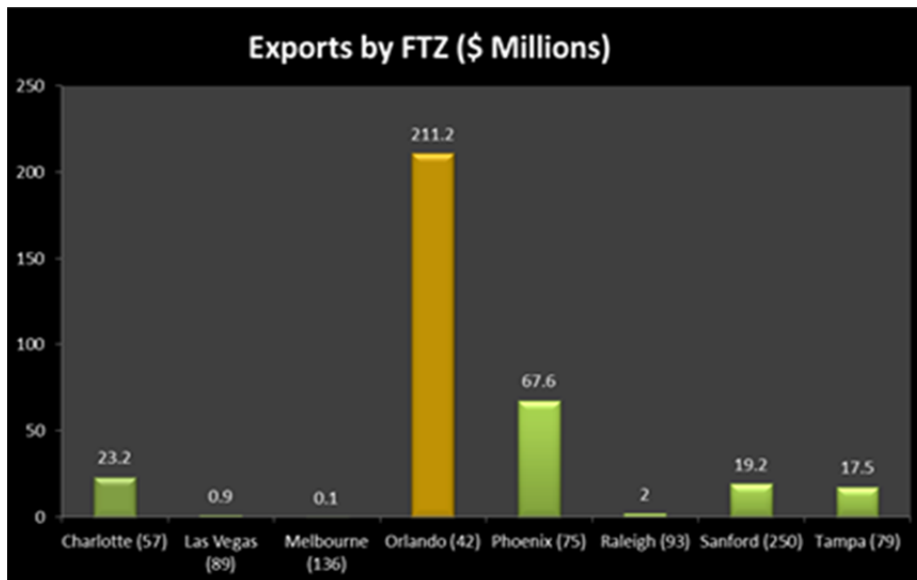


Figure 4-11: Comparing FTZ Exports. (By Author from FAA Data 2013)

What served to ensure the success of these economic development efforts was a close relationship with the EDO structure and the ability to incentivize the effort. Evidence of a skilled workforce, and that there were trained subject matter experts in the region to ensure a successful speed to market approach to the projects was a significant

decision-making factor for executives.

Tax Incentives

States offer tax incentives to assist in bringing the economic development effort to a region. Exemptions are often applicable towards sales tax and use tax on utilities in a region over a period of time. Some states offer manufacturing equipment and machinery tax credits. Some offer partial salary for labor components in order to ensure that higher wage jobs are available. Some airports offer airline incentives over the first years of operation at the subject airport in the form of facility fee and landing fee credits. In some cases airports that cannot do fee simple transactions and cannot compete for market true value will assist the development of the project and or will offer lease rebates of a percentage back to the tenant. States that can remain flexible and competitive in regards to the venture structure have a better chance of landing the economic development effort.

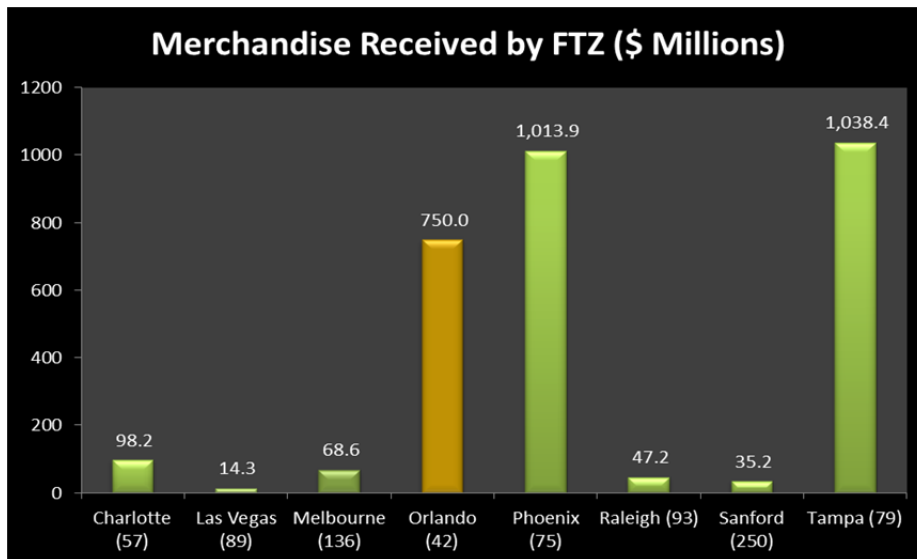


Figure 4-12 Comparing Available Property. (By Author from FAA Data 2013)

Airport City Indicators

For the purposes of our research matrix and in keeping with the intent to categorically ranking airports according to individual airport city progress, we will begin to compose a metric tool that incorporates the key variables and indicators that have been identified as part of this study. The purpose of this study is to objectively categorize and rank these key indicators in order to comparatively rank each airport in kind. Kasarda's method was primarily focused on whether each airport had the recommended planning and infrastructure components in place to be subjectively considered an airport city or aerotropolis. We move in this analysis toward setting up a system or method of categorically ranking each component as well as others discovered by the research that can offer a more strategic system of ranking that can better inform future economic development efforts at and around airport cities. Ideally, the airport city that best performs in analysis by our research matrix can be considered more advanced in its progress.

CHAPTER 5 DISCUSSIONS

The past decade was marked with a downturn in national economic growth. Despite this era of economic setback on a national stage, the South Eastern region of the United States has seen a significant period of growth and economic development. More specifically, the Central Florida region and the Space Coast of Florida continued to welcome larger economic development efforts over the past five years. Melbourne International Airport, which is situated in the Space Coast region, has benefited directly from this activity. The U.S. Government unfunded the Shuttle Constellation Program in 2008. This left a large highly skilled work force in peril. The Space coast community made a concerted effort to retain jobs and attract businesses to the region. The local EDO structure aligned itself successfully with state agencies to attract aerospace, higher wage, and highly skilled technical and manufacturing jobs.

Orlando International Airport in contrast, served to attract the Jet Blue and Flight Safety training facilities that are geared toward the airline and airline work force training. Orlando has a large tourist market. Non-aeronautical revenues for Orlando are primarily travel and tourism based. The rental car market accounts for a significant amount of revenue generation at Orlando International Airport.

The last decade of economic development in Central Florida shows that, although airports may have a significant catchment in service to airlines, commercial passenger catchment is not the only success of the airport city. There may be a significant mix of domestic to international carriers at an airport but this alone does not serve to establish the aerotropolis. Available land for expansion or the lack of might be in difference to this success in the generation of non-aeronautical revenues as well.

Restrictions on land development by policy may affect the type of development at airports and the ultimate success of an airport city. Site selection and preparedness, a trained workforce and an active relationship with the local EDO has been shown to foster economic growth in a down economy. These site selection factors are addressed in more detail throughout this research in order to examine more closely this success in Central Florida economic growth.

Orlando International Airport has served to facilitate effective land use and planning methodologies throughout its major periods of growth. The City of Orlando, Orange County, the regions planning organizations, economic development councils, public officials, and community leaders have served to promote responsible growth while advancing economic development in the region over the last century of its evolution. Today Orlando is a thriving metropolis that continues to advance itself along three major economic foundations, the travel and tourism industry, the aerospace and high-technology industry, and lastly the research and education industry. It is important to note that although the airport was not the sole driver of advancement in transportation and industry, Orlando International Airport has served as a proactive mission partner to development in the region. This symbiotic relationship between the Airport and the city that it serves has been present since its inception as an army air base in the mid 1940's as well as after its conversion to an international airport in 1972.

Moving forward GOAA has the opportunity to craft and hone a strategic commercial land development message of economic opportunity through the development of a strategic outlook and associated marketing collateral. The application of the competitive benchmarking matrix as defined by this research can serve the

airport as it moves to align itself with other airports both nationally and in the region. A three-pronged approach will serve this airport and other airports as they move toward airport city progress. First, airports should continue to perform traditional planning and inventories in order to identify what the need for capitalization of property will be. Second, commercial property managers can better serve themselves to understand the true market value of on airport property as restrictions and regulations serve to restrict development. Lastly, airports need to move towards site readiness and work with local EDO structures to promote and properly market their benefits.

Recommendations

It may benefit these airports to perform an internal SWOT analysis along the following topics and establish strategic areas of development, goals, and objectives as they grow into aerotropolises. Airports such as MCO should consider the Formation of an Aerotropolis Alliance or Stakeholders Group. This will assist the airports in leveraging business and economic development organizations and take advantage of the outreach capabilities. Orlando is currently under promoting the use of its foreign trade zone. It should consider expansion of foreign trade zone as well as consideration of promoting the alternative sites framework capabilities. The airport should establish standards of site readiness as defined by site location consultants. An effort to rebrand develop marketing collateral and target specific market sectors on economic development efforts.

Airport City Progress Index

Figure 5-1 below demonstrates a tool that can serve to provide a comparative understanding of three key airports presented in this benchmarking research for analysis. All three airports had significant growth in revenues, as well as, the necessary agglomeration of firms that has served to promote airport city progress over the past decade.

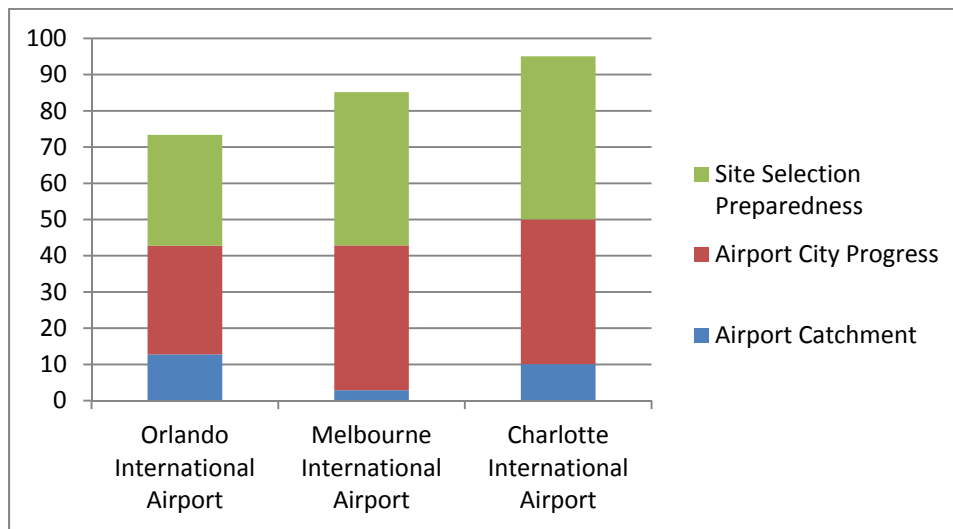


Figure 5-1: Hypothetical Airport City Progress Index (By Author, 2015)

Orlando excels in Airport Catchment followed by Charlotte's recent growth. Melbourne has lost its catchment to Orlando over the past years. Melbourne has excelled in Land development and Firm Diversification over the past decade. Orlando has focused on aviation related development with Jet Blue and Flight Safety as anchor tenants. Charlotte excels in the agglomeration of firms that are occupying their facility.

Developing an Airport City Index which combines analysis and factoring of both quantitative data and qualitative data as compiled and analyzed in this research may be an effective method for airports to categorically assess their progress towards becoming an airport neighborhood, town, city or aerotropolis.

CHAPTER 6 CONCLUSIONS

The study seeks to understand and differentiate between traditional airport planning and the proposed future of aerotropolis planning which is a contemporary concept that is gaining validity. Contemporary airports are embracing economic development and serving to attract firms to regions and the cities they represent. In the traditional model, airports are part of a broader national system. Prioritization of funding by the traditional FAA serves to ameliorate anticipated congestion in service to customers. This favors the Core 30 and larger hub airports as it focuses on aeronautical revenue. Other hub airports, that do not have a large catchment and are not geographically capable of attracting a major cargo operation, will have to focus on non-aeronautical revenues for sustainability.

The study focused on Orlando International Airport (MCO) as a case study large hub origination and destination airport. Origination and Destination airports have the ability to generate revenues from alternative sources other than traditional enplanement or cargo revenues. Orlando has the luxury of servicing a larger travel and tourism market as well as the luxury of being the fourth largest airport in terms of landholdings. The study used partial case study information from four national hub airports and four Central Florida regional airports for the comparison.

An objectives matrix was established to guide the research and to establish set of variables by which to categorically analyze airport city progress. The intention is to ultimately serve the industry in defining proper aerotropolis planning objectives. These objectives may be both quantitative and qualitative. The matrix serves to combine these

factors with the consideration that they can serve to be categorically ranked and serve as an airport city progress index.

The primary categories of airport catchment, airport city progress and site selection preparedness in the matrix realized their relevance in the study as Orlando was compared to characteristics of the subject comparative airports. Ultimately, the study realized the importance of site selection preparedness and the ability for airport management organizations to properly prepare for growth and to work with local economic development organizations to position their respective airports in the market.

LIST OF REFERENCES

- Airports Council International (ACI). (2012a). Airport Revenue Generation Report. Retrieved from: www.aci.aero/media/c8d4f7c6-86c2-4bce-882b-e9f5f525b030/Zzho
- Airports Council International (ACI). (2013). Airport Revenue Generation Report. Retrieved from: www.aci.aero/media/c8d4f7c6-86c2-4bce-882b-e9f5f525b030/Zzho
- Area Development Magazine (ADM). (2013). 28th Annual Survey of Corporate Executives: Availability of Skilled Labor New Top Priority. [Web log post] Retrieved from: <http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2014/28th-Corporate-Executive-RE-survey-results-6574981.shtml>
- Area Development Magazine (ADM). (2014). 29th Annual Survey of Corporate Executives: A Realignment of Location Priorities. [Web log post] . Retrieved from: <http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2015/annual-corporate-executive-business-expansion-survey-287775.shtml>
- Atlanta Hartsfield Jackson International (AHJIA) Airport Authority. (2015a). Atlanta Hartsfield Jackson International Airport Comprehensive Financial Report for the Fiscal Years Ending June 2015 and 2014. Retrieved from: http://one.atl.com/docs/BusinessInformation/Reports/FY15_Comprehensive_Annual_Financial_Report.pdf
- CDM Smith, Prepared for Airports Council International (ACI). (2014, September), The Economic Impact of Commercial Airports in 2013. Retrieved From: <http://airportsforthefuture.org/did-you-know/files/2014/09/Economic-Impact-of-Commercial-Aviation-2013.pdf>
- Charlotte Douglas International Airport (CDIA). (2014, June 30) Annual Report For The Years Ended June 30 2015 and 2014. Retrieved from: <http://www.cltairport.com/News/Documents/AnnualReportFY2014.pdf>
- Conway, H. McKinley, (1995), Airport Cities 21: The New Global Transport Centers of the 21st Century. Norcross, Ga., USA: Conway Data, ©1993.
- Cohen, Jeffrey P. and Coughlin, Cletus C. (2008), Spatial Hedonic Models of Airport Noise, Proximity, and Housing Prices (2007-12). Journal of Regional Science, Vol. 48, Issue 5, pp. 859-878.
- Dabrownstein. (2013) Noise Contour Map of Chicago Midway International Airport. [Web log post] Retrieved from: <http://dabrownstein.wordpress.com/category/noise-contour-maps/>

- Federal Aviation Administration, (FAA). (2015a, April 14). Land Use Compatibility at Airports: A Guide for Effective Land Use. Retrieved from: https://www.faa.gov/airports/environmental/land_use/
- Federal Aviation Administration (FAA). (2015b, October 5). Airport Categories, Retrieved from: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/categories/
- Federal Aviation Administration (FAA). (2015c). Terminal Area Forecast (TAF) Reporting. Retrieved from: https://www.faa.gov/data_research/aviation/taf/
- Federal Aviation Administration (FAA). (2016a, October 31) Passenger Boardings, Rank Order, and Percent Change from 2014. Retrieved from: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/
- Federal Aviation Administration (FAA). (2016b, October 31) Calendar Year 2015 Qualifying Cargo Airports, Rank Order, and Percent Change from 2014. Retrieved from: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/
- Florida Department of Transportation (FDOT). (2016). FDOT District Map. Retrieved from: <http://www.fdot.gov/info/images/District%20Map%20-%20Lg.jpg>
- Florida Department of Transportation (FDOT). (2013). Florida Transportation Plan (FTP) and Strategic Intermodal System (SIS). Florida Strategic Intermodal Systems. (2013) Retrieved at: <http://www.fdot.gov/planning/sis/>
- National Archives and Records Administration (2012). Foreign-Trade Zone 75-Phoenix, Arizona Application for Expansion (New Magnet Site) Under Alternative Site Framework. *Federal Daily Register*. The Journal of the Federal Government (2012). Retrieved from: <https://www.federalregister.gov/documents/2012/12/14/2012-30220/foreign-trade-zone-75-phoenix-arizona-application-for-expansion-new-magnet-site-under-alternative>
- Greater Orlando Aviation Authority (GOAA) (2015a). Orlando International Airport Comprehensive Financial Report for the Fiscal Years Ending September 2015 and 2014. Retrieved from: <https://orlandoairports.net/site/uploads/2015/09/CAFR2015.pdf>

- Green, Melanie. The Impact of Airport Development on Economic Development. Durham Literature Review. Duke University. (2014). [Web log post] . Retrieved from: <https://sites.duke.edu/urbaneconomics/?p=1248>
- Kasarda J. D., & Lindsay, G. (2011). Aerotropolis: The way we'll live next (1st ed. ed.). New York: Farrar, Straus and Giroux. Chapter 1 in Airport Cities: The Evolution
- Kasarda, J.D., & Stephen J. Appold (2014). Planning a Successful Aerotropolis, Advances in Airline. *Journal of Economics*, Eighth Edition Vol 4. Emerald Group Publishing.
- Kasarda, J.D., (2010). The Rise of the Aerotropolis, Business Facilities Magazine, Vol. 8 No. 14, Group C Media Publishers.
- Kasarda, J.D., (2007). Airport Cities & the Aerotropolis, Airport Innovation Magazine.
- Kasarda J.D., (2008). Chapter 1 in Airport Cities: The Evolution, London Insight Media. Retrieved from: <http://www.aerotropolis.com/files/evolutionChapter1.pdf>
- Clark County Department of Aviation (LAS). (2014). McCarren International Airport Annual Report. Retrieved from: <https://www.mccarran.com/DoingBusiness/Finance/Annual-Report-2014/files/assets/basic-html/index.html#1>
- Clark County Department of Aviation. (2015) McCarren International Airport. Economic Development Impact Analysis. Retrieved from: <https://www.mccarran.com/fsweb/file/395349>
- Phoenix Sky Harbor International Airport(PHX). (2013). Phoenix Sky Harbor International Airport Annual Report. Retrieved from: <https://skyharbor.com/docs/default-source/pdfs/annual-reports/annual-report-2015.pdf?sfvrsn=0>
- Raleigh-Durham (RDU) Airport Authority. (2015a) Raleigh Durham Comprehensive Annual Financial Report for the Fiscal Year Ended March 31, 2015. Retrieved from: <https://www.rdu.com/newsroom/publications/>
- Raleigh-Durham (RDU) Airport Authority. (2015b). Raleigh Durham International-Airport Economic Impacts. Retrieved from: <https://www.rdu.com/press-release/rdu-impact-on-the-region-estimated-at-12-6-billion-annually/>
- Raleigh-Durham (RDU) Airport Authority. (2016) Raleigh Durham Comprehensive Annual Financial Report for the Fiscal Year Ended March 31, 2016. Retrieved from: <https://www.rdu.com/newsroom/publications/>

Crider, Rick; Preisler, Matthew; Autin, Erin ; Roth, Sanders; Fulton, Stephanie; Swartzlander, Julie ; Tharp, Gary; Transportation Research Board (TRB), (2011). Guidebook for Developing and Leasing Airport Property-Report 47. Retrieved from: <https://www.nap.edu/download/14468>

State Book International (SBI). National/Domestic Airport Benchmarking Data (2013): www.StateBook.com web-based site selection analysis tool (by temporary subscription). Retrieved from: <https://www.statebook.com/>

U.S. Department of Commerce International Trade Administration (2015), Foreign Trade Zones Board, Annual Report (2015). Retrieved from: <http://enforcement.trade.gov/ftzpage/annualreport/ar-2015.pdf>

U.S. Department of Commerce International Trade (2016), Foreign Trade Zone Information, NYEDC Foreign Trade Zone Program. Retrieved from: <http://www.nycedc.com/program/foreign-trade-zone-program>

US Department of Transportation (USDOT). Bureau of Transportation Statistics. U.S. Department of Transportation (2016) Passengers Boarded at the Top 50 U.S. Airports. Retrieved from: http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_44.html

BIOGRAPHICAL SKETCH

Mr. Fernandez is Director of Planning and a Principal at BRPH Architects and Engineers. Mr. Fernandez has more than 25 years of experience in architectural design and planning. His background includes conceptual development for spaceports, airports, universities, convention centers, and military installations including numerous projects for the Orlando International Airport, University of Florida, NASA at Kennedy Space Center, and Cape Canaveral Air force Station under the command of the 45th Space Wing, and Port Canaveral. He has had a significant role in master planning, conceptual development, space needs assessment, and project scope documentation for large campus public facilities, concessions tenant space, as well as general airport terminal interior and exterior design. He approaches planning conscious of the community's vision and how occupants or visitors will use and move through a facility.

Mr. Fernandez Has a Master of Architecture from The University of Southern Illinois Carbondale. He has a Graduate Certification from Harvard Business School as CORE Credentials of Readiness in Business Analytics, Economics for Managers and Financial Accounting. He serves as a professor at Embry Riddle Aeronautical University teaching airport terminal planning courses.

