

Airport Strategic Planning; Master Planning: An Exploratory  
Research Project

By

Nicholas Ramirez

Applied Research Project

N\_R181@txstste.edu



Submitted to the Department of Political Science  
Texas State University  
In Partial Fulfillment for the Requirements for the Degree of  
**Master of Public Administration**

Spring 2019

Patricia M. Shields, PhD

Marc Wallace, PhD

Reggie Brooks, MPA

### **Abstract**

**Purpose:** Airport master plans have been used for decades but research done on the effectiveness, and its alternatives is limited and still in the beginning phase. This research begins to fill in the gaps. The purpose of this applied research project is to explore the facilitators and barriers of effective strategic planning at airports and the alternates. A review of the scholarly literature on airport strategic planning and airport master planning developed the three key concepts. After conducting interviews with airport professionals, a preliminary assessment was developed to begin addressing the challenges with each concept.

**Methodology:** A standardized, open ended interview was developed to assist with gathering qualitative data. The concepts were identified in the literature review as a framework to construct the interview questions. The sample of this study includes four airport planning officials and two airport executives that were interviewed to discuss the challenges and successes of airport master planning around the country.

**Findings:** initial findings suggests the respondents agree each airport has similar facilitators and barriers when implementing an airport master planning. The issues are consistent with the literature and the following recommendations were outputs of this research project:

- Develop realistic goals that support the customers' needs and ensure the goals receive community and political support early in the process.
- Engage political figures early in the process and incorporate their ideas, airport must garner support from key political figures for large project funding.
- Provide the FAA with a master plan that clearly demonstrates the need for new facilities to support passenger demand and meaningful justification.
- Improve communication across the organization.
- Ensure the master plan can be funded as presented.

### **About the Author**

Nicholas Ramirez is a Program Manager with the City of Austin at the department of aviation. His primary area of focus is within the planning and engineering division managing various programs and projects. Nicholas's duties include but not limited to utility management, contract management, grant administration, energy efficiency, design reviews and other project management duties that fall within his program area.

Prior to his current position, Nicholas was a sustainability associate at the department of aviation. He began working at the City of Austin as an intern in 2013. Nicholas earned his bachelor of science from East Carolina University in 2013. Nicholas played junior college basketball at Pitt community college in Greenville North Carolina from 2010-2012, he still enjoys sports, gambling, real estate investing, stock market investing and reading.

### **List of Acronyms**

FAA – Federal Aviation Administration

## Table of Contents

Abstract	1
About the Author	3
<b>Chapter 1: Introduction</b>	<b>6</b>
Research Purpose	7
Benefits of Research	8
Chapter Summaries	8
<b>Chapter 2: Literature Review</b>	<b>9</b>
Federal Aviation Administration Background History	9
Federal Aviation Administration (FAA) Early 1900's-1958	9
Federal Aviation Administration (FAA) Early 1959-2000	10
Federal Aviation Administration (FAA) 21 <sup>st</sup> Century	13
<b>Chapter 3: Strategic Planning</b>	<b>17</b>
What is a Strategic Plan	17
Airport Strategic Planning: The Master Plan	<b>20</b>
What is a Master Plan	20
Strengths and Weaknesses of Contemporary Airport Master Planning	23
• Strengths	23
• Weakness	24
<b>Chapter 4: Conceptual Framework; Pillar Questions</b>	<b>27</b>
Key Factors that Facilitate an Effective Strategic Plan	27
• Critical Goals	28
• Sound Data	29
• Follow Up	30
The Barriers to Effective Strategic Plans at Airports	32
• Political and Community Pressure	32
• Financial	35
• Environmental and Land Use	36
What Planning Models that can Substitute Master Planning at Airports	38
• Dynamic Planning	39

• Technology and Review	40
Conceptual Framework	42
• <i>Table 4.1 – Conceptual Framework</i>	43
<b>Chapter 5: Methodology</b>	<b>44</b>
Operationalization	44
• <i>Figure 5.1 - Operationalization</i>	45
Interviews	47
Sample	48
Human Subject Protection	49
<b>Chapter 6: Summary of Findings</b>	<b>49</b>
Key factors that Facilitate an Effective Strategic Plan	50
• Critical Goals	50
• Sound Data	51
• Follow Up	51
The Barriers to Effective Strategic Plans at Airports	52
• Political and Community Pressure	52
• Financial	53
• Environmental and Land Use	54
What Planning Models that can Substitute Master Planning at Airports	55
• Dynamic Planning	55
• Technology and Review	56
<b>Chapter 7: Conclusion</b>	<b>57</b>
<i>Figure 6.1 - Summary of Findings Linked to Pillar Questions</i>	57
Conclusions and Recommendations	59
• Facilitators	59
• Barriers	61
• Alternates	62
Appendix A: Institutional Review Board Exemption Documentation	66
Works Cited	67

## Chapter 1

### Introduction

There are currently 383 active airports in the United States, Puerto Rico, American Samoa, Guam, Northern Marianas and the U.S. Virgin islands under the Federal Aviation Administration's (FAA) control (FAA, 2018). The FAA also guides strategic planning in the airport industry and has been doing so for decades. Airports operate in a challenging and uncertain environment and to address these challenges, airports turn to developing a strategic plan. Master planning, the airports industry standard for strategic planning is an FAA requirement for all construction projects that occur at airports that request federal grant funding (Wells, 2011). "The Federal Aviation Administration (FAA) predicted that capacity will increase by 3.4% on average from federal fiscal (October – September) 2010 to 2030, while overall traffic was estimated to rise 3.5% during the same time period" (Diana, 2011, p. 269). As the airport industry demands increase, airports must build to meet the demand and continue to develop and update their master plan to reflect the phasing of their implementation plan. However, the effectiveness of approved airport master plans have little research associated with it, because as the airport industry evolves, airports must adapt to the current market trends and ensure day to day operations are not interrupted.

This research is in its initial stages of development and preliminary research was conducted to begin investigating the topic. Airports spend millions of dollars and hours of staff time developing a master plan and fail to achieve organizational goals due to under-developed

approved master plans. Denver, Miami and Dallas Fort Worth are good examples of master plans that excluded key operational needs. Errors that are not caught early in the development of a master plan can impact the airport with unplanned construction cost and missed opportunities to attract new air service which negativity affects its business. However, airports are required to develop and implement a master plan to fulfil the requirements of the FAA but currently do not have a mechanism to track the effectiveness of a master plan.

### **Research purpose**

The purpose of this project is to use the literature to identify factors critical to successful airport strategic planning; develop a set of pillar questions designed to explore ways these factors facilitate, create barriers and suggest innovations that lead to successful strategic planning; use the pillar questions to focus interviews with airport officials about how these factors might influence success (or limit success) of airport strategic planning efforts; and to use the information gathered from the literature and interviews to make recommendations to improve airport strategic planning. The project's goal is to explore the effectiveness of airport master planning. A review of appropriate literature identifies the following barriers and facilitators for effective master planning and potential alternates:



**Table 1.1 Effective Master Planning**

<u>Facilitators</u>	<u>Barriers</u>	<u>Alternatives</u>
Sound data	Political and community pressure	Dynamic Planning
Critical goals	Finances / funding sources	Technology and review
Follow up	Environmental / Land Use	

Interview questions were focused around the facilitators, barriers, and alternates to open dialogue regarding the challenges with gauging the effectiveness of the airport master plan process and outcomes. The interviews helped document the need for further research and recommendations for improving the master plan process and its outcomes.

### **Benefits of Research**

As the aviation industry continues to grow and exceed travel forecasts, airports need to find innovative ways to fulfill the FAA requirements for grant funded projects. Operational costs continue to rise, funding is stressed and the master plan process requires time and resources and depending on the size of the airport, it could cost millions of dollars to develop a master plan. The aviation industry should have a deeper understanding how master plans are currently developed and implemented. This project provides airport leaders with recommendations to consider while developing a master plan.

## **Chapter Summaries**

Chapter 2 reviews the related literature. It provides background information on the development of the FAA. Chapter 3 discusses what a strategic plan consist of and how airports develop and implement their strategic plan. It also explains the regulatory requirements of an airport master plan and its purpose. Chapter 4 explores the facilitators and barriers for effective master planning and its potential alternates. The concepts are developed into multiple pillar questions which build the structure of a conceptual framework. Chapter 5 explains the methods utilized to explore strategic planning at airports and evolves into interview questions that further enhance the research. Chapter 6 reveals the findings of the exploration following interviews with four airport planning professionals. Chapter 7 summarizes the overall project and concludes the applied research by providing recommendations for improving strategic planning at airports.

## Chapter 2: Literature Review

### Chapter purpose

This chapter's purpose is twofold. First, it reviews key literature on airport strategic planning and its strengths and weaknesses. Second, it develops a set of pillar questions that are used to craft expert opinion interview questions to find factors that can be used to improve airport strategic planning.

### Background and history

#### **Federal Aviation Administration (FAA) Early 1900's-1958**

On December 17, 1903, at Kitty Hawk, North Carolina, the Wright brothers successfully flew the first powered aircraft that achieve controlled, sustained flight with a pilot aboard (McCullough, 2015). The leaders in aviation at the time believed without proper regulation and safety rules the aviation industry would not succeed. Therefore, Congress passed the Air Commerce Act of 1926. The Act was responsible for developing aviation related rules and regulations (Wells, 2011, p.100). However, the agency was born due to multiple airplane collisions which triggered Dwight Eisenhower to sign the Federal Aviation Act of 1958 (Harris, 2004). The 1958 Act created the Federal Aviation Agency (FAA) into existence, and its first administrator was introduced to the citizens of the United States November 1, 1958, retired air force General Elwood "Pete" Quesada (FAA, 2018). The FAA's initial mission was to improve aviation safety (Kraus, 2008).

The FAA began operation sixty days after “Pete” became the FAA’s first administrator, December 31, 1958 (Wells, 2011, p.120). It inherited airspace responsibilities that were previously controlled by the Civil Aeronautics Authority (CAA) and the National Aviation Facilities Experimental Center in Atlantic City, New Jersey, which was formerly operated by the Airways Modernization Board. The FAA had issues gaining control of these function, because the federal government stakeholders felt these functions should be controlled by the military and others wanted civil airspace to regain control as it was previously overseen by the CAA (Kraus, 2008).

### **Federal Aviation Administration (FAA) Early 1959-2000**

January 15, 1959, the FAA’s organizational structure was developed. It began operating with three staffed offices located in Washington DC, Oklahoma City, and Atlantic City (Wells, 2011, p. 128). The FAA was spilt up into four programs: research and development, flight standards, air traffic management, and facilities. These programs oversaw multiple distinct aspects of airspace management. The FAA adopted the CAA’s system of six numbered regions that were led by regional directors, and they reported to agency administrators. After the structure of the FAA was approved, they began the process of improving aviation safety (Breihan, 1998).

The FAA structure was approved, and they began focusing on improving aviation safety, the federal government realized all aviation related documents were deficient and required significant updates (Kraus, 2008). The first document updated was the safety standards since public safety was a critical issue that needed to be addressed. These documents covered the

following areas: operations, maintenance procedures, pilot's requirements both physical and proficiency. March 1959, "Pete" presented the FAA's goals with a strong focus on safety (FAA, 2018).

Technology was the first major investment the FAA encumbered as a result of early accomplishments (Kraus, 2008). They understood it would be a great tool to enhance aircraft safety. The air traffic control system was established by this vision which is still used today to control airspace. Civil and military air traffic improved drastically, and the FAA developed a 64-code air traffic control radar beacon which would become a secondary radar. This radar was first used in WWII to identify friend and foe. By May 1960, the FAA had successfully implemented 20 radar beacons that were in operation at 16 air route traffic control centers (FAA, 2018).

Further investments in technology would develop semi-automated air traffic control systems. This provided the air traffic controllers more advanced controls and brighter displays. Massachusetts Institute of Technology (MIT) developed the majority of the technology (FAA, 2018). The development of airport surface detection equipment improved the abilities of air traffic controls to track aircraft and vehicle movements. This new technology also allowed the aircraft controllers to receive information on aircraft positions and ground vehicles during bad weather, darkness, and fog.

After the technology became viable it helped improve aircraft safety, this successful implementation of the airport surface detection equipment allowed the FAA to shift their focus to airplane pilot standards. American airlines advocated for updating the pilot standards; this

encouraged the FAA to introduce the “60-year” rule (FAA, 2018). They explained that at the age 60 individuals have a high risk of health issues, they were particularly concerned with heart attacks and strokes. FAA hired researchers to investigate the risks associated with human-related aircraft accidents. In April 1960, after the FAA’s age and health requirements received approval, they turned their focus to reduce noise and environmental impacts caused by the aviation industry (Kraus, 2008, p. 90).

However, December 16th, 1960, an aircraft midair crash pushed the FAA to further develop pilot reporting requirements (FAA, 2018). Instruments flight rules (IFR) are rules that require pilots to report any malfunctions of their navigations aids and communications equipment. The incident also pushed for the installation of distance measuring equipment on all turbine powered aircraft. This equipment allowed the FAA to require that any aircraft that flies below 10,000 feet cannot travel faster than 250 knots or 287 mph while within 30 nautical miles of a destination airport.

By the end of the first administrator’s tenure, which lasted two years, the FAA grew to 40,000 employees from and was responsible for overseeing the transportation of 60 million passengers. In 1967, the Federal Aviation Agency was renamed the Federal Aviation Administration (FAA) and became part of the Department of Transportation (FAA, 2018). The FAA continued to expand on its responsibilities, by mid-1970s they had successfully developed and implemented semi-automated air traffic control systems (Wells, 2011, p.135). This system enhanced the air traffic controls abilities by using both radar and computer technology (FAA, 2018). This was in response to the growth of air traffic in the United States.

The Airline Deregulation Act of 1978 removed control from the government over fares, routes, and market entry of new airlines (Wells, 2011, p. 148). This legislative act led to a nationwide strike by the air traffic controllers union in 1981, which forced the FAA to restrict flights and forced the agency to further automate air traffic control facilities. However, the FAA to provide a system that could operate without human assistance. The FAA ultimately reached an agreement with the air traffic controllers union and provided the air traffic controllers more advanced equipment. During the 1980s Congress requested the FAA to work on two charters with major commercial airports (FAA, 2018). The charters were the following:

- Define noise pollution contours
- Investigate the feasibility of noise mitigation

These charters were implemented during the 1980's and helped reduce the noise impacts for residents around major airports. Airports spent millions of dollars purchase real estate in areas that fell within their noise contours. In the 1990s the FAA was focused on developing satellite technology to improve communications, navigation and airspace management (FAA, 2018). The FAA deemed the program a success, it assumed responsibilities over safety of commercial space transportation. The FAA was tasked with ensuring all airspace travel was safe and secure.

### **Federal Aviation Administration (FAA) 21<sup>st</sup> Century**

In the early 2000s The FAA was assigned a new division by executive order called the Air Traffic Organization (ATO) (FAA, 2018). The ATO became the air navigation service provider for all airspace in the United States. It oversees commercial and private aviation and the military. It

currently employs 35,000 controllers, technicians, and engineers. The goal of the ATO is to link the control towers to airports and manage the following functions;

- Safety
- Work force training
- Information Technology
- Operational performance
- Weather

Due to the September 11<sup>th</sup> terrorist attacks, in 2001, the FAA was responsible for the following:

- Develop, operate, and maintain a safe, productive and efficient national air traffic management system;
- Ensure a national air traffic management system, which is in harmony with a safe, secure, efficient worldwide system;
- Regulate and encourage aerospace safety and security;
- Protect the public from aircraft noise;
- Promote U.S. aerospace industry vitality; and
- Assist and promote the development of airports and the U.S. aerospace industry

The FAA was responsible for grounding an estimated 4,000 flights under the FAA's control for 72 hours (FAA, 2018). This led airlines and airports to lose massive amount of revenue and leave thousands of passenger across the country. After the flights resumed, the FAA began focusing on airport and aircraft safety while encouraging aerospace travel. The economic down



turn during 2009-2012 slowed the FAA's growth and its ability to hire new air traffic controls. As the economy began to make a comeback the aviation industry started to feel the demand and the FAA introduced new hiring practices for air traffic controllers that would allow anyone with a bachelor degree to apply. In 2015, this program failed due to the large amount of applications who applied, and the FAA used an unethical practice to screen applicants which lead to a reverse discrimination law suit, this lead to new hiring practices (Shapiro, 2015).

In 2018, the FAA Reauthorization Act revealed their new five-year plan that covers the following key areas (FAA Authorization Act of 2018):

- Improve America's competitiveness • Enhancing aviation safety
- Improving customer service
- Modernizing America's airport infrastructure
- Addressing airport noise concerns
- Safely and efficiently integrating unmanned aircraft systems (Drones)

(FAA Authorization Act 2018)

The FAA continues to develop and implement new programs as the aviation industry evolves. One of their implemented programs was triggered by the growth of airports across the country, airport master plans, which require airports to demonstrate future needs based on growth projections. The master plan program's success provided a vehicle for airports to utilize and receive federal grant funding for major construction projects. New airport developments no matter the size, are required to submit a plan before construction begins. Also, airports

planning to expand must update their master plan every 20 years (Wells, 2011). This document assists airports with updating its airport layout plan (ALP). The three pillars of a master plan; safety, security, and efficiency.

The FAA was developed to regulate all aspects of civil aviation in the United States along with surrounding international borders. The agency is in charge of construction and operations of airports that include the following:

- Air traffic management
- Certification of personnel and commercial aircraft
- Air craft safety
- Pilot Certificates
- Developing programs to mitigate noise and environmental impacts
- Developing new aviation technology
- Flight inspections

These duties have increased aircraft safety and airport operations. The FAA currently manages three headquarters and nine regional offices within the United States. Each office has a section that oversees the master plan process for its region. The FAA provides guidance for airports across the country that are growing and need federal funding to construct new facilities to support passenger demand. Airport master planning is the aviation industry's version of strategic planning.

## Chapter 3: Strategic Planning

### What is a strategic plan?

Strategic planning is defined as a systematic process of envisioning a desired future, and translating that vision into broadly defined goals or objectives and a sequence of steps to achieve them. Strategic planning can also be defined as a deliberative, disciplined effort to produce fundamental decisions and actions that shape and guide what an organization (or other entity) is, what it does, and why (Bryson, 2011). Governments around the world use strategic planning (Ferlie & Ongaro, 2015). Strategic planning is applied to organizations or parts of organizations; intra-organizational functions (e.g., finance or human resources); purpose-driven inter-organizational networks or collaborations designed to fulfill specific functions, such as transportation, health, education, or emergency services; and to places ranging from local to national to transnational (Bryson, 2011).

Strategic planning often is part of the broader practice of strategic management that links planning with implementation on an ongoing basis. However, the definition of a strategic plan differs among professionals. According to Guidi (2009) chief executive officer of Oncology Management Consulting in Philadelphia, there is “no wrong idea” of what a strategic plan encompasses, people often do have misconceptions about it. “Some expect a strategic plan to be precise—it's not. Some think that it will take you forward forever—it won't. The biggest mistake people make is already having the result in mind when they start” (Guidi, 2009, p139).

Instead of always performing crisis management and solving immediate problems, strategic planning should help address organizational or business short or long term future

needs. Strategic planning assists Fortune 500 companies, small businesses, local, state and federal governments, nonprofit organizations and academic institutions to bring together stakeholders to develop short-term and long-term goals. Many of the driving forces behind strategic planning include the following: financial, environmental, technology advancements and shifts in the market place. This tool helps businesses, nonprofits, and organizations achieve goals which vary from one to five years or beyond (Bryson & Alston 2011). The design of a strategic plan usually involves mid-level managers, directors and CEO's (Bryson & Alston, 2011).

According to Bryson, 2018, key components to a strategic plan are: stakeholders, goals, mission, strengths, weaknesses, opportunities and threats (SWOT) analysis, developing strategies, action plan, and evaluation. The stakeholders are a significant part of the process considering that the master plan determines who needs to be involved in the early developmental stages. At this stage, participants brainstorm and gather ideas. Goals should be well defined and communicated clearly, without a goal your strategic planning group struggles to have a clear understanding what the organization's needs are or the focus area, strategic plans concentrate on two paths, short term or long term objectives (Bryson & Alston, 2011). The mission of the organization drives the strategic plan; organizations must ensure the mission is incorporated into all decisions, it is the basic purpose of the organization and its core values (Bryson 2018).

A Strengths, Weakness, Opportunities, and Threats (SWOT) analysis starts the brainstorming activities and focuses on competitive, collaborative capabilities and advantages. Strengths and weakness are internal assessments, and opportunities and threats are external assessments (Fine, 2010). This phase of strategic planning is critical in the process; it forces

important stakeholders to look at the organization from a holistic approach to be able to dissect current organizations strengths, weakness, opportunities, and threats (Fine, 2010). Developing strategies is the start of the strategic plan, this occurs after a clear picture has been established (Valentin, 2001). After the organization determines its goals, the implementation and action plan begins development (Bryson, 2018).

The action plan phase occurs when the team pulls together all of the data and begins to put the strategic plan together (Fine, 2010). The final phase of the strategic planning process, evaluation. The evaluation should determine the success of the plan. The plan should align with performance measures and targets the team has put in place (Rodriguez 2003). This review depends on if the organization developed short or long term goals, the evaluation process can be months or years down the road (Bryson, 2018). All of the hard work put into planning for the future usually is achieved if organizations meet the target it set forth during the initial stages of the planning process (Bryson, 2018).

## **Airport Strategic planning; The Master Plan**

### **What is a Master Plan?**

An airport master plan is a strategic planning process that airports follow which is a series of comprehensive studies of an airport that produce reports and plans. According the FAA, "The goal of the master plan is to provide guidelines for future airport development which will satisfy aviation demand in a financially feasible manner, while at the same time resolving the aviation, environmental and socio-economic issues existing in community" (Wijnen et al, 2008, p. 15-16). Wijnen, 2008 States that the plan should include data related to; the business goals and organization's goals; the future context of the airports operation in terms of economic, technological, regulatory and demographic developments; the airport system and its environment; system changes; and quantitative airport performance data. The data collected should be analyzed and the results of that analysis should shape the master plan.

These documents help gather information to support the modernization or expansion of an existing airport or the creation of a new airport (Itani, O'Connell & Mason, 2014). The airport master plan represents the airports blue print for long term development; the process typically takes 18-24 months to complete (Itani, O'Connell & Mason, 2014). The Master Plan, a 20-year strategic vision for the airport site which is generally updated every five years (Horonjeff, 2010, p. 138). The master plan includes future land uses, types of permitted development, and noise and environmental impacts. The environment strategy sets out the airport's strategy to manage environmental issues within five years and beyond" (Horonjeff 2010 p. 138). Airport master

plans composed of several planning elements, and prepared using the Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B titled, "Airport Master Plans."

According to (Horonjeff, 2010, p. 139) the key components of a master plan include the following: inventory of existing conditions, aviation activity forecasts, airfield demand/capacity analysis, airport facility requirements and identification issues, definition and evaluation of alternative airport analysis, airport layout plans, financial analysis, environmental review, and capital improvement program.

An inventory consists of airfield facilities, meteorological data, operations, and airspace procedures, general aviation facilities, airport support and other facilities, airport access and circulation, airport utilities, land use/zoning and environmental and financial overview (FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans). The first segment of an airport master plan includes the inventory and existing conditions chapter. The majority of data gathering for an airport master plan preliminary study takes place when planners are evaluating existing conditions. The aviation activity forecast provides current traffic and reasonable projections of the future activity which translates into specific airport facility needs. Airports use airfield demand/capacity analysis to assess the capability of the airfield facilities to accommodate projected levels of aircraft operations. The FAA identifies two definitions of airfield capacity in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay. The first definition of airfield capacity pertains to the maximum number of aircraft operations that a specific configuration can accommodate during a specified time interval of continuous demand. The second definition of airfield capacity, the number of aircraft operations that may occur during a specific time that corresponds with a tolerable delay.

Airport facility requirements assessments use data to determine the needs of the airport facilities; this is based upon the future demand that may occur over time. This assessment provides an account of the existing conditions of the airside and landside facilities at a given airport (Horonjeff, 2010, p. 152). Definition and evaluation of airport alternative analysis is an investigation of alternatives which provide an increased level of safety at an airport for the current type and size that operate at its facility; this is used to address safety improvements at airports. The alternates should comply with FAA design standards. Airport layout plan (ALP) is a critical planning tool that illustrates both existing facilities and planned projects for an airport (Horonjeff, 2010, p. 164). The ALP is a requirement of the FAA to ensure updates occur when a facility changes, airports that keep their ALP up-to-date receive FAA grant funding for airfield improvements, is a grant assurance obligation.

The financial analysis looks at current and future operating revenues and expenses along with estimated costs and potential funding sources. The outcome of this analysis provides the airport with the necessary information to develop a financial plan that can be implemented to achieve the goals of the capital improvement program (Graham & Morrell, 2016, p. 10)

The environmental review process ensures the future airport developments minimize the impacts to the environmental. This review includes but not limited to storm water, air quality, noise, compatible land use, hazard materials, natural resources, and floodplains, historical and archeological resources (Wells, 2011, p. 412).

The Capital Improvement Program (CIP) is developed after the master plan process has been completed and accepted by the FAA, The CIP lists the projects the airport plans to



construct and the phasing of the projects to support the airport's operational and capacity needs. The next section discusses the strengths and weakness of contemporary airport master planning.

## **Strengths and Weaknesses of Contemporary Airport Master Planning**

### **Strengths**

The development of the airport master plans and its process has many strengths. The biggest strength of airport master planning is that it provides the owner and operator a detailed formal report of what the facilities an airport currently has on site and what the current market forecasts (Horonjeff, 2010, p.168). It brings multiple stakeholders together to generate ideas that could potentially affect a multi-billion dollar industry and the citizens around the airport. Airports are huge contributors to the world economy as they tie together the world's transportation network. Airport master plans provide the history of the airport, the physical facilities at the airport, potential land use, and the socioeconomic and demographic data for its current airport service area (Neufville, 2013, p. 82). It also gives the airport a big picture perspective of what is to come shortly. It helps develop innovation within the airport's campus. Key stakeholders begin conversations where the airport and industry are headed which it develops ideas. Another strength is it gives airports a chance to engage with the FAA on fundamental issues that are hampering airport growth. This process also engages the public to comment on their needs as the primary user of the facility (Neufville, 2013, p. 83). The primary airport customers also provide feedback on all existing facilities and deficiencies. A good consultant firm can be an asset since the majority of well-known firms in the aviation industry

have completed multiple master plans (Neufville, 2013). Ultimately, this process brings airports up to date on safety, security, airfield management, terminal operations and landside access.

### **Weaknesses**

As discussed, airport master planning is the current model required by the FAA to plan for the future facility and operational needs. However, this was first developed when stable growth was the norm. The airport industry has gone through unprecedented growth over the past year. According to the International Air Transport Association, airlines across the world reported demand rose 7.6 percent over the previous year, which is well above the 10-year average annual growth rate of 5.5 percent. The capacity for 2017 increased 6.3 percent, and load factor climbed 0.9 percent to a record calendar-year high of 81.4 percent. In North America alone, airline traffic rose 4.8 percent, capacity climbed 4.5 percent, and the load factor jumped to 81.7 percent (International Air Transport Association).

“Practice shows that an organized and properly justified approach to development and management of the civil aviation system is normally lacking” (Itani, 2015, p.42)

“Last year, more than four billion passengers used aviation to reunite with friends and loved ones, to explore new worlds, to do business, and to take advantage of opportunities to improve themselves. The connectivity provided by aviation enables goods to get to markets, and aid to be delivered to those in need,” (de Juniac, 2018) continued. “Aviation truly is the business of freedom, liberating us from the restraints of geography to lead better lives. Aviation can do even more in 2018, supported by governments that recognize and support our activities

with smarter regulation, fairer taxation, cost-efficient infrastructure and borders that are open to people and trade.”

A weakness of airport master planning is the amount of time it takes to gather the required data and produce the final report, 18-24 months. Forecasting becomes tough when a long period has passed since the initial forecast was data was collected. Long term planning within the aviation industry is challenging, according to Dr. Richard de Neufville, forecasting has many holes and always wrong. Neufville (2013) studied several small airports aviation activity forecast, 5, 10 and 15 years out and determined that his assumption was correct. “Relying on forecasts is like steering a car by looking in the rear view mirror satisfactory for a very short time, so long as trends continue, but one soon runs off the road” (P. 88).

Nixon (2014) and Wijnen et al. (2008) both discuss how rapid changes in the economy, airline industry, and passenger preferences make the master plan less effective. These plans are unable to quickly adapt to things like recessions and technology improvements. Wijnen et al. (2008) also discusses the long lead time and milestones of creating a master plan, and how this timeframe can lead to parts of the plan become obsolete before they have been implemented.

Master plans do not anticipate the risk of possible changes in market conditions, major political changes, transportation needs, new airlines alliances or economic booms or recessions (Neufville, 2013). They also do not add insurance to those risks. The master plan process does not allow flexibility and has a difficult time incorporating potential risks.

According to Neufville (2013), Master plan teams are resistant to change when it is needed, especially if they are far along in the process. The consequences of this can contribute

to higher construction cost and lost opportunities when the incorrect facilities and land use is approved. Good examples of this are Miami International Airport, Denver (DEN) and Dallas / Fort Worth (DFW) master plans (Neufville, 2013).

Denver could not scale back the initial size of the airport because they were planning to build what was forecasted. They coined themselves a “multi-airline super hub” However, they did not have a commitment from the airlines, and they are the driving force for the growth of passenger traffic (Neufville, 2013). An airport’s worst nightmare is building additional facilities and gates that go empty and are underutilized. Another issue that was unplanned for was the failure of their baggage handling system; they invested in technology that failed with no alternate plan Neufville (2013). This led to additional costs that were unaccounted for in their initial CIP budget. “Flexibility is defined as an infrastructure’s ability to be as changeable as possible, to adapt to future needs with minimal investment and be able to, at least, maintain its productivity results” (Magalhaes, 2015, p. 90-91)

DFW planned to build additional terminals but did not have a plan in place to transfer passengers between the terminals without passengers circling back through security. This led to unnecessary cost and the development of the air transportation system (AirTran). MIA master plan team did not engage the local highway authority which led to a failure in documenting new highway plans that were approved and would block airport access, poor coordination with the transportation department led to this error Neufville (2013).

“The advantages to flexibility for infrastructures with long life cycles such as airports are related to the capacity, adapting, functions, and process in order to respond quickly and with minimum cost to new needs” (Magalhaes, 2015, p.91)

According to Neufville (2013), the master plan process is old fashion and repetitive; there is no innovation in the process. Master plans are completed to satisfy the requirement for federal funding, the same concept that states use when enforcing the legal drinking age of twenty-one to receive federal funding for their roadways.

“The airport master plan is becoming obsolete” (Nixon, 2014, p.344)

## Chapter 4: Conceptual framework; Pillar Questions

The purpose of this research is exploratory, and the conceptual framework that is used are pillar questions. Airport master plans have been used for decades and research was completed on the effectiveness, but research on alternatives is limited and still in the beginning phases. Shields and Rangarajan (2013, p. 148) explain that pillar questions are appropriate when a research question is in its initial stage. The conceptual framework table guides the research process. The three concepts of exploring the effectiveness of airport master planning:

- Facilitators of master plans,
- Barriers to the effectiveness of master plans,
- Alternatives to the master plan.

### **Key factors that facilitate an effective strategic plan (PQ1)**

Airport master plans are a requirement by the FAA and majority of medium (6-16 million annual passengers) and large (17-100 million annual passengers) airports participate in the process to secure federal funding. Due to the early stages of the research, the pillar question method is recommended by Dr. Shields and Rangarajan (2013, pg. 148) to utilize the exploratory research method. Shields explains “Pillar questions provide a way to focus or capture the landscape of the problematic situation” (2013, pg. 148). The research and literature identify key facilitators and barriers of successful master plans. This project identifies three key factors that are used to facilitate a successful master plan and three key barriers associated with the development of master plans. To facilitate the exploration, each factor is developed

and structured into a Pillar question. The pillar questions provide a framework that allows for a research-based inquiry into the effectiveness of strategic planning at airports also known as airport master planning.

### **Critical Goals**

According to ACRP #20 2009, Airport master plans should take a holistic approach when developing these critical goals. These goals must be well defined and developed by the master plan team. Master plan goals should align with the overall vision of the airport and communities values (ACRP #20 2009). Safety and security is the top priority for all airports operating under the FAA's umbrella: After 9/11 the focus shifted from aircraft safety to passenger and airfield safety. The second goal of the master plan team is identifying future developments to support the airport's and customer's needs; Airports have to take in customer's feedback and address concerns if the airport wants to continue to grow (ACRP #20 2009). As the means of transportation changes airports must adapt. Infrastructure is the third goal of the master plan process, if airports struggle get customers to the terminal the airport cannot thrive, this is known as landside access. To reach these goals the master plan team must perform a SWOT analysis (Fine, 2010). This generates ideas and develops the goals based on this analysis, and this also determines what infrastructure is required to support the landside. The planning team should ensure the vision is in line with the communities values (ACRP #20 2009). Develop the airport's physical facilities to meet the future needs of the surrounding community and provide an airport that is safe and reliable (Neufville, 2013, p. 436). These goals also should ensure the airport is taking a sustainable approach that allows flexibility if there is an upset in the industry.

## Sound Data

According to (Horonjeff, 2010, p. 138) the first step of the master plan process, collecting data, inventory of the existing conditions and historical data, these two data points begin the process of master planning. This commonly referred to as the airport's background information. The data collected summarizes what has occurred at the airport since it began operation and lessons learned from previous master plans. However, sound data is the most critical component of a successful master plan there for the new data collected should be vetted to ensure accuracy (Horonjeff, 2010, p. 149). This data is the building blocks for developing goals to meet the forecasted needs for the airport.

Forecasts develop multiple types of aviation activity depending on the size and function of the airport; forecasts include the following: domestic commercial scheduled traffic, air cargo, military, and general aviation movements (Horonjeff, 2010, p. 7-9). Forecasting sets the stage for the master plan, the results of the forecast drive the airport in a definite direction. Forecasting provides an airport with the general idea of the magnitude of growth (or lack of), as well as fluctuations in activity anticipated over a 20-year forecast period. Forecasting also assists the airport in determining existing and planned facility needs based on airport activity level estimates and projections (Neufville, 2013, p. 410). Forecasts attempt to develop realistic estimates of future changes. When developing the forecast, the team should have an objective approach since this data is ultimately used to determine how much funding the next 20 years the airport needs to budget for, forecasts must be updated often especially if there is a major shift in the aviation industry.



Demand and facility requirements help demonstrate deficiencies that require capital funding to correct; airports must optimize existing facilities and extend the life expectancy of these facilities to avoid the unplanned cost (Neufville, 2013, p. 415). Airports build new facilities when the demand dictates the airport operational need. In a competitive environment in which airports have to operate, it is vital for airport management to ensure that their operations are financially healthy while providing the appropriate infrastructure to cope with growth, sound data provides airports the opportunity to develop and achieve airport-wide goals (Neufville 2013 p. 427).

### **Follow up**

After the completion of the airport master plan, and is accepted by the FAA and the airport updates the airport layout plan is approved; airports are not required to evaluate if it was successful. For many airports, immediate business addressed, and long term projects are scheduled (Horonjeff, 2010, p. 571). Well-developed and implemented master plans give the airport the ability to grow and maximize existing infrastructure. Airports currently do not have a mechanism to determine if the master plan provided an effective plan because by the time the master plan is completed the majority of the information provided is outdated. Airports are a government entity but do not track master plan results. In other strategic planning processes, the public sector follows the Government Performance Act of 1993 "(GPRA) mandated federal agencies to develop and link strategic plans and performance measures into a budgeting system that allocates resources based on performance" (Rodriguez, 2003). However, this did not include airports since there are two forms of ownership private and public. Of the 19,098 inventoried airports in the United States, in 1999, approximately 72% are privately owned.

Thus, only 28% of the U.S. airports are publicly owned (Bureau of Transportation Statistics, 2000).

Rodriguez & Bijotat (2003, p.142) found that strategic plans were often used to guide growth and attract new airline contracts. However, these plans were not tied to performance measures, and funding was not affected by the performance of the plans. With this being said there is often no incentive or deterrent for a plan being ineffective or inefficient.

The FAA does fall underneath the requirements of the (GPRA) and is required to develop a strategic plan with corresponding performance measures. From the outside looking in, airports seem to be a good candidate to participate in performance measures and benchmarking. However, airport operations are characterized by such complex set of factors that airport activity is difficult to predict from on the hour to the next Humphreys (2002) have aptly described this situation as follows: "Airports are complex and dynamic organizations that consist of many interacting parts, which include passengers, airlines, handling agents, ground transportation service providers, other aviation related activity, and the interests of the regional and national economy" (Humphreys, 2002, p.265).

Thus, a reason why airport managers operate on a day-to-day basis rather than long term outlooks that favor performance measures. Airports should seek alternative ways to ensure master plans are effective by achieving their goals while incorporating sustainability, responsible monetary spending, facility development that meets customer demand and provide the community with a safe and reliable airport. This step usually is 5, 10 or 15 years after the master plan is completed, as the market grows and industry shifts, the questions airports must ask, did the airport plan accordingly.

Key factors in facilitating an effective master plan can be summarized by the following pillar question and sub-questions:

**Pillar question 1:** What factors facilitate an effective strategic plan at airports?

**PQ1a:** Why are critical goals important in the facilitation of a successful mater plan?

**PQ1b:** Why is sound data significant for an effective master plan?

**PQ1c:** Why is the follow-up evaluation for the master plan important when determining the effectiveness for an airport master plan?

### **The barriers to effective strategic plans at airports**

The airport master planning process has a variety of internal and external barriers that affect the mastering planning process: political and community pressure, financial, environmental and available land use. The next section discusses these in further detail.

#### **Political and community pressure**

The master plan process is complicated and takes input from multiple government entities to be successful. Airport master plan teams should involve key stakeholders early in the process to prevent confusion and to reduce the opportunity for delays of implementation of the plan (O'Connell & Mason 2014). This long drawn out process is problematic for stakeholders when disagreements about the forecasting, models, and results are not properly addressed. Changes in the political environment over time occur as people move on and new leaders are appointed. The process could frustrate the community and high profile political figures. The community's attitude toward an airport's growth and the master plan is always a

crucial factor, public opinion entices community leaders to question the master plan, and this could delay the plans development and implementation.

There are many stakeholders involved in the master plan process. One of the key stakeholders in the process are elected politicians (Wijnen et al., 2008, p. 15). With the majority of airports being operated by governmental entities, political decisions can affect airport operations. The goals of the airport and the goals of the political may not align, Nunn and Klacik (1996) discuss how politicians are often interested in incentives from growth without concern for the practicality of said growth. Airport officials have to learn how to manage this group of stakeholder, while still doing what is best for the airport.

A major commercial airport is a giant public enterprise. Some are cities in their own examples with a great variety of facilities and services (Wells & Young, 2004). Indubitably, one of the most vital and challenging relationships that an airport and an airport master plan team must foster and maintain is the relationship between the airport, key political figures, and the community it serves.

According to O'Connell and Mason 2014, political pressure comes from small interest groups and large lobbyist groups. The airport must build community relations and strong trust with its customers. Political and community views of airports affect small and large airports. An example was noted by Vineyard Airport in 2002, it failed to involve key stakeholders, and during their master plan presentation to the city council, their plan was scrutinized as a result of the lack of community engagement. "There was not a detailed section covering the public process utilized in the creation of the plan," noted by a town commissioner (Burke, 2002).

At Atlanta Hartfield Jackson International Airport, the world's busiest airport, is in the middle of a political battle that included the state versus the City of Atlanta. This battle relates to control of the largest economic engine in the state of Georgia. The state put together a committee to develop an airport authority that would take control of the airport. The City argued, "Under the city's department of aviation, the airport has generated billions of dollars in economics impact for metro Atlanta and remains the state's largest employer" (Yamanouchi, 2018). The FAA still has not provided a recommendation for the state on Georgia on the conversion.

In San Diego, for example, their master plan update was approved and the first major project planned was to add a rail system to transport passengers to the airport. "But officials from the City of San Diego, the Port of San Diego (Port), San Diego County, the Metropolitan Transit System (MTS), the San Diego Association of Governments (SANDAG), the California Coastal Commission, the California State Lands Commission and the state Department of Transportation submitted stern – at times exasperated – letters opposing the airport's approach" (Braymer, 2018). The airport was accused of adding infrastructure and facilities that other agencies subsidized, while the airport was turning a profit from these improvement project. "The opposition could derail the project, and has revealed massive disagreement over the best way to improve the airport's connection to transit and deal with its continued growth" (Braymer, 2018). "None of the letters are timid, but by far the most outspoken is from the Port, which leases the airport property to the airport authority. Its letter is 1,229 pages and reads more like a combative lawsuit than a technical response letter" (Braymer, 2018). "The letter, MTS accuses the airport of routinely building projects and relying on its neighbors to deal with

the effects” (Braymer, 2018). The Port likewise says the airport is free-riding, and its project will just mean the city, CalTrans, SANDAG and MTS foot the bill for the airport’s expansion” (Braymer, 2018).

These examples provide evidence that political pressure adds complexity to airports and master plan development and implementation. It is vital airports include key governmental figures and community engagement to ensure the airport master plan process is not hinder during the approval stage. Master plans should benefit its customers and the surrounding community.

## **Financial**

According to Wells (2011) airports have become one of the largest employers in the world. Ensuring airports function is essential to the world’s participation in the global economy. Majority of large airports in the U.S. are owned and operated by local and state governments which adds a complexity to funding. Airports generate revenue they operate like an enterprise (Graham & Morrell, 2017, pg. 10). Airports have expensive operating costs, improvement projects and contracts to provide a safe and secure environment. Infrastructure projects are outcomes of the master plan process are funding by airport improvement programs (federal grant, Passenger Facility Charge (PFC) and municipal bonds. Funding is a challenge for airports due to outdated funding sources (Graham & Morrell, 2017, p. 20). “The PFC is a local user fee that is required by law to be used to fund FAA-approved airport improvement projects. Created by Congress in 1992, the PFC user fee was designed as a tool to spur infrastructure investment that would create competition among the airlines” (ACI, 2018).

Airports must get creative to seek new ways to generate aeronautical which includes:

- Airline rents
- Usage fees
- Airside revenue

And non-aeronautical revenue which includes:

- Parking
- Ground transportation
- Advertising
- Car Rental
- Food & Beverage
- Property and real estate

The airports revenue streams must grow if an airport plans to expand to meet its forecasted passenger demand. Bonds, PFC's, and aeronautical and non-aeronautical funds contribute to the airports ability to build new facilities.

### **Environmental / Land Use**

As the aviation industry undergoes rapid changes, airports are constantly affected by environmental issues. These issues arise at airports during the master plan implementation process, environmental concerns include but not limited to the following: noise, air quality, and water quality and hazardous materials in the soil. All of these barriers affect master planning as a result of the unknowns.

Environmental concerns should be weighed during the planning process; environmental issues are important to the community it serves. Noise affects the surrounding community quality of life and property values. The buffer zone used around airports mitigates noise levels for the community, but as airport plan to grow that buffer is expanded which encroaches on new communities (Horonjeff, 2010, p. 579). Complaints about noise are common in the aviation industry especially when an airport publicly announces plans to add additional runways that change the current flight paths. Airport's continuously work on creative ways to reduce noise levels at airports but challenging when the primary users of the facility request new air service (Neufville, 2013, p. 147).

Air quality issues arise when an airport plans to expand and add additional flights. Carbon emissions receive the majority of the backlash from the surrounding communities due to carbon emissions negatively affecting humans (Neufville, 2013, p. 155). Environmentally conscious communities are against growth and make it difficult for airport expansion. Master plan teams should engage environmental groups early in the development stages of the master plan to gain trust and approval for future projects. Projects should be delivered in a way that minimizes environmental impacts (Neufville, 2013, p. 156).

Depending on the geographic location of an airport, water quality concerns heavily effect the airport's effort to expand. In colder climates, aircraft must de-ice to ensure aircraft safety. This activity dispenses a chemical on the aircraft that is designed to remove the oxygen from the water (Neufville, 2013, p. 167). The management of this chemical is critical for water quality and the surrounding waterways, failure to properly manage storm water run-off and



collection and disposal of this material could trigger environmental violations (Horonjeff, 2010, p. 577).

Active landfills on airport properties (brownfields) also squeeze construction limits and growth opportunities. Hazardous material in the soil is an unknown, during construction of projects, the master plan implementation can be delayed or canceled due to hazardous materials in the soil. Environmental assessments assist with reducing the unknowns. Master plan teams should plan for anticipated and unanticipated environmental issues and maximum their available land use.

Key barriers to the development of an airport master plan can be summarized by the following pillar question and sub-questions:

**Pillar question 2:** What are the barriers to effective strategic plans at airports?

**PQ2a:** How does political and community pressure negativity affect the master plan process?

**PQ2b:** What are the funding sources that support airport master plan outcomes?

**PQ2c:** How does an airport's available land use and environmental concerns effect a master plan?

### **Alternate planning models**

As previously noted, there is room for improvements in airport master planning. Airport planners have multiple variables to incorporate during the design phase and need to have a good understanding of these issues. Also, the airport leadership must recognize their business decisions affect the airport goals and its stakeholders. Finding common ground is difficult due

to the amount of variables that must be considered during the planning process. Airports seeking new ways to create flexibility in their master plan must change the common, repetitive activities with data and tools dispersed throughout and outside the organization Wijnen et al. (2008). Two models are discussed, Structural Equation Model and Decision Support System.

Itani, O'Connell, and Mason (2014) suggest using Structural Equation Modeling (SEM), which looks at the following items that have an effect on air transport output: passenger traffic, aviation total contribution to GDP, aviation total contribution to employment and air connectivity levels. The authors believe that taking a macro approach in the aviation industry helps the system function healthier across the country.

Wijnen et al. (2008) are presenting a Decision Support System (DSS) which follows Turban's (1995) definition of a DSS as an interactive, flexible and adaptable computer-based information system, developed for supporting the solution of a non-structured management problem for improved decision making. Wijen (2008) version is called HARMOS, their model "enables an airport operator to deploy its resources – people, data, information and tools more efficiently" (Wijnen, 2008). HARMOS would allow airport officials to be more efficient at exploring strategies. This system would allow for better responses to changes in the environment, the system would also learn and adapt.

### **Dynamic planning**

In the ever-changing industry, airports must adapt to new technology, aircraft, FAA rules and regulations, and passenger growth. "With passenger and cargo traffic expected to grow by around 5% per annum for at least the next 15 years, demand for new and updated airports has arguably never been so high" (Airport World 2018). A majority of airports use the traditional

master plan process to achieve airport-wide goals. However, this planning process usually results in static documents and reports that once completed are outdated due to the length of the process.

De Neufville (1995) suggests that airports use dynamic strategic planning, which allows them to only commit to immediate decisions while leaving flexibility for long-term decisions. Dynamic planning provides airports planners more time to adapt to changes.

Dynamic planning allows flexibility and opportunity for airports to continually update the master plan as the industry changes (Neufville, 2013, p. 101). This also allows airports to capture data daily and regularly inform airports when there is a need for a change in current operations. This type of planning accounts for rapid change and provides airport the opportunity to be robust (Wijnen, 2008). It incorporates anticipate risk and changes in the market by keeping daily records. A small change can be noticed and affords the airport time to adjust to a shift in the industry; this helps save airport official's time and money while providing it passenger's excellence customer service (Neufville, 2013, p. 102). This process can substitute master planning now that this is a more realistic approach that provides airports on-demand data, maximizes efficiency and minimizes cost. As the airport industry grows and technology changes, dynamic planning provides airport decision-makers the tools to make more informed decisions while being proactive instead of always reactive (Nixon, 2014). This provides the best opportunity for the airport to be more financially productive and provide the best possible experience for its customers.

## Technology and Review

As airports continue to strive for excellent customer service and high profits to fund Capital improvement projects (CIP), pay back debts and pay staff. They should plan for uncertainty and prepare for change. However, airport master plans allow minimal flexibility, forecasted demand drives airport growth and this is forecasted out over 20 years based on current and historical data. It cannot plan for unforeseen events, natural disasters or upsets in the market. Master planning projections are misled by bad forecasting and take the “business as usual” approach (Dr. Neufville, 2016). This has negatively impacted the airport master planning process. It appears it’s becoming obsolete due to it having a tough time predicting long and short term changes in air and passenger traffic, which makes it difficult to figure out the timing for improvements (Nixon, 2014). The advancement in technology has attempted to fill this void. Dynamic Analysis Tool (DAT) computer model, takes the master plan from just a plan to a real management tool (Nixon, 2014). The benefits of the DAT model:

- Creates graphs that quickly demonstrate the pros and cons of various scenarios
- Quickly give answers to complex questions and provide financial information
- Users can adjust variables and analyze a variety of future scenarios

Poinsatte (2011) discusses the successes that DFW International Airport has experienced with their latest strategic plan. Poinsatte (2011) also explains that DFW reviews their goals each year and adjusts classifications based on the current environment. They are having a review process built to assist with keeping the master plan valid throughout its duration.

This allows contingency during the planning process and helps evaluate airport needs in addition to reducing the chance of poor management of current and future facilities. Being able to adjust the plan is vital, as things may be in the implementation stage that no longer make economic sense due to an unexpected event that makes people scale back on traveling, or the opposite a rapid increase in discretionary spending due to passenger demand which leads to more travel (Nixon 2014). An airport is a dynamic city of its own that operates under the FAA's supervision and must provide a safe and efficient operation to its customers and maximize profits to continue to be self-sustaining. This process allows for external unforeseen events, extreme weather, terror attacks, and airline business failures. The airport industry is unpredictable, and the impacts of poor planning can be felt for years.

Innovations to airport master planning can be summarized by the following pillar question and sub-questions:

**Pillar question 3:** What are the alternatives to the master plan in airports?

**PQ3a:** What planning models can be substituted for master planning at airports?

**PQ3b:** Can dynamic planning be substituted for the master planning process?

**PQ3c:** What technology and active management tools can provide flexibility in the master process?

## Summary of Conceptual Framework

Due to the early developmental stage of this research, this is the exploratory phase and pillar questions are used to navigate the inquiry process. The pillar questions were developed by outputs from the review of the literature. Table 4.1 summarizes the conceptual framework table and links the pillar questions and sub-pillar questions. The literature reviewed focused on airport strategic planning and the airport master planning process. The pillar questions listed below include a narrative to explain why the questions are relevant to the research. Sub-pillar questions were developed to answer each pillar question.

**Table 4.1 Conceptual Framework**

<b>Title:</b> Effectiveness of Master Planning at Airports	
<b>Purpose:</b> The purpose of this research is to: 1) to use the literature to identify factors critical to successful airport strategic planning; 2) to develop a set of pillar questions designed to explore ways these factors facilitate, create barriers and suggest innovations that lead to successful strategic planning; 3) to use the pillar questions to focus interviews with airport officials about how these factors might influence success (or limit success) of airport strategic planning efforts; and 4) to use the information gathered from the literature and interviews to make recommendations to improve airport strategic planning.	
<b>Pillar Question</b>	<b>Supporting Literature</b>
<b>Pillar Question #1-</b> What factors facilitate an effective strategic plan at airports?	
PQ1a- Why are critical goals important in the facilitation of a successful master plan?	(Wells, 2011), (Wijnen, Walker, & Kwakkel, 2008) (Bryson, Alston 2011) (Bryson 2018)
PQ1b- What is the role of sound data in effective strategic planning?	(Poinsatte 2011) (Bryson 2018)
PQ1c- What is the role of evaluation in effective strategic planning?	(Rodriguez & Bijotat, 2003), (Vreeker, Nijkamp, & Ter Welle, 2002), (Poinsatte,

	2011), (Wijnen, Walker, & Kwakkel, 2008) (Magalhães, Reis, & Macário, 2015) (McManners, 2016) (Bryson, Alston 2011) (Bryson 2018)
<b>Pillar Question #2- What are the barriers to effective strategic plans at airports?</b>	
PQ2a- What political pressure is there on the airport when creating the master plan?	(Wells, 2011), (Itani, O'Connell, & Mason, 2015), (Nunn, Klacik, & Schoedel, 1996), (Wijnen, Walker, & Kwakkel, 2008), (McManners, 2016), (Baker & Freestone, 2012) (Horonjeff 2010)
PQ2b- What is the role of finances in strategic planning?	(Nixon, 2014), (Poinsatte, 2011), (Wijnen, Walker, & Kwakkel, 2008) (Magalhães, Reis, & Macário, 2015) (Graham, Morrell 2016)
PQ2c- What is the role of environmental issues land use in strategic planning?	(Baker & Freestone, 2012), (Nunn, Klacik, & Schoedel, 1996)
<b>Pillar Question #3- What are the alternatives to the master plan in airports?</b>	
PQ3a- What planning models can substitute master planning at airports?	(De Neufville, 1995), (Nixon, 2014), (Wijnen, Walker, & Kwakkel, 2008) (Itani, O'Connell, & Mason, 2014) (Santos & Antunes, 2015)
PQ3b- Can dynamic planning substitute the master planning process?	(De Neufville, 1995), (Nixon, 2014), (Wijnen, Walker, & Kwakkel, 2008) (Itani, O'Connell, & Mason, 2014) (Santos & Antunes, 2015)
PQ3b- What technology and active management tools can provide flexibility in the master process?	(Itani, O'Connell, & Mason, 2014), (Itani, O'Connell, & Mason, 2015), (Martín & Voltes-Dorta, 2011) (Neufville (2013) (Nixon 2014) (Poinsatte (2011)

## Chapter 5: Methodology

This research project is focused on strategic planning at airports and airport master planning. The purpose of this chapter is to describe the research methodology used to explore airport strategic planning and its facilitators and barriers to effective airport master planning. Pillar questions and interviews were used. Exploratory research is suitable when the research topic is still in its initial stages of development and a preliminary data collection method is required (Shields & Rangarajan, 2013, p. 26-27). The utilization of pillar questions were to organize the exploration of qualitative data (Shields & Rangarajan, 2013, p. 148). The interview questions were the vehicle used to survey 6 airport professionals around the country from medium and large airports to obtain in depth information regarding airport master planning.

### **Operationalization**

The standardization, open-ended interview questions were developed by incorporating the pillar questions and sub-pillar questions in the operationalization table (5.1). These questions were designed to open dialogue about specific professional experience with the associated topics. This also allowed follow-up questions and open discussion about existing airport planning challenges. The operationalization table demonstrates the transition from conceptual framework table into the open ended interview questions and follow up questions. For example, PQ1c- Do airports follow-up on approved master plans? The interview questions listed below were developed:

1. Who approves master plans?
2. What is the process for reviewing and evaluating master plans?



3. Describe master plan requirements.
4. Are performance measures used as an evaluation tool?
5. *Follow-up questions as merited*

**Table 5.1 – Operationalization Table**

<p><b>Title:</b> Effectiveness of Master Planning at Airports</p> <p><b>Purpose:</b> The purpose of this research is to: 1) to use the literature to identify factors critical to successful airport strategic planning; 2) to develop a set of pillar questions designed to explore ways these factors facilitate, create barriers and suggest innovations that lead to successful strategic planning; 3) to use the pillar questions to focus interviews with airport officials about how these factors might influence success (or limit success) of airport strategic planning efforts; and 4) to use the information gathered from the literature and interviews to make recommendations to improve airport strategic planning.</p>	
Pillar Questions	Open Ended Research Questions
<b>Pillar Question #1- What factors facilitate an effective strategic plan at airports?</b>	
PQ1a- What are the role of goals in effective strategic planning? Why are critical goals essential for strategic planning at airports?	<ol style="list-style-type: none"> <li>1. What drives the development of the goals?</li> <li>2. Who develops the airport goals?</li> <li>3. What analysis is used to develop the goals?</li> <li>4. Short-term goals versus long-term goals?</li> <li>5. <i>Follow-up questions as merited</i></li> </ol>
PQ1b- What is the importance of sound data to an airport master plan?	<ol style="list-style-type: none"> <li>1. Describe the data collection method?</li> <li>2. What types of data is collected?</li> <li>3. Who approves the data collected?</li> <li>4. Is there flexibility in the data?</li> <li>5. <i>Follow-up questions as merited</i></li> </ol>
PQ1c- What is the role of evaluation in effective strategic planning?	<ol style="list-style-type: none"> <li>1. Who approves master plans?</li> <li>2. What is the process for reviewing and evaluating master plans?</li> <li>3. Describe master plan requirements.</li> <li>4. Are performance measures an evaluation tool?</li> <li>5. <i>Follow-up questions as merited</i></li> </ol>
<b>Pillar Question #2- What are the barriers to effective strategic plans at airports?</b>	
PQ2a- What political pressure is there on the airport when creating the master plan?	<ol style="list-style-type: none"> <li>1. How do master plans incorporate key stakeholders?</li> <li>2. Is there community input?</li> <li>3. How are government agencies involved?</li> <li>4. When should master planning teams engage key political figures?</li> <li>5. <i>Follow-up questions as merited</i></li> </ol>
PQ2b- What is the role of finances in strategic planning?	<ol style="list-style-type: none"> <li>1. What are the available funding sources?</li> </ol>

	<ol style="list-style-type: none"> <li>2. How does the current economy affect construction decisions?</li> <li>3. How are airports funded?</li> <li>4. <i>Follow-up questions as merited</i></li> </ol>
PQ2c- What is the role of land use in strategic planning?	<ol style="list-style-type: none"> <li>1. Does geographic location affect long-term planning?</li> <li>2. Does climate affect potential land use?</li> <li>3. How does environmental concerns affect available land use?</li> <li>4. <i>Follow-up questions as merited</i></li> </ol>
<b>Pillar Question #3- What are the alternatives to the master plan in airports?</b>	
PQ3a- What planning models can substitute master planning at airports?	<ol style="list-style-type: none"> <li>1. Describe alternatives to master planning</li> <li>2. How does the current master plan process affect innovation?</li> <li>3. Does the FAA support innovation?</li> <li>4. <i>Follow-up questions as merited</i></li> </ol>
PQ3b- Can dynamic planning substitute the master planning process?	<ol style="list-style-type: none"> <li>1. What are the challenges with dynamic planning at airports?</li> <li>2. Does dynamic planning additional complexities to airport planning?</li> <li>3. What are advantages of dynamic planning versus master plans?</li> <li>4. <i>Follow-up questions as merited</i></li> </ol>
PQ3c- What technology and active management tools can provide flexibility in the master plan process?	<ol style="list-style-type: none"> <li>1. Do master plans provide airport official flexibility for decision making?</li> <li>2. Does the current process give airports insurance for future unidentified issues?</li> <li>3. What technology is used to enhance master plan outcomes?</li> <li>4. Are active management tools used to assist with implementation a master plan?</li> <li>3. <i>Follow-up questions as merited</i></li> </ol>

## Interviews

The airport officials all voluntarily agreed to participate in the interviews and supported this project. They all felt this project was beneficial for the airport industry leaders. All interviews were conducted via email and follow-up phone conversations occurred. The structure of the questions and introduction of the project helped facilitate responses. “Establish a general direction for the conversation and pursue specific topics raised by the respondents” (Babbie 2007, p. 306). Exploratory research methods have limitations and the majority of them provide qualitative information and the interviewee’s responses can often be judgmental. A majority of the participants agreed that this project would provide new insight of the airport master planning process and how it impacts the outcomes.

A concern throughout the interview was the weakness of the process due to the opportunity for bias, airports operate under the same set of rules but interpretation of these rules can produce different outcomes. Another issue was the interviews had to be approved by the Texas State University Institutional Review Board (IRB) which caused a delay in the researcher’s ability to reach out to potential participants. Also interviews are time consuming and difficult to schedule, this caused the sample to be small. Also noted by Johnson (1997) “Some inherent weakness of interviews and reflexivity”. The interviewer attempted to remove subjectivity by only accepting emailed responses, all interviewees’ conversations, if occurred, were recorded and transcribed in writing. The opportunity for a biased response from the interviewees was mitigated by encouraging the respondents to express their personal experiences associated with the process and never receiving guidance from the interviewer.

## Sample

This applied research project used convenience sampling, which is a non-probability sampling technique where the subjects were selected because of their convenient accessibility and proximity to the researcher along with their in-depth knowledge with the researcher's topic (Johnson 2017). Snowball sampling, another non-probability sampling method employed. The existing interview subjects assisted with recruiting additional respondents by giving the contact information of other colleagues with professional experience with the researcher's topic (Johnson 2017). Primary contact was made with the local airport officials in Austin Texas at Austin Bergstrom International Airport (ABIA) in March 2019. A meeting was scheduled with airport executives to discuss the project. After the meeting, the researcher developed an email that explained the project and included a set of interview questions.

Interviewees were selected with the help of the airport officials at the Austin Bergstrom International Airport. The goal was to obtain responses from colleagues that hold a leadership position within an airport that is directly tasked or have knowledge of airport strategic planning and master planning. They also had to have the availability to participate and respond to the interview questions by April 1<sup>st</sup>.

The researcher emailed the potential interviews to gauge interest and six requested participants responded. Of those who responded, a few included additional contacts that would possibly be interested in participating in the research project. Three participants submitted responses via email and three participants provided responses via a phone interview. The emailed responses to each question were only a few sentences. The two phone interviews lasted approximately one hour. The open-ended questions allowed the respondents to respond

freely with minimal guidance from the interviewer. This ultimately helped mitigate biases from the respondents.

### **Human Subject Protection**

The Texas State University internal review board (IRB) reviewed this applied research project and deemed it exempt. The IRB team ensured that all federal guidelines and approved ethical principles were followed during the interview process. (The IRB approval is attached in appendix A.)

## **Chapter 6: Summary of Findings**

This chapter provides a summary of the interview responses by airport planning professionals. Airport planning professionals from multiple airports agreed to participate in the research project for the purpose of exploring the effectiveness of airport strategic planning and airport master planning. The airport planning professional responses describe how their professional experiences with the facilitators and barriers of master planning effect the outcome.

### **What factors facilitate an effective strategic plan at airports?**

#### **Critical goals (PQ1a)**

All respondents concurred with the ACRP report #20 that critical goals need to be identified early in the master planning process to ensure the airport takes a holistic approach and factors in the all variables before committing to alternates. One respondent noted, “Goals establish the aiming point for desired outcomes.” All respondents noted, the analysis used during the developmental process of critical goals is a SWOT analysis and airports must understand the environment the airport is operating in – demographics, economics, existing conditions, forecast and the industry trends, these concur with the text in Horonjeff 2010. According to the respondents, the development of the critical goal requires input from key stakeholders. These goals should incorporate the organization’s mission, vision, values and overall philosophy. Another key component of developing these goals are finances and new

aviation policies. Another respondent noted, "Goals are critical because they are what the relevant stakeholders rally to support." All airport planning officials stated long-term and short-term goals should be established. Based on the need of the airport, business planning, are short-term goals which allow the most realistic opportunity to garner support and financing, short-term goal are focused around the next 1-5 years. Long term goals require vision and patience these goals are a 10-20 year outlook. He also mentioned, "Planning goals provide an understanding of what success looks like."

### **Sound data (PQ1b)**

Sound data usually is historical and is critical for establishing a basis for forecasting models. As noted by an airport executive, "Historic data if accurate, is factual." Respondents explained that modeling is challenging for all airport planners and is subject to many variable inputs. Respondents agree with Neufville (2013), historical data provides airport officials with important information that should be factored into the planning process, this validates the outcomes and helps determine if the goals developed meet the airports current and long term needs. One planner stated, "It can be used to validate previous assumptions and help to determine if the goals established with prior planning were met." Respondents noted that majority of airports hire consultants to collect the data used for the master plan. One planned said "Hire a good consultant to gather data." The data is retrieved from agencies that kept records of the transactions, which include the following: FAA, air operations, ground transportation, financial staff and passenger traffic data. The data is reviewed by the airport sponsor and the FAA approves the forecast, critical aircraft and ALP. The respondents explained, there is flexibility in the data, if the data is subjected to subjective and professional

inference and interpretation. It's the airports responsibility to vet the data and question the findings.

### **Follow-up (PQ1c)**

All respondents stated airports should follow up on approved master's plans every 5-10 years if they have an airport planner on staff. The respondents concurred with Neufville (2013) that the sponsor and governing body approves the master plan, the FAA only approves the forecast and ALP. The review process of the master plan is an evaluation that is conducted by airport staff. The key items are comparison of the actual operation versus the forecast, regulatory changes and AIP funding outlook. The consultants hold public meetings and present a high level overview of the key items and takes input from the community and address comments. The master plan requirements are spelled out in FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans. The respondents were not aware of any performance measures attached to a master plan. Respondents noted master plans are designed to meet airport passenger demand and secure funding for projects.



## **What are the barriers to effective strategic plans at airports?**

### **Political and community pressure (PQ2a)**

Respondents explained depending on the location of the airport determines the amount of political pressure a planner will experience. The respondents that contributed have not experienced any political pressure. They noted the reason they believe no political pressure was felt is due to the key political figures do not understand what a master plan consist of or its goal. One planner noted, "Generally, the community leaders have little to no understanding of the master plan process or interest in their airport." However, a large amount of community input is provided by hosting open public meetings, this is not required but is strongly recommended by the FAA. Government agencies are invited to sit on the committee to comment on items that affect their entity. Highway administration were noted as the most important agency, because if passengers cannot safely and efficiently access the airport it could have a negative impact on the passenger's experience. Respondents explained key political figures should be engaged at a minimum. One airport executive stated, "There is too much information included in a master plan that doesn't interest majority of political figures." They should only be invited to the kick-off meeting, selection of the preferred alternates and conclusions. One planner noted, "Airports must present the information in a way the political figures in power want to support and make them look like they making a positive impact on the community." Their input and support is only required for funding of large projects and if the project impacts the surrounding community.

## **Finances / Funding Sources (PQ2b)**

According to 5 respondents airport funding is provided by airport investment program, passenger facility charges, bonds, various federal grants, capital funds and operation and maintenance funds. This concurs with the ACI airport funding report 2018. The current economy is a major factor when airports are implementing a master plan, because funding is required to construct the essential facilities to support passenger demand. An airport executive mentioned, "The finance team should be involved in the master plan process from the beginning." Procurement and the methods used to deliver projects determine the amount of funding is required. The market the airport operates in can negatively affect the airports ability to deliver projects, hot markets where construction is ongoing throughout the region usually means the high quality contractors are not available, this delays projects. One planner stated, "Without funding you cannot implement a master plan." Also, if the national economy is poor, the AIP grant money may not be available, banks might not lend money as readily and or bond rates might preclude funding for projects. One planner noted, "If airports have the money to spend they will spend it on projects that enhance the passenger's experience." According to all respondents one of the goals of the master plan should include the goal of being able to afford the projects or develop a financing plan based on the recommended projects in the master plan CIP.

### **Environmental / Land Use (PQ2c)**

All planning officials interviewed explained that environmental and land use concerns are airports biggest obstacle during the master planning process. Environmental issues cost airport millions of dollars every year. Mitigation for certain environmental issues force airports to cancel projects, one planner indicated, "Mitigation can be cost prohibitive". The geographic location is a major factor when developing land on an airport, it also affects the area around the airport. one planner stated, and "Noise impacts on the surrounding community can create a huge finance burden." According to the interviewees, development in a crowded city makes it far more difficult for long-term planning than an airport that is out in open area. One planner provided examples, San Antonito's airport is land-locked and Denver has a abundance of land which is located outside the city that owns 18,000 acres, operated more freely. One airport executive explained, "Non-compatible land development surrounding an airport can actually choke off any growth at the airport." Weather and climate were also noted as a barrier to airport planning, some airports are located on coast lines which are notorious for hurricanes and others area located near mountain ranges which are known for large amounts of snow. The planners noted, air quality and water quality are also key variables that determine how an airport plans facilities. One airport planning official concluded with "Airports and airlines rightfully so, will need to ensure their impacts on the environment are kept in check and they too have to be good citizens in the world environment."

## What planning models that can substitute master planning at airports?

### Dynamic planning (PQ3a)

All respondents noted that airport master plans have a specific purpose and are industry recognized and are not sure a replacement would be accepted by the FAA. The biggest concern noted regarding dynamic planning was funding opportunities would not be secured and long lead times for construction schedules for large projects make is a unlikely options for airports. According to the respondents, the FAA does not support innovation due to limited funding but airports around the country have tired get creative but the airlines deem them anti-competitive, an example noted was common use technology. On planner stated, "FAA does support innovation if they don't have to pay for it." Airport master plans are not designed to be innovative they are created to secure funding. Airport planners do not think dynamic planning can substitute for airport master planning because it decentralizes decision-making. One planner mentioned, "Government entities are generally risk-averse organisms." Dynamic planning would allow airports the ability to change quickly, but this is restricted by funding and regulatory requirements. However, airports are not product driven, quarterly driven or truly competitive business. One planner concluded, "Changes cannot be made quickly at airports because of funding, regulatory, and schedule limitations."

### **Technology and Review (PQ3b)**

According to the airport planners, technology evolves at a rapid pace and airports cannot keep up. As discussed, FAA does not support innovation due to limited funding. However, technology is used during the creation of the master plan to develop maps and to store important information used to build the back data to support the recommendations and outcomes. Technology can also be used to promote and disseminate information to the affected community about the master plan. Airport executive mentioned, "Technology can prove to be the difference maker in the master planning process." This a vehicle to engage the public and provide updates on the master plan process and outcomes. It can be used to help with implementation but can't replace the process. The respondents were unaware of any software that is currently being used in the aviation industry that is supported by the FAA as a replacement. One planner stated, "I'm not sure what active management tools would be used in airport master planning implementation." Ultimately, technology is used to obtain meaningful participation during the process to provide the community a product everyone can support. The respondents noted that master plans are reviewed every five years to determine if the airport achieved certain financial goals and construed the necessary facilitates to support the critical goals developed by the master plan.

## Chapter 7: Conclusions

This chapter provides conclusions and recommendations based on research and interview findings from airport planning professionals. Their responses also provided insight on how they ultimately view the process and recommend a variety of alternate options. This exploratory research is in its preliminary stages and is only intended to provide real world insight and not final conclusions.

**Table 5.1 – Summary of findings linked to Pillar Questions**

Pillar Question	Open Ended Research Questions
Pillar Question 1: What factors facilitate an effective strategic plan at airports?	
<p><b>PQ1a:</b> Why are critical goals important in the facilitation of a successful mater plan?</p>	<p><b>Summary:</b> The master plan relays on airport leadership to determine what the airport goals are for the master plan and allows staff and the consultant to provide a plan to achieve airport wide goals.</p>
<p><b>PQ1b:</b> What is the role of sound data in effective strategic planning?</p>	<p><b>Summary:</b> Sound data is the most important aspect in the planning process of a master plan, it provides the airport the historical information and established the forecast modeling</p>
<p><b>PQ1c:</b> What is the role of evaluation in effective strategic planning?</p>	<p><b>Summary:</b> The evaluation is the final step of the airport strategic plan before it is released to be accepted and reviewed by the FAA, the FAA approves the forecast and the ALP.</p>
Pillar Question #2- What are the barriers to effective strategic plans at airports?	
<p><b>PQ2a:</b> What political pressure is there on the airport when creating the master plan?</p>	<p><b>Summary:</b> The location and size of the airport determines the amount of political pressure an airport planning team receives.</p> <p><b>Recommendations:</b> Engage political figures early in the process and incorporate their ideas, airport must</p>

	garner support from key political figures for project funding
<b>PQ2b:</b> What is the role of finances in strategic planning?	<p><b>Summary:</b> The goal of the master plan is to secure federal funding, airport are expensive to operate and maintain, funding is key.</p> <p><b>Recommendations:</b> Provide the FAA with a master plan that clearly demonstrates the need for new facilities to support passenger demand.</p> <p>Ensure the master plan can be funded as presented</p>
<b>PQ2c:</b> What is the role of environmental issues and land use in strategic planning?	<p><b>Summary:</b> Environmental issues are the biggest burden for airports across the country mitigation cost can make projects cost prohibitive. Land use can determine how much an airport can expand and what land is valuable.</p> <p><b>Recommendations:</b> Identify what are the potential environmental issues are at the airport and try to avoid disturbing the land.</p>
<b>Pillar Question #3-</b> What are the alternatives to the master plan in airports?	
<b>PQ3a:</b> What planning models can substitute master planning at airports?	<p><b>Summary:</b> Currently there are not substitutions for master plans, master plans are industry recognized and is the only planning process accepted by the FAA.</p>
<b>PQ3b:</b> Can dynamic planning substitute the master planning process?	<p><b>Summary:</b> Dynamic planning is unable to support the airport planning process due to the airport being quarterly driven not product driven. Dynamic planning requires extensive communication and it's challenging for large airports.</p> <p><b>Recommendations:</b> Improve communication across the organization.</p>
<b>PQ3b:</b> What technology and active management tools can provide flexibility in the master process?	<p><b>Summary:</b> Current technology provides airport master plans a vehicle to quickly disseminate information to a large audience, It also supports maps and modeling used to clearly demonstrate airport facility and infrastructure needs.</p>

## **Conclusions and Recommendations**

The development of the FAA has provided the aviation industry a government agency to provide rules and regulations for over 383 public airport national wide. The FAA's goals is to ensure the flying public is safe and secure. The FAA has also provided growing airport with a method to secure federal funding for large construction project. Airport master plans are guided by the FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans. Airport master plans have been used for many decades with little change in the process and should be open for suggestion for improvement. The evidence provided by multiple miscues during the master planning process which has cost airports and the federal government hundreds of millions of dollars. As a result, of this exploratory research project, a few recommendation have been noted.

## **Facilitators**

All respondents agreed that the master plan process involves multiple stake holders, critical goals, sound data and labor intensive. They also stated that a realistic SWOT analysis should be conducted and the plan should be flexible. Planners are the gatekeepers for airport planning and development. Their main goal is to look out for the interest of the airport and its customers. If airport planning officials keep the key facilitators in the forefront during the process the airport has a greater change of successfully delivering a master plan that can be fully fund and implemented.



## Barriers

Airport planners encounter multiple variables that impact the outcome of a master plan. Airports strive to provide the necessary facilities to support passenger demand. Most airport planners are looking into the future and watching the aviation industry to try to predict a shift. The master plan process is utilized to assist with airport development. The process has its challenges. All airport officials agree that funding, political engagement, land use and environmental concerns are key barriers and should be identified early in the process to help minimize the negative impacts.

### Recommendations:

- The airport master plan process should be required to develop realistic goals that support the customers' needs and ensure the goals receive community and political support early in the process.
- Provide the FAA with a master plan that clearly demonstrates the need for new facilities to support passenger demand.
- Identify what are the potential environmental issues are at the airport and try to avoid disturbing the land and Improve communication across the organization to help reduce planning missteps.
- Ensure the master plan can be funded as presented
-

## Alternates

Airport planners are at the mercy of the FAA to secure funding for capital improvement projects and have not been able to find a replacement for the airport master plan. All respondents noted that the FAA currently does not have an alternate planning model for federal funding, this is industry recognized. Master plans currently do not use performance measures. They also don't support innovation to the planning model. According to the respondents, Airport planners are busy with keeping up with current trends to have the capacity to develop and engage the FAA about other potential acceptable planning models.

### Recommendations:

- Improve communication across the organization.
- Provide the FAA with a master plan that clearly demonstrates the need for new facilities to support passenger demand.

However, further research should be conducted to evaluate why master plans are the only option to secure federal funding and why the FAA does not approve the entire master plan.

## References

- Airport Infrastructure Funding. (n.d.). Retrieved October 10, 2018, from <https://airportsCouncil.org/advocacy/airport-infrastructure-funding>
- Albrechts, Balducci, and Hillier, 2016 Albrechts, L., A. Balducci, and J. Hillier, eds. 2016. *Situated Practices of Strategic Planning*. New York: Routledge.
- Austin-Bergstrom International Airport. (n.d.). ABIA Master Plan. Retrieved from <http://www.abiamasterplan.com/>
- Babbie, Earl. *The Practice of Social Research*. Thomson Wadsworth, 2007.
- Baker, D., & Freestone, R. (2012). Land Use Planning for Privatized Airports. *Journal of the American Planning Association*, 78(3), 328-341. doi:10.1080/01944363.2012.716315
- Balanced Scorecard Institute. (n.d.). The Basics of Strategic Planning, Strategic Management and Strategy Execution. Retrieved from <http://www.balancedscorecard.org/BSC-Basics/Strategic-Planning-Basics>
- Braymer, N. T. (2018, October 17). Politics, San Diego's Airport And Rail Connections. Retrieved November 11, 2018, from <https://ntbraymer.wordpress.com/2018/10/17/politics-san-diegos-airport-and-rail-connections/>
- Breihan, J. R., Preston, E., & Briddon, A. E. (1998). *FAA historical chronology: Civil aviation and the Federal government, 1926-1996*. Washington, D.C.: Dept. of Transportation, Federal Aviation Administration, Office of Public Affairs.
- Briddon, Arnold E, et al. "FAA Historical Fact Book: a Chronology, 1926-1971." Find in a Library with WorldCat, 11 Mar. 2019, [www.worldcat.org/title/faa-historical-fact-book-a-chronology-1926-1971/oclc/1056369](http://www.worldcat.org/title/faa-historical-fact-book-a-chronology-1926-1971/oclc/1056369).

- Bryson, John M., and Farnum K. Alston. *Creating Strategic Plan: a Workbook for Public and Nonprofit Organizations*. Jossey-Bass, 2011.
- Bryson 2011 Bryson, J. M. 2011. *Strategic Planning for Public and Nonprofit Organizations*. San Francisco, CA: Jossey-Bass.
- Bryson, John M. *Strategic Planning for Public and Nonprofit Organizations: a Guide to Strengthening and Sustaining Organizational Achievement*. Wiley, 2018.
- Burke, J. (2002, December 12). Pressure to Delay Airport Master Plan Vote May Jeopardize Final Approval of Study. Retrieved November 11, 2018, from <https://vineyardgazette.com/news/2002/12/13/pressure-delay-airport-master-plan-vote-may-jeopardize-final-approval-study>
- Carey, Susan; Pasztor, Andy (July 13, 2016). ["Senate Passes FAA Reauthorization Bill"](#). *Wall Street Journal*. [ISSN 0099-9660](#). Retrieved March 8, 2017.
- City of Austin. (n.d.). Airport Master Plan. Retrieved from <http://www.austintexas.gov/page/airport-master-plan>
- David McCullough: The Wright brothers (Simon & Schuster audio book, 2015).
- De Neufville, R. (1995). Management of multi-airport systems. *Journal of Air Transport Management*, 2(2), 99-110. doi:10.1016/0969-6997(95)00035-6
- De, N. R., Odoni, A. R., Belobaba, P., & Reynolds, T. (2013). *Airport systems: Planning, design, and management, second edition*. New York: McGraw-Hill Education.
- Diana, T. (2011). Are secondary airports subject to the same fixed or random effects as large hub airports? A case study of the Chicago metropolitan area airports using dynamic panel data analysis. *Journal of Airport Management*, 5(3), 269-281.

Dr. Neufville, R (2016) Airport Strategic Planning. *Airport Systems Planning & Design / RdN*

[http://ardent.mit.edu/airports/ASP\\_current\\_lectures/ASP%2004/Planning%2004.pdf](http://ardent.mit.edu/airports/ASP_current_lectures/ASP%2004/Planning%2004.pdf)

Federal Aviation Administration. (2015, January 27). Airport Master Plans. Retrieved from

[https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_150\\_5070-6B\\_with\\_chg\\_1&2.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_150_5070-6B_with_chg_1&2.pdf)

Federal Aviation Administration (FAA). (2018) Reauthorization Act 2018. Retrieved from

[https://transportation.house.gov/uploadedfiles/faa\\_reauthorization](https://transportation.house.gov/uploadedfiles/faa_reauthorization)

Federal Aviation Administration (FAA). (2018, October 12). Retrieved October 15, 2018, from

<https://www.faa.gov/about/history/>

Ferlie and Ongaro 2015 Ferlie, E., and E. Ongaro. 2015. *Strategic Management in Public Sector Organizations: Concepts, Schools, and Contemporary Issues*. New York: Routledge.

Fine, Lawrence G. *The SWOT Analysis: Using Your Strength to Overcome Weaknesses, Using Opportunities to Overcome Threats*. Kick It, 2010.

Glass, Andrew. Congress passed Air Commerce Act, May 20, 1926. Retrieved December 8, 2018 from <https://www.politico.com/story/2013/05/this-day-in-politics-091600>

Global Air Passenger Traffic Soared in 2017. (n.d.). Retrieved November 19, 2018, from

<https://www.travelpulse.com/news/airlines/global-air-passenger-traffic-soared-in-2017.html>

Harris, Douglas "Federal Aviation Act (1958)." Major Acts of Congress. . Retrieved February 15,

2019 from Encyclopedia.com: <https://www.encyclopedia.com/history/encyclopedias-almanacs-transcripts-and-maps/federal-aviation-act-1958>

Horonjeff, Robert. *Planning and Design of Airports*. McGraw-Hill, 2010.

Hughes, John. Bloomberg News. March 2, 2009.

- Itani, N., O'Connell, J. F., & Mason, K. (2014). A macro-environment approach to civil aviation strategic planning. *Transport Policy*, 33, 125-135. doi:10.1016/j.tranpol.2014.02.024
- Itani, N., O'Connell, J. F., & Mason, K. (2015). Towards realizing best-in-class civil aviation strategy scenarios. *Transport Policy*, 43, 42-54. doi:10.1016/j.tranpol.2015.05.013
- Johnson, B (Winter 1997). Examining the Validity Structure of Qualitative Research. University of South Alabama. Mobile, Alabama: Education: 118, 2. Retrieved from [https://www.researchgate.net/profile/R\\_johnson3/publication/246126534\\_Examinin\\_g\\_the\\_Vaiidity\\_Structure\\_Of\\_Qualitative\\_Reserach/links/54c2af380cf219bbe4e93a59.pdf](https://www.researchgate.net/profile/R_johnson3/publication/246126534_Examinin_g_the_Vaiidity_Structure_Of_Qualitative_Reserach/links/54c2af380cf219bbe4e93a59.pdf)
- Johnson, Burke, and Larry B. Christensen. *Educational Research: Quantitative, Qualitative, and Mixed Approaches*. SAGE, 2017
- Kraus, Theresa L. The Federal Aviation Administration: a Historical Perspective, 1903-2008. U.S. Dept. of Transportation, Federal Aviation Administration, 2008.
- Magalhães, L., Reis, V., & Macário, R. (2015). Can flexibility make the difference to an airport's productivity? An assessment using cluster analysis. *Journal of Air Transport Management*, 47, 90-101. doi:10.1016/j.jairtraman.2015.05.003
- Maniriho, E. A. (2016). *Strategic airport planning and marketing*. Notion Press, Inc.
- Martín, J. C., & Voltes-Dorta, A. (2011). The dilemma between capacity expansions and multi-airport systems: Empirical evidence from the industry's cost function. *Transportation Research Part E: Logistics and Transportation Review*, 47(3), 382-389. doi:10.1016/j.tre.2010.11.009
- McManners, P. J. (2016). Developing policy integrating sustainability: A case study into aviation. *Environmental Science & Policy*, 57, 86-92. doi:10.1016/j.envsci.2015.11.016

- Neufville, Dr Richard de. *Airport Systems: Planning, Design, and Management, Second Edition*. McGraw-Hill, 2013.
- Nixon, C. (2014). The dynamic planning approach and the death of the traditional master plan. *Journal of Airport Management, 8*(4), 343-350.
- Nunn, S., Klacik, D., & Schoedel, C. (1996). Strategic Planning Behavior and Interurban Competition for Airport Development. *Journal of the American Planning Association, 62*(4), 427-441. doi:10.1080/01944369608975710
- Poinsatte, C. (2011). Achieving strategic alignment at DFW International Airport. *Journal of Airport Management, 6*(1), 12-31.
- Rodriguez, A., & Bijotat, F. (2003). Performance Measurement, Strategic Planning, and Performance-Based Budgeting in Illinois Local and Regional Public Airports. *Public Works Management & Policy, 8*(2), 132-145. doi:10.1177/1087724x03256513
- Santos, M. G., & Antunes, A. P. (2015). Long-term evolution of airport networks: Optimization model and its application to the United States. *Transportation Research Part E: Logistics and Transportation Review, 73*, 17-46. doi:10.1016/j.tre.2014.10.016
- Shapiro, Adam; Browne, Pamela (May 20, 2015). ["Trouble in the Skies"](#). Fox Business. Retrieved January 3, 2016.
- Shields, P., & Rangarajan, N. (2013). *A playbook for research method*. New Forums Press, Inc.
- Shields, P. M., & Tajalli, H. (2006). Intermediate theory: The missing link in successful student scholarship. *Journal of public affairs education, 12*(3), 313-334.
- Shields, P., & Whetsell, T. (2017). Public administration methodology: A pragmatic perspective. Eds. Raadshelders, J. and Stillman, R. *Foundations of Public Administration*. (75-92) New York: Melvin and Leigh.

- Sismanidou, A., & Tarradellas, J. (2017). Traffic demand forecasting and flexible planning in airport capacity expansions: Lessons from the Madrid-Barajas new terminal area master plan. *Case Studies on Transport Policy*, 5(2), 188-199. doi:10.1016/j.cstp.2016.08.003
- Taylor. R (2018) what is the strategic plan process  
<https://www.smestrategy.net/blog/what-is-the-strategic-planning-process>
- Vreeker, R., Nijkamp, P., & Ter Welle, C. (2002). A multicriteria decision support methodology for evaluating airport expansion plans. *Transportation Research Part D: Transport and Environment*, 7(1), 27-47. doi:10.1016/s0969-6997(01)00005-9
- Wells, A. T. (2011). *Airport planning and management 6/e* (6th ed.). McGraw Hill.
- Wijnen, R. A., Walker, W. E., & Kwakkel, J. H. (2008). Decision Support for Airport Strategic Planning. *Transportation Planning and Technology*, 31(1), 11-34.  
doi:10.1080/03081060701835670
- Valentin EK. 2001. SWOT analysis from resource-based view. *Journal of Marketing Theory and Practice*. 9(2): 54-68.
- Yamanouchi, K. (2018, June 10). State Study Committee to stir up issue of Hartsfield -Jackson control. *The Atlanta Journal-Constitution*. Retrieved November 8, 2018, from  
<https://www.ajc.com/business/state-study-committee-stir-issue-hartsfield-jackson-control/zEbrJqMJKwd1tApGUiuxYM/>



