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Evaluating the Influence of Airport Governance Structures on Financial Performance

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EVALUATING THE INFLUENCE OF
AIRPORT GOVERNANCE STRUCTURES ON FINANCIAL PERFORMANCE

by

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Bachelor of Science, Ohio University, 2004

A Thesis
Submitted to the Graduate Faculty

of the

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for the degree of

Master of Science

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2008

This thesis, submitted by Marcelo F. Lima in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

Chairperson

This thesis meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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ABSTRACT

Medium hub airports in the United States vary in their governance structures. Airports are operated by an airport authority, transportation authority, city, county or state governance. These different types of governance structures establish the guidelines of how an airport will operate. The predicted growth in air travel in the coming years has inauspiciously coincided with expected cuts in federal airport funding programs. Airport profits, operating costs and cost per enplaned passenger were compared among the five governing structures to evaluate financial performances among the airport groups.

The comparison was done using a one-way analysis of variance (ANOVA) and Tukey tests. The results of the study indicate if financial differences exist among airports based on their governance structure. Managerial control was examined among the five airport groups to help indentify possible reasons for the similarities and differences.

The results revealed that differences did exist among the groups. These differences, however, were not found among all the groups in all three categories. Many of the results were found to be inconsistent with each other leaving the possibility for other factors contributing to the financial differences among these airports.

CHAPTER I

INTRODUCTION

Airports in the United States (U.S.) are a vital element in any local or state government and the national airspace system (NAS). They provide and attract multi-billion dollar corporations to operate in their region, along with travel options for area residents, resulting in a substantial boost to the local economy and job creation. Airports across the country offer economic growth to a community; yet many of these enterprises operate considerably different from one another depending on their governance control and regional goals.

Airports are operated under several different forms of governance. Some airports are owned and operated by a city or county department; others under their state Department of Transportation (DOT), and some operate independently as an airport or port authority. In addition to airport authorities, certain metropolitan areas designate a transportation authority to operate the airport(s) as well as other transportation systems in its region.

Within each airport structure lies even greater diversity. Some organizations appoint an airport manager that controls the direction the airport will take. Other organizations may elect or appoint city, county or state board members to head the department. Still some entities choose to implement a combination of these styles to lead the airport.

All airports in the U.S. with commercial airline services are held to the same

federal standards mandated in 14 CFR Part 139 (FAA, 2008). Yet many airports operate under dissimilar governance structures and differ in their managerial realm of control. While federal standards can be met with any type of governance structure, local and state governments administer their airports to achieve local and regional financial obligations. As a result, there exists a diverse range of authority to similarly sized airports.

Statement of Problem

The majority of research and information conducted on the aviation industry does not explore airport governance structures. Most airports conduct internal research about their own operations and achievements. The results are typically kept locally and not compared with other similarly sized and managed organizations.

Many airports' organizational structures are designed to match the local government's style and their principles of operation. The airport is a division, being compatible to the local government and not necessarily pursuant to the best possible structure for an airport, its specific needs and goals for continuous growth and support for its tenants. Airports must be adaptable to the future growth and changes of the aviation industry. The need to maximize their finances is gaining greater importance and should be managed in the most efficient manner. The need to expand and grow is coming at a time when federal aid is becoming thin and predicted to decrease in the coming years (GAO-07-490T, 2006). Airports will need to apply more conservative financial tactics to build the necessary facilities as a self supportive organization.

The problem facing airports today is that the predicted growth and expansion needs the industry will have to accommodate, may exceed the federal financial aid that is available to them. According to the 2007 Federal Aviation Administration's (FAA)

Terminal Area Forecast (TAF), total enplanements at medium hub airports will have an annual compounded growth rate of 2.86 percent until the year 2025 (TAF, 2007). That will result in total growth of approximately 41 percent by the year 2025 (TAF, 2007). Airports will have to be more self-reliant in order to grow with the predicted demand and avoid over congestion.

Purpose of Study

The goal of this study is to determine if there are significant financial differences in operating revenues, operating costs, profits and cost per enplaned passenger, based on an airport's governance structure. The results also indicate if a particular airport governance group is creating more revenues and operating at lower costs than the other governance structures.

Significance of the Study

The need to research this issue is due to the importance these transportation and economic enterprises have on the community and their surrounding region. The predicted growth rate in air travel has created two issues in particular that are facing the airport industry.

1. The rapid air travel growth will result in extensive airport expansion needs to relieve congestions and delays.
2. The FAA struggles to provide all the necessary funding many airports will need to accommodate the growth (GAO-07-490T, 2006).

The FAA is predicting an approximate three percent yearly growth rate in air travel until the year 2020 (Sanchez, 2007). The increased passenger loads will force many airports to accommodate their airline tenants and provide ever greater service to growing

customers. These accommodations become expensive when the most reasonable solutions require airport expansion.

The significance of this study lies in identifying if one particular airport governance structure is more readily prepared to handle these two issues facing today's airport industry. The study measured the airports' operating revenues, operating costs, profits and cost per enplaned passenger.

Research Questions

The following are a list of questions that the researcher examined and answered based on the findings of the study.

1. Do significant differences in profits exist between airports with different governance structures (i.e.: city, county, state, authority ownership)?
2. Do significant differences in cost per enplaned passenger exist between airports of different governance structure (i.e.: city, county, state, authority ownership)?
3. Do significant differences in operating costs exist between airports of different governance structure (i.e.: city, county, state, authority ownership)?

Conceptual Framework

This study examined medium hub airports in the U.S. as defined by Title 49 of the United States Code (USC) 47102, from a financial perspective. The airports selected for the study were those identified as a medium hub by the FAA in 2005. Economic and statistical concepts and formulas were used for comparing airport's financial data. Each airport was measured based on their operating revenues, operating costs, profits and cost per enplaned passenger. All the airports were categorized into groups associated with their respective governance structure. The average of each group's operating costs,

profits and cost per enplaned passenger was taken and compared to each of the other groups using a one-way analysis of variance (ANOVA) test. The results indicated if there existed significant financial differences among airports of different governance structures.

Where differences existed among the groups, particulars about the control of each group's governing body was examined to determine possible causes for the difference(s). The realm of control from the airport manager and/or governing body was also considered as a possible cause of the financial difference among the groups.

Definitions

Analysis of Variance (ANOVA) is a single statistical technique used to analyze multi-group experiments (Pagano, 2004).

Cost per Enplaned Passenger is a value that determines how much it costs the airlines to board a passenger at a particular airport. The value is calculated by the airline's terminal rentals, landing fees, and credits divided by the total enplanements conducted that year (Charles Simmons, Personal communication, September 12th 2008).

Critical Value is the value of the statistic that bounds the critical region under the curve that contains all the values of the statistic and allows for the rejection of the null hypothesis (Pagano, 2004).

Medium Hub Airport is a commercial service airport that has at least 0.25 percent but less than 1.0 percent of the passenger boardings (49 USC 47102).

Passenger Boardings are defined as revenue passengers in the U.S. in the prior calendar year on an aircraft in service in air commerce; and includes passengers who

continue on an aircraft in international flight that stops at an airport in the 48 contiguous states, Alaska, or Hawaii for a non-traffic purpose (49 USC 47102).

Statistical Difference is the statistical finding that rejects the ANOVA null hypothesis between groups (Pagano, 2004).

Title 14 Code of Federal Regulations Part 139 (14 CFR Part 139) requires the FAA to issue airport operating certificates to airports that serve scheduled and unscheduled air carrier aircrafts with more than 30 seats or scheduled air carrier operations in aircrafts with more than nine seats but less than 31 seats (FAA, 2008).

Assumptions

1. The FAA Terminal Area Forecast Reports are accurate in predicting a rapid and consistent air travel growth in the next several years.
2. An airport's allocation of finances is influenced by the governance structure of that airport.
3. Airports accurately report their financial results and governance structure

Limitations

1. This study only included airports identified as a medium hub in the U.S. in the year 2005.
2. This study only examined airport financial data contributing to operating revenues, operating costs, profits and cost per enplaned passenger.
3. An airport's operating profit is calculated by subtracting the total operating costs from total operating revenues.
4. The profitability examination of individual airport only took into account those aspects in direct control of the airport operator; operating expenses and operating

revenues. Financial categories such as depreciation, interest, bond debt, etc. were not accounted for in this study.

5. Although all the airports in the study were categorized as medium hub, there exist differences in annual operations.

Review of Literature

Airports as Regional Economical Engines

Airports in the U.S. have a substantial economic effect on the surrounding community. They generate direct and indirect funding into the local economy by providing businesses opportunities to serve thousands of customers a day in a confined area. Major corporations within the airline industry, Fixed Base Operations (FBO), corporate charters and concession services such as HMS Host flood the region with economic benefits and jobs. Concession revenues for Port Columbus International Airport, for example, exceeded \$15 million in 2005, an eight percent increase from the previous year (Columbus Regional Airport Authority, 2005). Concession revenues contribute a significant amount of income for Port Columbus, but public car parking remains the largest single source of revenue for the Airport (Doulin, 2006).

Airports also provide opportunities for businesses outside the airport property such as hotels, taxi services, rental car companies and off-airport public car parking facilities. The additional clientele the airport provides to these companies are enough for them to establish facilities exclusively serving that airport's travelers.

A contributing factor as to why airports are exceeding in regional service issues is a result of the 1978 Airline Deregulation Act, forcing the industry to create the hub-and-spoke system (Bacot & Christine, 2006). The result of the new travel system not only

forces passengers to spend more time traveling, but also transfers them to several different locations before reaching their final destination. The extra time and travel for passengers provide the airport tenants with more potential customers.

Airport Governance

The FAA categorizes commercial service airports into four hub types: large, medium, small and non-hub. In 2005 there were 30 airports identified as large hub, 38 identified as medium hub, 66 identified as small hub and 359 as non-hub airports in the U.S. Airports can change hub types on a yearly basis depending on the percent boardings they receive that year. In 2004, only one year prior, the FAA identified the same amount of large hub airports; however there existed 37 medium hub airports, 68 small hub and 358 non-hub airports (TAF, 2004-2005).

There exists a variety of governance structures that oversee airports. The two most predominant forms of governing bodies are airport authorities and city councils (Bacot & Christine, 2006). County commission and state-operated airports cover the remaining commercial service airports. Figure 1 depicts the breakdown of airport government structures in the U.S.

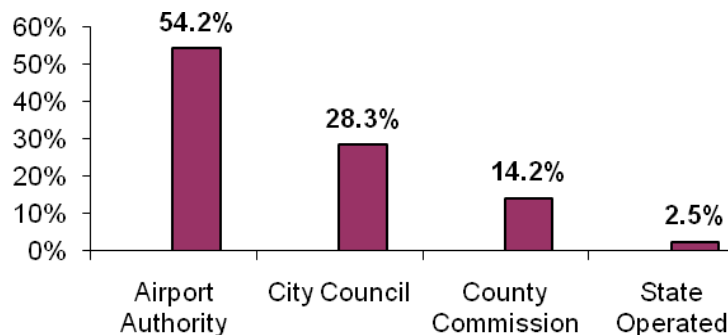


Figure 1. Airport Governance Structure Distribution
Source: Bacot and Christine, 2006

In 2004 the issue with governance structure was raised between the Metropolitan Washington Airport Authority and the Maryland Department of Transportation (Fieser, 2004). The debate arose when Senator James E. DeGrange Sr. believed to have enough support to pass a bill that would examine the possibility of transferring control of the Baltimore/Washington International Airport (BWI) from the Maryland DOT to the Metropolitan Washington Airport Authority. The senator argued that BWI would benefit from the authority's ability to float bonds and use cash reserves to respond quicker to business opportunities. Under state control, BWI makes requests to the DOT in order to access the state's transportation Trust Fund, which also funds Maryland's highway systems and other transportation infrastructures. In addition to quicker access to funding, the authority would allow BWI to reinvest its year end net revenues as opposed to contributing a significant amount of revenue back into the Maryland Transportation Trust Fund (Fieser, 2004).

Throughout the 1990s, BWI continued to grow under the state DOT, attracting new businesses and flights, including Southwest Airlines, who by 2002 controlled 44 percent of its business (Fieser, 2004). Baltimore/Washington International attained 19 million passengers that year, compared to 17 million at Dulles and 13 million at National (Fieser, 2004).

The Metropolitan Washington Airport Authority was unable to convince Maryland's DOT to transfer control of the airport. Maryland Secretary of Transportation Robert L. Flanagan was stated saying, "We are not convinced that ... it necessarily advances the general transportation goals of the Baltimore-Washington area..." He also said, "BWI is very successful under its current governance model." (Fieser, 2008).

Airport Federal Funding Programs

The FAA provides commercial service airports with capital improvement funding through the Airport Improvement Program (AIP). The AIP is a grant program that the federal government issues to public use airports for improving airport capacity infrastructure. Eligible projects include those that improve airport safety, capacity, security and environmental concerns. Large and medium hub airports receive up to 75 percent funding for eligible improvements and up to 80 percent for noise mitigation programs for the surrounding community (AIP, 2008). Table 1 provides a list of examples for eligible and ineligible projects for funding through the AIP.

The FAA distributes AIP funding based on a priority system (U.S. Department of Transportation, 2005). Safety and security in the aviation industry is the FAA's primary objective (U.S. Department of Transportation, 2005). Hence, it is no surprise that top priority is given to airports that depend on the federal funding for safety and security projects. Airport infrastructure, capacity needs and noise abatement projects are followed in priority. The FAA also assures that funding be available to general aviation and non-primary commercial service airports (U.S. Department of Transportation, 2005).

Table 1. Examples of Airport Project Eligibility

Eligible Projects	Non Eligible Projects
Runway Construction/Rehabilitation	Maintenance Equipment and Vehicles
Taxiway Construction/Rehabilitation	Fuel Farms
Apron Construction/Rehabilitation	Aircraft Hangers
Airfield Lighting, Signage, Drainage	Artwork
Weather Observation Station	Landscaping
Environmental and Planning Studies	General Aviation Terminal Building
Safety Area Improvements	Training
Access Roads on Airport Property	Market Planning

Source: Federal Aviation Administration (FAA)

Although the AIP grants are available, the FAA believes that large and medium hub airports already operate with a financial surplus and have the ability to finance their own capital needs through debts without the need of federal aid (AIP, 2005). In 2004, the FAA reported that the AIP grant only funded 16 percent of total expenditures at large hub airports. Medium hub airports utilized 29 percent of AIP grants to fund its total expenditures. The grant program however, becomes essential to small hub and non-hub airports. Those airports reported using 51 percent and 94 percent AIP funds, respectively, for its expansion needs (AIP, 2005).

The dependence of airports on AIP funding however, becomes evident when the majority of available federal funding is suddenly reduced. The fear of losing a significant amount of AIP funding became a sincere concern in 2003 for the Norfolk International Airport (Lerman, 2003). In prior years, the small hub airport in Norfolk had been serving

an increasing amount of passengers. The noticeable increase resulted in Norfolk International upgrading from a small hub classification to a medium hub airport. The new classification translated into less available AIP funding for the airport. Kenneth Scott, executive director of Norfolk International, said that the airport was counting on AIP funding for their \$6.5 million dollar renovation of the airport terminal (Lerman, 2003). The airport was able to avoid losing \$2.5 million in AIP funding thanks to a provision from Virginia Senator George Allen. The provision of a bill created to reauthorize FAA programs, extended federal aid to “transitional” classification airports such as Norfolk International that year (Lerman, 2003).

A study conducted by the Government Accountability Office (GAO) concerning FAA challenges in coming years predicted a significant decrease in AIP funds available to many airports. If the predictions hold true, Norfolk and many other airports may find themselves in similar financial situations. According to the study, the total cost for planned airport development eligible for AIP funding will be approximately \$42 billion from 2007 through 2011(GAO-07-490T, 2006). According to the Transportation Research Board, that results in \$8.24 billion annually in eligible capital projects (2008). The total AIP funding in 2006 only reached \$3.5 billion leaving a \$4.7 billion annual difference (Transportation Research Board, 2008). The FAA however, is unprepared for the increased demand and has already been forced to make noticeable cuts in the 2008 AIP funding budget (GAO-07-490T, 2006). The cut in available funding could result in the FAA increasing the cap on Passenger Facility Charge (PFC) to assist the airports in their expenditure needs.

Passenger Facility Charge are an alternative airport funding method the FAA uses to assist airports with projects improving security, safety and capacity levels (FAA, 2008). The FAA sets a cap, controlling the amount an airport may charge passengers using their airport. Currently the cap is limited to \$4.50 (FAA, 2008).

In a Congressional testimony in March of 2007, Charles Barclay, President of American Association of Airport Executives (AAAE), praised the FAA's action to increase the PFC cap from \$3.00 to \$4.50. He continued however, to urge lawmakers to keep increasing the cap to \$7.50 to "keep pace with airport capacity and financial demands" (Barclay, 2007).

A separate study outlining federal financial supplies also warned the FAA of possible financial troubles (GAO-06-562T, 2006). In recent years, the Airport and Airway Trust Fund's uncommitted balance has rapidly dropped. In 2001 the balance was reported as \$7.3 billion but, by 2005 it was reduced to \$1.9 billion. In addition, the trust fund has failed to produce the same revenue levels as it did in the late 1990s. Due to the reduced revenue and uncommitted balance the GAO recommends that the FAA explore ways to improve efficiency and reduce costs for the future (GAO-06-562T, 2006).

David Plavin, President of Airports Council International (ACI) – North America, believes that the reason for the consistent decrease of the trust fund has been a result of additional operational costs not intended in the original plan of the trust fund. Mr. Plavin states, "Over the last decade, more and more of the trust fund has been depleted by a regular and systematic addition of operations funding despite the original intent of the fund, which was to support airport and airways investments. As the revenues in the fund have not grown as projected, the squeezing out of investment funding has accelerated.

The effect becomes even more dramatic as the Administration proposes to cut \$1.6 billion from the general fund contribution to FAA operations funding, reducing the level of the FAA's general fund support from 19.4 percent in fiscal year (FY) 2005 to eight percent in FY 2006. The missing general fund support is made up by draining the unobligated balance of the Trust Fund to nearly zero, a risky proposition" (Plavin, 2005).

This critical balance of the trust fund is vital to airports seeking funding through the AIP because the program is paid by the Airport and Airways Trust Fund. The limitation in available funding for airport development will result in more airports needing to be self efficient, maximizing their revenues and reducing costs.

In a separate attempt to assist airports with under capacity quandaries, the FAA has recently published a notice of proposed amendment statement utilizing landing fees to limit aircraft operations during peak times (DOT, 2008). Airports currently charge aircraft operators based on the aircraft's size and weight (Dachis, Poole Jr., 2008). The proposed amendment uses the economic theory that by increasing costs (landing fees), demand will decrease. The FAA believes that by increasing landing fees, the airport operator will reduce aircraft operations by forcing the operator to:

1. Use alternative, less congested, airports for their air service needs (DOT, 2008)
2. Adjust flight schedules to operate during less congested times (DOT, 2008).
3. Use congested airports more efficiently by up-grading aircrafts (DOT, 2008).

A study conducted by the Reason Foundation affirmed the FAA's decision to propose their amendment. The findings concluded that by pricing runway use based on time periods, as opposed to aircraft size and weight, it will significantly reduce delays, spread out peak demand and encourage aircraft operators to use larger planes to transport their

passengers (Dachis and Poole Jr., 2008). The study was conducted to determine how airports can better cope with the congestion problems.

The idea of reducing airport congestion by increasing landing fees during peak operating hours has been a debated issue for a number of years now. A case study on the Niagara Frontier Transportation Authority (NFTA) from 1975 tackled the issue of reducing airport congestion techniques (Cerwonka, 1975). The study praised the use of strategic landing fee pricing and increased ticket pricing to help curb airport congestions as an alternative to airport expansion. The most problematic issue discussed with expansion included the minimal use of the new facilities and land during non-peak periods. During those off periods, the newly developed areas would not be maximizing the value of their expenditures (Cerwonka, 1975). According to the study, efficient resource allocation would best be achieved by using a landing fee system based on marginal costs. Ideally, landing fees should increase during peak operating periods and decrease during off peak periods (Cerwonka, 1975).

The NFTA study provides a sound economical pricing formula to maximize one source of airport aeronautical revenues but, due to the study's age, it fails to consider current airport facility needs. Today's forecasted air travel rates may exceed airport facility space even during non-peak periods. A more plausible resolution would be to incorporate a landing fee system based on marginal costs while expanding airport facilities.

Privatization of Airport Finances

The large amount of cash, debt and grants that are associated with the expansion of airport facilities has caused some stakeholders to pursue private financing of airport

projects. The predictable growth of air travelers and transportation of cargo has advanced concerns that airport governments are not prepared for the necessary adaptations through special taxes and fees (Gold, 2000).

Private sector financing can be abundant and beneficial to the airport infrastructure. It can offer a faster implementation of projects and greater management and efficiency throughout the process. This extra benefit, however, requires a strong business plan and financial safety to persuade the investment of the private corporation. Airport concessions are a successful example of how private finances improve an airport's capability. Concessions have expanded with the growing airport population while proving the private sector a financially stable investment with adequate return (Gold, 2000).

Factors Influencing Airport Financial Services

According to the Transportation Research Board, there exist five major factors that influence airport financial services (2007).

1. Federal Regulations and Policies: This factor includes the changes in regulations and recommendations created by Congress, the FAA/DOT, the National Transportation Safety Board (NTSB), the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). Airports must adapt to these forced regulations that could lead to increased spending.
2. Authorizing Legislation: Because many airports operate under local government entities, city, county or state legislation may persuade airports to follow and keep certain responsibilities such as maintaining facilities and access roads to the airport.

3. Bond Ordinance/Resolution/Trust Indenture: These factors include the capital market. Bondholders, rating agencies, and credit/liquidity providers all influence the characteristics of bonds that are used for airport development. Bonds are a major source of revenue for airport capital projects. The access to these vital bonds depends on four primary aspects (Transportation Research Board, 2007):
 - a. Bond Rating: established by major credit rating agencies such as Moody's Investors, Fitch Rating and Standard & Poor
 - b. Interest Costs: attractiveness to investors
 - c. Insurability: the affordability to purchase bond insurance to improve credit rating
 - d. Defaults: the frequency with which operators have defaulted on bond issues
4. Airline Use and Lease Agreement: This agreement sets the rights and obligations of the airport operator and airlines serving the airport. This agreement also creates rental fees and charges between the airlines and the airport.
5. Concession Agreements: These agreements are made between the airport operator and non-aeronautical services such as rental car companies, hotel operators, fixed base operators and vendors.

These factors that influence airport finance all provide an important aspect to airport development funding. The most important of these are the bonds. Bond proceeds contribute to 58 percent of total airport capital compared to only 21 percent of AIP and 11 percent of PFC funding (Transportation Research Board, 2007). Without the access to bonds, airports would have a much harder time funding much

of their expansion needs. The dependency on bond proceeds creates a need to attain the highest bond rating possible. This task however, is depended upon an airport's financial history (Transportation Research Board, 2007). The more attractive an airport's financial history, the greater chance it will have to persuade credit rating agencies to increase the airport's bond rating.

Medium Hub Airport Facts

Airports registered as medium hub are those that carry between 0.25 and 1.00 percent of total passenger boardings in the U.S. (49 USC 47102). The definition, however, does not take into consideration mail and cargo operations, a major resource for many airports. In 2006 Memphis International reported over \$37.8 million in revenue from air cargo operations. Cargo was the single largest source of revenue for Memphis that year compared to just over \$33.5 million in operating and non-airline rental revenue (Memphis-Shelby County Airport Authority, 2007).

In 2006 the FAA reported over 146 million aircraft enplanements at the 38 medium hub airports. That number represented approximately 20 percent of total enplanements that year. Large hub airports comprised approximately 69 percent. By 2025, enplanements at medium hub airports are predicted to rise to over 250 million. The percentage of total enplanements, however, is predicted to remain the same; the extra numbers are a result of growing air travel (TAF, 2006).

Even within the medium hub airport designation, there exists a wide range of total enplanements depending on the individual airport. In 2007 the largest medium hub airport in annual enplanements was Portland International with approximately 7.3 million enplanements (Preliminary CY 2007 Passenger Boarding and All-Cargo Data, 2008). On

the other side of the scale, the smallest medium hub airport in annual enplanements was Norfolk International at approximately 1.9 million enplanements (Preliminary CY 2007 Passenger Boarding and All-Cargo Data, 2008). The FAA data also denotes that medium hub airports ranked 31st to 68th overall in total enplanements in 2007 (Preliminary CY 2007 Passenger Boarding and All-Cargo Data, 2008).

Table 2. Top Five Medium Hub Airports in Total Enplanements in 2007

Airport	City, State	Enplanements
Portland International	Portland, OR	7,281,018
Metropolitan Oakland Int'l	Oakland, CA	7,144,107
Lambert-St. Louis Int'l	St. Louis, MO	7,124,020
Kansas City International	Kansas City, MO	5,833,059
Cleveland Hopkins Int'l	Cleveland, OH	5,571,260

Source: FAA Preliminary CY 2007 Passenger Boarding and All-Cargo Data Report, 2008

A substantial amount of the enplanements from medium hub airports consists of a growing class of airlines; low-cost air carriers. Many low-cost air carriers operate the majority of their flights through medium hub airports. These air carriers prefer flying into medium hub, rather than the traditional large hub airports to avoid air traffic delays and save on facility costs. As a result, medium hub airports become regional hubs to many low-cost airlines. The following are a few examples:

1. Skybus Airlines – Port Columbus International Airport Columbus, OH
2. Midwest Airlines – General Mitchell International Airport Milwaukee, WI
3. Southwest Airlines – Dallas Love Field Dallas, TX

The previous five years has shown consistent growth at medium hub airports. According to the FAA's data on airports' financial statements, medium hub airports have reported a 21 percent growth in total revenues from 2003 through 2006. Increased revenues have coincided with increases in operating expenses and debt during those years as well. The FAA data depicts an increase of 20 percent in operating expenses and 21 percent in total indebtedness at each year's end. The information from Table 3 is a collective account of finances from all the medium hub airports from those years. In 2003 only 36 airports were identified as medium hub, 37 airports in 2004, but for 2005 and 2006 it grew to 38 airports.

Expenditures for projects are one of the few areas which did not show consistent increases. Project expenses dropped between 2004 and 2005 by almost five percent. Expenditures rose the following year, however, to the extent of exceeding the numbers of the past four years (Airport Financial Report, 2003-2006).

Table 3. Financial Reports from Medium Hub Airports, 2003-2006

Category	2003	2004	2005	2006
Total Aeronautical Operating Revenue	\$1,107	\$1,176	\$1,254	\$1,284
Total Non-Aeronautical Operating Revenue	\$1,097	\$1,168	\$1,301	\$1,414
Total Non-Operating Revenue	\$870	\$882	\$1,051	\$1,227
Total Revenue	\$3,074	\$3,226	\$3,607	\$3,927
Total Non Operating Expenses	\$474	\$461	\$482	\$576
Total Year Expenditures for Projects	\$1,466	\$1,456	\$1,386	\$1,559
Total Indebtedness at Year End	\$9,010	\$10,771	\$10,993	\$11,420

Note. Dollar amounts are in millions.

Source: Compliance Activity Tracking System. FAA Form 127.

Air transportation growth has forced medium hub airports to expand their services and facilities to accommodate the needs of the public and tenants. Statistics and information from previous years are reinforcing the forecasts that point to future passenger, cargo and service growths for airports. Financial stability and planning will become increasingly critical as airports grow to accommodate these changes with less assistance from the federal government.

CHAPTER II

METHODOLOGY

The methodology used in this study was a descriptive quantitative research approach. The financial data collected was categorized into airport groups based on their governance structure. The data from each group was compared using basic economical and statistical formulas.

Population

In 2005 the FAA database depicted over 19,000 total airports in the National Airports System (NAS). Only a small portion of those airports are open to the public. Of those open to the public are primary airports, which account for 99 percent of passengers and consist of 383 airports. Medium hub airports constitute for 20 percent of primary airports (Airport Data Package for Stakeholders, 2005).

All of the subjects in this study have been identified as medium hub airports according to the FAA in 2005. The total population consists of 38 airports from across the country, including the Luis Munoz Marin airport in San Juan, Puerto Rico (TAF, 2006).

Sample

The purpose of this study was to accurately examine medium hub airports. Due to the relatively small number of subjects that met the criteria, the entire population was selected. Any partial selection of this population may not have given an accurate sampling of the subject groups. In addition, some governance control groups may be

significantly smaller than others and a sample size of the population poses the risk of eliminating one of the smaller groups altogether.

Research Design

This study was conducted using a quantitative research approach. The two forms of data being examined are financial and governance structures. The financial data collected concerns each airport's operating revenues, operating costs, and cost per enplaned passenger from 2003 through 2007. The governance data explains how each airport is managed, the span of control of the governing body and the amount of authority given to the airport manager.

The 38 airports selected for the study were categorized into five groups. The airport's categorization was dependent upon their selection from the data collection survey. The groups are:

1. Airport Authority
2. Transportation Authority
3. County Commission
4. City Council
5. State Operated (state DOT)

The financial data collected from the study's survey of each airport was combined into one of the five airport groups determined by the airport's governing body. Due to the irregular number of subjects in each group, the average operating revenues, operating costs, profits and cost per enplaned passenger were calculated. A statistical comparison of the groups was conducted to determine significant financial differences between the governing bodies.

Upon determining the results of the one-way analysis of variance (ANOVA) test, attention was given to the governance control data. Airport groups with significant differences were compared by the governance control data to determine possible causes for the difference. Groups with no identifiable differences were also examined with governance control data to study any possible correlations between the results and collected data.

Data Collection Methods/Procedures

Data collection was conducted by a mail-in survey to each airport's administration office. The data being requested included operating revenues, operating costs, cost per enplaned passenger, governance and managerial control information.

Additional background information and financial history of the airport industry was obtained through FAA resources and the agency's statistics division. The results of previous studies, federal spending and airport profile information are available through the FAA and were used as a comparison to this study's results.

Instrument Reliability and Validity

The instrument used for data collection was a mail-in survey to each of the 38 airports identified as medium hub in the year 2005. The data requested included financial information regarding the individual airport's operating revenues, operating costs and cost per enplaned passenger for the years 2003 through 2007. Additional governance information was also requested including the governance structure of each airport and managerial control information.

Proposed Data Analysis

The financial information collected from the surveys was analyzed statistically. Calculations identified the numeric patterns of the data including standard deviations, the degrees of freedom and the means. Although this information was revealed in the calculations, the research results do not include all of these details as they are not necessary in determining the answers of the research questions.

Upon receiving the data from the airport subjects, the financial statistics were categorized into the appropriate governance control group. The first calculation of the data was to solve for the between-groups sum of squares (SS_b):

$$SS_b = [(\sum X_1)^2/n_1 + (\sum X_2)^2/n_2 + (\sum X_3)^2/n_3 + (\sum X_4)^2/n_4 + (\sum X_5)^2/n_5] - (\sum X_{all})^2/N.$$

The second step was to calculate the within-groups sum of squares (SS_w):

$$SS_w = \sum X_{all}^2 - [(\sum X_1)^2/n_1 + (\sum X_2)^2/n_2 + (\sum X_3)^2/n_3 + (\sum X_4)^2/n_4 + (\sum X_5)^2/n_5]$$

The third step was to calculate the total sum of squares (SS_t):

$$SS_t = SS_w + SS_b$$

The fourth step was to calculate the degrees of freedom for each estimate (df):

$$df_b = k - 1$$

$$df_w = N - k$$

$$df_t = N - 1$$

Step five calculated the between-group variance estimate (SB^2):

$$SB^2 = SS_b/df_b$$

Step six calculated the within-groups variance estimate (SW^2):

$$SW^2 = SS_w/df_w$$

The final calculation was to determine the Fobt:

$$F_{obt} = SB^2/SW^2$$

The final calculation of F_{obt} was compared to the F critical value. If the F_{obt} was greater than the F critical value, it was concluded that the organizational groups being compared were not financially similar and there existed significant differences in their finance results.

Protection of Human Subjects

This study did not examine human subjects. Information containing individuals' names or government affiliation was not collected or requested. Airport identifiers and results were not made known, nor did the study require the identification of any particular organization. In addition, the study followed all prescribed rules and regulations pertaining to the University of North Dakota's Institutional Review Board (IRB) and the protection of human subjects and their information.

CHAPTER III

RESULTS

In 2005 the FAA identified 38 medium hub airports in the U.S. Each medium hub airport was sent a copy of the Medium Hub Airport Governance survey. Of those 38 surveys, 15 were returned, constituting 39.5 percent of the population. The participating airports identified themselves according to the following groups:

1. City Council – four airports
2. County Commission – three airports
3. Airport Authority – seven airports
4. Transportation Authority – one airport
5. State Operated – zero airports

In addition to comparing city, county, airport authority and transportation authority groups, this study also compared municipality-owned airports to authority-owned airports. The municipality group was comprised of both city council and county commission airports, resulting in seven airports. The authority group was composed of both airport authorities and transportation authorities resulting in a total of eight airports.

Operating Costs

Throughout the years of 2003 to 2007, operating costs showed a steady increase among all the groups, particularly during 2005 to 2007. The increase aligns with the return and rise in total passenger boardings the aviation industry has experienced in recent years (DOT, 2008). If the trend continues as is predicted by the FAA's Terminal

Area Forecast reports, it is likely that operating costs will continue to rise to accommodate accordingly.

Table 4. Average Operating Costs by Airport Governance Group

	2003	2004	2005	2006	2007
City	\$41,021	\$40,197	\$41,266	\$42,550	\$48,221
County	\$49,062	\$52,348	\$54,927	\$60,270	\$66,085
Airport Authority	\$54,884	\$58,139	\$61,074	\$65,062	\$69,739
Transportation Authority	\$120,800	\$124,000	\$129,600	\$132,700	\$137,100

Note. Dollar amounts in thousands

City operated airports had the lowest average operating costs compared to the other three groups. In addition, the same group was the only one to have lowered their average operating costs between two years, which occurred from 2003 to 2004. Within the previous five years, the average operating costs incurred by city operated airports was \$42,650,916 while county operated airports were the second most conservative with an average of \$56,538,580. On the other side of the scale, airport authorities averaged \$61,779,654 and the transportation authority averaged \$128,840,000 in the past five years.

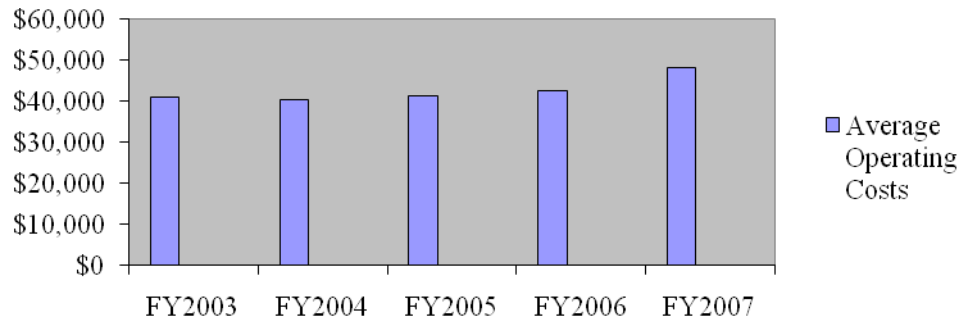


Figure 2. Average Operating Costs for City-owned Airports

Note. Values in thousands

A closer look into the groups' operating costs results reveals the sources where the largest amount of costs were incurred. County-owned airports reported 60.85 percent of operating costs came from maintenance, repairs and contractual costs. Another 31.67 percent was allocated to employee wages and benefits. Airport authority and city-owned airports only indicated 39.19 percent and 51.16 percent of operating costs to maintenance, repairs and contractual costs, respectively. City-owned airports allocated the largest percentage of operating costs to employee wages and benefits at 41.85 percent. Airport authorities reported 40.16 percent of operating costs to wages while county-owned airports only provided 31.67 percent.

Operating Revenues

Operating revenues were used to calculate profits. The sources of these revenues are important to note in determining why differences existed among the groups. The sources of the revenues were not provided by transportation authorities.

As mentioned earlier in the study, concessions and parking revenues are a major source of airport income. While the majority of operating revenues are acquired through airlines in the form of landing and rental fees, parking and concessions provided a

substantial amount of income to airports. To some airports, concessions alone made up 25 percent of total operating revenues. Parking revenues attributed to over 40 percent for many airports.

Table 5. Average Parking and Concession Revenues

	Parking Revenues	Percentage of Total Revenues	Concession Revenues	Percentage of Total Revenues
City	\$9,791,643	19.29%	\$14,360,678	24.41%
County	\$32,263,970	42.78%	\$10,774,059	12.63%
Airport Authority	\$15,319,125	26.15%	\$7,226,509	11.77%

Profits

Profits in the airport results fluctuated more than any other individual field. The raw data showed that each of the airport groups, excluding the transportation authority, had at least one airport that reported profits in the negative at least one year out of the previous five years of this study. Once the average results were calculated, every group remained profitable throughout the time span of the study.

None of the groups experienced consistent growth throughout the five years. City operated airports saw little change in their profits between 2003 and 2007. Airport authorities had the largest percentage increase in profits with 32 percent; however the group remained the lowest in total profit. County operated airports exhibited increases of 27 percent between those years.

Table 6. Average Profits by Airport Governance Group

	2003	2004	2005	2006	2007
City	\$20,562	\$20,128	\$15,701	\$18,725	\$20,159
County	\$17,123	\$19,333	\$23,922	\$23,267	\$21,677
Airport Authority	\$6,338	\$5,860	\$6,331	\$6,647	\$8,374
Transportation Authority	\$25,100	\$29,100	\$30,800	\$29,900	\$29,400

Note. Dollar amounts in thousands

Cost per enplaned passenger

Similar to the profits results, cost per enplaned passengers included a large range of values within each governance group. In 2003, airport authorities noted costs ranging from \$2.50 to \$10.45 per enplaned passenger. Notable differences were also found among county commission airports. The same year revealed cost per enplaned passenger ranging from \$3.86 to \$10.39 by county-owned airports.

The majority of participating airports experienced steady increases in cost per enplaned passenger throughout the five years of this study. The only exception was the transportation authority group which was able to decrease their average cost per enplaned passenger. Although the transportation authority decreased its averages, the group continued to be the most expensive airport in this category.

Airport authorities had an average cost of \$6.28 in the five year span, ranking the group as the lowest of the four. The county operated airports were the second lowest group with an average cost of \$6.59.

Table 7. Average Cost per enplaned passenger by Airport Governance Group

	2003	2004	2005	2006	2007
City	\$7.86	\$7.91	\$8.51	\$8.85	\$9.13
County	\$6.07	\$6.41	\$6.63	\$6.85	\$7.01
Airport Authority	\$5.87	\$6.68	\$5.92	\$6.26	\$6.68
Transportation Authority	\$11.91	\$11.71	\$10.80	\$10.43	\$10.51

Airport Governance Results

The governance data obtained by each participating airport focused on the management structure each entity operates under. This data contained information on the number of board members associated with each airport, the number of airports operated by each airport governing body, the jurisdiction boarder of each airport as well as the control each airport manager is given in regards to financial transactions.

A look at the number of airports operated by each type of governing body showed that the majority of governing bodies over a medium hub airport operate multiple airports, while only three governing bodies operate a single airport. Of those three, each pertained to a different governing structure: city, county and airport authority. The majority of governing bodies control two airports within their jurisdiction. The largest number of airports operated by one government entity was five, which pertained to the county group.

The results also identified how many airports are controlled by one governmental body and owned by another. This study classified airports based on the controlling government body. However, some airports may have separate owners from operators.

The results identified two airports which represent this situation. Both of these airports were controlled by airport authorities, but one had city limit jurisdictions while the other had county limit jurisdictions.

The most prominent aspect of the governance data was the control the airport manager holds over financial transactions. The control was determined by the ability to make financial decisions (adjust user fees, bond issuance, expenditure approvals, etc.) without the approval of the board members from the governing body. According to the results, no airport managers from city operated airports had the authority to issue bond debt, approve expenditures, adjust user fees, or approve contracts without its board members approval. However, airport authority managers had the most decision-making authority. The majority of these managers had complete influence over making expenditures, entering contracts and adjusting user fees.

The most noticeable financial commonality among the groups was in the issuance of bond debt. From the 15 participating airports and four governing structures, only one airport allowed the manager's decision to be the deciding factor in the issuance of bond debt. That airport operates under an airport authority and gives the manager control over all the financial aspects covered in this study.

The final portion of the governance data results examined the experience and education of the airport manager. According to the results there existed a wide range in the manager's airport industry experience. Within city operated airports alone, managers' experience varied from three years to over 40 years. Airport authority managers reported on average 26.17 years of airport experience. County airport

managers showed an almost identical average of 26.00 years, while city airport managers had 22.75 years. No transportation authority airport provided this data.

Collegiate degrees and American Association of Airport Executive (AAAE) certification/accreditation also varied among the managers of medium hub airports. Eight of the 15 managers identified themselves as Certified Members (C.M.) of AAAE. The only group to have all the airport managers as C.M. was from the county commission group. Every manager from the participating airports noted at least a four year degree. The degrees ranged from Bachelors of Science to Masters of Business Administration to a Juris Doctorate.

Financial Group Comparisons

The four governance groups from the study were compared to each other by yearly averages in operating costs, profits and cost per enplaned passenger from 2003 through 2007. Each of the groups had an N = 5, representing the average of each of the five years. The results from the ANOVA test showed that significant differences did indeed exist between the four groups in each of the three categories. Subsequent post hoc tests were also conducted in each category in order to identify exactly which groups were different from each other. The Tukey test results indicated that some groups did not appear to be different.

Operating Costs Comparison

The results of the ANOVA test comparing average operating costs indicated an F value of 155.778 and a Significance value of .000. Since the Significance value is less than .05, significant differences in operating costs did exist between the groups.

The Tukey test was then performed to determine which groups were actually different from each other. The results of the Tukey test indicated that county operated airports have significantly different operating costs than those of both city operated and transportation authority airports. No differences were identified between county airports and airport authorities. Airport authorities showed significant differences than those of city operated and transportation authority airports. Transportation authorities and city operated airports were both found to have different operating costs from all the other groups in the study.

Table 8. Mean Significant Differences in Operating Costs Between Groups

	County	City	Airport Authority	Transportation Authority
County	-	Yes	No	Yes
City	Yes	-	Yes	Yes
Airport Authority	No	Yes	-	Yes
Transportation Authority	Yes	Yes	Yes	-

The comparisons between the municipality and authority groups also indicated significant differences. The mean operating costs value for the municipality group was \$48,602,773 while the authority group held a mean value of \$70,162,198. The difference of \$21,559,425 in operating costs proved to be significantly different between the two groups.

Profit Comparison

The ANOVA calculations performed to compare the four governance groups' mean profit values revealed an F value of 103.018 and a Significance value of .000. The

results also indicate, with 95 percent confidence, significant differences among the four governance groups in average profits.

According to the Tukey test, the differences existed between county operated airports and both airport authorities and transportation authorities. County and city operated airports did not show any significant differences in profits. Both the airport and transportation authority groups showed differences compared to all the other groups.

Table 9. Mean Significant Differences in Profits Between Groups

	County	City	Airport Authority	Transportation Authority
County	-	No	Yes	Yes
City	No	-	Yes	Yes
Airport Authority	Yes	Yes	-	Yes
Transportation Authority	Yes	Yes	Yes	-

The profit comparison between the municipality and authority groups recorded a mean difference of \$10,437,707. That difference also proved to be significant between the two groups.

Cost per Enplaned Passenger Comparison

The cost per enplaned passenger comparison also showed a significant difference through the ANOVA test with an F value of 80.079 and a Significance value of .000. The lowest average costs among the four groups were realized by the airport authority group at \$5.87 per passenger while the highest, at \$11.91, was recorded by the transportation authority group.

Similar to the operating costs results, county operated and airport authority groups did not prove to have significant differences. City and transportation authority groups again were different from all the other groups.

Table 10. Mean Significant Differences in Cost per enplaned passenger Between Groups

	County	City	Airport Authority	Transportation Authority
County	-	Yes	No	Yes
City	Yes	-	Yes	Yes
Airport Authority	No	Yes	-	Yes
Transportation Authority	Yes	Yes	Yes	-

Municipalities and authorities again shared differences within their financial achievements. The two groups showed a mean difference of 1.646 making the value significantly different between the two.

Concluding Results

The data obtained by the airports was only enough for comparing four of the five groups originally proposed by this study. The lack of response from state operated airports resulted in the group's omission during the comparison calculations.

The research questions proposed in Chapter I asked:

1. Do significant differences in profits exist between airports with different governance structures (i.e.: city, county, state, authority ownership)?
2. Do significant differences in cost per enplaned passenger exist between airports with different governance structures (i.e.: city, county, state, authority ownership)?

3. Do significant differences in operating costs exist between airports of different governance structure (i.e.: city, county, state, authority ownership)?

The results of the statistical tests comparing the groups indicated that differences did exist in profits, cost per enplaned passenger and operating costs between airports with different governance structures. The differences, however, were not among all the groups, although each category indicated differences between at least two of the four groups compared. The transportation authority group was the only one to show differences from all the other groups in all three categories. Yet, the airport authority and county groups did not denote differences in two of the three categories. These outcomes showed inconsistencies in that where differences existed between two groups in one category, they did not in another. The results also did not indicate that all the groups were different from each other or that all the groups were not different from each other. Instead, some groups were different while others were not. That inconsistency would suggest that the differences among the airports are not due to their governance structure, but other factors not covered in this study.

CHAPTER IV

DISCUSSION

The statistical tests comparing the financial achievements of each of the groups indicated that the majority of the groups are significantly different from one another. The one exception is between the airport authority and county groups, which did not show differences in both operating costs and cost per enplaned passenger. The county group also did not show differences with city operated airports when comparing profit results.

County Commission and Airport Authority Comparisons

Medium hub county and airport authority operated airports reported similar operating costs and cost per enplaned passenger. A comparison of managerial control also revealed that similarities existed within the structures. When asked which airports allow the airport manager to approve expenditures without the approval of the governing body, 71 percent of airport authorities agreed that their airport manager does possess that power. Of the county operated airports, 66 percent of those participating agreed. Both airport groups also showed those same percentage rates when asked whether the airport manager could approve contracts without the authorization of the governing body. The pattern of similarity continues when comparing the airport manager's ability to adjust user fees, again without the approval of the governing body. Of the airport authority group, 57 percent agreed, while 66 percent of the county group confirmed the manager's authority.

Table 11. County Commission and Airport Authority Data Comparison

Group	Operating Cost (Mean)	Cost/Enplaned Passenger (Mean)	Manager Approve Expenditures	Manager Approve Contracts	Manager Approve User fees
County Commission	\$56.5 Million	\$6.59	71% Yes	71% Yes	57% Yes
Airport Authority	\$61.8 Million	\$6.28	66% Yes	66% Yes	66% Yes

County and airport authority groups showed many consistencies within their results. These consistencies were not only in their operating costs and cost per enplaned passengers, but also in the authority given to the airport managers. In fact, both groups' average airport management experience also proved similar, equaling 26 years of experience for each group. All of the comparisons indicated that airport authorities and county owned airports resembled each other more than any other group comparisons. Yet, it is interesting to mention, in the one category where differences were significant, profits, they were quite different. The profit comparison results indicated the mean difference of the two groups to be over \$14 million. That value was the second largest difference between any of the other groups including the comparison between the municipality and authority groups. Only the profit comparison between airport authority and transportation authority was greater. The difference in profits between these two groups may be a result of their differences in operating revenues. Airport authorities reported average operating revenues of \$68.5 million while the county group averaged \$77.6 million. The sources of the revenues also differed between these two groups. Airport authorities reported 26.15 percent of operating revenues coming directly from

airport parking while the county group depended more on parking which made up 42.78 percent of its total operating revenues.

Managerial Control and Financial Results

The amount of authority given to a manager in regards to setting and approving financial transactions did not appear to have consistencies with the financial achievements each group reported. City operated airport managers were given the least amount of authority than the other groups. Each city airport required the approval of the city council before expenditures or contracts could be made. In addition, each city council also had to approve changes in user fees and the issuance of bond debt.

As the group with the least authority given to the manager, the city group obtained the lowest mean operating costs of \$42.7 million per year. The low operating costs did not give the city group the highest amount of profits, however. Both the transportation authority and county group achieved greater mean profits of \$28.9 million and \$21.1 million, respectively. City operated airports also had the second highest cost per enplaned passenger with a mean of \$8.45.

When examining managerial control of the most profitable governance group, the transportation authority, the majority of control was given to the manager rather than the governing body. The transportation authority allowed the manager complete control over approving expenditures and entering contracts as well as adjusting user fees. The issuance of bond debt, however, required the governing body's approval. Yet, to argue managerial control has a strong influence on financial achievements does not hold true. Since the most profitable group also bestowed the most influence to the manager, it would be expected than that the least profitable withheld such authorities from the

manager. However, the least profitable group, the airport authority, also granted high influence to the managers.

The same inconsistency was also observed in the cost per enplaned passenger comparison. Again, both transportation and airport authority groups obtained the highest and lowest means, yet as mentioned earlier, both groups noted similarities in managerial control.

The only consistency that was noticed was in the operating costs comparison. Here, the two most different groups in managerial control also stood out as the two most different in operating costs. City airports had the lowest operating costs, and gave the least amount of influence to its manager, while the transportation authority displayed the highest costs and is the most liberal in managerial power. Without this consistency being observed through the other comparisons, however, it would be difficult to argue the two are actually linked.

Table 12. Highest and Lowest Means in the Financial Categories

	Highest (Governance Group)	Lowest (Governance Group)
Operating Costs	\$128.8 Million (Trans. Auth.)	\$42.7 Million (City)
Profit	\$28.9 Million (Trans. Auth.)	\$6.7 Million (Airport Auth.)
Cost per enplaned passenger	\$11.07 (Trans. Auth.)	\$6.28 (Airport Auth.)

Source of the Differences

It has been determined that airports of different governance structures have significant differences in annual operating costs, profits and cost per enplaned passenger. Although these differences exist, the claim cannot be made that these differences are a

result of the differences in governance structures between airports. In fact, further ANOVA and Tukey tests showed that significant differences exist between airports of the same governance structure, in the same three categories examined in this study.

An ANOVA test was conducted comparing each city owned airports' annual operating costs to other city owned airports. The results of the test indicated that from the four participating city airports, differences existed in all but two airports. Two airports in particular were significantly different from all of the other city airports. Of the different airports, some of the mean differences were greater than those comparing city airports with county airports and those comparing city airports with airport authorities.

The county group was also compared to its fellow county owned airports in the profit category. Much like in the city comparison, differences again existed among these three airports. Although only three county airports participated in this study, large differences in profits existed among those three, at times up to approximately \$46.8 million.

Finally, the test between airport authorities and their cost per enplaned passenger was conducted. Again, differences were noticed between several of the airports. Two airports from this group attained significantly different cost per enplaned passenger than all its other fellow airport authorities. In 2007, this group had values ranging from \$3.50 to \$13.31 among the different airport authorities. That range in value was larger than any other range comparing the different governance groups against each other.

The results of the subsequent ANOVA and Tukey tests, comparing airports within their own governance groups, indicated that the differences that existed between airports cannot be due to their governance structures alone. Airports of all governance achieved

similar and dissimilar financial results. While some city operated airports accumulated high operating costs, others functioned with low costs. Airport authorities and county operated airports both recorded high and low cost per enplaned passengers as well.

Other Areas of Financial Influence

As discussed in Chapter I of this study, there are several aspects that influence the financial structure of an airport. Although federal regulations and policies are equal burdens to all the airports in the country, other areas such as local regulations, bond ordinances, and airline use and lease agreements may be different.

Airport Locality

Local regulations have an impact on organizations operating in the region. Environmental regulations, for example, could be made a priority over cost cuts to many airports in certain states. According to Forbes Magazine, states such as Oregon, Washington and California have substantial environmental regulations (Wingfield, Brian and Marcus, Miriam, 2007). The state of California, having medium hub airports of Oakland and Ontario International, was singled out as having “mountains of [environmental] regulations” (Wingfield, Brian and Marcus, Miriam, 2007). These regulations may compel an airport to incur larger amounts of costs in order to fulfill their state requirements. The higher operating costs needed to implement environmentally friendlier operations may in turn reduce profits. If Oakland International, for example, is obligated to purchase hybrid vehicles, its operating costs would increase compared to an airport in Kentucky that has the choice not to purchase hybrids.

In addition to local regulations, an airport’s locality may also offer different problems to cope with regarding weather patterns and wildlife in its specific area.

Anchorage (AK) International for example, would have higher costs during the winter compared to Kahului (HI) International due to snow removal operations. Not only do the snow removal operations increase costs, but the purchase and maintenance of the necessities such as plows, urea and even a de-icing facility needed to perform the job would also contribute to cost increases.

The diverse wildlife found in different areas of the country can also attribute to increased operating costs. An airport with a high number of bird strikes or large deer populations may need to take extra measures of wildlife management techniques to protect the airfield from the hazards they create. The extra costs of taller fences, wildlife studies, training and equipment one airport incurs compared to another, may contribute to the differences in operating costs between airports.

Bond Ordinances

Another area of influence, as discussed in Chapter I, is bond ordinances. Depending on the specific airport's bond rating and bond agreements, certain airports may have lower interest rates to long-term bonds than other airports. The Transportation Research Board (TRB) stated that between the years of 2002 to 2004, 58 percent of airport capital came directly through bond proceeds (2007). The importance of bonds to airport development cannot be ignored in determining the major issues that affect airport finance. Some of the major factors in acquiring favorable bonds include the airport's bond rating as well as the credit and liquidity providers (Transportation Research Board, 2007). Those key elements may offer valuable insight to an airport's success and future development.

Airline Use and Lease Agreements

Airline use and lease agreements establish the rights, privileges and obligations of the airlines and airport operator (Transportation Research Board, 2007). Because these agreements determine how rentals and fees are calculated, they have a direct influence at how attractive an airport appears to its current airline tenants as well as future tenants. Lower rental fees will encourage current airline tenants to continue to provide services, as well as attract other airlines to begin new services. If, however, an airport cannot afford to provide low user fees to its airlines, it risks losing services without much hope of encouraging other prospective tenants to begin business at the airport.

Recommendations for Future Studies

Medium hub airports are complex government and business entities that incur millions of dollars in costs and revenues. Although this study found that an airport's governance structure was not the determining factor in how profitable airports operate, there remain several other factors that could reveal the true reasons for the differences. The following are recommendations for future study that may bring additional insight to determining the factors that attribute to the financial differences between airports.

Airports in Similar Regions

The physical location of an airport may have significant influences on how it operates. Some of the key factors to examine between airports in the same geography include the area's demographics or average household income. Other factors may include the local regulations associated with the state, county or city, similar weather or environmental conditions that pose threats to the airports in the region and the economic conditions of the region.

A study examining those factors among a specific state that operates all the airports within its borders may also bring insight of the key determinacy of an airport's financial achievements. By studying airports within the state of Maryland for example, not only do similar demographics and regulations influence the airports, they also all operate under the same government entity, the state's department of transportation.

Airport Vision

Much like any other business, airports have guiding principles that influence the priorities, directions and actions a specific airport will take. While some airports may choose to provide the highest quality service, others may prioritize operating at the lowest possible costs. These differences in the vision of each airport may also reveal important factors in the profitability of an airport.

Of the 15 airports participating in this study, five reported negative profits at least one year from 2003 through 2007. If those airports, reporting negative profits, prioritized higher quality service or higher paid employees over profitability, it would be expected that it not report the favorable numbers that other profitable airports reported. Most airports in the U.S. operate as a not-for-profit entity with politically appointed authority oversight (Transportation Research Board, 2008). As a result, an airport is able to prioritize other factors such as quality of service over profitability. A study taking a closer look at these differences in visions and goals may reveal a key factor in the differences of financial accomplishments between airports.

Financial Details of Airports

Because airports are complex organizations, the differences among these organizations may lie within the details of its business. As stated earlier, bond proceeds

represent the majority of airport capital. As an important aspect in capital development, a study examining and comparing the details of these bond agreements may divulge contributing factors of an airport's success.

Some of the key factors to examine regarding bond proceeds are the airport's bond rating as determined by rating agencies, the types of bonds such as general airport revenue bonds (GARB) and bridge bonds, as well as the financial firms from which these bonds are received. An additional factor could be the amount of debt incurred by the airports.

Final Remarks

This study was conducted to determine if significant differences exist between airports of different governance structure. The study provided adequate data on medium hub airport authorities and municipalities, but was not able to attain the necessary response from state operated airports. The omission of the state group may have left out more notable patterns between the airports as these organizations are rare in the U.S. consisting of only seven percent of the airports in the country (Transportation Research Board, 2007). According to each airport's website, state operated medium hub airports include Ted Steven Anchorage (AK) International, Kahului (HI) Airport and T.F. Green State Airport in Providence, RI (2008).

The response from the transportation authority group was also minimal. The single response from this group was that of the largest medium hub airport in annual boardings. Accordingly, that airport reported the largest average operating costs, profits and cost per enplaned passenger. The response of other transportation authorities may have resulted in different outcomes for the group.

The lack of responses appeared to be limited to those two groups in terms of obtaining an accurate population sample. The airport governance distribution from the participating airports of this study resulted in 47 percent airport authorities, 27 percent city-owned and 20 percent county-owned airports. These percentages were similar to those demonstrated in Figure 1 that indicated the airport population as 54 percent airport authorities, 28 percent city-owned and 14 percent county-owned.

According to this study, it was statistically determined that significant differences exist in certain financial results between airports of different governance structures and similar size. Although differences exist, not all the groups were different in all three categories. Groups such as airport authority and county showed no differences in average operating costs. In fact, at least two governance groups in each of the three categories compared did not prove to be significantly different from one another. Airport authority and county groups did not exhibit differences in both operating costs and cost per enplaned passenger comparisons. City and county groups also did not show differences in the profit comparison.

More importantly, it was determined that the differences between airports are not completely attributed to their particular governance structure. Many airports of the same governance structure are different from one another, at times even more so than airports of unrelated governance structures. How an airport is financially different from another airport does not lie in their governances but, rather, it is more likely that the differences are a result of more individual attributes of each airport. The true reasons for the differences and similarities could be each government entity's vision or goals, the airport

manager's goals and priorities, or local regulations that differ between cities, counties and states.

The true reasons may lie deeper than the boundaries of this study, but it is clear to state that governance structures, although showing financial differences, are not the determining factor of individual medium hub airports' financial achievements.

APPENDICES

Appendix A
2005 Medium Hub Airports

Airport Name	City, State
Albuquerque International Sunport	Albuquerque, NM
Ted Stevens Anchorage International	Anchorage, AK
Austin-Bergstrom International	Austin, TX
Bradley International	Windsor Locks, CT
Nashville International	Nashville, TN
Buffalo Niagara International	Buffalo, NY
Bob Hope Airport	Burbank, CA
Cleveland-Hopkins International	Cleveland, OH
Port Columbus International	Columbus, OH
Dallas Love Field	Dallas, TX
William P Hoppy	Houston, TX
Indianapolis International	Indianapolis, IN
Jacksonville International	Jacksonville, FL
Kansas City International	Kansas City, MO
Memphis International	Memphis, TN
Manchester Airport	Manchester, NH
General Mitchell International	Milwaukee, WI
Louis Armstrong New Orleans Int'l	New Orleans, LA
Metropolitan Oakland International	Oakland, CA
Kahului Airport	Kahului, HI
Eppley Airfield	Omaha, NE
Ontario International	Ontario, CA
Norfolk International	Norfolk, VA
Palm Beach International	West Palm Beach, FL
Portland International	Portland, OR
Pittsburgh International	Pittsburgh, PA
Theodore Francis Green State Airport	Providence, RI
Raleigh-Durham International	Raleigh-Durham, NC
Reno/Tahoe International	Reno, NV
Southwest Florida International	Fort Myers, FL
San Antonio International	San Antonio, TX
Louisville Int'l-Standiford Field	Louisville, KY
Norman Y. Mineta San Jose Int'l	San Jose, CA
Luis Munoz Marin International	San Juan, PR
Sacramento International	Sacramento, CA
John Wayne Airport-Orange County	Santa Ana, CA
Lambert-St. Louis International	St. Louis, MO
Tucson International	Tucson, AZ

Appendix B
2007 Medium Hub Airport National Rank by Passenger Enplanements

National Rank	Airport Name	City	State	Enplanements
31	Portland International	Portland	OR	7,281,018
32	Metropolitan Oakland Int'l	Oakland	CA	7,144,107
33	Lambert-St Louis International	St. Louis	MO	7,124,020
34	Kansas City International	Kansas City	MO	5,833,059
35	Cleveland-Hopkins Int'l	Cleveland	OH	5,571,260
36	Memphis International	Memphis	TN	5,546,309
37	Sacramento International	Sacramento	CA	5,382,459
38	Norman Y. Mineta San Jose Int'l	San Jose	CA	5,255,216
39	Luis Munoz Marin International	San Juan	PR	5,144,342
40	Raleigh-Durham International	Raleigh	NC	4,981,098
41	John Wayne Airport-Orange County	Santa Ana	CA	4,948,789
42	Nashville International	Nashville	TN	4,888,123
43	Pittsburgh International	Pittsburgh	PA	4,876,049
44	William P Hobby	Houston	TX	4,239,415
45	Austin-Bergstrom International	Austin	TX	4,182,039
46	Indianapolis International	Indianapolis	IN	4,097,465
47	Dallas Love Field	Dallas	TX	3,988,232
48	Southwest Florida International	Fort Myers	FL	3,986,905
49	San Antonio International	San Antonio	TX	3,911,700
50	Port Columbus International	Columbus	OH	3,827,844
51	Louis Armstrong New Orleans Int'l	Metairie	LA	3,770,290
52	General Mitchell International	Milwaukee	WI	3,751,907
53	Palm Beach Int'l	West Palm Beach	FL	3,475,109
54	Ontario International	Ontario	CA	3,473,308
55	Albuquerque Int'l Sunport	Albuquerque	NM	3,239,050
56	Bradley International	Windsor Locks	CT	3,231,853
57	Kahului	Kahului	HI	3,141,449
58	Jacksonville International	Jacksonville	FL	3,137,986
59	Bob Hope	Burbank	CA	2,950,625
60	Buffalo Niagara International	Buffalo	NY	2,677,241
61	Ted Stevens Anchorage Int'l	Anchorage	AK	2,628,372
62	Theodore Francis Green State	Warwick	RI	2,499,748
63	Reno/Tahoe International	Reno	NV	2,450,440
64	Tucson International	Tucson	AZ	2,178,909
65	Eppley Airfield	Omaha	NE	2,162,937
66	Manchester	Manchester	NH	1,920,950
67	Louisville Int'l-Standiford Field	Louisville	KY	1,913,044
68	Norfolk International	Norfolk	VA	1,867,327

Appendix C
Medium Hub Airport Governance Survey

Medium Hub Airport Governance Survey
University of North Dakota

The purpose of this survey is to gather financial and governance structure information from medium hub airports to be used in an airport financial study. The information from this survey will be used to determine if significant financial differences exist between airports of different governance structures. The analysis of the survey data will be presented in a research paper that will be used for course credit in the Master's of Aviation program at UND. The information submitted in this survey will be held in the strictest of confidence and individual airports will not be identified in the research findings. A copy of the results will be available to any participating airport upon request.

Your time and effort in completing this survey is very much appreciated. Thank you!

Airport Financial Information

This section will provide financial information from the previous five years. Please provide estimated results for FY2007 data if not available.

1.1 Airport Identifier: _____

1.2 Airport Revenue:

		FY2003	FY2004	FY2005	FY2006	FY2007
Airline Revenue						
Parking Revenue						
Terminal Concession Revenue						
Total Operating Revenue						

1.3 Airport Expenses:

		FY2003	FY2004	FY2005	FY2006	FY2007
Employee Wages/Benefits						
Repairs, Maintenance, Contractual Costs						
Total Operating Cost						

1.4 Please provide the cost per passenger for the following years.

FY2003_____ FY2004_____ FY2005_____ FY2006_____

FY2007_____

Airport Governance

In this section I am asking the respondent to identify how the airport is governed. Please answer the following questions based on which governing arrangement is applicable at your location.

2.1 Local Jurisdiction: _____ *City Limits*
 _____ *County Limits*
 _____ *City & County Limits*
 _____ *Military (Joint-use) Airfield*

2.2 Airport Governance: _____ *Airport Authority* _____ *City Council*
 _____ *County Commission* _____ *State Operated*
 _____ *Transportation Authority*

2.3 How many airports are operated by the governing body? _____

2.4 How many board members constitute the governing body? _____

2.5 Is there a difference between the airport owner and governing body (i.e. owned by the city and operated by the Airport Authority)? _____ *Yes* _____ *No*

Airport Management

In the following questions, I am asking what actions the Aviation Director/Airport Manager/CEO (Manager) can take **WITHOUT** approval of the governing body.

3.1 Does the Manager have the ability to approve expenditures? _____ *Yes* _____ *No*

3.2 Does the Manager have the ability to approve contracts? _____ *Yes* _____ *No*

3.3 Does the Manager have the ability to issue bond debt? _____ *Yes* _____ *No*

3.4 Does the Manager have the ability to adjust user fees (i.e. auto parking rates, aircraft tie down rates, landing fees, etc.)? _____ *Yes* _____ *No*

3.5 How many years of experience does the Manager have in the airport industry?

3.6 What is the highest degree and area of study the Manager possess?

_____ *Degree* _____ *Area of Study*

3.7 Is the Manager a Certified Member of the American Association of Airport Executive (AAAEE)?

_____ *Yes* _____ *No*

Thank you for your time and consideration in completing this survey!

Would you like to receive a copy of the research results when the study is completed?

_____ *Yes* _____ *No*

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