



Acquisition of Airliners

An Incredible Process

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Student's Signature

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Guide's Endorsement

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Declaration by the Guide

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Further, I certify that the work is based on the investigation made, data collected and analyzed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfilment for the award of degree of BBA.



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Abstract

Aviation industry has seen a massive growth over past few years with airlines being the most important players of the industry. Because of an increasing competition they've implemented various strategies and innovative methods to out-stand. These include everything ranging from timeliness to the perks provided to attract the customers.

All these elements have increasingly become part of this complex industry; however, the very root of an airline lies in **Acquisition of Airliners**.

An **airliner** is a type of aircraft for transporting passengers and air cargo. Such aircraft are most often operated by airlines. Airliners are most commonly defined by their range and size:

- **The "range"** is the maximum distance that it can fly without stopping for additional fuel, while still carrying a reasonable payload of passengers and/or cargo. seating or cargo capacity, as indicators of the amount of payload that it can carry.
- **The "size"** of an aircraft can be represented by measures such as its weight, its

Choosing the right type of an airliner largely depends upon the how an airline operates i.e. whether it's regional or International, what is the demand of number of passengers or the Cargo that the airliner is required to fulfil, what's the route airliner is supposed to fly upon & various other factors.

Airliners are expensive. A Boeing 737-700, the type Southwest uses, is priced in 2008 USD in the range of \$58.5–69.5 million (although very few airlines actually pay this much).

Acquiring these Million \$ worth airliners is a very critical & complex process that includes various stages that we have focused in this study in detail.

The people who acquire are

- Airlines & Operators (Eg: American Airlines, Emirates) who acquire these aircraft either directly from the manufacturer through **Direct Lending** through loan/ cash or from these lessors on **Operating leasing** (Dry, Wet & Moist Lease) or on **Finance leasing** from special purpose companies.
- Lessors (Eg: GECAS) who acquire these aircraft directly from the manufacturer through loan/ cash and lease it to the lessee (Airlines & Operators).
- Governments, Executive and Private.

Each has pros and cons that shall be further analysed in the study from the data collected through reliable sources (Primary and secondary) which shall be further analysed and interpreted. The final result shall be compared with the expected outcome and the study shall be concluded giving valuable information on the process.



Chapter1: Introduction

1.1 Overview

1.2 Background

1.3 Purpose of study

1.4 Research hypothesis

Chapter1: Introduction

1.1 Topic: overview

Mergers and acquisitions in the transportation sector are typically explained as attempts to capture economies of scale and scope through shared infrastructure and related cost-saving measures. In the airline industry, the past fifteen years has seen an increasing number of international mergers and acquisitions that would have been blocked under prior regulatory regimes. This activity suggests that there are indeed gains from increasing airline size. Such gains may be largely financial in nature. One benefit to a merged airline could be greater market power over particular routes and hubs after merger, as well as improved contract structure and bargaining power in operations, although greater de-regulation and more competition internationally makes these arguments less compelling. In many cases, gains may be unique to specific airlines or operational situations.

In addition, acquisitions, mergers or sales generally take a long time to negotiate between the carriers, considering the regulatory bodies governing the jurisdiction(s) in which the carriers are incorporated. Frequently, the public announcement of these activities is subsequent to the effective date of the agreement. During this time, there may be a



significant change in the operation of the carriers involved since they will begin operating as a combined entity (acquisition or merger) or reduced entity (sale/divestiture). In such instances, the dates noted for these activities are the dates when the financial reports incorporate the impact, rather than the public announcement.

Thus, in general, increasing the size or scope of airline operations enables them to function more efficiently and whether this effect is sustained across all sizes of airline.

1.2 Topic: Background

Merger and acquisition activity suggests that there are gains from increasing airline size. However, these gains may be largely financial in nature. A key benefit for a merged airline might be greater market power over particular routes and hubs after the merger, as well as improved contract structure and bargaining power in operations, while greater deregulation and competition internationally makes these arguments in favor of a merger less compelling. In many cases, gains may be unique to specific airlines or situations. Thus, the issue addressed in this chapter is whether, in general, increasing the size or scope of airline operations enables them to function more efficiently and whether this situation is sustained across all types and size of airline.

Efficiency and returns to scale estimates for airlines, particularly those operating in the United States, have been the subject of a number of studies. Some early work (Caves, et al., 1984) concluded that there were few economies of scale per se but that as airlines increased in size, they experienced economies of route density. Later studies (for example, Liu et al., 1999) suggested that there are increasing returns to network size, a finding that helped rationalize the industry's tendency even at that time to pursue expansive mergers and alliances. On the policy side, airline deregulation in the US focused attention on the gains from size but also raised concerns about the degree of competition (or contestability) that might be expected in the deregulated airline industry

Over the past 15 years, both the world and the airline industry in particular have been subject to a number of exogenous shocks, most notably the events of September 2001 and the subsequent changes in travel security requirements, as well as the 2003 outbreak and movement of the SARS virus, and the more recent prolonged worldwide economic recession. At the same time, the airline industry has been undergoing numerous structural changes while the US industry in particular has seen a number of carriers seek bankruptcy protection



1.3 Topic: purpose of study

Increase in competitive pressures fuelled by globalization, deregulation and privatization have forced many firms to adopt a variety of strategies including mergers & acquisitions. In 2007, the Indian aviation industry had witnessed three such consecutive mergers & acquisitions of airlines (notably merger of Indian Airlines with Air India, acquisition of Air Sahara by Jet Airways and merger of Kingfisher Airlines with Air Deccan). Global evidences on mergers and acquisitions show that there is a high rate of failures due to cultural indifferences and carry forward liabilities by the merging firm. In this study, an attempt has been made to analyze the financial performance of the three merged airline companies.

In today's corporate culture, mergers & acquisitions (M&A) is corroborated as an official marriage between two or more willing firms to live life together as they wish. Business enterprises widely apply M&A as strategic corporate restructuring tool for achieving larger market share, faster growth, improving competitiveness, broadening portfolios to reduce business risk, entering new markets and capitalizing on economies of scale. The open sky

policy of 1990's followed by series of economic reforms and deregulation of industry allowed entry of many private airlines including overseas players. The entry of many low cost carriers during 2000-2005 had led stiff competition not only amongst the airlines but also with Indian Railway's AC segment. Depressing forces such as soaring in price of aviation turbine fuel, rising labor costs, shortage of skilled labor, rapid fleet expansion and intense price competition had led major airlines including Air India, Indian Airlines, Jet Airways and Kingfisher Airlines suffered from huge losses since 2006. Resultantly, three consecutive M&A of airlines (notably merger of Indian Airlines with Air India, acquisition of Air Sahara by Jet Airways and merger of Kingfisher Airlines with Air Deccan) have happened in 2007. Given such a scenario, researchers may be curious to empirically test whether these M&A are successful. Alternatively, are there any significant improvements in the financial performance of these merged companies followed by M&A?

1.3.1 OBJECTIVES OF THE STUDY

- To analyze the financial performance of the merged airline companies.
- To assess short term as well as medium term stock price effects on the merged companies.
- To evaluate whether the effects of mergers & acquisitions are similar or different on each merged company.

1.4 Topic: research hypothesis



The global airline industry is currently characterized by slack passenger demand, soaring fuel prices, and a slowdown in the global economy (the industry is cyclical, and its performance is closely linked to the GDP growth). Instead of engaging in competition and turf wars, currently, companies in the industry are focusing on improving profitability, especially in markets where they already have a strong presence. Mergers, joint ventures, and other strategic alliances are slowly becoming the norm for airline industry participants who are focusing on cost cutting and excess capacity reduction in order to combat the rising fuel prices and recession.

Following the slowdown in the global economy, primarily caused by the Eurozone crisis, strategic and financial investors have become cautious and risk-averse about portfolio investments. This has negatively impacted merger and acquisition (M&A) activity in terms of deal value. Deal values declined in 2011 to \$ billion from \$ billion in 2010, a sharp percent. The average value of transactions (excluding transactions of values greater than \$1.00 billion) has declined by percent from \$ million in 2007 to \$ million in 2012.

Soaring fuel prices, declining passenger demand, and the economic crisis have led to excess capacity for airline carriers.

Instead of engaging in competition and turf wars, companies in the industry are currently focusing on improving profitability, especially in markets where they already have strong

presence.

Mergers, joint ventures, and other strategic alliances are slowly becoming the norm for airline industry participants, who are focusing on cost cutting and excess capacity reduction in order to combat rising fuel prices and recession.

1.4.1 Types of airlines:

- **Commercial Airlines**

Establishments primarily engaged in operating airplanes for commercial use, such as Boeing.

- **Private or Business Aircraft Services**

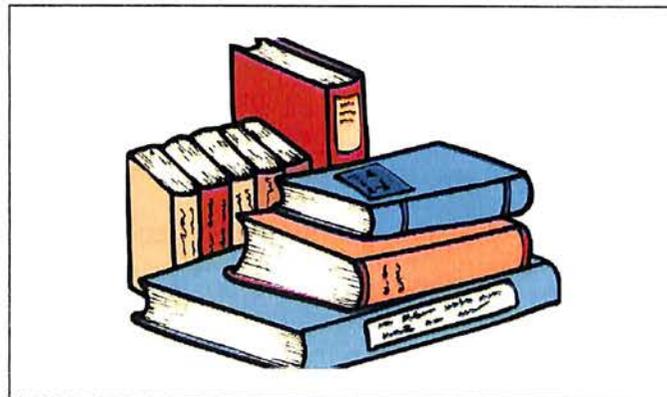
Establishments primarily engaged in providing aircrafts/charters to fly from place to place on customers' own time schedules for personal or business use.

- **Helicopter Transportation Services**

Establishments primarily engaged in providing non-scheduled helicopter transportation services.

- **Rescue and Safety Aircraft Services**

Establishments primarily engaged in providing aircraft for rescue or emergency purposes.



Chapter2: Literature Review

2.1 Broad Problem Area

2.2 Narrow Area Review

2.3 key success factors

Chapter2: Literature Review

Literature review is the documentation of a comprehensive review of the published and unpublished work from data sources in the areas of specific interest to the researcher.

Chapter objectives are as follows

1. Discuss how problem areas can be identified
2. State research problems clearly & precisely
3. Explain how primary and secondary data help the researcher to develop a problem statement
4. Develop relevant and comprehensive bibliographies for any research topic
5. Write a literature review on given topic
6. Develop a research proposal

2.1 Topic: Broad Problem Area

The broad problem area refers to the entire situation where one sees a possible need for research and problem solving.

Such issues might pertain to:

1. Problems currently existing in an organizational setting that needs to be solved
2. Areas that a manager believes needs to be improved in the organization
3. A conceptual or theoretical issue that needs to be tightened up for the basic researcher to understand certain phenomena.
4. Some research questions that a basic researcher wants to answer empirically

Mergers and acquisitions typically involve a substantial amount of due diligence by the buyer. Before committing to the transaction, the buyer will want to ensure that it knows what it is buying and what obligations it is assuming, the nature and extent of the target company's contingent liabilities, problematic contracts, litigation risks and intellectual property issues, and much more. This is particularly true in private company acquisitions, where the target company has not been subject to the scrutiny of the public markets, and where the buyer has little (if any) ability to obtain the information it requires from public sources.

The following is a summary of the most significant legal and business due diligence activities that are connected with a typical M&A transaction. By planning these activities

carefully and properly anticipating the related issues that may arise, the target company will be better prepared to successfully consummate a sale of the company.

Of course, in certain M&A transactions such as “mergers of equals” and transactions in which the transaction consideration includes a significant amount of the stock of the buyer, or such stock comprises a significant portion of the overall consideration, the target company may want to engage in “reverse diligence” that in certain cases can be as broad in scope as the primary diligence conducted by the buyer. Many or all of the activities and issues described below will, in such circumstances, apply to both sides of the transaction.

2.1.1 Examples of broad problem areas that could be observed at the work place:

1. Training programs are perhaps not as effective as anticipated
2. The sales volume of a product is not picking up
3. Inventory control is not effective
4. Some members in organization are not advancing in their careers
5. Their introduction of flexible work hours has created more problems than it has solved in many companies.

2.2 Topic: Narrow Area Review

In mid-2018, Bombardier of Canada transferred its promising new CSeries jet airliner program to Airbus.

Starting with two versions of up to 130 seats, the CSeries promised to be a line of new-generation airliners from 100 to as large as 160 seats, competing directly with Boeing and Airbus.

It is now renamed as the Airbus 220, and because Airbus already has an aircraft in the upper capacity capabilities of the -220, it is not likely to invest in expanding the platform.



2.2.1 The Final Curtain To Major Global Competition.

This is more than just a corporate decision to sell off a product line. This transaction, combined with the pending partnership of Boeing with Embraer of Brazil, signals the end of a 50-year consolidation process in the jet airliner manufacturing business.

Back in the 1960s, global airlines could choose mainline products from Convair, Douglas, deHavilland, Vickers, Dassault, Lockheed, Sud-Aviation, and Boeing – all of which had jet airliners on the market.

Today, with the exit of Bombardier, it's down to Airbus, Boeing and Embraer... and the latter two will soon be in a cooperative venture. Bombardier continues – for now – to build the CRJ series airliner, which is physically much smaller than mainline single-aisle airliners, and is facing a declining global demand.



2.2.2 The Bombardier CSeries – Treading On Airbus & Boeing.

The Bombardier CSeries was the only new-entrant airliner anywhere in the world that was more than just another me-too attempt to compete with existing Boeing and Airbus products. It was a program to economically leapfrog them both.

In fact, the decisions eight years ago to come out with the upgraded A-319/320 NEO series and the B-737MAX were clearly due to the threat of the CSeries, which was a major economic breakthrough airliner.

Occasionally inaccurately described in some circles as a “regional jet,” the CSeries promised to deliver economics and customer comfort features that eclipsed then-current Airbus and Boeing offerings. From a passenger perspective, the CSeries – again, now called the Airbus 220 – has wider seats than either of its two former competitors, with economy-cabin seats at, or just a bit short of, 19 inches wide. That’s close to an inch more than those on the Airbus-319/320, and about an inch and a half more than the seats on the 737.

Market mission capabilities were more than competitive, with the larger -300 version of the CSeries being capable of trans-Atlantic flying.

Add in the expected economics of the CSeries, plus the potential to stretch it to further invade their market territory, and it was clearly causing some serious strategic heartburn at Airbus and Boeing.

2.2.3 An Order Book With More Than Vapor Interest

Delta Air Lines took note, and ordered 75 CSeries. The first delivery unit is now flying. JetBlue and other airlines across the globe ran up the solid orders to almost 700 units.

Unfortunately, the costs of development, plus some major delays in the planning process, and the time and financial resources needed to break into the global marketplace, threatened to sink a small company such as Bombardier. It found a very willing partner in Airbus to transfer the program.

Airbus will certainly market the former CSeries in its present form, but it's not likely that they'll do much to expand the program into larger variants that will compete with their own A-319/320. This is particularly underscored by the recent announcement that Airbus is now working on a clean-sheet narrow-body airliner design to replace the -319/320.



2.2.4 Effectively, Now Just Two Real Players

Now that Bombardier is out of the segment, the CSeries clearly has only a niche future as part of the Airbus product line.

That puts *finis* to the last potential and truly threatening competitor to Airbus and Boeing.

Today, Boeing and Embraer of Brazil are in discussions to collaborate in airliner development in the future. Embraer has an outstanding product in the new versions of its 75-130 seat E-175/195 airliner, but that platform has pretty much been optimized. It's very likely that any new programs will be accomplished with Boeing as the major partner.

This consolidation is just simple economics. It costs billions to design, plan and build a new airliner, and then more billions trying to break into an airline industry that already has fleets of Airbus and Boeing models that are still being produced.

2.2.5 Unless It's A Breakthrough, It's Not A Competitor

With the sidelining of the CSeries, there are no full-size airliner programs anywhere on the planet that offer enough improvement in economics to get free market attention of any airline front office.

The last part is critical. Airlines are not looking for new “more of the same” airplanes. To gain entry into the global market, any new entrant will need to offer materially better operating economics and/or much-advanced customer attractiveness over the current Airbus and Boeing products - a very tall order.

The barriers to new competitor entrants are now a financial brick wall. Adding an additional fleet type at an airline is not just pulling it up to the gate. It's a massively expensive undertaking involving putting it on the carrier's operating certificate, training pilot, cabin, maintenance and customer service staff on the new model, getting spare parts on the shelf - even sometimes negotiating with unions to fly the new plane.

But the CSeries indeed had the economic advantages and the mission capabilities to convince carriers such as Delta and Swiss, and several others across the world to order the plane. As we'll see below, there is not another aircraft on the drawing board that has that capability.

There is another niche player on the horizon, namely the Boom Technologies 55-seat supersonic airliner. It has a growing orderbook and support from players such as Japan Airlines and CTrip of China, but it's in a whole new category, and is not a competitor to anything that is currently produced anywhere else in the world, including at Airbus and Boeing.



2.2.6 Russia And China Are Out of The Running

It's natural that some may conclude that this situation is perfect for manufacturers in Russia and China. It certainly would be so if either of them had a competitive product someplace on the horizon.

Unfortunately, they don't. Not only do none of the programs now on the books represent any real improvement over current aircraft, the program time lines for new platforms in

Russia and China will roll out new planes that are a decade late and millions of rubles and yuan short of the market cycle.

We can start with Russia. Its entire commercial airliner business is an on-going global embarrassment. Russian programs have the distinction of consistently producing airplanes that may have been acceptable for their captive customers, but not of any interest to Western carriers.

To be clear, the commercial airliners produced in the old Soviet Union are thankfully now pretty much history, and they made history as aircraft that nobody outside of the Soviet sphere of influence would give up ramp space for, let alone put their passengers on.

But the more recent market offerings produced in Russia in the past 20 years, like the TU-204, which looks strikingly like the now-discontinued Boeing 757, or the Antonov-148/158, which has been grounded due to safety concerns, or the 100-seat Sukhoi SSJ “Superjet,” have been consistent market flops, typified by lack of parts support, failure to meet performance objectives, and appalling lack of reliability.

One current Russian operator of the Sukhoi SSJ recently stated in an aviation publication how thrilled they are with the reliability of the airplane. Buried in the kudos was the admission that the four they have in passenger operation are backed up by three spare units. Now, add in the reports that a Mexican operator had to use one of their SSJs essentially as a parts bin because of lack of manufacturer support, and we have a real rap-stopper when a Sukhoi salesman phones to get an appointment at United or American. Or at Air Fred, for that matter.

Russia is also developing a new competitor to the A-319/320 and Boeing 737. This is the MC-21, and it’s years from being operational. It offers no improvement in any major metric, and the official order book for 369 units includes no Western customers, beyond an “interest” registered from some paper airline in Peru that hasn’t even started flying.



As for China, it’s a nation that is becoming a global thought-leader in many technological and industrial areas. Unfortunately, the commercial airliner business isn’t one of them.

They have the ARJ-21, a relatively simple traditional 100-seat design with mostly

off-the-shelf components. But it took more than a dozen years to become market-ready. A nice aircraft, it offers zero operational advantages to attract any serious Western carrier interest.

China also has the C919, a new narrow-body product that's aimed at the category and class of the Airbus and Boeing airliners. Whether or not it is a promising project, its development has been slow, and it offers no material performance advantages to entice large Western carriers to be interested. With the exception of an order from GE Capital, all of the customers listed are in China, and many are financial institutions, not airlines.



Curiously, the Chinese and Russians are collaborating on a new widebody jet, the CRJ929, meant to compete with the Boeing 787 and the Airbus A-330, somewhere in the very distant future. Current plans are for operations in 2027-2028. They are betting on an airline industry that will have needs beyond the capability of Airbus and Boeing's manufacturing ability. It's not a bet anybody in Las Vegas would entertain.

The point is that in the mainline airliner space – from 100 seats up – the global market belongs to Airbus and Boeing.

2.2.7 Shrinking Players But Shrinking Demand, Too

A review of the estimated fleet demand curves into the next ten years should give pause to any entity thinking it can easily gain global airliner market share with a new jet airliner platform. It would be gambling with economic suicide.

Our global fleet forecasts indicate that today over 65% of all jet airliner demand is the result of replacement of older units, with the driving reason being acquisitions to next-generation, more fuel-efficient airliners, mainly the NEO series from Airbus and the MAX variants from Boeing.

But in four short years, that demand bubble will be mostly over, and less than 50% of deliveries will be as replacements. That concurrently will collapse annual demand from an estimated 3,050 airliners in 2020, to half that number in 2024. That's a rather severe drop that has yet to be fully contemplated in several financial sectors.



The reality is that if emerging manufacturers in China, Russia, or anywhere else are planning on filling demand gaps left open by the two remaining global players, they are going to be very disappointed.

2.2.8 Conclusion: Fallout Across The Industry

Airbus and Boeing will need to adjust production planning to that driven by organic traffic growth, without much of the current stimulation caused by aircraft replacement needs.

The fallout will be far ranging. Production will slow, affecting suppliers, financial institutions and potential R&D investment in the future. Communities in the US that are betting on expanding jobs and economic impact from new airliner manufacturing may want to investigate contingency plans – a lot of those jobs so rosily predicted a couple years ago may not materialize.

Globally, at some point manufacturers in China and Russia will need to tumble to the reality that they can either bring out new breakthrough products, or go the way of Lockheed, Dassault, Vickers, British Aerospace, and others, and be relegated to footnotes in aviation history.

2.3 Topic: key success factors

The review further identifies the **Key Success Factors (KSFs)** in the global **airline industry** in relation to the challenges that carriers face. These strategic **factors** include structure, culture, strategic alliances, planning and forecasting, technology, marketing and branding and outsourcing.

The ability for airlines to succeed today is measured according to several key success factors.

Key success factors have several direct and several possible uses for any business unit whether it is for-profit or not-for-profit, large or small, domestic or foreign. In strategic analysis of a business unit, key success factors often initially appear as analytical tools for examining the character of the industry in which the business unit competes.

Often key success factors next appear as elements of a competitive strength assessment in examining the relative strength of the business unit compared to its rivals in the industry. When a strategic management control system is designed to ensure achievement of the business unit's strategic objectives, key success factors may suggest either strategic objectives themselves or measures for strategic objectives for that business unit or both.

The key point of this examination for those in other industries is that practitioners of strategic management should look closely at the number of key success factors appropriate for the industry being examined at the time of the examination.

In the startup and early growth phases of an industry, the general guidance from Thompson et al. may be sufficient: “Only rarely are there more than five or six key factors for future competitive success.” However, as an industry approaches maturity, rivalry among competing business units often increases. Consolidation of the industry often follows. As a rivalry increases and consolidation proceeds, the number of key success factors is likely to increase.

Although there are few purely domestic industries today, as rivalry increases in an industry, business units are increasingly likely to expand into foreign markets in order to grow. For several stakeholders at least for customers, employees, and suppliers additional key success factors may also be required as the business grows more complex, if only because of the increase in national and regional cultures to be considered.

This analysis examines the U.S. airline industry, an example of the use of key success factors in an industry which by many estimates is mature and consolidating.

An industry’s **key success factors (KSF’s)** are those competitive factors that most affect industry members’ ability to prosper in the marketplace. KSF’s by their very nature are so important to future competitive success that all firms in the industry must be competent at performing or achieving them or risk becoming an industry also-ran. Crafting and Executing Strategy

2.3.1 Attracting Customers

In this article, we use two factors of measurement with regard to customers: 1) the attractiveness of the airline’s service and 2) the effectiveness of the airline’s promotional expenditures. In the original research we used a rather complex model of an airline’s “attractiveness” relative to that of its competitors, for example including infrastructure convenience, and scope of service. The base was the attractiveness of the price of tickets. In this analysis only the relative price of tickets has been used because ticket price was by far the most significant factor in attractiveness. A lower relative price would generally be more attractive to most travelers.

Similarly, the derivation of the promotional effectiveness in the current analysis has been simplified to that of the base used in the original study model. A measure of ticket sales per dollar of promotion expense is used in this study, with higher sales per promotion dollar being advantageous. Except where otherwise noted, the data for the analysis are taken from the U.S. Department of Transportation databases.

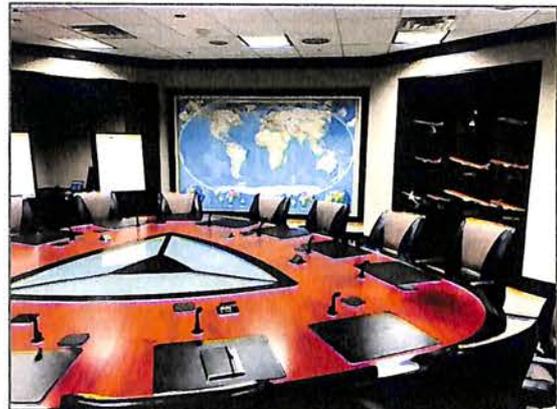
2.3.2 Managing the Fleet

In the area of fleet management, the same factors are used for this analysis as in the earlier study. Airplane utilization in hours per day deals with how well the companies’ major assets (airplanes) are used as a group. The load factor relative to the industry average

indicates how well the average individual airplane is used. Simply stated, the load factor is that proportion of an airplane's seats that are sold and actually filled at departure.

2.3.3 Managing People

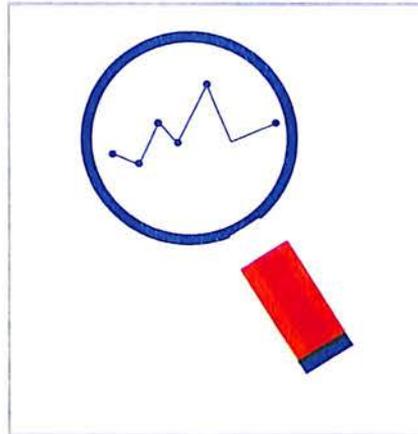
We use two factors with respect to how well the airline manages its people. Productivity, in airline capacity per employee, is a measure of how effectively the employees work together in providing the physical service of getting passengers from one place to another. Morale is a measure of how committed employees are to providing good service to the airline's customers. As in the original study, productivity is measured in available seat miles per employee. Morale is measured using proxies since the original morale model is complex and requires information not currently available for the airlines being examined. In this case, lost bags per 1000 passengers and complaints per 100,000 enplanements derived from the Air Travel Consumer Report are used as indicators of how committed airline employees are to serving their customers. The activities that result in lost bags or in poor enough treatment of passengers that they file complaints are indicative of the morale of the airline employees. Labor-management relations (including strikes and threatened strikes) are one example of a driver of these effects.



2.3.4 Managing Finances

The last of the four areas is financial management, for which six factors are used. Unit revenue and unit cost are important by themselves, but their relationship is also important. Therefore, we have compared both unit revenue and unit cost as well as the unit margins among the airlines. A measure of capacity to normalize these factors is used since the airlines fly all their available seats, not just those that are occupied. Better unit revenue may not be an advantage for an airline whose unit costs are out of line.

In addition to unit revenues and unit costs, funding for growth is an important factor for an organization's long-term success. Most successful organizations choose to grow over time. In the case of the airlines, growth is measured in terms of capacity growth. Furthermore, in order to grow, an airline needs adequate funds. To be attractive for most equity investors, an airline must grow its equity over time. Moreover, to be attractive to most debt investors, a reasonable debt-to-assets ratio is desirable. In this realm of funding, this study is less precise. However, in light of this study's prior research, the measures in this case appear to indicate the likelihood of enduring success for the airlines.



Chapter: 3 Research Design, Methodology and Plan

3.1 Data Sources

3.2 Research Resign

3.3 Survey questions

3.4 Interview procedure

3.5 Data Analysis Procedures

Chapter: 3 Research Design, Methodology and Plan

3.1 Topic: Data Sources

Data Collection in Marketing Research is a detailed process in which a planned search for all relevant data is made by researcher.

3.1.1 Types of Data

6. **Primary Data-** Primary data is the data which is collected first hand specially for the purpose of study. It is collected for addressing the problem at hand. Thus, primary data is original data collected by researcher first hand.
7. **Secondary data-** Secondary data is the data that have been already collected by and readily available from other sources. Such data are cheaper and more quickly obtainable than the primary data and also may be available when primary data can not be obtained at all.

3.1.2 Data Collection Methods

1. **Qualitative Research-** Qualitative Research is generally undertaken to develop an initial understanding of the problem. It is non statistical in nature. It uses an inductive method, that is, data relevant to some topics are collected and grouped into appropriate meaningful categories. The explanations are emerged from the data itself. It is used in exploratory research design and descriptive research also. Qualitative data comes into a variety of forms like interview transcripts; documents, diaries and notes made while observing. There are two main methods for collecting Qualitative data
 - **Direct Collection Method-**When the data is collected directly, it makes use of disguised method. Purpose of data collection is not known. This method makes use of-
 - Focus Groups
 - Depth Interview
 - Case Study
 - **Indirect Collection-Method**
 - Projective Techniques
2. **Quantitative Research-** Quantitative Research quantifies the data and generalizes the results from the sample to the population. In Quantitative Research, data can be collected by two methods
 - Survey Method
 - Observation Method

3.1.3 Sources of data used in research

❖ **Primary data** is used as a valuable source. It is collected from

1. Aircraft manufacturing websites like
 - (2) **AIRBUS**: www.airbus.com,
 - (3) **BOEING**: www.boeing.com/commercial/,
 - (4) **BOMBARDIER**: commercialaircraft.bombardier.com,
2. Commercial Aircraft Sales and Leasing (CASL) Companies' websites such as
 - (1) **GE Commercial Aviation Services** (1700+ big planes owned):
www.gecas.aero,
 - (2) **International Lease Finance Corporation** (nearly 1000 big planes owned): ilfc.com
 - (3) **SMBC** (350+ Planes owned): www.smbc.aero
3. Airline Companies websites such as
 - (1) **Indigo**: www.goindigo.in
 - (2) **Emirates**: <http://www.emirates.com>
 - (3) **American Airlines**: www.americanairlines.in

❖ The research is conducted with **Secondary data** as the major source. This data is collected from

1. Journal of Air Law and Commerce: Research by Walter W. Eyer— **The Sale, Leasing and Financing of Aircraft**,
2. Reliable online sources such as Studies & Blogs by professionals associated with the related field,
3. Information on wikipedia.com,
4. Website: <https://www.businessinsider.com/the-incredible-process-behind-buying-a-fleet-of-airplanes-2013-11?IR=T>
5. https://www.managementstudyguide.com/data_collection.htm

In aviation, a **flight-data acquisition unit (FDAU)** is a unit that receives various discrete, analog and digital parameters from a number of sensors and avionic systems and then routes them to a flight data recorder (FDR) and, if installed, to a Quick Access Recorder (QAR). Information from the FDAU to the FDR is sent via specific data frames, which depend on the aircraft manufacturer.

There is some trend towards integration of FDAU functions into software contained aboard other aircraft system components, as in the case of enhanced airborne flight recorders (EAFRs).

FDAUs are often used to output a second non mandated data stream to be used by the flight operational quality assurance (FOQA) system.

The introduction of digital systems instead of analog ones has created a major separation in the aviation technology. Although the digital equipment made possible that the increasingly faster controllers take over, we should say that the real world remains essentially analogue. Fly-by-wire designers attempting to control and measure the real feedback of an aircraft were forced to find a way

to connect the analogue environment to their digital equipment. In order to manage the implications of this division in aviation, data optimization and comparison has been quite an important task. The interest in using data acquisition boards is being driven by the technology and design standards in the

new generation of aircraft and the ongoing efforts of reducing weight and, in some cases addressing the safety risks.

The advances of standard digital data buses in the civil aircraft have been matched by advancements in processor, memory and other microelectronic devices such as analogue-to-digital and digital-to-analogue devices, logic devices etc. which made possible the application of digital technology to aircraft systems.

The greater single impact of standardized digital data buses is the improvement of the intercommunication between the aircraft systems. In earlier analogue avionic systems the number of cables used to transfer the information between the various system components was considerably high. As systems became more complex and integrated, this problem became a major issue.

With these systems, at least one pair of wires has been required for each signal and so a typical installation requires several pairs of wires. With the equivalent digital systems, all the analogue signals are converted into their equivalent and are assigned unique address labels to ensure there are no conflicts. These signals are then transmitted down a single, twisted pair of wires, which makes up a data bus. Aircraft data bus systems allow a wide variety of avionics equipment to communicate with one another and exchange data. The type of language used on an aircraft data bus is known as the protocol.

Common types of digital data transmissions, include:

- **Single source - Single Sink.** This is the earliest application and comprises a dedicated link from a device to another, Single source - Multiple Sink. This describes a technique where one transmitting device may send data to a number of recipient device (sinks). Arinc 429 is an example.
- **Multiple Source - Multiple Sink (full duplex).** In this system multiple transmitting sources can transmit data to multiple receivers. The use of data buses has experienced tremendous growth over the last few years especially with the introduction of COTS technology - adopting those buses designed for the computer and telecommunications industries. This technology has been spread for reasons of cost, speed, component obsolescence and control, though a lot of attention is necessary to ensure that the proper variants are selected for the aerospace industry. Table 1 below lists most of the data buses used on aircraft today in ascending order of the data transmission. Statistics in Fig.1 show that fiber optic buses operate at a speed of 20 times higher than the speed through Ethernet and two times higher than the speed of the serial IEEE data buses, also referred as "FireWire", thus providing a much faster alternative.

The foundation of the Aircraft Acquisition Plan is to understand the aviation mission. That understanding leads to identifying the key missions of the aviation function. Those most important missions are what allow you to derive a set of objective evaluation parameters. Those mission-specific parameters can include payload, passenger seats, range, runway performance etc.

Given a set of parameters, you will need to find out which aircraft are capable of meeting those parameters. For example, if you are an Emergency Medical Services (EMS) operator, you may need to carry 2 liter patients plus two attendants. You may also need to lift that load from a 3,000 foot elevation on an 86F (30C) day. You know the capabilities of your current EMS helicopter. Where do you get the information about possible replacement helicopters? What about performance on specific trips such as London City airport to Cairo, Egypt? What about the maximum payload you can depart Eagle, Colorado and make Charlotte, North Carolina non-stop? There is generally available data and specific data calculations.

There are three generally available categories of published sources of information and data. Trade publications, off-the-shelf databases and the manufacturer published data.

Trade Publications. There are a number of excellent publications that publish surveys, list performance reviews/pilot reports, and have new aircraft pricing. These magazines are readily available via subscription. In addition to hard copy, many have electronic copies and some maintain past issues on their website. The cost to receive them is nominal. This is a good first step to get general information. The ones with pilot reports may have more

technical information versus general product reviews. These articles may not answer your detailed questions or cover all the aircraft models you are interested in.

Published Databases. There are a number of databases published in the US that can provide a great deal of useful information. They cover four areas: acquisition costs, operating costs, performance and specifications, and specialized data. While trade magazines usually do a good job of listing new aircraft process, they don't have a lot of information on pre-owned process. Information that is published on acquisition costs relies on sellers or buyers reporting their transactions to the publisher. Not every transaction is reported and there is a time lag in the reporting of a transaction and the ability of a publisher to analyze and publish their data. When markets are changing rapidly, this data has less value than in a stable used market.

Operating cost databases focus on the day-to-day costs of owning and operating aircraft, including taxes and fixed costs such as insurance. Operating cost databases also have limitations. No two operators operate their aircraft in the exact same way. Some operators do much of the routine maintenance in-house while others use a service center.

Unscheduled maintenance is just that, unscheduled. There is no way to predict unscheduled maintenance save for using generalities and defining assumptions.

Guaranteed hourly maintenance programs may help, but each manufacturer or program seller will use different assumptions and many allow for some variability in charging based on utilization. As they say with automobiles, "your mileage may vary." These databases can be a valuable tools for comparing relative costs, but aircraft costing is not an exact science!

Performance and specification databases are useful provided that the person using them is knowledgeable about aircraft performance. They go into more detail than many magazine articles and they tend to have standardized formats for each category of aircraft. These generally come in software versions. Unless you buy the flight manuals or subscribe to a database that offers that level of detail, the ability to change the data for your exact mission can be limited. Again, as a relative comparison tool, they can be invaluable.

Costs of the above databases vary from several hundred dollars to over \$1,000 for complete sets. They tend to offer a fair amount of detail, are impartial, and given the time involved in gathering each bit of information on your own, a very worthwhile investment. Our company has published a number of these types of databases for over 30 years.

Other specialized databases do exist. They can be for things such as charter listings, aircraft for sale listings, airport databases, and en route winds and temperature statistics. Depending on your mission, they still may not answer the very specific question that you may have.

Manufacturer's Data. The information from the aircraft manufacturer can range from the sales brochures' optimistic, best case information, to very specific performance analyses.

Be cautious reading generalized sales information as they may or may not conform to standardized criteria. They may also be out of date. The flight manuals are the best source for specific calculations. Buying them for one-off comparisons can be quite expensive, especially when researching a number of different aircraft models.

Detailed performance questions can be easily answered by the manufacturer. Contacting the manufacturer does inform them of your interest and usually generates sales calls and perhaps a visit from your local aircraft sales person. If you wish to maintain your anonymity, you may wish to order a technical manual through the product support group.

What are the other sources? Consultants can be paid to do all or part of the work in the Aircraft Acquisition Plan. When we do a study for someone, we work closely with both the aviation professionals and well as the end user to make sure all the right questions are asked, and answered. Other operators can be a wealth of "inside" information, as are maintenance facilities and training companies. When asking questions, be specific. Ask a general question, get a general answer. List price is not necessarily selling price, nor does a flat-rate cost for an inspection tell you what to allow for unscheduled and "over and above" maintenance.

3.2 Topic: Research Resign

3.2.1 Objectives of the Study

3.2.1.1 Primary Objectives

To Study the factors leading to brand resonance with regard to selected airline brands such as Jet airways, Kingfisher and Air India with regard to Indian domestic aviation sector.

3.2.1.2 Secondary Objectives

To study the Customers' brand awareness towards the selected airline brands.

To analyze the Customers' perception towards the brand performance with regard to selected airline brands.

To examine the Customers' perception towards the brand imaginary with regard to selected airline brands.

To evaluate the Customers' judgments with regard to selected airline brands. To Study the Customers' feelings with regard to selected airline brands.

To study the strong factors that reasons the customer's resonance towards various airlines.

To identify the path of the strong airline brand in the CBBE pyramid. Please purchase PDF Split-Merge on www.verypdf.com to remove this watermark.

3.2.2 Research Methodology

3.2.2.1 Type of Research:

The Research study is to find out the customers opinion and preference regarding the selected airline brands. As it is associated with the opinion and feelings of the customers during the period of study, the type of research is descriptive in nature.

3.2.2.2 Area, Research type, Sample Design, Sample Size, Tools for Data Collection:

The research problem focuses to explore the insights and perception of the customers with regard to their long standing thought and feel related to the airline brands. Hence, nature of the research is descriptive. The area of the study is restricted to Coimbatore District, since this is the biggest two tier city next to Chennai in the state of Tamil Nadu, Air travel is popular due to the existence of Industries, Corporate hospitals and Educational Institutions which provide lot of scope for mobility such as medical tourism, visits of industrialists and movement of students for higher education. This population provides sufficient scope for the study. Besides, the Indian online travel Industry is also one of the facilitating factors for the popularity of air travel. Hence the population for the study consists of people who travel in airlines.

3.3 Topic: survey questions

Some matters and along with it topic question of enquiry or concern follows hereby

3.3.1 Financial Matters:

The buyer will be concerned with all of the target company's historical financial statements and related financial metrics, as well as the reasonableness of the target's projections of its future performance. Topics of inquiry or concern will include the following:

- What do the company's annual, quarterly, and (if available) monthly financial statements for the last three years reveal about its financial performance and condition?
- Are the company's financial statements audited, and if so for how long?
- Do the financial statements and related notes set forth all liabilities of the company, both current and contingent?
- Are the margins for the business growing or deteriorating?

- Are the company's projections for the future and underlying assumptions reasonable and believable?
- How do the company's projections for the current year compare to the board-approved budget for the same period?
- What normalized working capital will be necessary to continue running the business?
- How is "working capital" determined for purposes of the acquisition agreement? (Definitional differences can result in a large variance of the dollar number.)
- What capital expenditures and other investments will need to be made to continue growing the business, and what are the company's current capital commitments?
- What is the condition of assets and liens thereon?
- What indebtedness is outstanding or guaranteed by the company, what are its terms, and when does it have to be repaid?
- Are there any unusual revenue recognition issues for the company or the industry in which it operates?
- What is the aging of accounts receivable, and are there any other accounts receivable issues?
- Should a "quality of earnings" report be commissioned?
- Are the capital and operating budgets appropriate, or have necessary capital expenditures been deferred?
- Has EBITDA and any adjustments to EBITDA been appropriately calculated? (This is particularly important if the buyer is obtaining debt financing.)
- Does the company have sufficient financial resources to both continue operating in the ordinary course and cover its transaction expenses between the time of diligence and the anticipated closing date of the acquisition?

3.3.2 Technology/Intellectual Property

The buyer will be very interested in the extent and quality of the target company's technology and intellectual property. This due diligence will often focus on the following areas of inquiry:

- What domestic and foreign patents (and patents pending) does the company have?
- Has the company taken appropriate steps to protect its intellectual property (including confidentiality and invention assignment agreements with current and former employees and consultants)? Are there any material exceptions from such assignments (rights preserved by employees and consultants)?

- What registered and common law trademarks and service marks does the company have?
- What copyrighted products and materials are used, controlled, or owned by the company?
- Does the company's business depend on the maintenance of any trade secrets, and if so what steps has the company taken to preserve their secrecy?
- Is the company infringing on (or has the company infringed on) the intellectual property rights of any third party, and are any third parties infringing on (or have third parties infringed on) the company's intellectual property rights?
- Is the company involved in any intellectual property litigation or other disputes (patent litigation can be very expensive), or received any offers to license or demand letters from third parties?
- What technology in-licenses does the company have and how critical are they to the company's business?
- Has the company historically incorporated open source software into its products, and if so does the company have any open source software issues?
- What software is critical to the company's operations, and does the company have appropriate licenses for that software (and does the company's usage of that software comply with use limitations or other restrictions)?
- Is the company a party to any source or object code escrow arrangements?
- What indemnities has the company provided to (or obtained from) third parties with respect to possible intellectual property disputes or problems?
- Are there any other liens or encumbrances on the company's intellectual property?

3.3.3 Customers/Sales.

The buyer will want to fully understand the target company's customer base including the level of concentration of the largest customers as well as the sales pipeline. Topics of inquiry or concern will include the following:

- Who are the top 20 customers and what revenues are generated from each of them?
- What customer concentration issues/risks are there?
- Will there be any issues in keeping customers after the acquisition (including issues relating to the identity of the buyer)?
- How satisfied are the customers with their relationship with the company? (Customer calls will often be appropriate.)

- Are there any warranty issues with current or former customers?
- What is the customer backlog?
- What are the sales terms/policies, and have there been any unusual levels of returns/exchanges/refunds?
- How are sales people compensated/motivated, and what effect will the transaction have on the financial incentives offered to employees?
- What seasonality in revenue and working capital requirements does the company typically experience?

3.3.4 Strategic Fit with Buyer.

The buyer is concerned not only with the likely future performance of the target company as a stand-alone business; it will also want to understand the extent to which the company will fit strategically within the larger buyer organization. Related questions and areas of inquiry will include the following:

- Will there be a strategic fit between the company and the buyer, and is the perception of that fit based on a historical business relationship or merely on unproven future expectations?
- Does the company provide products, services, or technology the buyer doesn't have?
- Will the company provide key people (is this an acqui-hire?) and if so what is the likelihood of their retention following the closing?
- What integration will be necessary, how long will the process take, and how much will it cost?
- What cost savings and other synergies will be obtainable after the acquisition?
- What marginal costs (e.g., costs of obtaining third party consents) might be generated by the acquisition?
- What revenue enhancements will occur after the acquisition?

3.3.5 Material Contracts.

One of the most time-consuming (but critical) components of a due diligence inquiry is the review of all material contracts and commitments of the target company. The categories of contracts that are important to review and understand include the following:

- Guaranties, loans, and credit agreements
- Customer and supplier contracts

- Agreements of partnership or joint venture; limited liability company or operating agreements
- Contracts involving payments over a material dollar threshold
- Settlement agreements
- Past acquisition agreements
- Equipment leases
- Indemnification agreements
- Employment agreements
- Exclusivity agreements
- Agreements imposing any restriction on the right or ability of the company (or a buyer) to compete in any line of business or in any geographic region with any other person
- Real estate leases/purchase agreements
- License agreements
- Powers of attorney
- Franchise agreements
- Equity finance agreements
- Distribution, dealer, sales agency, or advertising agreements
- Non-competition agreements
- Union contracts and collective bargaining agreements
- Contracts the termination of which would result in a material adverse effect on the company
- Any approvals required of other parties to material contracts due to a change in control or assignment

3.4 Topic: interview procedure

Mergers and acquisitions are proceedings in which the possession of companies, other business organizations, or their operating units are changed or integrate with other entities. Want to shift your career in mergers acquisitions? Looking for some interview questions in merger acquisition then we in wisdomjobs have provided you with the complete details about the **Mergers acquisition interview question and answers**. If you are familiar with mergers acquisitions concepts then there are various leading companies that offer job roles

like HR Generalist, acquisition manager, senior executive talent acquisition, Technical Talent Acquisition Executives, Regional Acquisition Manager along with that there are many other roles too.

Question 1. Walk Me Through A Basic Merger Model?

Answer :

“A merger model is used to analyze the financial profiles of 2 companies, the purchase price and how the purchase is made, and determines whether the buyer’s EPS increases or decreases.

Question 2. What Is The Difference Between Asset Beta And Equity Beta?

Answer :

The asset beta is the unlevered beta which holds no risk to the leverage that the asset may hold. On the other side, when the beta is calculated by looking into the beta of other company, you obtain your levered beta. The mere thing left to do is to de-lever the beta.

Question 3. What’s The Difference Between A Merger And An Acquisition?

Answer :

There’s always a buyer and a seller in any M&A deal – the difference between “merger” and “acquisition” is more semantic than anything. In a merger the companies are close to the same size, whereas in an acquisition the buyer is significantly larger.

Question 4. Why Would A Company Want To Acquire Another Company?

Answer :

Several possible reasons:

- The buyer wants to gain market share by buying a competitor.
- The buyer needs to grow more quickly and sees an acquisition as a way to do that.
- The buyer wants to acquire the seller’s customers so it can up-sell and cross-sell to them.
- The buyer thinks the seller has a critical technology, intellectual property or someother “secret sauce” it can use to significantly enhance its business.
- The buyer believes it can achieve significant synergies and therefore make the deal accretive for its shareholders.

Question 5. Which Body Governs Mergers And Acquisitions In India?

Answer :

There is no single governing body to govern mergers and acquisitions in India.

The statutory law(s) which governs a particular industry, the Industrial Development and Regulation Act, the Companies Act, the Competition Act, FEMA, Income tax Act, and SEBI (Substantial acquisition of shares and takeovers) Rules 2011 – known as the ‘takeover code’, all together (but not limited to these) have rules and regulations which have to be followed for M & A in India.

Question 6. What Is Conglomerate Merger?

Answer :

This is the kind of merger between two companies in totally unrelated businesses or industries. Like if an IT company wants to enter into FMCG segment by buying a company selling FMCGs.

Question 7. What Is Congeneric Merger?

Answer :

Generic means in simple words – generally meaning the same – so congeneric merger is when two companies belonging to the same/ related industry – but producing/ dealing in different products merging to form a company.

Lets say, a producer or professional bats for the game of cricket – and a company producing only baseball bats merge to go global with their bats!

Question 8. What Is Reverse Merger?

Answer :

It is when a private company – buys a public company to automatically become a publicly traded company – and it does not have to undertake initial public offer.

Sort of like a roundabout way to become a public company without the actual hassles and costs of IPO and other initial formalities that a public company has to compulsorily adhere to.

Question 9. Why Would An Acquisition Be Dilutive?

Answer :

An acquisition is dilutive if the additional amount of Net Income the seller contributes is not enough to offset the buyer’s foregone interest on cash, additional interest paid on debt,

and the effects of issuing additional shares. Acquisition effects – such as amortization of intangibles – can also make an acquisition dilutive.

Question 10. A Company With A Higher P/e Acquires One With A Lower P/e – Is This Accretive Or Dilutive?

Answer :

You can't tell unless you also know that it's an all-stock deal. If it's an all-cash or all-debt deal, the P/E multiples of the buyer and seller don't matter because no stock is being issued. Sure, generally getting more earnings for less is good and is more likely to be accretive but there's no hard-and-fast rule unless it's an all-stock deal.

Question 11. Why Would A Strategic Acquirer Typically Be Willing To Pay More For A Company Than A Private Equity Firm Would?

Answer :

Because the strategic acquirer can realize revenue and cost synergies that the private equity firm cannot unless it combines the company with a complementary portfolio company. Those synergies boost the effective valuation for the target company.

Question 12. Why Do Goodwill & Other Intangibles Get Created In An Acquisition?

Answer :

These represent the value over the "fair market value" of the seller that the buyer has paid. You calculate the number by subtracting the book value of a company from its equity purchase price. More specifically, Goodwill and Other Intangibles represent things like the value of customer relationships, brand names and intellectual property – valuable, but not true financial Assets that show up on the Balance Sheet.

Question 13. What Is The Difference Between Goodwill And Other Intangible Assets?

Answer :

Goodwill typically stays the same over many years and is not amortized. It changes only if there's goodwill impairment (or another acquisition). Other Intangible Assets, by contrast, are amortized over several years and affect the Income Statement by hitting the Pre-Tax Income line. There's also a difference in terms of what they each represent, but bankers rarely go into that level of detail – accountants and valuation specialists worry about assigning each one to specific items.

Question 14. Is There Anything Else “intangible” Besides Goodwill & Other Intangibles That Could Also Impact The Combined Company?

Answer :

Yes. You could also have a Purchased In-Process R&D Write-off and a Deferred Revenue Write-off. The first refers to any Research & Development projects that were purchased in the acquisition but which have not been completed yet. The logic is that unfinished R&D.

projects require significant resources to complete, and as such, the “expense” must be recognized as part of the acquisition. The second refers to cases where the seller has collected cash for a service but not yet recorded it as revenue, and the buyer must write-down the value of the Deferred Revenue to avoid “double-counting” revenue.

Question 15. What Are Synergies, And Can You Provide A Few Examples?

Answer :

Synergies refer to cases where $2 + 2 = 5$ (or 6, or 7...) in an acquisition. Basically, the buyer gets more value than out of an acquisition than what the financials would predict.

There are 2 types: Revenue synergies and cost (or expense) synergies.

- **Revenue Synergies:** The combined company can cross-sell products to new customers or up-sell new products to existing customers. It might also be able to expand into new geographies as a result of the deal.
- **Cost Synergies:** The combined company can consolidate buildings and administrative staff and can lay off redundant employees. It might also be able to shut down redundant stores or locations.

Question 16. Why Does Mergers Or Acquisitions Happen?

Answer :

The underlying rationale in every merger or acquisition or amalgamation or de-merger, is always more economic benefit.

Economic benefits can be envisaged in various ways:

it depends on every individual case to see what the benefit is that a certain merger/ de-merger is targeting at.

Question 17. Why Do Most Mergers And Acquisitions Fail?

Answer :

Like so many things, M&A is “easier said than done.” In practice it’s very difficult to acquire and integrate a different company, actually realize synergies and also turn the acquired company into a profitable division. Many deals are also done for the wrong reasons, such as CEO ego or pressure from shareholders. Any deal done without both parties’ best interests in mind is likely to fail.

3.5 Topic: Data Analysis Procedures

3.5.1 Framework of Analysis

Research framework for analysis is decided based on the model and the objectives considered for the study. Suitable hypothesis were framed with regard to the objectives. Appropriate statistical tools are decided which are highlighted as follows:-

3.5.1.1 Percentage Analysis

A frequency distribution shows the number of frequencies in various classes which helps to get a general idea on personal profile of the respondents and opinion given by them on the phenomenon with respect to the objectives under study. Therefore, as a first step, percentage analysis was performed.

3.5.1.2 Standard Deviation

Whether the average represents the data or not can be found by computing the S.D, which is defined as.

$$SD = \sqrt{\frac{\sum |x - \mu|^2}{N}}$$

S.D helps to find out

1. Whether arithmetic mean represents the data?
2. Whether data are consistent on the basis of mean and S.D, parametric tests are performed?

3.5.1.3 χ^2 - test (Chi Square Statistic)

The χ^2 statistics is defined as

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

where:

c = degrees of freedom

O = observed value(s)

E = expected value(s)

χ^2 test is applied to test 1.

The significant difference between observed and expected value 2 to test the independence of attributes.

In this study the researcher has the observed data on the attributes like satisfaction, awareness etc., to analyze the data on above said attributes χ^2 test is applied.

3.5.1.4 ANOVA:

To compare three or more number of groups on the basis of mean values ANOVA Technique is applied. In this research also making use of the scores (obtained from likert scale) the awareness, perception on judgment, feelings, etc., of customers are compared on the basis of mean scores, hence ANOVA Technique is applied.

3.5.1.5 Correlation

Correlation gives the relationship or mutual inter dependence between two variables. In this way there are several related variables in the study. This correlation coefficient is given by, $r = (z_y)_i = (y_i - \bar{y}) / s_y$.

In this research, the relationship between overall satisfaction and several other factors like brand performance, brand image, customer judgment, etc are analyzed using correlation.

3.5.1.6 Regression

Regression is a concept used to find out the degree of dependence of a one variable on the other. As mentioned in correlation about the relationship between variables, similarly to find out to what extent the dependent variable is influenced by the independent variables the regression concept is applied. The regression equation of x on y is, $x = c + dy$
The regression equation of y on x is, $y = a + bx$. $x y r$, $y x r$ are the regression coefficients which tell us the rate of change in the independent variable with respect to one unit change in dependent variable.

3.5.1.7 Multiple Regressions:

The main objective in using this technique is to predict the variability on the dependent variable based on its covariance with all the independent variables. One can predict the level of the dependent phenomenon through multiple regression analysis model, given the levels of independent variables. Given the dependent variable the linear multiple regression is to estimate constants B_1, B_2, \dots, B_k and A such that the expression, $Y = B_1X_1 + B_2X_2 + \dots + B_kX_k + A$ provides a good estimate of an individual's Y score based on his X scores. The special correlation coefficient from Karl Pearson is termed as the multiple correlation coefficient (R). the squared multiple correlation R^2 represents the proportion of criterion variance accounted for by the explanatory variables i.e., the proportion of total variance that is 'common variance'. In the study, the overall satisfaction of the respondents are considered as the dependent variable and the various dimensions from the brand resonance grid such as brand performance, brand imaginary, customer judgment, customer feelings etc are considered to find the extent of the relationship between the variables.

3.5.1.8 Correspondence Analysis

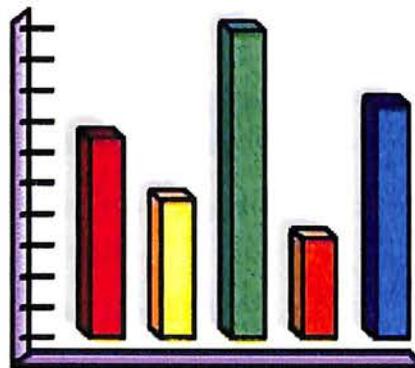
Correspondence Analysis is a technique for dimensional reduction and perceptual mapping. It is based on the association between the objects and set of descriptive characteristics or attributes. The researcher is also interested in finding the relative position of brands (Air India, Jet Airways and Kingfisher Airlines) and the resonance factors such as Concessional Air fare, Check in issues, Timings, Booking Convenience, Cabin crew services, Customer care, Special Assistance. To analyze and graphically show this objective the correspondence analysis technique is applied.

3.5.2 Pilot study analysis

From the results of the pilot study conducted among one hundred and eighty passengers questionnaire and inference was made. It is understood that, Air India is preferred for various reasons and poised third, Kingfisher is preferred for various features and preferred in the second position and the most preferred airline brand for many reasons and factor is Jet Airways. It is observed that the Spice jet was preferred for only one reason that the airline is providing affordable flight charges in all other cases that brand stays in last position. Even though this is an important factor to consider for the brand performance, to decide about the customer feelings and resonance the customers need to prefer the brand. Hence Spice jet is removed from the questionnaire for the reason that other than price there are so many other factors which are the inducing factors for the brand preference and brand resonance.

3.5.3 Reliability Results

Reliability analysis was done to check whether the data collected are reliable. The test was made for various dimensions considered for the study. The reliability results shown that for brand performance, brand image, customer judgment, customer feelings and customers' brand resonance, the results are more than 0.7. For the overall questionnaire, reliability was found using Guttman Split half Coefficient and the value was 0.705. Hence this gives confidence for the researcher to go ahead with the existing questionnaire and data collection and analysis process.



Chapter 4: Findings and Analysis

Chapter 4: Findings and Analysis

Descriptive Statistics & Correlation

- Descriptive statistics are brief descriptive coefficients that summarise a given data set, which can be either a representation of the entire or a sample of a population.
- Descriptive statistics are broken down into:-
 - **Measures of central tendency:** includes the mean, median, and mode and
 - **Measures of variability (spread):** standard deviation, variance, the minimum and maximum variables, and the kurtosis and skewness.

4.1 Application of Descriptive statistics

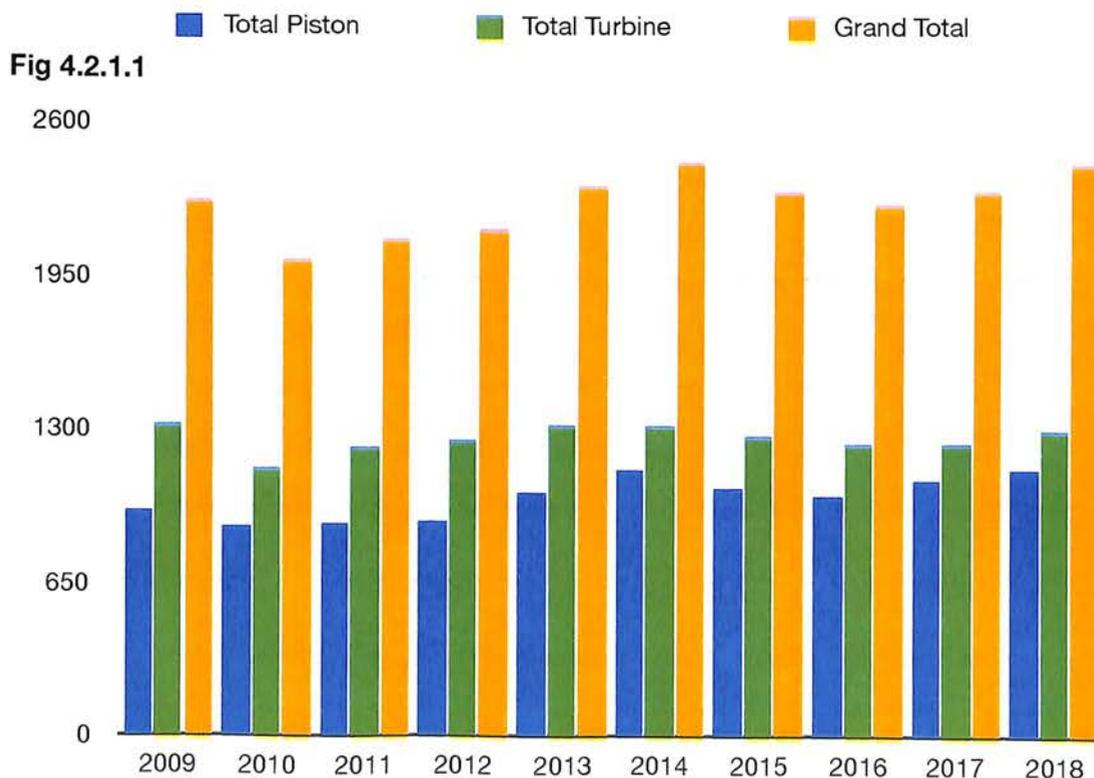
- Descriptive statistics, in short, help describe and understand the features of a specific data set by giving short summaries about the sample and measures of the data.
- Descriptive statistics provide simple summaries about the sample and about the observations that have been made.
- Such summaries may be either quantitative, i.e. summary statistics, or visual, i.e. simple-to-understand graphs.
- These summaries may either form the basis of the initial description of the data as part of a more extensive statistical analysis, or they may be sufficient in and of themselves for a particular investigation.
- This single number describes the general performance of a student across the range of their course experiences.
- The use of descriptive and summary statistics has an extensive history and, indeed, the simple tabulation of populations and of economic data was the first way the topic of statistics appeared.
- More recently, a collection of summarisation techniques has been formulated under the heading of exploratory data analysis: an example of such a technique is the box plot.
- In the business world, descriptive statistics provides a useful summary of many types of data.

4.2 Given Below are relevant Descriptive statistics that are further used to Obtain: Measures of central tendency & Measures of variability (spread)

4.2.1. Number of different Types of Airliners acquired for General Aviation Worldwide (2009–2018) {Source: General Aviation Manufacturers Association’s Annual Report 2018}

Year	Single-Engine Piston	Multi-Engine Piston	Total Piston	Turboprop	Business Jet	Total Turbine	Grand Total
2009	893	70	963	446	874	1320	2283
2010	781	108	889	368	767	1135	2024
2011	761	137	898	526	696	1222	2120
2012	817	91	908	584	672	1256	2164
2013	908	122	1030	645	678	1323	2353
2014	986	143	1129	603	722	1325	2454
2015	946	110	1056	557	718	1275	2331
2016	890	129	1019	582	666	1248	2267
2017	936	149	1085	563	677	1240	2325
2018	954	185	1139	601	703	1304	2443

Table No. 4.2.1



Measures of central tendency

We make following observations:

1. Average number of **Total Piston Airliners** Purchased in a year

= Total number of Piston Airliners Purchased over 10 Years/ 10

= 10116/10

= 1011.6



2. Average number of **Total Turbine Airliners** Purchased in a year

= Total number of Turbine Airliners Purchased over 10 Years/ 10

= 12648/10

= 1264.8



3. Average number of **Total Airliners** Purchased in a year

= Total number of Airliners Purchased over 10 Years/ 10

= 22764/10

= 2276.4

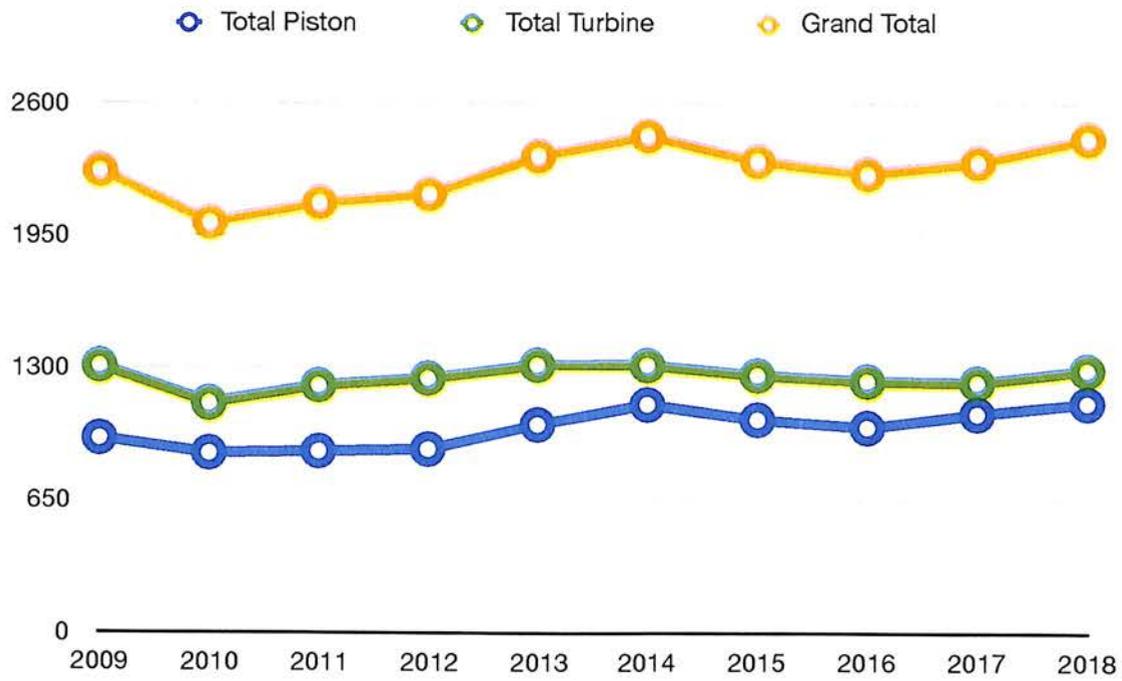
Hence, we can conclude from the above data that

- over 2276 airliners are acquired every year, from which over **1011** are Piston aircraft while **1264** are Turbine aircraft
- Greatest number of **Piston aircraft** were sold in year 2018 i.e **1139** aircraft.
- Greatest number of **Turbine aircraft** were sold in year 2014 i.e **1325** aircraft.
- Greatest number of **aircraft** were sold in year 2014 i.e **2454** aircraft.

Measures of variability

We make the following observations:

Fig 4.2.1.2



1. Number of **Piston Aircraft** shipped has considerably increased from 963 in 2009 to 1139 in 2018. Hence we can conclude that people have increasingly turned to Piston Aircraft over time. It's generally used at places with shorter runways & for occupations such as Farming, Skydiving, Pilot Training, etc.

2. Number of **Turbine Aircraft** shipped has decreased steeply from 1320 in 2009 to 1135 in 2010. But it saw a significant growth from 1135 in 2010 to 1325 in 2014 with 2014 witnessing highest shipment of Turbine aircraft so far. The number gradually decreased to 1304 in 2018. Hence 2014 was a year of highest growth in the sector.

3. Number of **Aircraft** shipped has decreased steeply from 2283 in 2009 to 2024 in 2010. But it saw a significant growth from 2024 in 2010 to 2454 in 2014 with 2014 witnessing highest shipment of Turbine aircraft so far. The number remained constant till 2018. Hence 2014 was a year of highest growth in the sector.

4.2.2. Estimated Amount in Million (Mn) \$ [USD] spent on different Types of Airliners acquired by Airlines Worldwide (2009–2018) {Source: General Aviation Manufacturers Association’s Annual Report 2018}

Year	Total Piston	Turboprop	Business Jet	Total Turbine	Grand Total
2009	442	1589	17443	19032	19474
2010	415	1300	18000	19300	19715
2011	441	1365	17235	18600	19041
2012	428	1359	17108	18467	18895
2013	571	1821	21058	22879	23450
2014	635	1849	22015	23864	24499
2015	601	1651	21877	23528	24129
2016	661	1705	18727	20432	21093
2017	718	1490	17994	19484	20202
2018	866	1839	17859	19698	20564

Table No. 4.2.2

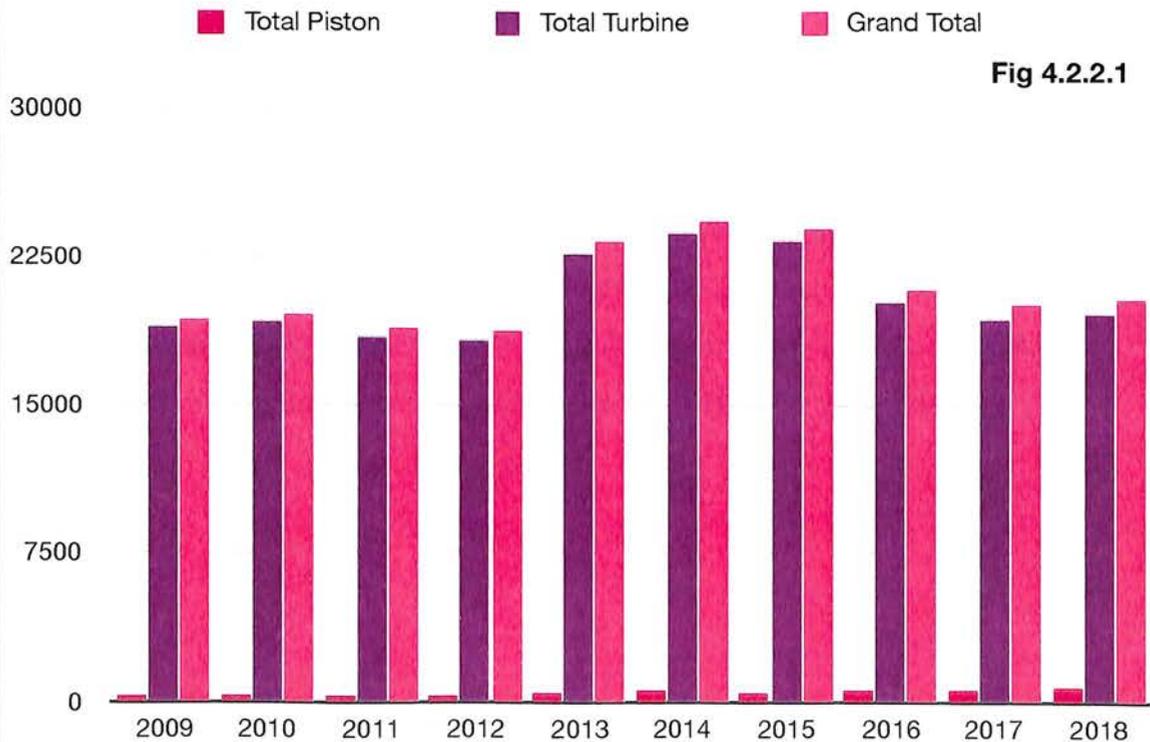


Fig 4.2.2.1

Measures of central tendency

We make following observations:

1. Average amount spent on acquisition of **Total Piston Airliners** in a year

= Total amount spent on Piston Airliners Purchased over 10 Years/ 10

= 5778 Mn \$ /10

= 577.8 Mn \$

2. Average amount spent on acquisition of **Total Turbine Airliners** in a year

= Total amount spent on Turbine Airliners Purchased over 10 Years/ 10

= 205284 Mn \$ /10

= 20528.4 Mn \$ or 20.53 Bn \$

3. Average amount spent on acquisition of **Total Airliners** in a year

= Total amount spent on Airliners Purchased over 10 Years/ 10

= 211062 Mn \$ /10

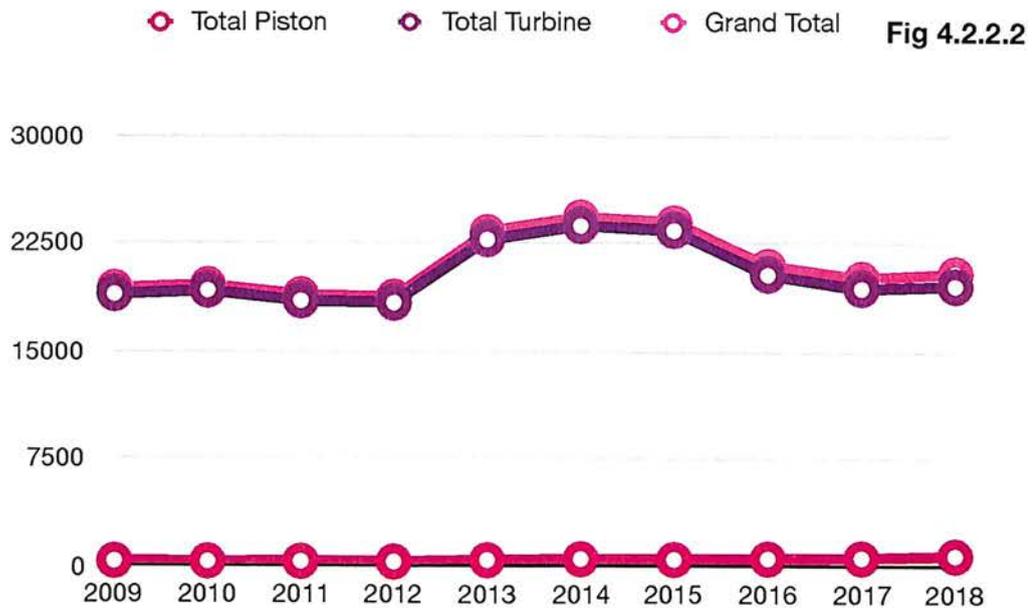
= 21106.2 Mn \$ or 21.1 Bn \$

Hence, we can conclude from the above data that

- over 21.1 Bn \$ worth of airliners are acquired every year, from which over **577.8 Mn \$** of worth are Piston aircraft while **20.53 Bn \$** of worth are Turbine aircraft.
- **Piston aircraft** of Greatest worth were sold in year 2018 valued at **866 Mn \$**.
- **Turbine aircraft** of Greatest worth were sold in year 2014 valued at **23.86 Bn \$**.
- **Aircraft** of Greatest worth were sold in year 2014 valued at **24.49 Bn \$**.

Measures of variability

We make the following observations:



1. Amount spent on **Piston Aircraft** has considerably increased from 442 Mn \$ in 2009 to 866 Mn \$ in 2018. Hence we can conclude that people have increasingly turned to Piston Aircraft over time. It's generally used at places with shorter runways & for occupations such as Farming, Skydiving, Pilot Training, etc.

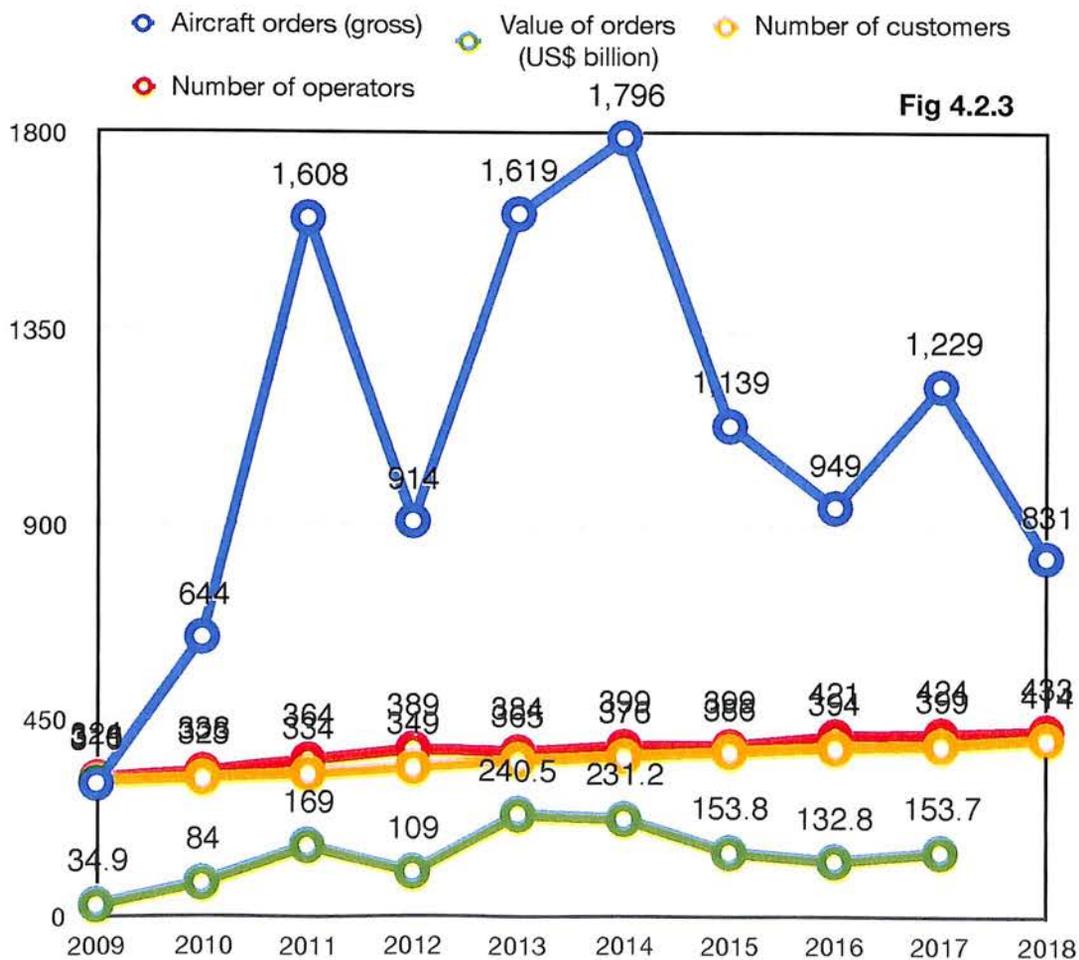
2. Amount spent on **Turbine Aircraft** decreased moderately from 19Bn \$ in 2009 to 18.4 Bn \$ 2012. But it saw a significant growth from 18.4 Bn \$ in 2012 to 23.8 Bn \$ in 2014 with 2014 witnessing highest shipment of Turbine aircraft so far. The number gradually decreased to 19.7 Bn \$ in 2018. Hence 2014 was a year of highest growth in the sector.

3. Amount spent on **Aircraft** decreased moderately from 19.5Bn \$ in 2009 to 18.9 Bn \$ 2012. But it saw a significant growth from 18.9 Bn \$ in 2012 to 24.5 Bn \$ in 2014 with 2014 witnessing highest shipment of Turbine aircraft so far. The number gradually decreased to 20.6 Bn \$ in 2018. Hence 2014 was a year of highest growth in the sector.

4.2.3. Data on Order of Airliner for a major Aircraft Manufacturing Company: Airbus over 10 Years. {Source: <https://www.airbus.com>}

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Aircraft orders (gross)	310	644	1608	914	1619	1796	1139	949	1229	831	11039
Value of orders (US\$ billion)	34.9	84	169	109	240.5	231.2	153.8	132.8	153.7	N.A.	1308.9
Number of customers	316	323	334	349	365	376	386	394	399	414	3656
Number of operators	324	338	364	389	384	399	399	421	424	433	3875
Average Aircraft Value (US\$ million)	112.6	130.4	105.1	119.3	148.5	128.7	135.0	139.9	125.1		

Table No. 4.2.3



Measures of central tendency

We make following observations:

1. One of the largest aircraft manufacturer Airbus receives an order of 1104 Aircraft every year on an average valued at 131 Bn \$ from its customers & Operators.
2. Highest number of aircraft i.e 1796 aircraft were ordered in year 2014 valued at a whopping 231.2 Bn \$ by 399 Airbus operators worldwide.
3. Highest value of order was in year 2013 i.e 240.5 Bn \$. This means however greater number of aircraft were ordered in 2014, but the aircraft ordered in 2013 had larger individual value (See in point 4).
4. Individual Average Aircraft value in {2014: 128.7 Mn \$} {2013: 148.5 Mn \$}

Measures of variability

We make following observations:

1. Airbus saw a steep growth in terms of aircraft orders from 310 in 2009 to 1608 in 2011. This was the time when Airbus entered into a competition with the previously dominating giant Boeing. Number declined the next year but increased significantly to 1796 in 2014.
2. Since most of the major airlines had ordered their aircraft in 2014, they had their absolute fleet & hence purchase declined till 2016. However an order of 1229 Aircraft was made in 2016.
3. Value of Aircraft ordered has seen a massive 7 times increase from 34.9 Bn \$ in 2009 to 240.5 Bn \$ in 2013.
4. Number of customers and operators have 324 in 2009 to 433 in 2018. This signifies goodwill of the company and its reliability.
5. Higher value aircrafts were purchased in 2013 with each on average listed at 148.5 Mn \$. This signifies that during this time either long distance overseas travel was in great demand.

4.2.4. Data on Average list price of an Airbus Aircraft (2018). {Source: <https://www.airbus.com>}

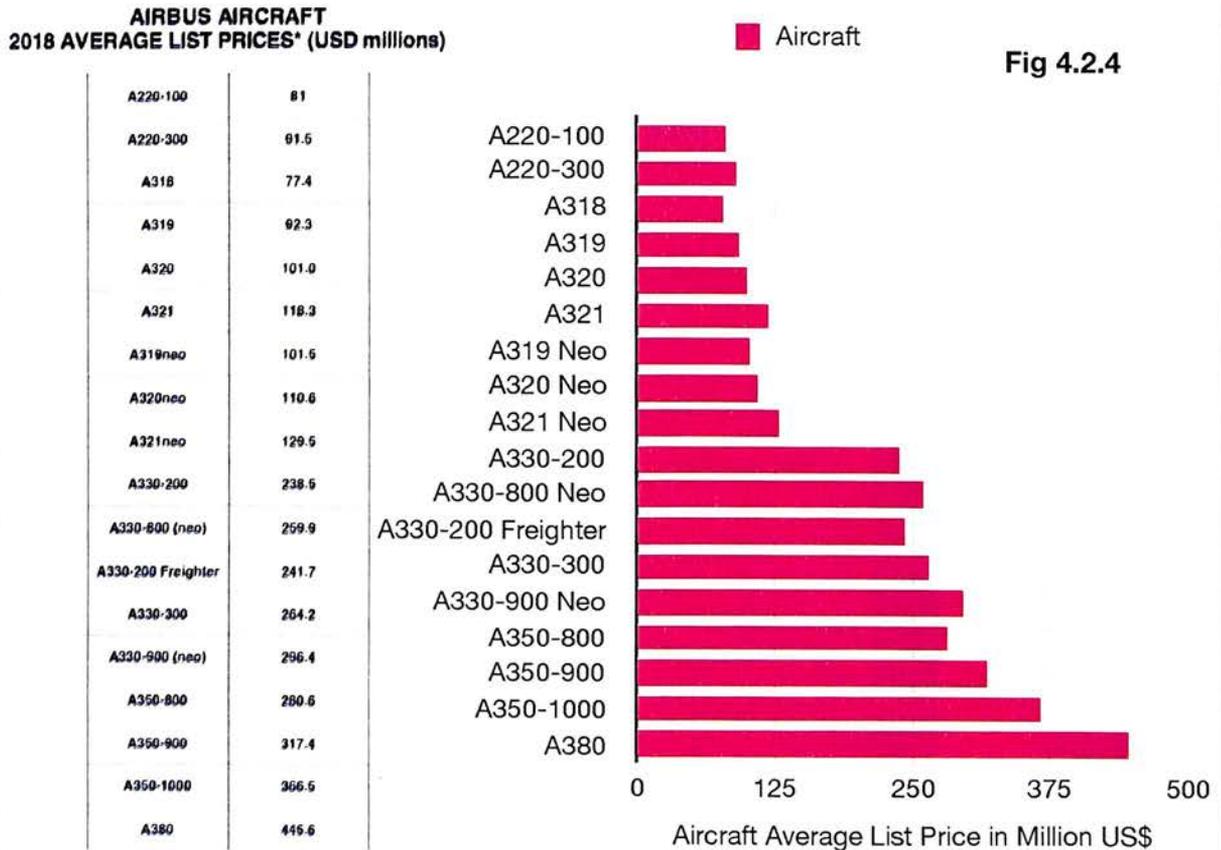


Table No. 4.2.4

Measures of central tendency

1. An average Narrow-body Airbus Aircraft costs 100.34 Million US\$
2. An average Wide-body Airbus Aircraft costs 301.2 Million US\$.
3. An average Airbus Aircraft costs 200.7 Million US\$.

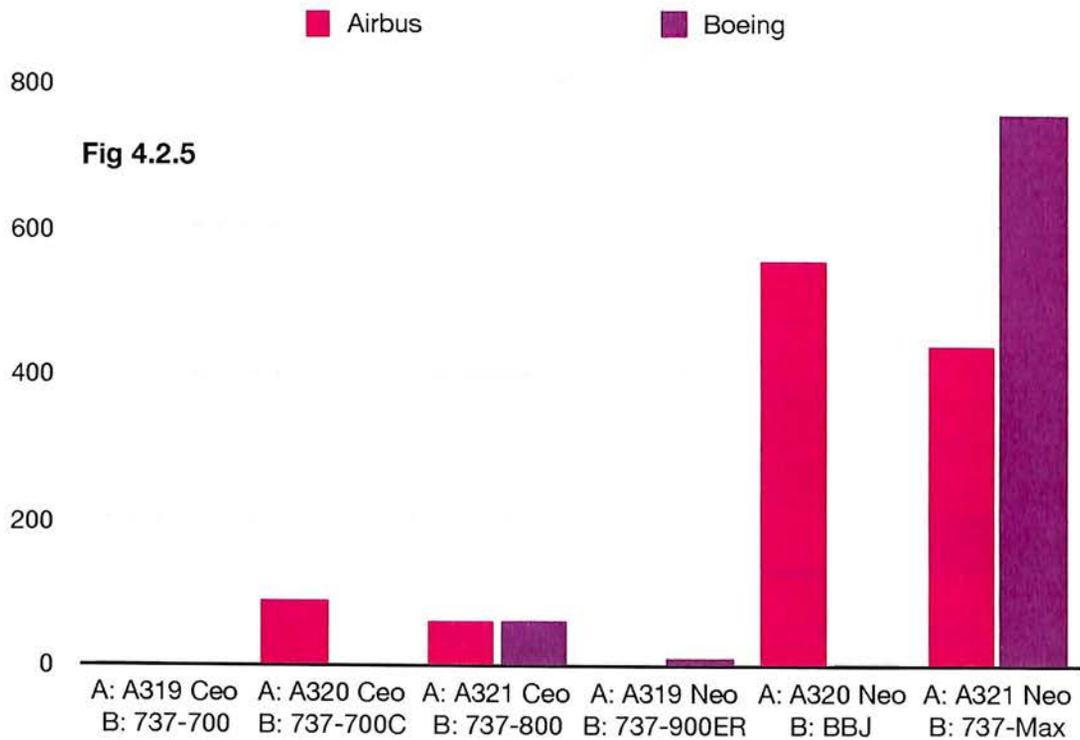
Measures of variability

1. Airbus' Aircraft vary from 81 Mn \$ to a whopping 445.6 Mn \$ Depending upon their **Body type**- where wide-body aircraft cost more, **Capacity** (Passenger/Cargo)- more the capacity, more expensive the aircraft is, **Range**- Aircraft with greater range of travel considerably cost more.

4.2.5. Comparing Boeing & Airbus' Gross Orders [Narrow-Body]-2017 Through Dec 31st, 2017 {Source: <https://dsm.forecastinternational.com/>}

	A: A319 Ceo B: 737-700	A: A320 Ceo B: 737-700C	A: A321 Ceo B: 737-800	A: A319 Neo B: 737-900ER	A: A320 Neo B: BBJ	A: A321 Neo B: 737-Max
Airbus (A)	7	90	64	1	556	442
Boeing (B)	0	2	64	14	4	759

Table No. 4.2.5



Measures of central tendency

1. Highest number of narrow-body aircraft ordered in 2017 is the Boeing 737-Max (759)
2. No Boeing 737-700 was ordered in 2017
3. Airbus had received more orders than Boeing in 2017
4. More Companies had turned to newer version of aircraft by the manufacturer i.e. Neo series of Airbus & 737- Max by Boeing.

Measures of variability

1. A very limited number of older Aircraft by both manufacturers were ordered in 2017 as compared to the latest models. This signifies the importance of Performance, efficiency & safety for the operator.

4.2.6. Comparing Boeing & Airbus' Gross Orders [Wide-Body]-2017 Through Dec 31st, 2017 {Source: <https://dsm.forecastinternational.com/>}

	A: A330 Family B: 787 Family	A: A350 Family B: 777 Family	A: A380 Family B: 747 Family	B: 767 Family
Airbus (A)	25	44	0	0
Boeing (B)	107	60	6	15

Table No. 4.2.6

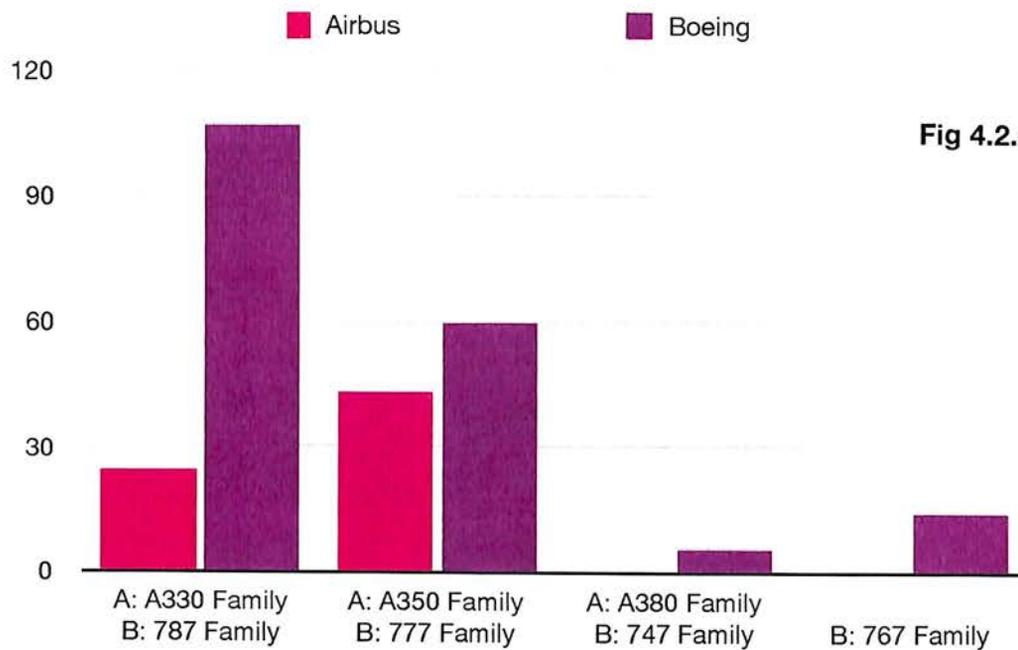


Fig 4.2.6

Measures of central tendency

1. Highest number of wide-body aircraft ordered in 2017 is the Boeing 787.
2. No Airbus A380 was ordered in 2017
3. Boeing had received more orders than Airbus for wide-body aircraft in 2017.
4. More Companies had turned to newer version of aircraft by the manufacturer i.e. the latest Boeing 787 & Airbus A350.

Measures of variability

1. A very limited number of older Aircraft by both manufacturers were ordered in 2017 as compared to the latest models. This signifies the importance of Performance, efficiency & safety for the operator.

4.2.7. Data of orders placed for Airbus aircraft in 2015 by different type of customers.

{Source: <https://www.airbus.com>}

	Airline Companies	Leasing Companies	Governments, Executive & Private	Undisclosed
Number of Aircrafts ordered	11756	3660	188	747

Table No. 4.2.7

- Airline Companies
- Leasing Companies
- Governments, Excecutive & Private
- Undisclosed

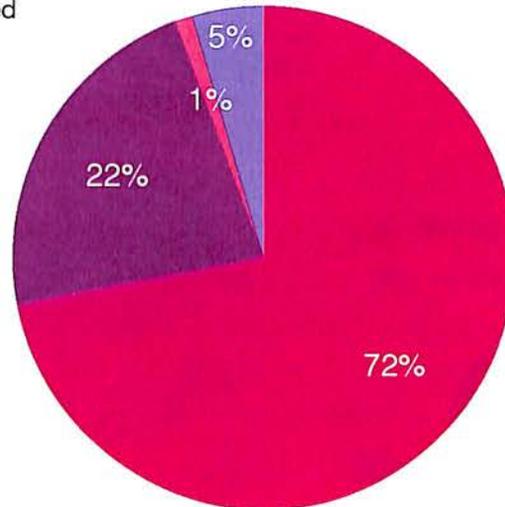


Fig 4.2.7

Measures of central tendency

- Highest orders are placed by Airline companies (11756) that prefer directly purchasing their aircraft instead of leasing it from a lessor.
- Right after airline companies are Leasing companies that have ordered 3660 Aircraft in 2015. They further lease these aircraft to lessee through wet/damp/dry lease, who are generally Airline Companies (mostly smaller ones) or other business or individuals.

Measures of variability

- Least number of aircraft in 2015 were ordered by Governments, Executive, Private (188).
- A greater number of aircraft i.e. 3660 were ordered by lessors.
- Highest number of aircraft i.e. 11756 were ordered by Airlines. This signifies purchasing of Aircraft is highly beneficial for business rather than leasing it, provided the Airline can manage sufficient funds to do so.

4.2.8. Operating Fleet of American Airlines as per 2019 {Source: wikipedia.com}

Aircraft	Airbus A319-100	Airbus A320-200	Airbus A321-200	Airbus A321 Neo	Airbus A330-200	Airbus A330-300	Boeing 737-800	Boeing 737-Max 8	Boeing 757-200	Boeing 767-300ER	Boeing 777-200ER	Boeing 777-300ER	Boeing 787-8	Boeing 787-9	Embraer 190
No. Of Aircraft	133	48	219	9	15	9	304	24	34	20	47	20	20	22	18

Table No. 4.2.8

- Airbus A319-100
- Airbus A320-200
- Airbus A321-200
- Airbus A321 Neo
- Airbus A330-200
- Airbus A330-300
- Boeing 737-800
- Boeing 737-Max 8
- Boeing 757-200
- Boeing 767-300ER
- Boeing 777-200ER
- Boeing 777-300ER
- Boeing 787-8
- Boeing 787-9
- Embraer 190

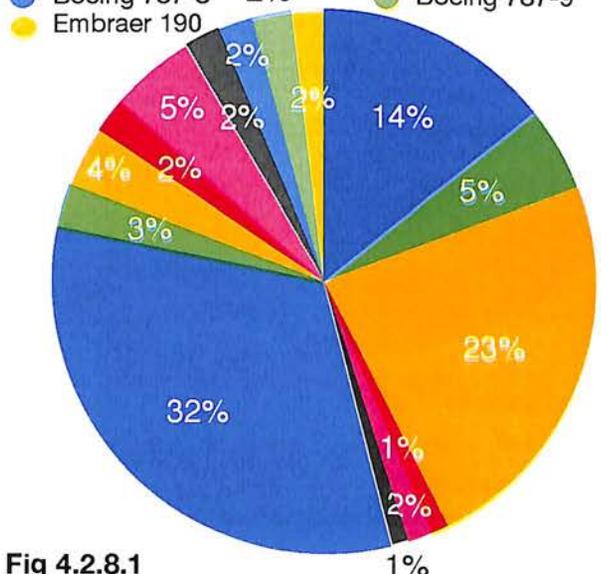


Fig 4.2.8.1

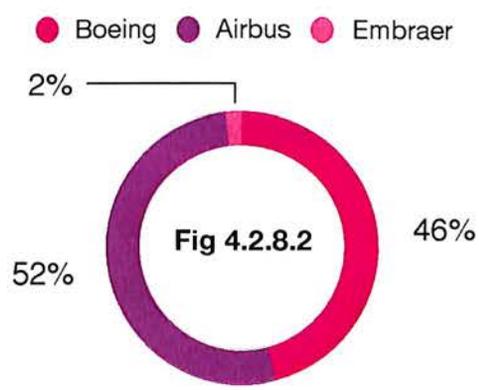


Fig 4.2.8.2

Measures of central tendency

- American Airlines has highest number of Boeing 737-800 i.e. 304 followed by Airbus A321-200 i.e. 219.
- 52% of American Airlines' fleet is Airbus Aircraft while 46% are Boeing & 2% Embraer.

Measures of variability

- Number of narrow-body aircraft used is huge as compared to wide-body.

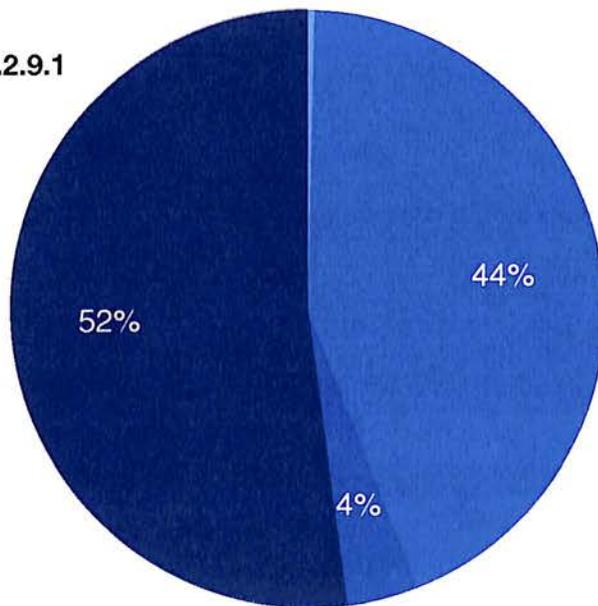
4.2.9. Operating Fleet of Emirates Airlines as per 2019 {Source: wikipedia.com}

Aircraft	Airbus A319-100	Airbus A380-800	Boeing 777-200LR	Boeing 777-300ER
No. Of Aircraft	1	112	10	134

Table No. 4.2.9

- Airbus A319-100
- Boeing 777-200LR
- Airbus A380-800
- Boeing 777-300ER

Fig 4.2.9.1



- Boeing
- Airbus
- Embraer

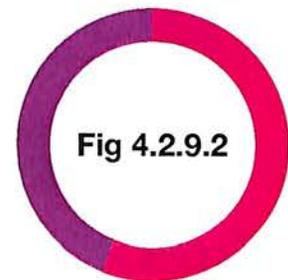


Fig 4.2.9.2

Measures of central tendency

- Emirates Airlines has highest number of Boeing 777-300ER i.e. 134 followed by Airbus A380-800 i.e. 112.
- 44% of American Airlines' fleet is Airbus Aircraft while 56% are Boeing.

Measures of variability

- Number of wide-body aircraft used is huge as compared to narrow-body.



Chapter 5: Interpretation of Results

5.1 Interpretation of Results

5.2. Hypotheses

Chapter 5: Interpretation of Results

5.1 Interpretation of Results

5.1.1. Introduction

Interpretation of results refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study. In fact, it is a search for broader meaning of research findings. The task of interpretation has two major aspects viz.,

- the effort to establish continuity in research through linking the results of a given study with those of another, and
- the establishment of some explanatory concepts.

“In one sense, interpretation is concerned with relationships within the collected data, partially overlapping analysis. Interpretation also extends beyond the data of the study to include the results of other research, theory and hypotheses.”¹ Thus, interpretation is the device through which the factors that seem to explain what has been observed by researcher in the course of the study can be better understood and it also provides a theoretical conception which can serve as a guide for further researches.

5.1.2. Method

The researcher may, at times, seek the guidance from experts for accomplishing the task of interpretation. The technique of interpretation has involved the following steps:

1. Reasonable explanation is given for the relations which have been found and the lines of relationship in terms of the underlying processes is interpreted. Further, the thread of uniformity that lies under the surface layer of the diversified research findings has been found. In fact, by using this technique, generalization has been done and concepts have been formulated.
2. Extraneous information collected during the study, has been considered while interpreting the final results of research study, for it has proven to be a key factor in understanding the problem under consideration.
3. Before embarking upon final interpretation, Mr. Ajay Jain is consulted, who has insight into the study and who is frank and honest and doesn't hesitate to point out omissions and errors in logical argumentation. Such a consultation has resulted in correct interpretation and has enhanced the utility of research results.
4. The task of interpretation has been accomplished only after considering all relevant factors affecting the problem to avoid false generalization. Interpretation of results has been done with fair amount of patience for accurate conclusions.
5. Interpretation is done with reference to data in chapter 4.

5.1.3 Interpretations are as followed:

5.1.3.1 [With Context to Data 4.2.1, Pg: 45] Having studied the 1st data i.e. number of different Types of Airliners acquired for General Aviation Worldwide (2009–2018) following interpretations have been made:

1. Over 2276 airliners are acquired every year, from which over **1011** are Piston aircraft while **1264** are Turbine aircraft. This suggests that Turbine aircraft have extensively been used much more for its reliability, safety, speed of travel, range of travel, larger size to accommodate more pax or cargo. Whereas the Piston aircraft have been used much for their convenience of being able to use at places with shorter runways be it a field at an isolated area or a difficult terrain. It's also used widely for it being cheaper and hence widely accessible to professionals be it farmers who use piston aircraft for their occupation or the skydiving groups that make use of these aircraft.
2. It is surprising to witness that the number of **Piston Aircraft** shipped has considerably increased from 963 in 2009 to 1139 in 2018 while the number of **Turbine Aircraft** shipped has gradually decreased from 1325 in 2014 to 1304 in 2018.
 - The best possible reasons for the increase in shipment of **Piston aircraft** are:-
 - 1. **Agriculture**, food, and related industries contribute \$1.053 trillion to **U.S.** gross domestic product (**GDP**) as per 2017. This is a massive growth and hence more and more people turning towards this occupation demands for advanced means of technology. An average farm in US covers 418 acres of land. Hence for such an enormous area of land spraying fertilisers and other chemicals using an aircraft is a reasonable consideration. Here is where a Piston Aircraft comes into play.
 - 2. With a steady growth in tourism sector, there has been an increased use of piston aircraft to carry people to places where a larger jet/ turbine aircraft cannot possibly land for Eg: Paro Airport in Bhutan
 - 3. These aircraft have also increasing being used to carry goods to places with limited connectivity.
 - 4. Such aircraft are crucial for initial training and licensing of pilots. Since the air travel industry has grown inevitably in these years, demand of pilots have significantly increased and hence for these planes.
 - 4. These are used for adventurous activities like sky diving which today has become largely available to tourists.
 - Shipment of **turbine aircrafts** has seen a slight decline from 2014 to 2018 which is possibly due to:

- 2012-2014 was a boom period for the air travel industry. In 2014, the number of passengers carried on scheduled services rose to 3.3 billion, which was 5.5 per cent higher than previous year. Having seen this opportunity many existing airlines, new players, businesses turned to this industry which resulted to a massive order & shipment of aircraft in 2014. Today since the growth of industry isn't as steep, the number of new aircraft acquired has reduced.
- Also the previously acquired aircraft are still operational and turning to new aircraft for little upgrades is infeasible.

5.1.3.2 [With Context to Data 4.4.2, Pg: 48] Having studied the 2nd data i.e. Estimated Amount in Million (Mn) \$ [USD] spent on different Types of Airlines acquired by Airlines Worldwide (2009–2018) following interpretations have been made:

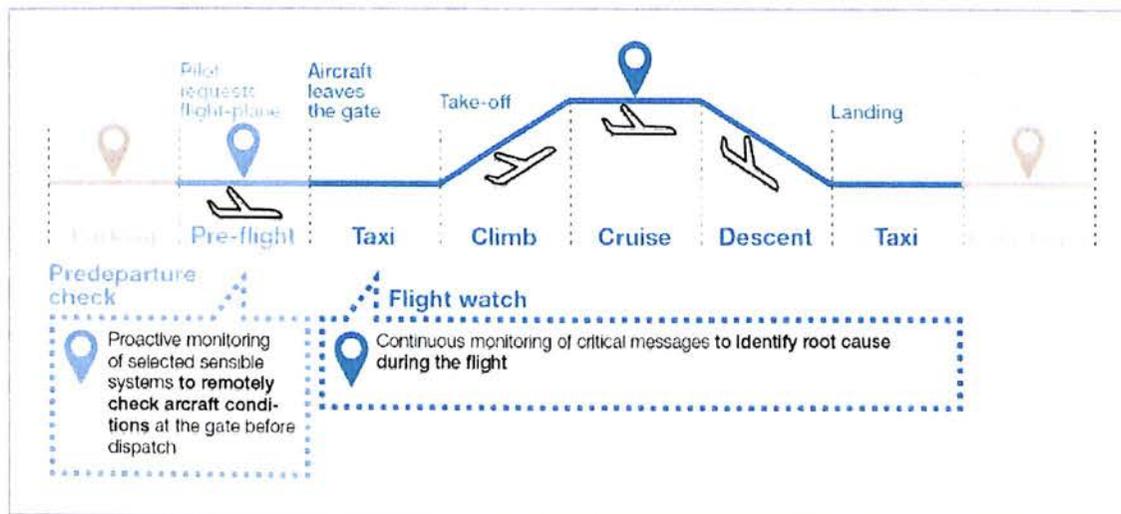
- Here, the amount spent on aircraft proportionally depends upon number of aircraft acquired. And hence the trend of amount in spent on different Types of Airlines goes parallel with the previous data on number of aircraft shipped.

5.1.3.3 [With Context to Data 4.2.3, Pg: 51] Having studied the 3rd data i.e. data on Order of Airliner for a major Aircraft Manufacturing Company: Airbus over 10 Years, following interpretations have been made:

- Airbus receives a massive order of 1104 Aircraft every year on an average valued at 131 Bn \$ from its customers & Operators. Number of customers and operators have 324 in 2009 to 433 in 2018. These numbers signify the brilliant performance by the French giant in terms of:-
 - **Safety and reliability:** Airbus provides its customers and operators with
 - (I) **Turnkey solutions to ensure maximum availability and reliability of your aircraft:** To ensure maximum aircraft availability and reliability, Airbus offers a wide range of services and consultation on maintenance and engineering and material management to operators, OEMs and MROs (Maintenance Repair and Overhaul centres). Capitalising on the modern trend of digitalisation to provide more advantages to customers, Airbus optimises the use of data to allow insightful, fast and accurate decision making through breakthrough solutions, co-innovating with the best in the field.
 - (II) **24/7 Support Worldwide:** AIRTAC The Airbus Technical Aircraft-on-ground Centre (AIRTAC) is a state-of-the-art facility with dedicated specialist engineers and innovative technology, operating 24 hours a day,

365 days a year. AIRTAC is part of a wider customer service approach that provides all Airbus operators with global around-the-clock assistance for all aircraft-on-ground matters.

- (III) **Preventive Maintenance with AiRTHM:** In an increasingly competitive environment, customers require optimised maintenance and real-time troubleshooting to maximise aircraft availability. AiRTHM is an Airbus service that provides guidance for A380 and A350 operators by offering them optimised maintenance and real-time troubleshooting actions empowered by the MCC (Maintenance Control Centre). The AiRTHM service is built on two stand-alone modules fitting the aircraft operation phases: Pre-departure check and Flight watch



- (IV) **A full range of digital solutions:** Airbus has always led the way by integrating the latest technological advancements into the utilisation and interpretation of data from aircraft maintenance, delivering significant economic advantages to customers and allowing them to optimise their fleet and generate additional savings.
- (V) **Material Management:** Airbus has the flexibility to offer a full range of services that can be tailored for any potential customer – covering everything from tools, consumables and expendables to proprietary and standard part management and distribution through SATAIR.
- **Best in class technology:** Airbus has pioneered the art of aircraft making with an introduction of its latest Airbus A350-1000 XWB Aircraft with benefits from being built with over 70% advanced materials; combining carbon composites (53%), titanium and modern aluminium alloys, to create a lighter and more cost-efficient aircraft while also reducing maintenance requirements. The latest-generation Rolls-Royce Trent XWB engines are quieter and more efficient. This ensures best possible

performance in terms of speed, range, efficiency and also the unique shape makes the aircraft extremely comfortable for passengers with least possible turbulence.

- In this data it is also surprising to see that highest number of aircraft i.e. 1796 were sold in year 2014 but with an average individual value of 128.7 Mn \$ while in year 2013, comparatively less aircraft were ordered but an individual aircraft valued 148.5 Mn \$. With this observation it shall be interpreted that:
 - The airlines and operators in 2013 focused more on acquiring more expensive aircraft than in 2014 possibly because:-
 - (I) In **2013**, **International tourist** arrivals reached a record 1.087 billion. This meant an increased demand for more wide-body aircraft that had great range of travelling and could accommodate more Pax. Hence more operators turned to long-haul flights and therefore, much more expensive aircraft were purchased
 - (II) Year **2014**, saw a significant rise of domestic travel and short/ medium-haul travel and hence comparatively less expensive aircraft were ordered.

5.1.3.4 [With Context to Data 4.2.4, Pg: 53] Having studied the 4th data i.e. data on Average list price of an Airbus Aircraft (2018), following interpretations have been made:

- The price of aircraft depends largely upon:
 - (I) **Size** of the aircraft: whether wide or narrow body, the ones with a larger capacity cost more obviously due greater & larger equipments used. A giant A380 requires larger thrust as compared to an A320 and hence is powered by four Engine Alliance GP7200 or Rolls-Royce Trent 900 turbofans providing a range of 8,000 nmi (14,800 km) and a capacity of carrying over 850 Pax.
 - (II) **Range:** Aircraft with a larger range of travel cost more than the ones capable of shorter ranges. The longest range Airbus jetliner in service is the A350 XWB Ultra Long Range, capable of flying up to 18,000 km (9,700 nmi). It evidently costs 51 Mn \$ more than the A330-900 Neo that is capable to travel 6,550 nmi (12,130 km).
 - (III) **Fuel efficiency:** Profits for airline industry largely depends upon the cost of fuel and hence how efficiently the aircraft uses its fuel. The A320neo (*neo* for *new engine option*) is a development launched on 1 December 2010. Re-engined with CFM International LEAP-1A or Pratt & Whitney PW1000G engines and with large sharklets, it is 15% more fuel efficient than the 3 previous variants A319, A320 and A321. And hence it costs more.

5.1.3.5 [With Context to Data 4.2.5, Pg: 54] Having studied the 5th data i.e. comparing Boeing & Airbus' Gross Orders [Narrow-Body]-2017 Through Dec 31st, 2017, following interpretations have been made:

- More operators and airlines have turned up for newer aircraft from both manufacturers i.e. A320-neo and A321-neo by Airbus and Boeing 737-Max by Boeing.
- 1162 Buyers have turned to Airbus while 843 towards Boeing for Narrow-body aircraft in 2017. This is probably because:
 - In terms of range, B737- Max (range: 3700 nmi) lies between A320-neo (range: 3500 nmi) and A321 Neo (range:4000 nmi). In terms of passenger capacity also, B737- Max (Pax: 204) lies between A320-neo (Pax: 195) and A321 Neo (Pax: 240). While in terms of price B737- Max is the most expensive amongst the other 2 i.e. 134 M \$. Hence the ones demanding a performance better than A320neo turned to B737-Max and for a much greater performance turned to A321neo.
 - Here, another fact to be considered is that many airlines and operators generally prefer aircraft from a similar family they had been previously using since it requires none or barely any amount of training for staff like pilots and cabin crew. Also they consider these for having similar aircraft saves a lot on maintenance since, spares required are readily available and no special training is required to maintain a similar aircraft. Hence the B737 users have tended to purchase 737-Max while airbus users have purchased mostly A320/A321 neo aircraft in order to save upon further operational costs.

5.1.3.6 [With Context to Data 4.2.6, Pg: 55] Having studied the 6th data i.e. comparing Boeing & Airbus' Gross Orders [Wide-Body]-2017 Through Dec 31st, 2017, following interpretations have been made:

- The latest next-gen aircraft by Airbus and Boeing are A350-1000XWB and B787-10(Dreamliner). Each of them is a marvellous example of best in class engineering with highest efficiency and best possible performance. In terms of passenger capacity both A350 and B787 are equivalent. But the A350 definitely has an edge in terms of performance (Range) and efficiency. However Boeing 787 remains the highest ordered aircraft as it comes with a 40 Mn \$ cheaper price tag.
- Not many have turned to the largest variants i.e. Airbus A380 and Boeing 747. No Airbus A380 has been ordered while only 6 B747 have been ordered. This is because:
 - They're a 20th-century design with four engines, and costs per seat are commensurately high. Because of their sheer size, ground infrastructure is expensive. Those factors are offset to some extent by the passenger preference – some people will pay a premium to fly the aircraft – and the way that it extracts

maximum value from “slot-constrained” airports such as London Heathrow. But the main problem is that there are relatively few routes on which they are successful planes.

- On the other hand B747 are widely used for cargo and hence cannot be overlooked for the business.
- Hence newer versions i.e. B-787, A350 and to some extent B777 & A330 solve these problems.

5.1.3.7 [With Context to Data 4.2.7, Pg: 56] Having studied the 7th data i.e. data of orders placed for Airbus aircraft in 2015 by different type of customers, following interpretations have been made:

- 72% (11176) aircraft were ordered by airline companies and operators, 22% (3330) by lessors and remaining by governments, executive & Private and undisclosed people.
- This means that majority of airlines and operators have increasingly considered purchasing their aircraft directly from the manufacturer. This is done through **Direct Lending**. Here, an airline may simply take out a secured or unsecured loan to buy a commercial aircraft. In such large transactions, a **syndicate** of banks may collectively provide a loan to the borrower.
- Others acquire their airliner from the **Lessors** that have purchased 22% of these aircraft. The lessee acquires the airliner from the lessor in 3 ways:

1) **Operating leasing:** Commercial aircraft are often leased through a Commercial Aircraft Sales and Leasing (CASL) company, the two largest of which are International Lease Finance Corporation (ILFC) and GE Commercial Aviation Services (GECAS). Operating leases are generally short-term (less than 10 years in duration), making them attractive when aircraft are needed for a start-up venture, or for the tentative expansion of an established carrier. The short duration of an operating lease also protects against aircraft obsolescence, an important consideration in many countries due to changing noise and environmental laws. In some countries where airlines may be deemed less creditworthy (e.g. the former Soviet Union), operating leases may be the only way for an airline to acquire aircraft. Moreover, it provides the flexibility to the airlines so that they can manage fleet size and composition as closely as possible, expanding and contracting to match demand. The 2 types of operating lease are:

- 1) **Wet Lease:** A wet lease is a leasing arrangement whereby one airline (the lessor) provides an aircraft, complete crew, maintenance, and insurance (ACMI) to another airline or other type of business acting as a broker of air travel (the lessee), which pays by hours operated. The lessee provides fuel

and covers airport fees, and any other duties, taxes, etc. The flight uses the flight number of the lessee. A wet lease generally lasts 1–24 months.

II) **Dry Lease:** A dry lease is a leasing arrangement whereby an aircraft financing entity (lessor), such as GECAS, AerCap, or Air Lease Corporation, provides an aircraft *without* crew, ground staff etc. Dry lease is typically used by leasing companies and banks, requiring the lessee to put the aircraft on its own air operator's certificate (AOC) and provide aircraft registration. A typical dry lease lasts upwards of two years and bears certain conditions with respect to depreciation, maintenance, insurances, etc., depending also on the geographical location, political circumstances, etc.

III) **Moist Lease:** Mix of the other 2.

2) **Finance leasing**, also known as "capital leasing", is a longer-term arrangement in which the operator comes closer to effectively "owning" the aircraft. It involves a more complicated transaction in which a lessor, often a special purpose company (SPC) or partnership, purchases the aircraft through a combination of debt and equity financing, and then leases it to the operator. The operator may have the option to purchase the aircraft at the expiration of the lease, or may automatically receive the aircraft at the expiration of the lease. The various forms of finance leasing include:

- 1) **Equipment trust certificate (ETC):** Most commonly used in North America. A trust of investors purchases the aircraft and then "leases" it to the operator, on condition that the airline will receive title upon full performance of the lease. ETCs blur the line between finance leasing and secured lending, and in their most recent forms have begun to resemble securitization arrangements.
- 2) **Extendible operating lease:** Although an EOL resembles a finance lease, the lessee generally has the option to terminate the lease at specified points (e.g. every three years); thus, the lease can also be conceptualized as an operating lease. Whether EOLs qualify as operating leases depends on the timing of the termination right and the accounting rules applicable to the companies.^[13]
- 3) **US leveraged lease:** Used by foreign airlines importing aircraft from the United States. In a US lease, a Foreign Sales Corporation (FSC) purchases and leases the aircraft, and is tax-exempt so long as at least 50% of the aircraft is made in the US, and at least 50% of its flight miles are flown outside the US. Because of the extensive documentation required for these leases, they have only been used for very expensive aircraft being operated

entirely outside the US, such as Boeing 747s purchased for domestic routes within Japan.

- 4) **Japanese leveraged lease:** A JLL requires the establishment of a special purpose company to acquire the aircraft, and at least 20% of the equity in the company must be held by Japanese nationals. Widebody aircraft are leased for 12 years, while narrowbody aircraft are leased for 10 years. Under a JLL, the airline receives tax deductions in its home country, and the Japanese investors are exempt from taxation on their investment. JLLs were encouraged in the early 1990s as a form of re-exporting currency generated by Japan's trade surplus.
 - 5) **Hong Kong leveraged lease:** In Hong Kong, where income taxes are low in comparison to other countries, leveraged leasing to local operators is common. In such transactions, a locally incorporated lessor acquires an aircraft through a combination of non-recourse debt, recourse debt, and equity (generally in a 49-16-35 proportion), and thus be able to claim depreciation allowances despite only being liable for half of the purchase price. Its high tax losses can then be set off against profits from leasing the aircraft to a local carrier. Due to local tax laws, these investments are set up as general partnerships, in which the investors' liability is mainly limited by insurance and by contract with the operator.
- The global leasing industry has grown rapidly from 1,800 aircraft owned by lessors in 1996 to nearly 8,000 in 2016, collectively lessors now own nearly 42% of all commercial aircraft. The past three years have been very strong for aircraft lessors globally. However, many functions within aircraft leasing companies are being actively expanded despite the downturn:
 - Pricing and Trading for example. Understanding the value of an asset, it's value overtime, finding right moment and putting together right mix (narrow-body, wide-body) of aircraft in the package to sell and to buy in order to keep up with the overall strategy of the company.
 - Procurement- the ability to negotiate favourable deals with OEMs, drive cost reduction projects and change throughout organization, secure favourable deals and save money by negotiating purchasing contracts.
 - Legal and Risk – main gatekeeper for evaluating all the details of the potential deal, understanding the possible challenges and protecting the lessor's interests.
 - And of course, Marketing. Driving profit in for the lessor. Using in depth knowledge of the dedicated region, building relationship with lessees, networking

internationally, knowing everything about the customer and it's plans in terms of growing fleet and the direction the airline is taking in future.

- Despite the cyclical nature of aircraft leasing, an increasing number of companies see the long-term value in the industry and are expanding operations despite the prospect of a near-term down turn.

5.2. Hypotheses

5.2.1 Introduction

A hypothesis is a proposed explanation for a phenomenon. For a hypothesis to be a scientific hypothesis, the scientific method requires that one can test it. Scientists generally base scientific hypotheses on previous observations that cannot satisfactorily be explained with the available scientific theories. Even though the words "hypothesis" and "theory" are often used synonymously, a scientific hypothesis is not the same as a scientific theory. A working hypothesis is a provisionally accepted hypothesis proposed for further research,⁽¹⁾ in a process beginning with an educated guess or thought.

5.2.2 Scientific hypothesis

People refer to a trial solution to a problem as a hypothesis, often called an "educated guess" because it provides a suggested outcome based on the evidence. However, some scientists reject the term "educated guess" as incorrect. Experimenters may test and reject several hypotheses before solving the problem. According to Schick and Vaughn, researchers weighing up alternative hypotheses may take into consideration:

- Testability (compare falsifiability as discussed above)
- Parsimony (as in the application of "Occam's razor", discouraging the postulation of excessive numbers of entities)
- Scope – the apparent application of the hypothesis to multiple cases of phenomena
- Fruitfulness – the prospect that a hypothesis may explain further phenomena in the future
- Conservatism – the degree of "fit" with existing recognized knowledge-systems.

5.2.3 Working Hypothesis

A working hypothesis is a hypothesis that is provisionally accepted as a basis for further research in the hope that a tenable theory will be produced, even if the hypothesis ultimately fails. Like all hypotheses, a working hypothesis is constructed as a statement of expectations,

which can be linked to the exploratory research purpose in empirical investigation. Working hypotheses are often used as a conceptual framework in qualitative research.

The provisional nature of working hypotheses makes them useful as an organizing device in applied research. Here they act like a useful guide to address problems that are still in a formative phase.

In recent years, philosophers of science have tried to integrate the various approaches to evaluating hypotheses, and the scientific method in general, to form a more complete system that integrates the individual concerns of each approach. Notably, Imre Lakatos and Paul Feyerabend, Karl Popper's colleague and student, respectively, have produced novel attempts at such a synthesis.

5.3.4 Hypothesis for result 4.2.1 & 4.2.2, pg: 45 & 48

The Global air traffic passenger demand having seen an average of 6% annual growth between 2009-2018, the number of different Types of Airliners acquired for General Aviation Worldwide is anticipated to increase consistently, however it has remained almost constant between 2014 and 2018. 2014, being the year of largest demand witnessed the largest shipment of airliners till date.

Similar is the case with the estimated Amount in Million \$ [USD] spent on different Types of Airliners acquired by Airlines Worldwide (2009–2018). This is apparently because the amount spent solely depends upon number of airliners shipped.

5.3.4 Hypothesis for result 4.2.3 pg: 51

With the Global air traffic passenger demand having seen an average of 6% annual growth between 2009-2018 and Airbus outperforming its competitors in terms of performance and reliability, it was well anticipated that the orders received by the manufacturer will increase annually. But here, the graph is contrasting to what was expected. The growth and decline have been very inconsistent. 1608 orders were placed in 2011 but only 914 the next year. 2014 witnessed highest orders however it's consistently declined since then.

Also, the number of customers have constantly increased which was well anticipated.

5.3.5 Hypothesis for result 4.2.4 pg: 53

Data on Average list price of an Airbus Aircraft (2018) was well anticipated since it is apparent for price of aircraft to vary according to its size, performance, range and other factors listed in 5.1.3.4.

5.3.5 Hypothesis for result 4.2.5 & 4.2.6 pg: 54 & 55

When comparing Boeing & Airbus' Gross Orders [Narrow-Body]-2017 Through Dec 31st, 2017. The Airbus A321 Neo outperforms the Boeing 737-Max in terms of passenger capacity, fuel efficiency and range. Both are offered at a similar price i.e. 129 Mn US\$ for the A321 Neo & 134 Mn US\$ for the B737-Max. Hence it was anticipated that operators would consider ordering the A321 Neo. However, more 737-Max were ordered. This is possibly because many of these operators were already operating the jets from the 737 Family, and hence considered the 737-Max to save further on operating costs like staff and maintenance as mentioned above in 5.1.3.5.

Similar is the case with the Boeing & Airbus' Gross Orders [Wide-Body]-2017 Through Dec 31st, 2017. Here the A350-1000 XWB Outperforms the B787, but the picture is quite clear since B787 comes with a 40 Mn \$ cheaper price tag. However, it was never anticipated that no Airbus A380, the largest civil aircraft ever would not be ordered at all.

5.3.6 Hypothesis for result 4.2.7 pg: 56

The global leasing industry has grown rapidly from 1,800 aircraft owned by lessors in 1996 to nearly 8,000 in 2016, collectively lessors now own nearly 42% of all commercial aircraft. Aircraft manufacturers project a net increase in the global fleet of 23,000 aircraft by 2035 with the lessor's market share increasing to 50% by the end of the decade, resulting in more than 11,500 additional aircraft acquired by lessors. This trend is being encouraged as export credit financing has become more restrictive and lessors have emerged as the vehicle through which commercial aircraft are efficiently allocated around the world as macroeconomic trends, geopolitical events and other external factors dictate. Hence in the data of orders placed for Airbus aircraft in 2015 by different type of customers, it wasn't anticipated that lessors would have merely 22% share.



Chapter 6: Conclusions and Scope for Future Work

Chapter 6: Conclusions and Scope for Future Work

Aviation Industry has become an inevitable part of all our lives be it travelling somewhere for business, leisure or any other purpose. The very root of this industry lies in the airliners acquired by the operators.

Without proper airliners i.e. aircraft to suit the requirement, it's unimaginable to operate a successful Airline business since it largely depends upon the aircraft that:

On what route the airline can fly its aircraft i.e. **Range**: maximum distance an aircraft can fly between takeoff and landing.

Apart from range, the maximum **Capacity** of the aircraft is a factor that cannot be overlooked while ordering an aircraft. Its impractical to fly a narrow-body aircraft (Eg: Airbus A320 Neo) on routes with high demand and a wide-body aircraft (Eg: Boeing 777-300ER) on routes with low demand as it would leave seats vacant result to loss for the airline. Same goes in case of Cargo-planes.

Since the business of an airline largely depends upon the cost of fuel used for the flight, **Fuel Efficiency** is a significant consideration while acquiring an airliner. There are cases where airlines prefer saving on aircraft costs by considering cheaper but less efficient options, but this results to higher operational costs. The aircraft manufacturers have increasingly started programs to produce aircraft with better fuel efficiency for example the Neo (new engine option) Program started by Airbus for making their aircraft 15-20% more fuel efficient.

We've seen trends that say airlines and operators have turned to certain aircraft despite of a cheaper and a better option available (Eg: Boeing 737- Max & Airbus A321-Neo). This is mainly because they consider aircraft of **similar category**/ manufacturer, they already own so as to save on operational costs such as

- Maintenance: They often don't require to purchase and keep spares for similar aircraft since they already have for ones they operate and hence, if they turn to a different manufacturer or category, they'd be required to purchase spares for the distinctive aircraft separately and it will cost more.
- Staff: Airlines already have staff (Pilots, cabin crew, engineers, etc.) well trained for the aircraft they already operate. If they consider acquiring distinctive airliners, they'd have to spent a good fortune on training the staff. Eg: Pilots certified to fly Boeing 737 require no or very little amount of additional training.

Thus an airline has to consider all these factors well in advance before acquiring the aircraft. These help them to come to a conclusion on

What aircraft to Acquire: From which manufacturer, Wide/Narrow Body, etc.

How to finance it: Directly acquire from manufacturer through direct lending (cash or loans) or lease it from lessors through either Operating lease (Dry/ Wet/ Moist) or Financing lease.

However from data 4.2.7 on pg. 56 we can conclude more operators have turned to acquiring directly from the manufacturers which indicates direct lending is a better option if executed properly for the airline business.

Further the airlines get these aircraft customised:

- What type of seats & of what configuration (First, Business, Economic) is to be fitted with what kind of upholstery. Eg: Cathay Pacific has green seats while emirates has beige.
- Interior of the aircraft designed according to the airline's theme/ requirement.
- Liveries on the exterior with airline's branding and other stuff.
- Type of engine required. For Example Airbus A380-800 is offered with 2 types of engine configurations i.e. Engine Alliance GP7200 or Rolls-Royce Trent 900 .

Finally on receiving the delivery of aircraft, route is allotted which is best suited for business. Routes with greater demand are allotted larger aircraft while the ones with less demand, smaller aircraft.

Hence its very necessary for an airline to patiently decide on what aircraft to acquire and in what manner in terms of financing. Failing to executing this task properly is a major reason of failure for an instance in December 2013, Air India sold 5 of its 8 Boeing 777-200LR aircraft to Etihad Airways since, plans for introducing ultra-long flights with service were cancelled due to factors like high fuel prices and weak demand. This is what makes the task of **Acquisition of Airliners** extremely complex and strenuous where there is no scope of a negligible error.

The study has covered the trend of acquisition of airliners. However in future, the trends may change suggesting a different practice for the process. It may be interesting to find out what turns out to be the best procedure for acquisition of aircraft in future and if there had remained any coin unturned in past.

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