"ASSISTANCE TO AIR TRANSPORT IN DEVELOPING COUNTRIES"

By

ATHUL SAJU

500028435

Guided by

GUIDE NAME: **VIGI V NAIR**

DESIGNATION: **GUEST FACULTY**

ORGANISATION: **SREE NARAYANA ARTS AND SCIENCE COLLEGE**

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Signature :

Name of the Student : ATHUL SAJU

Residential Address : Kollalackal House, Puthuppally P.O,
Kottayam ,Kerala, India pin: 686011

Telephone/Mobile : 04812354729, +918606472173

E-mail :krrocksathulsaju555@gmail.com

Date : 02/10/2015

Place: Kerala

SREE NARAYANA ARTS& SCIENCE COLLEGE

Kumarakom,Kottayam 686563

(Affiliated to Mahatma Gandhi University)

==========

Viji V.Nair
HOD,
Department of BBA

Declaration by the Guide

This is to certify that **Mr. Athul Saju** a student of executive BBA program with **Roll No: 500028435** has successfully completed this dissertation report on **"_ASSISTANCE TO AIR TRANSPORT IN DEVELOPING COUNTRIES_"** under my supervision. 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 fulfillment for the award of degree of Executive BBA.

Signature

Name & Designation: Viji V Nair

Address:- HOD, Department of BBA, Sree Narayana Arts & Science College, Kumarakom

Email:- viji v nair @ gmail.com

Date:- 06/10/2015

Place:- Kumarakom

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Executive Summary

The objective of this dissertation is to examine in detail the challenges faced by air transport operators in developing nations and present methods for improving the aviation industry in both safety and quality in these parts of the world. It has been written to serve as a guide for expatriate and local aviation professionals working in developing countries.

Efforts to improve the standards of aviation in these regions are hindered by several key factors. These include a multitude of cultural issues, business styles, and government abilities common to the developing world. Specific characteristics are examined in detail in relation to the effect they have on the air transport industry.

The cultural influences have a significant impact on the behavior and performance of a workforce. In some developing nations these social characteristics may be in direct opposition to the mindset required to operate aircraft safely and efficiently. A cultural shift must take place before any long lasting improvement is made.

Historical ideas of the role of leadership and a current shortage of qualified professionals and educated individuals negatively affect on how aviation businesses are managed and operated. A lack of appreciation for the consequences of not operating advanced technology equipment to the rules and culture for which they were developed and built is likely to result in disaster.

Many national governments of the developing world are prone to what may be regarded as corruption and mismanagement. Several inherent flaws prevent successful self governance on national and local levels. Regulating a complex industry such as aviation still remains an impossible task for some of these countries.

Solutions are found by modeling other successful industries working in developing countries, improving training and safety awareness, instilling a respect for existing regulations, introducing incentives in the form of rewards, and by partnering with reputable aviation businesses from industrialized nations.

The author submits that a mentoring relationship between successful aviation companies and personnel from industrialized nations and those from struggling developing nations is the most effective way to improve global standards in aviation. Extra training and education is needed to address cultural issues and social characteristics that adversely affect this industry. Only then can lasting improvement of air transport in the developing world take place.

Chapter 1

Introduction

In March of 2003, a thirty-four year old de Havilland Twin Otter operated by a local Indonesian company, crashed in the remote mountains on the island of New Guinea. The accident occurred in high mountainous terrain several miles from Mulia airport in the province of Irian Jaya. Instead of circling after departure to gain altitude, the aircrew attempted an immediate aggressive turn on course through a mountain pass. The risky maneuver had previously been performed by the chief pilot of the airline in a partially loaded aircraft with favorable wind conditions. Emulating this type of departure resulted in both crew and two passengers being killed. Heavy cargo was loose in the main cabin. Many of the surviving fourteen passengers were injured. Two aircraft operated by a western humanitarian agency were dispatched to retrieve the causalities and transport them to the hospital in the provincial capital.

The airport in Mulia is typical of so many in the developing world. It has a wooden control tower that is seldom occupied. There are no navigational aids or airport lighting. Animals will occasionally graze on the airstrip. The harsh surrounding terrain creates some additional challenges. It is situated in a narrow valley with steep mountains on all sides except one. Approaches and departures can only be made from this direction. The runway has a ten percent slope and consists of rough gravel.

The response to this accident was typical of this part of the world. The following day the local newspaper reported that the pilots involved in the accident were heroes. A strong wind was blamed for the crash. The article never questioned the actions of the crew and airline.

The local Civil Aviation Authority conducted no formal investigation and required no change of flight procedures. The airline was however forbidden to carry passengers for a specified period. This restriction was ignored. Four weeks later the company crashed a second Twin Otter in Mulia with passengers on board. The airplane was attempting an unauthorized descent through a thick layer of fog overhead the airport. Unable to spot the airstrip in time, the aircraft impacted the hillside and came to a stop in the dense jungle vegetation. The chief pilot was at the controls and received a severe head injury.

Once again no formal investigation was conducted by the Civil Aviation Authority. No corrective action was taken by the airline itself. The owner had the right connections with the government and was able to continue operating as before. A third Twin Otter was purchased. Like the previous aircraft, it was over thirty years old. Seven months later this airplane suffered substantial damage in another accident in Mulia.

The unsafe air transport practices and conditions in New Guinea are similar to many

other parts of the developing world. Aviation in this region is treated like any other enterprise. Airlines operate with low standards, unreliable equipment, without regulation compliance and effective government oversight. The number of aviation accidents that occur in developing countries every year is staggering. While the safety record in modern industrial nations has steadily improved over the past decades, the opposite is true in these poor countries.

This disparity between airlines from modern industrial nations and those from struggling developing countries has received renewed attention resulting from several tragic accidents during the summer of 2006. The European Community responded by publicizing a Black List, effectively banning 93 airlines from operating in European airspace.

In developed nations an aviation accident usually results in corrective actions. The causes of the event are analyzed, procedures are changed if necessary, equipment may be modified, and government regulations are often passed to reduce the risk of the incident from re-occurring. Operators incorporate safety margins in their planning and procedures as a protection against future unforeseen circumstances.

In contrast, the traditional mindset of people in less developed nations differs greatly. Absolute limitations, safety considerations, and public accountability are not cultural norms. The lack of financial resources by both the service provider and the consumer allow only the bare necessities. Cultural values differ greatly. A fatalistic outlook on life and the desire to make a quick profit often encourage reckless conduct. Many nations have prematurely adopted aviation without a complete understanding of this high risk technology and lack a willingness to allocate resources where needed to insure safety.
The objective of this thesis is to understand the obstacles and challenges faced by air transport operators in the developing world and to make recommendations to improve standards in safety and efficiency.

1.1 Trade

The benefit that air transport has on business operations is vast. Efficient transportation links is an essential factor when considering investment opportunities.4 It allows greater access to international markets. Personal communication between clients becomes possible. Efficiency is improved through fast and reliable delivery of products. Inventory costs can be minimized and production interruptions are more easily prevented.

The developing world is more isolated than other industrial nations. Therefore aviation plays a greater role in overcoming geographical and political barriers. Even a small increase in air transport activity can result in major improvements and economic growth. Some of the poorest nations in the world have raw materials that are in high demand by other counties. An example of this is the gold in Mali, or the uranium in Niger. Aviation is used to fly personal and perishable supplies to the remote camp and to retrieve the acquired resource. The revenue from the few mines in these two countries contributes to over seventy percent of the gross national income.

1.2 Tourism

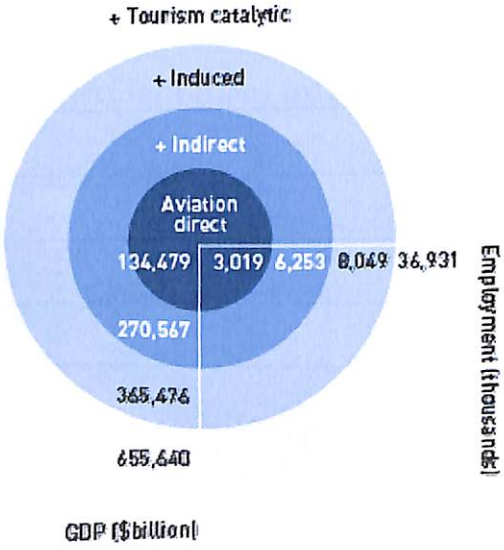
Air transport is vital for tourism. Over forty percent of all international tourists travel by air. It is a major source of income and boost to the economy for popular locations.

Tourism often plays a more significant role in developing countries. Some of the nations that lack other industries are dependent upon foreign visitors. The vast unspoiled landscapes offer an attractive destination for tourists. Rainforests, animal reserves and other places of historical importance are all popular destinations. The income generated from these foreign visitors might be the primary source of revenue for some counties. Air transportation promote safety and comfort in travel as it is being known as the safest mode of transportation. It is proved according to Federal Aviation Administration (FAA), there are only 2 accidents in 5 million flights due to strict requirement for the aircraft to be airworthy. This condition drive the tourist demand to travel by using air transportation and the number of tourist using air transportation keep increasing year by year. In 2010, approximately 5 billion passengers of air transportation with 6% increase in using the world's airport.

1.3 Employment

Air transport supports 36.9 million jobs and $656 billion in GDP in developing countries.

The air transport industry in developing countries directly generated an estimated 3 million jobs in 2012.



(Figure 1)

- Airlines: 789,000 (26% of the total).
- Airport operators: 299,000 (10%).
- Other on-airport: 1.5 million (51%).
- Civil aerospace: 299,000 (10).
- Air navigation service providers: 95,000 (3%).

Including indirect and induced impacts, the air transport sector supported eight million jobs and contributed $365 billion to GDP in the developing countries.

Moreover, substantial benefits derived via the catalytic impacts of tourist spending are estimated to have added 29 million to employment (1.2% of economy-wide employment) and $290 billion in GDP (1.2% of economy-wide GDP).

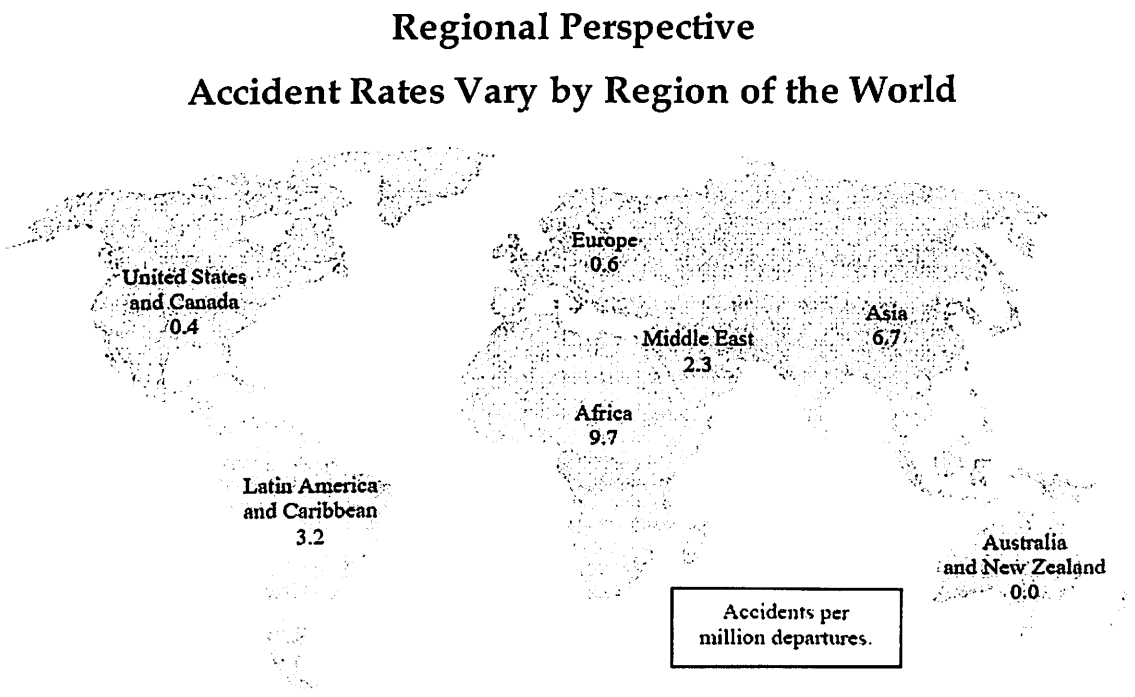


Figure 2: Accident Rates by Region

Chapter 2

Literature Review

Aviation plays a vital role in the further development of any nation. It provides significant economic and social benefits. Foreign trade, tourism, employment, and revenue from taxation are increased. In some remote locations, air transport is the only viable method of access. Mountains, jungle or deserts may prohibit other forms of travel. In the least developed regions, the quality of life is improved through air delivery of humanitarian goods. Medical staff, engineering crews, teachers and even land mine removal teams are deployed more quickly and utilized more effectively.

Figure 2: An abandoned Ariana Afghan Airlines at Qalinaw Airport

2.1 The Impact of Unreliable Air Transport

In several developing nations, the local air transport industry may act as a deterrent to foreign investment and tourism. Although an airline may meet the lower expectations of local authorities and residents, it often falls far short of international standards. Furthermore, a history of accidents, incidents, delays and cancellations discourage expatriates and visitors from air travel. Modern industrialized nations will post warnings for their citizens in regards to flying on certain airlines or within certain countries. Some companies or agencies will even forbid their employees from travelling on specific air carriers.

The failure to provide reliable air transport can severely limit access to a developing country. It can further reduce confidence in both the national government and local

industries. Potential investors and vacationers will seek other locations. As a result, the economies in these countries will continue to suffer. The disparity between the more developed and less developed nations will increase.

Freight is an important part of the transportation sector, and the transportation sector is in itself a major component of our economy. The transportation sector moves goods and people, employs millions of workers, generates revenue, and consumes materials and services produced by other sectors of the economy. The wide range of transportation services used in the economy includes for-hire freight carriers, private transportation providers, freight forwarders, logistics providers, and firms that service and maintain vehicles.

In 2002, transportation-related goods and services accounted for more than 10 percent—over $1 trillion—of U.S. Gross Domestic Product (see table).1 Only three sectors—housing, health care, and food—contributed a larger share of GDP than transportation (USDOT BTS 2004). The for-hire transportation service industries alone, not including the value of transportation equipment, fuels, and other material inputs, and the value of the in-house transportation services provided by non transportation industries for their own use, contributed $306 billion to the U.S. GDP in 2001. Sixty-eight percent of this for-hire contribution came from the freight transportation sector (BTS estimate based on data from U.S. National Income and Product Accounts).

Transportation also contributes to the economy by providing millions of jobs. It allows men and women to earn their living by manufacturing vehicles and by driving, maintaining, and regulating them to allow for the safe and efficient movement of goods and people. One out of every seven jobs in the United States is transportation related. Transportation jobs in transportation industries as well as in non transportation industries employed nearly 20 million people in 2002, accounting for 16 percent of U.S. total occupational employment (see table). For example, the for-hire transportation sector employed over 4.4 million workers in 2002. More than 60 percent of these for-hire workers are either in freight-related occupations or in jobs that directly support freight transportation. An additional 1.7 million workers are employed in transportation equipment manufacturing and another 4.5 million in transportation-related industries such as automotive service and repair, highway construction, and motor vehicle and parts dealers (USDOT BTS 2004). Transportation-related occupations also make up a significant portion of the employment of non transportation industries such as truck drivers, freight arrangement agents, and freight-moving workers in the wholesale and retail industries. In 2002, there were about 9.2 million people employed in transportation-related occupations in non-transportation industries.

Growth in productivity is the fundamental driving force for economic growth. Productivity growth in freight transportation has long been a driving force for the growth of U.S. overall productivity and contributed directly to the growth of the U.S. GDP. For example, from 1991 to 2000 labor productivity rose 21 percent in the overall nonfarm business sector. During the same time period, labor productivity rose 53 percent for rail, 23 percent for trucking, and 143 percent for pipeline. All three of these modes are primarily engaged in freight transportation. Such

productivity gains result in lower transportation costs and lower prices for consumers. This brings savings to consumers and reduces business costs.

During the past few decades, continued shifts in the U.S. economy towards more services, increased production of high-value and light-weight goods, expanded trade with Mexico and China, and the current pattern of global production and distribution systems influenced trends in U.S. freight transportation. As the nation's economy shifted towards more services, the goods share of GDP declined relative to total GDP (see figure). Thirty-four years ago, in 1970, goods accounted for 43 percent of U.S. GDP, only slightly lower than the 46-percent share of services in GDP. But, by 2002 the share of goods in GDP decreased to 33 percent, while the share of services increased to 58 percent. Because freight transportation is, in general, more closely associated with goods production than with services production, the decline in goods share of GDP contributed to a slower growth in freight transportation (measured in ton-miles) than the overall growth of GDP in the past few decades. Between 1970 and 2002, U.S. real GDP, measured in 2000 chain-type dollars, grew 167 percent. During the same time period, U.S. freight transportation, measured in ton-miles, grew only 73 percent. Consequently, the freight transportation intensity of the U.S. economy decreased from 0.59 ton-miles per dollar of GDP (measured in 2000 dollars) to 0.38 ton-miles per dollar of GDP.

Freight transportation intensity declined even within the goods producing sector. In 1970, it took 2.1 ton-miles of freight transportation to produce $1 of goods GDP. In 2002, it took only half that amount, 1.1 ton-miles, to produce the same value of goods GDP (in real terms). This trend reflects two underlying changes in the U.S. economy. The downsizing of products towards lighter weight products (such as computers, cell phones, and hand-held digital devices), and improvement in the efficiency of the freight transportation system, not only in terms of faster and timelier delivery, but also higher direct accessibility.

Although freight ton-miles grew more slowly than real GDP, it grew faster than the U.S. population, which is another factor in the growth of freight transportation as well as total transportation. From 1970 to 2002, U.S. per capita ton-miles grew 23 percent, from nearly 11,000 to 14,000. And it is still on an increasing trend (see figure). Looking ahead, the nation's freight tonnage is projected to increase nearly 70 percent by 2020 (USDOT FHWA 2003). General cargo tonnage is projected to more than double, and some gateways may see a tripling in freight volumes between 1998 and 2020. As the demand for freight transportation grows, so will its overall contribution to the nation's economy. And the expected growth in freight movements could result in capacity, congestion, and environmental challenges. Balancing the need for efficient and secured movement of goods with concerns for improved safety, accessibility, and mobility will likely remain a major interest of the transportation community.

2.2 Understanding the Challenges of Aviation in the Developing World

Biggest Challenges Facing the Global Aviation Industries are

Safety

Flying today is extremely safe. It wasn't always that way. In the early days it was a risky business. But right from the beginning there was an understanding among governments and industry that safety was not a competitive issue. And there has always been great cooperation among all the industry's stakeholders in efforts to make flying ever safer.

In 2013 there were some 36.4 million flights and 16 fatal accidents. If you were flying on a jet aircraft, your chances of being involved in a major accident were one in 2.4 million. And among the three billion passengers that flew (the equivalent of about 40% of the world's population) there were 210 fatalities. There is no safer way to get from A to B than by plane.

But accidents do happen. And this year we had some sad reminders of that reality. The two tragedies involving Malaysia Airlines are still fresh in all of our minds. And our hearts go out to the victims and their families. Every day some 100,000 flights take-off and arrive safely at their intended destination. What happened with MH 370 and then MH 17 is absolutely unprecedented in aviation history. And we will honor the memories of those involved by re-doubling our efforts on safety.

IATA is working with our partners towards some recommendations on how to track aircraft better. There is some promising technology that will become available in the near future. And we are also looking at some interim actions which will be considered by our Board of Governors in December.

MH 17 brought to light the need for better information for operations over conflict zones. Everyone in the world was angered that a civilian aircraft—an instrument of peace—could be shot down in airspace that was declared safe. The responsibility for improving the information needed to avoid a repeat of this tragedy rests firmly with governments. In fact, through the International Civil Aviation Organization (ICAO-IATA's United Nation's counterpart) governments are working on ways to fill the gap in an otherwise robust system.

In parallel, we are calling on governments to look even more broadly and develop an international protocol to manage the design, manufacture and deployment of weapons with anti-aircraft capability. We have it for other categories of weapons – chemical weapons, land mines, nuclear warheads etc. Anti-aircraft weapons should be no different.

These efforts are important. But I should emphasize that they are in response to very rare and I hope never-to-be-repeated events. But every day the industry is working to improve safety. For example, each of IATA's 240 members is required to pass and maintain the 900+ crucial standards of the IATA Operational Safety Audit (IOSA). They are seen to be so important that even airlines that are not members of IATA are also on the IOSA registry which includes over 400 airlines.

As we look to the future, auditing will continue to be an important safety tool. But the real advancements in safety will be driven by data. An enormous amount of data is generated by every flight. Governments, airports and air navigation service

providers also have data. IATA has data from our safety audits and reporting programs. Engine and airframe manufacturers have important safety data. There is probably no other industry on the planet that generates so much data.

IATA has invested to build the world's largest database of safety information. We call it GADM for Global Aviation Data Management. As we (and others) develop the analytical capability to perform deep queries of the data we are coming up with the insights that will lead the next generation of safety improvements.

Passenger Experience

I hope that I have conveyed to you the deep sense of responsibility and commitment that the aviation industry has towards safety. For passengers, safety is something that you can take for granted. And that is the way that it should be.

You should also take a hassle-free and convenient experience for granted. I travel a lot, as I am sure many of you do. The experience of travel has improved tremendously over the years. The quality of airline products provides a huge range of choice from absolute luxury to a very basic seat. But I have certainly experienced moments of frustration with the processes that have been put in place around the actual flying experience.

We have a vision for the future flying which we are building today. Some elements already exist. In 2008 we made e-tickets the global standard. Just over six years later it is already difficult to remember the days when you had to worry about taking your ticket with you to travel. That was an important element in realizing our future vision. And I would like to share that with you in a short video about a business trip to India that illustrates what flying could be.

The good news is that the future of travel is full of innovation.

Sustainability

Of course there can be nothing guaranteed about the future of aviation if the industry is not sustainable. And I would briefly like to touch on two dimensions of sustainability before I close – environmental and financial.

Environment

Any business is expected to be sustainable. But it is particularly challenging for airlines that burn fuel to propel their aircraft. Nonetheless, the industry (not just airlines but the whole value chain) has committed to some very ambitious goals. From 2020 we will cap our emissions and our growth will be carbon-neutral. And by 2050 the aspiration is to cut our net emissions back to half the levels that we emitted in 2005.

A key driver will be technology. Modern aircraft entering into airline fleets today bring with them fuel efficiency gains of 20-30% over their predecessors. Billions of dollars are being spent on this each year.

Another example of the role of technology is the development of sustainable biofuels. Over 1,500 commercial flights have been fueled by sustainable biofuels. The challenge is that biofuels are in short supply and expensive. It's a chicken-and-egg situation. The high cost is being driven by the small quantities being demanded. And demand is low because of the high cost. We are calling on governments to incentivize the use of sustainable biofuels as they have done for other alternative power supplies such as solar. The good news is that distribution will be relatively easy. If we can get biofuels to just 190 airports, we will cover about 80% of potential demand.

The second pillar of our strategy is infrastructure. We've all probably been on a flight that has to circle an airport before it is cleared to land or has to reduce speed before entering a busy air corridor. In both cases, the aircraft is burning more fuel than it should have to because the infrastructure cannot handle the demand. Estimates are that there is about 12% efficiency that could be gained if air traffic control systems worked at their optimum level. And every minute that is saved, reduces fuel burn and emissions.

The third pillar is more efficient operations. A very simple example of this is a program that we are working on worldwide so that airlines can land in a continuous descent. Traditionally, aircraft have been guided to land in a series of descending steps. There is nothing wrong with the procedure, but it burns more fuel than the alternative.

And lastly, we are asking governments for a global mandatory carbon offset scheme. Airlines recognize that we will have to pay for at least some of our emissions until the other pillars of our strategy fully mature. This important work is being done through ICAO. We hope to have the framework agreed in 2016 and to be able to implement from 2020—just in time for our carbon neutral growth commitment.

Profitability

The other vector of sustainability is profitability. Over the last century airlines have just broken even. Despite all of the value that they bring to the world—as we have discussed—they have basically destroyed a vast amount of capital. It is a very competitive and very tough business.

That is not to say that people have not made money on airlines. Stocks are volatile—just look at what is happening now with the threat of Ebola. And some people make money on that. There are also some solid performers operating in aviation-friendly environments that generate significant profits year on year. There is a great turn-around story in the US where the industry is now leading the world in profits after a very difficult decade that began with the 9.11 tragedy.

But, on average, airlines make less than $6 per passenger. On about $750 billion in revenue, we expect a net profit of just $18 billion. For those of you who are good at arithmetic, you will have calculated that it is just a 2.4% profit margin.

The good news is that this is an improvement on the recent past. And continuing strong demand for passenger travel—despite economic uncertainties—shows that

the world's thirst for connectivity that only aviation can provide is still growing. I am an optimist about the future and I hope that you are too.
Improving air transportation in the developing world is not a simple task. Various aviation industry leaders from North America and Europe have made recommendations in the past. Government agencies, aircraft manufacturers, and safety advocacy groups have formed committees and offered strategized methods for improvement. The results are detailed proposals often compiled from a western perspective. They examine aviation as a single isolated industry. Recommendations often fail to recognize the complexity of existing obstacles and social differences. They are like aspirin treating the symptom but are not addressing the original malady.

Figure 3: Multiple wrecked aircraft visible on approach to Kabul Airport

One such report is the lengthy Global Aviation Safety Roadmap. This document outlines various areas for improvement. A proposal is made regarding the national development of an independent safety agency. This group would be tasked with analyzing safety related data, observing regulatory compliance and making recommendations without interference.

The proposal assumes that qualified employees are available and will be hired purely on merit. Family and tribal ties will not influence actions, nor will this person be susceptible to bribery. The employee will be primarily concerned with conducting the job with integrity and not be consumed with self enrichment. The economic and political stability is assumed adequate to allow for enough occupational longevity to accomplish the task.
Sadly, the reality is often very different. Even with generous assistance from

outside, many of these proposals simply will not work.
In an attempt to improve international relations, Colonel Muammar Gaddafi made a diplomatic visit to Niger. Upon his arrival he graciously donated a portable runway lighting system for the nation's primary airport. This system would allow for increased aviation traffic and safety beyond sunset. Within weeks the system was disabled from theft. The valuable copper wires were stolen and sold as scrap metal in the local market.

Two critical facts must be understood before any appropriate solution can be devised. The first is to recognize the unique differences in aviation as compared to other industries. It is distinctive in its challenges, consequences and limitations. It has very little in common with other industries or activities. The second fact is that social characteristics, business styles and government methods in developing nations differ greatly from that of other modern industrialized nations. These differences need to be fully understood and addressed before any solutions for lasting improvement can be presented.

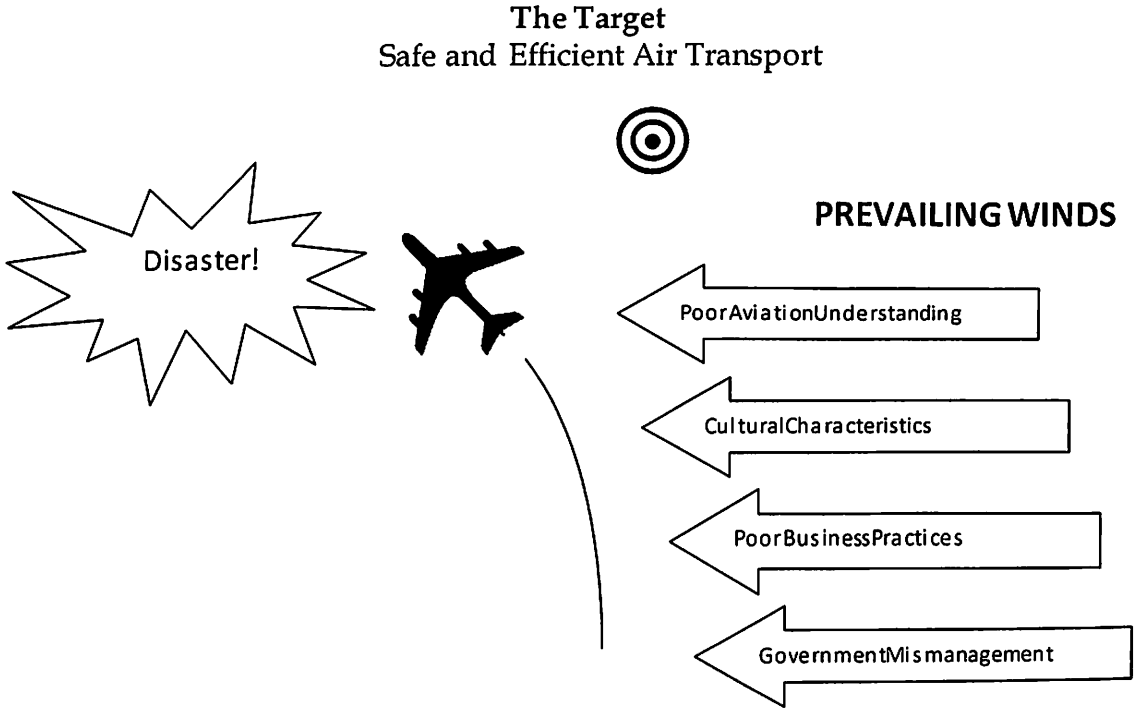


Figure 4: Prevailing winds affecting air transport

Chapter: 3

Research Design, Methodology and Plan

Aviation is different from other forms of transportation. For several millennia mankind has been using vehicles to travel by land and sea with various degrees of success. Air travel, however, requires the ability to defy gravity. This has only been commercially viable through more advanced technology available within the last century. The successful application of this aviation technology requires a thorough understanding of its vulnerabilities, limitations and consequences.

In 1917, Elizabeth Rickenbacker sent her famous son a letter to the front lines where he was serving as a pilot in the newly established Army Air Corps. "Be sure to fly slow and close to the ground", she cautioned him. Eddie Rickenbacker, who was soon to become America's leading ace in the First World War, was greatly amused by her correspondence for it revealed a complete lack of understanding of aviation. Flying slow put the aircraft in danger of stalling and being close to the ground, increased the risk of impact with terrain. The combination of both increased the odds of being shot down.

This lack of understanding in the basic principles of aviation still prevails. Even today, many people do not fully appreciate the critical differences of air transport when compared to its land and sea based counterparts. It is especially challenging for people in developing countries who have had limited exposure to other high-tech industries. Aviation is unique in hazardous operating conditions, engineering limitations, critical weight and balance limitations, and dependence on weather. It requires additional considerations.

3.1 Severe Consequences

In order for an aircraft to fly successfully it must continuously expose the vehicle occupants to potentially lethal speeds and heights. Even the simplest, powered flight contraption, the ultra light, is described by aviation enthusiasts, as "Just fast enough to kill you" if some failure occurs. While motor cars, trains, and ships can idle to a stop or drift until repairs are made, an airplane is completely dependent upon uninterrupted power, consumption of fuel, and structural strength to remain aloft and keep those on board in a survivable condition. En route repair options are virtually nonexistent in comparison to other methods of travel. This requires aircraft components and systems to have a reliability, redundancy, and maintenance intensity far beyond what any other form of transport might require. In the developing world, the potentially fatal consequences remain unrealized.

3.2 Reduced Safety Factor in Design

In engineering, most parts or assemblies are designed with a high margin of safety. A device is built to withstand more than its expected maximum load or stress. The amount of strength above the expected load is referred to as the factor of safety. Most load bearing structures or critical components are designed with a factor of

safety between four and ten times the maximum expected stress. These systems need minimum care and can tolerate neglect well. Aviation is a notable exception with lower design limitations usually between 1.50 and 3.00. Aircraft are constructed of thin, light weight materials in order to become airborne. The necessity for this reduced weight restricts the amount of strength, durability, and neglect that an aircraft component can endure. This results in a vehicle significantly more fragile than a device intended for land or sea. Continued operation can only be assured by regular inspections, intensive maintenance, premature replacement or overhaul before failure occurs. In the developing world most vehicles are abused, overstressed, and mechanically neglected. Aircraft are treated no different.

3.3 Limited Life Parts

To insure that critical aircraft systems do not fail during flight, many components are replaced well before excessive wear and failure might occur. These life limited parts may be restricted by number of hours in use, cycles (number of times used or subjected to stress), or by calendar time since installation or last overhaul. This requires that detailed maintenance records are kept. These limitations are assigned by manufacturers and often enforced by government regulations. Few other industries require the amount of paper work, regular replacement of components, and strict compliance with many regulations as experience in aviation.

The concept of replacing a functioning part prematurely based on some regulation is very difficult to get across in the developing world. Even when compliance takes place, an unserviceable part is still kept nearby. If a similar component should fail completely, the previous removed "timed-out" part might be reinstalled.

3.4 Extreme Weight and C.G. Sensitivity

Many forms of transportation have the amount of cargo and passengers limited only by the space available. Weight is seldom a concern for land based vehicles. Overloading these vehicles will only have minor consequences. An excessively loaded lorry will, at the most require its passengers to get out and push during steeper sections of the road. Aircraft on the other hand are extremely sensitive, not only in regards to the weight of its payload but also its position on board. Heavy cargo may prevent an airplane from even becoming airborne. Incorrectly positioned cargo may adversely affect the stability in flight. Special care and strict enforcement of previously determined limitations are essential in loading aircraft.

The idea that an empty seat or partially loaded cargo hold cannot be filled is sometimes inconceivable in the developing world. Every available space is utilized inside and if possible, outside of a vehicle. Inaccurate and incomplete cargo records and passenger manifests lead to further risks of overloading. This problem has had disastrous affects in both maritime transport as well as aviation.

3.5 High Vulnerability to Weather

The impact of weather and climate on air transport is greater than on other forms of transport. Changes in air temperature and barometric pressure have a profound impact on aircraft takeoff performance. Even a small accumulation of ice on a wing can drastically alter the flight characteristics of an airfoil making flight impossible. Factors affecting visibility such as heavy rain and fog may cause other vehicles an

inconvenience but could be fatal to an aircraft.

During the harsh winters in Afghanistan, it was common to see Lorries descending from the mountain passes of the Hindu Kush range with half a meter of snow accumulated on the roofs and canvas tarps. Trying to convince a national employee at Kabul airport that a few millimeters of frost had to be laboriously scrapped off the aircraft wing surface before flight was a difficult task.

Figure 5: Public taxi in Kabul, Afghanistan

These key differences which set aviation apart from other industries may be obvious to the educated reader, but to many people in developing nations they are not. The principles of aviation technology can be quite foreign in comparison to anything else people have experienced.

3.6 Minimum Value of Life

The value that a society places on a human life has a massive influence in regard to the measures and expense it will take to ensure its safety. This value differs greatly between industrialized nations and those in developing countries.

In the West much effort is invested in preserving a life. Expensive precautions are willingly taken to ensure the physical safety of a person. When an accident occurs, the response from rescue personnel is usually quick and determined.

When an eighteen month old girl fell into an abandoned narrow drilling hole in

Midland, Texas, every effort was made to save her. For the next 58 hours rescue workers and volunteers did everything possible to retrieve the girl who was stuck eight meters below the surface. Expensive mining equipment was flown in and a parallel shaft, using new water jet technology, was drilled to successfully bring Baby Jessica to the surface. Rescue efforts for this one child were estimated to cost over 1 million US dollars.

Other less developed regions do not place the same value on human life. Exposing people to hazards and dangers may be an economic necessity. Life in developing countries is difficult. A majority of the population is concerned with the most basic needs such as having adequate food, water and shelter. The lack of proper sanitation, nutrition, and healthcare, coupled with the abundance of disease and warfare have shortened many lives. The life expectancy in some countries is less than half that in modern industrialized nations. When death becomes common place, it seems that less effort is made to prevent it. Allocating scarce resources towards protecting a life is considered futile. There is little financial liability when death has resulted from an accident. If there is compensation for the victim's family, it is minimal and has little financial impact for the responsible party.

In a rural school house in the Chinese Jiangxi Province, children would assemble fireworks between their lessons. This hazardous practice is not uncommon in impoverished regions as a source of generating extra income for teachers and for school supplies. In 2001, a faulty fuse led to an explosion that claimed the lives of 42 people, most of them young children. The local fire department was unable to respond quickly because its telephone service had no longer been paid. Chinese authorities denied the accident, and the risky classroom activity still continues.

Another example demonstrating the minimum value of life took place in northern Afghanistan. A humanitarian pilot was informed that land mines had been placed on the gravel runway. After contacting the de-mining agency, Halo Trust, a representative revealed that the use of land mines was still very common. Farmers would put them alongside their melon gardens to keep out trespassers. A piece of fruit was more valuable than a thieving neighbor's life.

The loss of a life in the West, however, is a costly affair. If a company or entity is found liable in some way for causing the death of a person, it is required by law to pay compensation. The amount is usually significant enough to encourage a genuine effort towards accident prevention.

When an American passenger is killed on an aircraft, his family is immediately entitled to a payment of $135,000 by the airline in accordance with the Warsaw Convention agreement. This amount is paid regardless whether the airline is at fault or not. If the airline was proven to be negligent, further pecuniary (economic, lost wages) and non-pecuniary (non-economic, pain and suffering) damages can be collected, totaling several million dollars.

A low regard for life can have disastrous consequences in aviation. Expensive safety precautions are ignored and redundant systems are not maintained. Little effort is made to ensure that passengers are secure.

This was clearly demonstrated in the 2003 incident involving a forty year old Ilyushin 76 in the Democratic Republic of Congo. The aircraft was chartered by the military to transport troops within the country. An unknown number of additional passengers and family members were among the unsecured cargo in the hold. Seats and safety belts were not available. The rear cargo door was not secured properly before flight. Upon reaching cruise altitude it separated from the aircraft. Differing reports suggest that between 170 and 250 people were sucked out of the airplane. It is doubtful that any compensation was given to the victim's families from the government. At that time, the country was in its fifth year of civil war which had claimed more than 2.5 million lives. This tragic aviation accident received little attention within the country.

3.7 Lack of Safety Consciousness

Some societies lack a safety culture. Although the term is predominately used to describe a workplace environment, it can also be used to depict the personal attitudes, beliefs, perceptions, and behavior that an individual has in relation to safety.
In the West, people are very safety conscious. An example of this is demonstrated by the use of child seats in automobiles. These restraint devices keep a child secure inside a moving vehicle. Their use was initially voluntary by safety conscious parents. In Europe, Canada and the United States they are now required by law. A complex set of regulations based on age, weight or size determines the type of seat, direction facing, and attachment method and placement location when transporting small children. A violation can result in hefty fines as well as public censure.

Little attention is given to safety in developing countries. People appear indifferent with regard to potential dangers. Hazards are not perceived or not considered as dangerous as what they truly are. There is less collective responsibility felt towards someone being injured or killed. If blame is placed, it falls on the victim. If multiple parties are involved in an accident, it is the wealthier person or the foreigner who must make amends.

This lack of safety consciousness becomes immediately apparent upon visiting a developing country. A short journey by road reveals countless hazards. Road markings are faded or missing. Open sewers, unlit streets, and narrow bridges without guardrails create additional dangers. Rules of the road are based on momentum, (either mass or speed) and not by the orderly system of right of way. A family of five may ride precariously on a single moped. Not one person will wear a helmet. The tolerance between what is a near miss and what is an acceptable driving clearance is undetermined. Many a visitor from the West has seen their life pass before their eyes as a first time passenger on a busy road.

Aviation in the developing world is often treated the same way. The need to adhere to "a bunch of western rules and safety regulations" is not considered necessary. A macho and cavalier attitude is often prevalent.

3.8 Fatalism

Some cultures in the developing world tend to have a fatalistic outlook on life. This is apparent in the belief that regardless of the actions an individual takes, the outcome of a situation has already been predetermined. Unfortunately this results

in an individual taking even less responsibility for his or her actions. If fate has previously decided the outcome, a person has no influence in changing the result. The motivation to rectify or improve a situation is no longer there.

This attitude is most prevalent in areas with extreme poverty and among certain religious groups. When famines or natural disasters seem to continuously plague a region, a sense of helplessness can develop in the populace. With efforts to improve life repeatedly destroyed, apathy soon develops. Like a prisoner without a chance of parole, the person has resigned himself to his fate.

Some religions adhere to the belief that a supreme deity is in control of every aspect of life. This tends to be most prevalent in Islam dominated societies and to a lesser degree in Hindu societies. Human effort and decisions are viewed to have a lesser impact because ultimately it is the will of a god or gods.

In one accident in Indonesia, the pilot became disoriented while flying in reduced visibility. Unable to find an opening, the aircraft hit a mountain side, killing several people on board. Instead of initiating a climb when danger was sensed, a surviving passenger reported that the pilot threw his hands up in the air and shouted, "Insha'Allah!" (God wills it).
Another example was experienced by a Canadian humanitarian worker in Kabul, Afghanistan. As he boarded an old aircraft for an international flight, he discovered with some concern that his seat was not equipped with a safety belt. He got the attention of a Russian flight attendant and mentioned the discrepancy. She stared at him blankly and walked away. A few minutes later she returned and informed him in broken English, "No more belt." Upon seeing that he was not satisfied with her response, she added, "No need belt, if we crash, we die." Although belts also serve a purpose of keeping the corpse in place and assist in identifying the body, it is only of value if an accurate Passenger Manifest is kept.

3.9 Different Work Ethic and Values

A disciplined work ethic has been recognized for its contribution to the economic success of Northern Europe, the British Commonwealth, and the United States during the past century. This belief suggests that hard work and diligence will be rewarding to both the individual and society as a whole. Other non-Protestant nations such as Japan have adopted a similar concept with positive results.

An employee will put extra effort into a task when some tangible benefit is likely to follow. This could be in the form of public recognition, promotion, or wage increase. Many cultures, however, have complex social issues that restrain potential rewards. Family connections, ethnic, tribal, cast associations, religious affiliation and gender have a much greater influence on career success than merit alone. Government interference, economic uncertainty, excessive inflation and general mistrust further rob the incentive of making extra effort in the work place.

Many of these societies place a stronger emphasis on the demands of the community and less on production. In Afghanistan, a worker did not show up at his place of employment for an entire week. When questioned about his absence, he explained that relatives from a mountain village had arrived unannounced and it was his duty to host them. The idea that his employer would be inconvenienced did not occur to him. His obligation to a relative came first.

A major European owned shipping service offered a two day service to Kabul, Afghanistan. Although the service was prohibitively expensive, this was one of the few methods for receiving vital parts needed to restore a grounded aircraft to airworthy status. With the modern tracking available by internet, the shipped part was traced on its rapid journey from North America, through Europe, and Dubai, and finally onwards to Afghanistan. Two days passed, then a third. The part had still not arrived. A phone call to the local agent's office was answered by an employee who only spoke a local language. The following day, more phone calls took place. The package was reported to be in the neighboring town of Bagram. The delivery truck to Kabul made deliveries only once only a day. The following day the truck was full and the package was left behind. The next day was Friday and all the drivers took the day off to attend midday prayers. The package finally did arrive after a delay of nearly a week. This experience is quite common with aircraft operators in developing countries. Once a package enters this region, the prior commitment to punctuality and timely service has ceased.

Another example was experienced by western pilots operating an air charter service departing from Conakry, Guinea. To accommodate additional flights, the pilots arranged for an earlier departure for eight o'clock. Upon arriving at the terminal an hour before they discovered that the gate to the main apron was locked. Although it was a normal weekday, the manager did not appear with a key until much later. Refueling services had been requested the night before but were unavailable until after nine o'clock. The weather office did not open until ten o'clock. There was no paper available to print or record the weather briefing. The late arrival of immigration officials resulted in further delays before passengers could board. Regardless of the efforts and intentions of the flight crew, the aircraft departed two hours late. These delays at the nation's primary international airport are typical in West Africa.

3.11 Saving Face

In some cultures the concept of saving face is of utmost importance. Being humiliated in front of peers, subordinates or strangers is avoided at all costs. In these societies, admitting fault, ignorance or inexperience is rare. An individual would rather lie than appear stupid or assume guilt. Honesty is of lesser value. An older person or someone with seniority will seldom be questioned. Challenging incorrect actions is still considered offensive and is to be avoided. These characteristics are most common in the Middle East and in East Asia.

In industries with a very low tolerance to error this cultural characteristic can have devastating results. Aviation is dependent on the accurate transfer of information. There is little room for social traditions and courtesies that prohibit safety. When a manager asks a mechanic if he is experienced and capable to perform a specific task, an honest answer is required. The mechanic must have the integrity to admit his lack of expertise or ask for assistance when needed.

A potentially dangerous situation arises when people are not communicating in their native language. As the international language of aviation, English has become essential throughout the world. Often non-native speakers are reluctant to admit their lack of understanding. Abnormal situations or the use of non-standard phraseology can quickly lead to confusion.

While requesting takeoff clearance from a control tower on the island of Borneo, the controller would respond in very broken English. He had memorized one simple statement, "Wind calm, clouds scattered one thousand, few three thousand, cleared for takeoff." Regardless of the actual current weather or impending traffic, he would report the same meteorological conditions day after day. He believed his job was to say this one line, not to provide any sort of service. He would not admit a lack of understanding of either English or aviation.

There has been great progress made in the West in removing the blame culture. If a pilot errors into some restricted airspace, that person can submit a form to aviation authorities explaining the reason for the violation. By voluntarily disclosing the mistake, no punitive action can be taken. The authorities are grateful for the information which might be helpful in improving the system. In the United States when an aviation accident occurs, the National Transportation Safety Board will investigate in order to find a probable cause. Their stated purpose is not to place blame but to identify reasons for the event and make suggestions for improvement.

Much has been accomplished in recent decades with the adoption of Cockpit Resource Management courses. Flight crews are trained to interact appropriately, with greater functionality and accurate communication between various members. This has helped bridge some of the cultural barriers that have prevented a first officer from questioning potentially hazardous actions of a captain. Improvement is still needed in cultures with a very strong hierarchy mentality. Unfortunately other critical aviation departments have received less attention. The maintenance and ground handling departments in particular would benefit greatly from a similar type of training.

3.12 Integrity

The issue of honesty and integrity is critical in the aviation industry. False information can lead to disaster.

In the non-radar environment of many developing nations, aircraft report their position by radio to the tower. When multiple aircraft are approaching at the time, the airplane closest to the airport is usually given priority to land first. Without any way to verify an aircraft's actual position, there is a temptation to falsely report a closer distance in order to land first. The actual closer aircraft is ordered to circle overhead until the deceptive aircraft has touched down. These false position reports greatly increase the risk of an airborne collision during reduced visibility conditions.

A further deception to ensure priority handling is to declare a low fuel situation to the tower. Although an aircraft may still have a large remaining reserve it is allowed to land first. On one occasion a Russian AN-12 cut in front of a humanitarian aircraft that was establishing on a final approach. The tower verbally reprimanded the cargo airplane and ordered it to depart the pattern and hold. There was some hesitation on the part of the Russian crew. Then a voice spoke up in broken English,

"We...huh...low fuel, low fuel. We landing now." Immediately the landing clearance for the humanitarian aircraft was revoked and the Russian airplane was given the priority. The AN-12 landed heavy, the landing gear collapsed, and the aircraft caught fire. There was enough fuel on board to burn for several hours.

Another area of vital importance is the honesty in keeping maintenance records. An aircraft requires regular inspections, instrument calibrations, servicing, and replacement of life-limited parts to remain legally and mechanically airworthy. The only confirmation that these critical tasks have been completed, however, is simply the initials or signature of an employee. When these tasks cause significant delays before the next flight or require the costly replacement of a part that "still should work okay", the temptation is high to simply check off the item as complete. In the West, much attention has been given towards the practice of "pencil whipping" the signing off of non-complied with items. Management and technicians have been exposed to lawsuits and government prosecution when safety has been compromised. Failure to complete required tasks in order to save time and money could have disastrous effects. The government authorities will respond to violations. The fatal crash of ValuJet Flight 592 not only resulted in the deaths of 110 people but also in the indictment of two technicians and one manager for manslaughter. The maintenance crew had falsely signed off their compliance that a hazardous oxygen generating device had been secured for air transport.

Many cultures do not share the same Western notion that a signature on a document is a clear sign of intention or compliance. For many people, it is just their name and has no legal bearing whatsoever.

In a partnership with a North American ground handling service, it was discovered that its Middle East partner was failing to meet certain obligatory conditions. A new contract was drawn up which specifically mentioned the need to improve the deficient areas. The contract was duly signed but no effort of improvement followed. The western managers accused their counterparts with signing a contract they had no intention of keeping. The Arab partner's response was simply, "But you wanted us to sign." The idea that their signature indicated intention was a false assumption.

Chapter: 4

Findings and Analysis

The person growing up in a developing nation has different priorities, values, and experiences compared to his or her counterpart in the West. Educational and vocational training are minimal. Exposure to advanced industries and technologies is often limited. Cultural differences have a profound influence on the decision making processes, attitudes and conduct in the workplace. The more complex the task, the greater the potential for cultural influence and interference may be. These common traits will have a significant impact in a highly technical industry such as aviation. Regardless whether an individual is working as a pilot, ground crew, air traffic controller or is a paying customer, these values will play a vital role in his or her performance and acceptance of conditions. In the developing world all of these factors may be the cause of substantial resistance towards improving standards and safety.

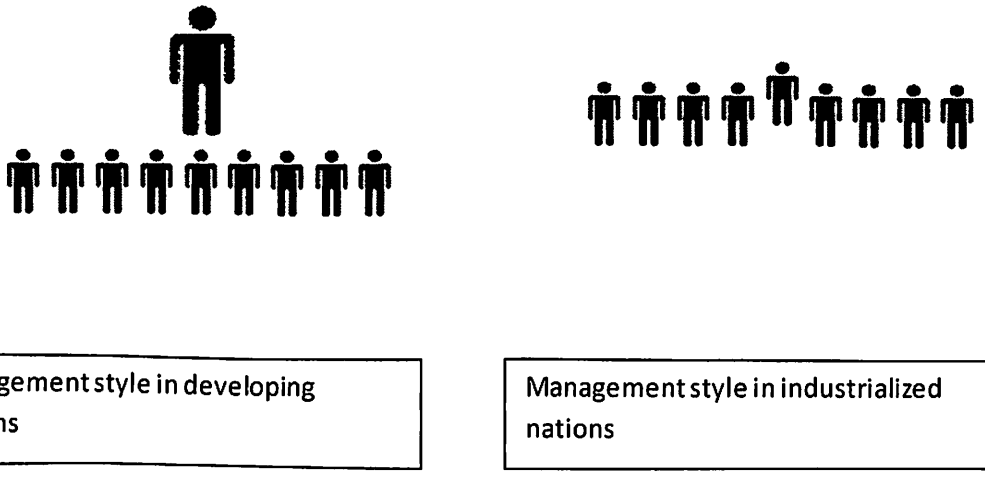


Figure 6: Different styles of management

4.1 Lack of Initiative and planning

In the daily life of an individual in a developing country, there is little need or desire to plan ahead. Upcoming financial costs are often not taken into consideration. The community and extended family are expected to participate in any abnormal expenses or needs as they arise. Problems are not anticipated but dealt with when they occur.

The new Indonesian employee told her Western manager that she needed 200 dollars for her seven year old son's operation. She had only begun working two months ago, part-time and was now already asking for six months worth of wages. The employer was sympathetic towards this medical emergency and gave the funds. He soon discovered that the necessary operation was a ritualistic circumcision. The money he had given went towards the food for a large celebration that was to follow. Every Islamic Indonesian male is circumcised between seven and eleven years of age. This was not a financial emergency, but rather a commonly anticipated event. Yet no advanced financial planning had taken place.

This lack of forethought can create critical problems in air transport on all levels. Ramp workers may not report a flat tire on the tow truck at the end of a shift. The aircraft is delayed until the vehicle finally gets fixed. Managers will not keep financial maintenance reserves. Engine replacements are not anticipated and cause airplanes to sit indefinitely as finances are arranged. Problems tend to be dealt with when they come. They are not anticipated and prepared for in advance.

4.2 Lack of Education

The quality and availability of education varies greatly throughout the world. The literacy rate of a nation is one method of measurement. In 1998 the United Nations claimed that 20% of the world population was illiterate. In some nations, such as Mali and Burkina Faso, less than one fourth of the population is able to read or write in any language. Some cultures put little value on literacy by associating it with former colonial times. Oral traditions are considered more sacred and of greater importance.

In modern industrialized nations new technology developments occur at a rapid rate. Often the younger generation has a greater familiarity with these advancements. They are quicker to learn and accept new systems and improvements and may be better qualified for certain professions. Modern society has accepted this. Developing nations place more value on specific skills acquired over many years and less on recent knowledge learned in school. The respected older generation may fail to recognize the need for education and may even see it as a threat to their society.

The style of education in some countries is very different. In the West, independent thought and innovation is encouraged. In other cultures it can be aggressively discouraged. The methods of teaching in developing nations tend to be towards rote memorization.

The quality of education may also vary. Teachers may have little training themselves. Opportunities for higher schooling are not always available. Corruption has also found its way into education. In some nations, degrees and technical qualifications can be purchased with relative ease.

The former maintenance director of the national airline of Afghanistan has accused his government of issuing licenses and certifications to mechanics and pilots in exchange of bribes. For 200 to 500 US dollars, the necessary qualifications could be falsely acquired. With no local aviation training facilities in the country, applicants would have to study overseas or resort to falsifying records in order to meet

necessary qualifications.

It is difficult to find properly trained people in the developing world. Often individuals with a genuine desire to learn and advance professionally will have to leave their homeland and study in the West. Those who can afford a good education may prefer the new comforts and opportunities, and choose not to return to home country.

4.3 Influence of Religion

Religion has a large influence on the values and moral conduct of a particular society. It is reflected in the worth placed on human life, work ethic, and integrity as discussed in the previous sections. It also may require the performance of regular rituals that may conflict with productivity. Certain days are declared to be holy days. In developing nations, religion usually has a greater influence in the lives of its citizens. Some nations do not have a secular government and require strict adherence to the state religion.

One example of religious influence in aviation is found with El Al. The national airline of Israel will not fly on Saturdays, the Shabbat. Only kosher food prepared under rabbinical supervision is served on board. Fortunately the political isolation, government backing, and geographic monopoly allow the airline to continue operating. The financial loss is still considerable.

Some religions require daily rituals to be performed. In Islam, prayers need to be conducted five times a day by all mature Muslims. The process can become rather lengthy. Employees leave their work stations and go to a prayer room or local mosque. A ceremonial washing is required. Sometimes a change of clothes is necessary. After the prayers are performed, some social interaction may take place. It can be considered a major interruption during the day.
Many Muslim countries observe a Thursday/Friday or Friday/Saturday weekend. This creates significant challenges when attempted to co-ordinate international activities. When an Islamic nation observes a weekend of Saturday and Sunday, the employees will also have Friday afternoons off to pray in the mosque. Many people leave work early in order to travel to their place of worship. Very little productivity is observed during the few hours available Friday morning. It effectively becomes a third day off.

Industrialized nations have clearly defined vacation days that are based on the Gregorian calendar. These holidays remain unchanged year after year and allow for adequate planning to cover staff levels and changes in productivity. Other religions arrange their religious holidays on a lunar calendar. These days will vary from year to year. Occasionally they will conflict with peak travel seasons. In some countries the actual observed holiday will only be announced the night before. The local elder must first observe the moon before the holiday is declared. This has been the case in Afghanistan and some provinces in Indonesia. It was not uncommon to have an expected holiday suddenly jump a day ahead. National employees do not show up and last minute scheduling changes need to be made.

The Muslim practice of taking a pilgrimage to Mecca allows for some dangerous practices. Desperate pilgrims are willing to accept lower standards to fulfill this lifetime goal. Aircraft due to be scrapped are resurrected to perform just one more

flight. The possibility of quick financial gain for just a few weeks' work is too tempting for some air operators. The airports of many developing countries are littered with abandoned aircraft that were intended or used on a Haji flight.

4.4 Influence of Government

The majority of the least developed nations have authoritarian governments. They may be ruled by dictators, military juntas or warlords. Since independence, many former colonies are struggling with unstable regimes, corruption and mismanagement. The central government is politically too weak or simply ineffective to have any real control. These governments tends to be self-serving vehicles to enrich a select few of individuals.

Common problems in these countries are the inability to deal with high crime rates, extreme political corruption, impenetrable bureaucracy, judicial ineffectiveness, and vulnerability to general strikes and coups.

Authoritarian nations also tend to have limited press freedom. The government controls what is printed and reported in the media. Information critical of the regime is not tolerated.

The effectiveness of a government has a large impact on the success of aviation within its borders. It has the power to protect, regulate, and encourage participation within the industry. It also has the potential of causing considerable damage. This could be by imposing crippling taxes, failing to enforce regulations, and allowing the industry's infrastructure to fall into disrepair.

4.5 Limited Rule of Law

Some societies place different values on the rule of law. The term refers to the extent that people have confidence in and abide by the law. In the West, rules are generally respected and complied with. The public accepts that adherence to rules will benefit society as a whole. Modern nations even have laws governing regarding acceptable clothing in public and appropriate disposal of rubbish.

Developing nations tend to have a general disregard for laws. Compliance is only assured by direct supervision and enforcement. Adherence is considered voluntary. Even less respect is paid towards those laws that originated in other countries. These include copyright laws and the regulations regarding equipment manufactured and licensed elsewhere.

On a flight across Indonesia, the national carrier made multiple stops at several islands. Passengers were encouraged to disembark as cargo was being loaded and the aircraft refuelled. Only a few people elected to remain on board the brief layover. Meanwhile the flight attendants opened the back door of the Boeing 737 and began smoking. Although smoking was strictly forbidden by announcement and numerous placards around the aircraft, these flight attendants considered themselves exempt.

Aviation is one of the most regulated industries in the world. It assumes that employees in the air transport industry will want to be informed of the regulations and willing to comply with them. Compliance is not motivated solely by fear from

enforcement and punishment. There needs to be a genuine desire to perform a task the "right" way.

4.6 Corruption

Corruption can be found at all levels in the least developed countries. In some nations it is so severe that the government is labelled a kleptocracy. Each politician or clerk requires a cut from any financial activity passing through their office. In the worst cases, national projects and programs will be created for the sole purpose of funneling money out of the treasury into the hands of the elite. The amount of money that the aviation industry requires and generates makes it a prime target for corruption.

According to Transparency International, there are multiple conditions that make some nations prone to corruption. These are commonly a lack of government transparency, limited press freedom, weak accounting practices, dysfunctional government, weak judicial independence, no protection for whistleblowers, and limited rule of law. Poorly paid officials feel the need to add to their incomes. Payments are usually handled in cash with limited or no records kept. Any well intentioned government policy or programme runs the risk of being rendered paralyzed by internal corruption.

4.7 Limited Regulatory Oversight

A major concern expressed by aviation authorities in the West is the lack of regulatory oversight by their counterparts in developing counties. This has been listed as a primary reason by the FAA and the EASA for refusing to allow aircraft from certain nations to operate within their prospective airspace. When regulatory compliance cannot be ensured, the aviation quickly becomes hazardous.

Almost all nations are signatories to the Convention on International Civil Aviation. Their governments have signed this international agreement regarding their commitment to standards and adherence to aviation regulations. In reality some nations have made little effort to conform.

An example of poor regulatory action occurred at the airport of Kinshasa in the Democratic Republic of Congo. An official with the local Civil Aviation Authority was in conversation with an American missionary pilot near the main apron. Nearby, a Russian cargo plane was being loaded. An excess amount of cargo was being tossed into the hold without any effort to secure it in place. Passengers began boarding and seating themselves amongst the baggage. The American pilot noted to the official that the airplane was being loaded in a dangerous and illegal manner. The official did not understand. The missionary pilot proceeded to explain that according to aviation regulations all cargo had to be safely secured before flight. The official promptly ran up to the Russian aircraft which was about to depart. After a brief argument with the crew, the aircraft departed without any change being made. The CAA official walked back to the waiting missionary pilot with a smile beaming from ear to ear. In his hand was a crisp new $100 bill.

4.8 Revenue verses Service

Most government ministries or departments in the poorer developing nations seem more preoccupied with the collection of revenue than in providing the necessary service to the community.

It is a common sight in these poorer nations to see a gang of policemen standing at a busy intersection stopping vehicles. They are not encouraging safe driving but are verifying that all vehicle paperwork is in order. When an infraction is found the license is temporarily held by the officer. He presents the option of going to the station for processing or the simple solution of paying him a fee to let it go. The fee is negotiable. No report is filed or receipt given.

Other government departments vary little from this model. Even the Civil Aviation Authority seems to be primarily an affiliation of the tax bureau and not with the department of transportation.

An example of this is the CAA of Mali, West Africa. The national office is located in the capital of Bamako. The main responsibility is the collection of aviation fees. An annual fee of 2000 US dollars is collected for an Air Operators Certificate. Each aircraft based in the country is further required a fee of 300 US dollars a month. Only four Air Operator Certificates have been issued. Four private aircraft are registered in the country. The CAA has little actual responsibilities regarding aerospace or airports as this is handled exclusively by a third party.

Much of the airspace activity in Francophone Africa is controlled by Agency for the Security of Aerial Navigation in Africa (ASECNA). This organization provides some level of continuity and service. Traffic separation is done primarily by position reporting only. Landing fees and air route fees are paid by the operator.
Several nations have chosen to provide their own air route service. One of the more challenging facilities to work with is located in Conakry, Guinea. Radio coverage is minimal. Traffic and weather advisors are often unavailable, yet some of the highest fees are charged in this location. When an aircraft first makes contact by radio, the controller will first request the name and address of the operator. The position of the aircraft is not as important to him. He first wants to know where to send the bill.

4.9 Nepotism & Tribalism

A serious problem within many governments in developing nations is the widespread occurrence of nepotism and tribalism. Employment eligibility for a government position is based on the relationship to a relative, friend or particular tribe. Little value is placed on an objective evaluation of an individual's abilities, qualifications and suitability.

The results of this system are obvious. Job performance is greatly reduced. In nations that already suffer from limited educational opportunities; the productivity is further crippled by not giving preference to qualified personal. Employees who are completely incapable of performing the necessary tasks will be hired because of their connections.

There is a story from Africa about a politician taking his family to a public swimming pool. His son involuntarily ended up in the deep end and began to

drown. The politician called to the life guard to assist. The life guard announced that he could not swim. He had gotten the job because his uncle owned the pool.

The effects of tribalism extend beyond the tendency to hire a member from the same ethnic group. The borders of many modern nations were drawn by their former colonial masters with little consideration toward language, culture and religion. The tribal identity of an individual can therefore be far more prominent than a unifying national identity. Often some enmity exists between different tribal groups. The nature of the aviation industry demands an unwelcome interaction between tribes.

In the reconstruction of Afghanistan after the fall of the Taliban, various tribal groups scrambled for national power. The result was that certain government ministries would be dominated by a specific ethnic group. For example the Ministry of Interior would consist of Uzbeks while the Ministry of Transportation consisted mostly of Pashtu. These tribes have had a history of frequent clashes. When an air operator required permissions from several different departments, cooperation was not forthcoming. The seamless interaction one would hope for between government agencies would be at a standstill until each tribe felt that they could benefit somehow from the deal.

Many least developed nations lack an independent transport administration. The relationship between the Ministry of Air Transport and a national airline can be so strong that in a sense they are one and the same entity. Family members will hold positions of authority in both entities. The airline will be protected from competing companies and not penalized for any safety shortcomings.

4.10 Gift Economy

In many cultures it is appropriate to give an extra small payment to workers in certain service sectors beyond the advertised price. In the West this is referred as a tip or gratuity. The recipients are commonly waiters, hotel staff, luggage porters, and tour guides. This is considered to be good etiquette. The practice does not include police officers and civil servants. In those circumstances tipping is illegal.

Many developing countries have different social customs regarding a gratuity. In some places, members of the police and government will openly solicit gifts. There is a difference between a small gift as a sign of appreciation and a gift to influence the recipient's conduct. Some local languages may not distinguish between the two, but in English, one is a tip and the other a bribe.

There is a service policy in the West known as "First come, first served". The concept is simply that customers or clients will be attended in the order that they have arrived. This system ensures a predictable sequence in which requests are to be processed without biases or preferences. It rewards those who plan ahead and recognized those who have waited the longest.

Many cultures in the developing world do not have this service policy. There may be a complex social hierarchy as to who receives attention first. It is not the order of arrival but rather aggressive action, position in society, or a bribe that will affect the sequence and quality of service.

There is a tendency in developing countries to expect favours from air operators.

Occasionally pilots will get requests to transport government employees or their extended family members free of charge. Seldom is any favour returned. The practice naturally extends into the private sector as well. Security guards, aircraft refueling personnel and airport staff will often ask for a small gift of appreciation.

Aircrew will be frequently asked to give money or beverages from the galley supplies. After paying several hundred dollars of landing and parking fees, the flight crew retired to a hotel in Niamey, Niger. Their experience with the local aviation authorities had been particularly frustrating in that they were charged for a heavier landing weight far above their aircraft. The officials would not accept any available documentation proving the certified weight of the airplane. That evening, as the pilots were relaxing in their rooms, they were called to the hotel front desk. An official from the aviation authority had come after work to ask for an extra financial gift. He had searched several of the hotels acceptable to Westerners until the pilots were found. He began by asking if the pilots were happy with the aviation service provided. The captain responded politely that he was not. The official was surprised but regardless asked for a financial gift of appreciation. All he received was a mention this thesis.

4.11 Taxation

Some developing nations do not have the organizational capacity to effectively levy income and sales taxes. Taxes must come from other sources. This can be in the form of permits, tolls and tariffs. These methods allow for easier collection and verification. It also places an additional financial burden on specific activities simply because of the ease of taxation. Aviation is prime target for taxation.

A simple and common method of collecting taxes is to requiring a permit which must be publically displayed. Compliance can then be quickly verified. Automobiles and other vehicles are ideal targets for this. It is common in the least developing nations to see the corner of a windshield filled with national, regional, and municipal permits that must be renewed regularly. Revenue from aircraft is also collected this way.

In modern nations many functions are financed through general taxation. Developing nations tend to charge more tolls and fees to support necessary infrastructure. This is not limited to roads and bridges but includes aviation as well. The various fees for operating an aircraft tend to be much higher than the cost of maintaining the infrastructure. Remote unmaintained dirt airstrips will still require a "landing fee" to be paid to a local chieftain. Heavy navigation fees for limited or nonexistent services create an additional financial burden on the aviation industry. This can promote unsafe and dishonest behaviour on the part of some operators by falsifying position reports and other aviation records.

Another common method of collecting government revenue comes from custom duties. Tariffs will be charged on various imported goods. These will not be limited to luxury merchandise. Often useful cargo that would greatly benefit a nation is held up and heavily charged. During recent flooding in Mozambique for example, custom officials demanded tax on humanitarian goods donated from the West.

The biggest financial obstacle for air transport in Mali, West Africa is the customs department. Any imported aircraft component or spare part is heavily taxed. The

fee demanded can vary between 30% and 50% depending on the mood of the local official. This has significantly increased the cost of maintenance. It has discouraged the timely replacement of worn components. Maintenance is delayed until the aircraft is positioned in a friendlier taxed nation.

4.12 Autocratic Management

Most businesses in developing nations are managed autocratically. Usually there is one person who is completely in charge. This individual makes all the decisions. The advantage of this method is that it provides some consistency and stability within the business. It is necessary when the skill level of most employees is low. The disadvantage of this authoritarian style is that employees are less motivated; they lack initiative and are completely dependent on their leader. Potential abilities, skills and talents amongst staff are not utilized.

When the owner or manager is absent productivity is impaired. Other employees do not have the ability or authority necessary to allow for a continuous operation. A shop may be open but the owner has departed with the key to the cash box. Limited transactions can take place without him. There is a book written by the Irish doctor Ian Clark about his experiences in Uganda. It is entitled, *The Man with the Key has Gone*. This phrase describes the situation in many developing nations.

This style of management causes additional challenges especially in aviation. Often the manager will not delegate responsibility to different departments. Maintenance personnel are restricted from ordering parts. The flight scheduling staff is not authorized to make changes. The efficiency of the company is reduced as the majority of decisions must be approved by the executive leader.

The Advantages of Autocratic Management

This style of management comes with a handful of advantages, and these are:

- Decisions are made quickly and more efficiently. There is no longer a need to thoroughly discuss matters with employees so the time it takes to make decisions is cut short.
- Updates and changes are relayed to everyone so that they can be implemented right away. Employees cannot say 'no' when their manager implements something so you can expect changes to be implemented and acted upon right away.
- Managers are given authority to run a team or a department, making them more confident about their own abilities. Because this style of management enables managers to project a high authority over their subordinates, it makes them feel like they know what's best for the team and for the company.
- It can help project a strong and solid image for the company, as a whole. With smooth-sailing implementation and quick decision-making, it makes a company seem like a well-managed business.

4.13 Lack of Trust

The concern of theft is very apparent in the developing world. High concrete walls surround homes and businesses. Barbed wire and embedded broken glass discourage trespassers. Iron bars protect each window. Many people find employment as guards. Middle income families will have a watchman at the front gate of their homes. Even small businesses or restaurants will have a parking attendant watching over the vehicles of customers. A lack of trust is present within a business itself. Few employees have access to the keys for the main doors or the cash box. Losses from crime and the cost of preventive measures are significant.

The fear of theft can be so epidemic that it results in major inconveniences for businesses. An example of this was demonstrated with an aircraft refuelling service in West Africa. Fuel is usually available by payment of US dollars in cash upon delivery. The mistrust within the fuel company became so epidemic that even this method was no longer possible. The corporate headquarters required that a deposit be made directly into a bank account. Once the funds were verified, the refuelling truck was authorized to fill up the aircraft. The senior managers did not trust their own employees to handle the cash. Costly delays were forced upon the air operator.

4.14 Knowledge Transfer Challenges

An effective organization will seek to collect, organize and distribute useful knowledge to its various members. In the developing world, the flow of information is minimal. An authoritarian manager will communicate to the subordinates exactly what he wants done. Feedback or data from employees is neither considered necessary or welcome. Information that would help an employee to better perform his or her job is not forthcoming.

Technology plays a major role in knowledge transfer. Vital data is collected on computer spreadsheet programs. Company manuals and revisions are generated on word processors. Many people in the developing world are not yet computer literate. Information is generally passed verbally. These societies tend to emphasis a "learning on the job" or "learning as you go" approach. Unfortunately this method has limitations and is prone to error. The appropriate information is not always available to those who need it most.

Aviation is dependent on a successful transfer of information to ensure safety and efficiency. Weather reports, NOTAM's, new Airworthiness Directives, maintenance concerns, and scheduling changes are just some of the items needed by aviation personal. The unpredictable operating environment of the developing world makes this even more critical. The status of fuel shortages, functioning navigational aids, and airport conditions can all change rapidly without any communication taking place.

At an airport in central Afghanistan, a meteorologist dutifully monitored the weather and recorded it several times each day. This was at the request of the Ministry of Transport. The information was handwritten in a paper notebook and supposedly submitted at monthly or annual intervals. Having a meteorologist on sight could have been a big improvement. Because the information was not available by internet or by telephone, it was of no value to aircrew or dispatchers.

Another more dramatic example also occurred in Afghanistan. After an uneventful landing at a remote airfield, the crew was casually informed by a local villager that fresh landmines had been placed in the centre of the runway. During the previous week two vehicles were destroyed while driving down the dirt airstrip. Although the local authorities were aware of the incident, the information was not passed on further. No effort had been made to inform the aviation authorities or to the aircraft operator of this weekly scheduled flight. The airfield continued to appear usable from the air. The aircrew could not risk a departure until a demining team had secured the area five days later.

4.15 Cheap Labour

The cost of labour in developing nations is significantly cheaper than in the West. A factory worker in Germany will cost a cost a company 37 US dollars an hour. By comparison, he will cost $1.40 in China, and $1.00 in India. While labour continues to be a top budget item in modern nations, in remains a minor expense in developing countries.

This cost difference has a tremendous impact on how business is conducted. Manpower is cheap and readily available when compared with mechanical and automated systems. This causes greater variation in performance and quality. Western standards of efficiency are often related to the output based on the number of employees or man-hours. This puts the developing world at a disadvantage. Many businesses employ large numbers of workers with little experience, resulting in less productivity.

In developing countries it is also common sight to see a crowd of employees sitting around and waiting. They may be needed occasionally to unload a vehicle, but they are not needed constantly. This style of work has existed for generations. By contrast in the West, one individual may pause from one task to quickly unload a vehicle with a forklift. As increased levels of modernization are introduced, the traditional work culture is challenged. The technical nature of aviation often requires more productivity from better trained individuals. This is at odds with the normal work culture.

4.16 Lack of Resources

One of the biggest problems facing developing nations is the lack of resources. Although some countries may have sources of natural wealth that benefit a select few, the majority of the population lives in poverty.

Nations with weaker economies favour the use of second-hand machinery and vehicles. Equipment deemed outdated, inefficient, and potentially hazardous by the industrialized nations finds an extension of life in these poorer nations. The cost of new equipment is prohibitive for most local businesses. The available revenue from the public is minimal. The population has also developed a complete willingness to tolerate lower standards and quality.

Most aircraft in the developing world are old. They have surpassed their economically useful life in industrialized nations and have changed owners several times. In the least developed countries some aircraft are over forty years old. Airplanes fit for the scrap yard are still in service.

The disadvantages of these older aircraft are the increased cost and time invested in maintenance, the lack of reliability, and the higher fuel consumption from older engines. For these reasons, the aircraft were considered inefficient and beyond their useful life in the West. The lack of skilled mechanics, high cost of parts, and general tolerance for low standards compound the problem further. Eventually an essential component will fail completely. If these aircraft do not suffer an accident, they will eventually be abandoned off the runway. Most airports in the least developing world are littered with discarded aircraft.
Other resources necessary to conduct business efficiently are also lacking. Essential services such as electricity, telephone, internet, and mail services are either unavailable or unreliable. The local currency might be unstable and prone to rampant inflation. The availability of spare parts and fuel may be limited.

All of these challenges require extra forethought on the part of the air operator. Electrical generators must be available, satellite phones kept for emergencies, and extra fuel kept for shortages.

4.17 Poor Workplace Safety

The lack of safety consciousness in the society and a tolerance toward substandard conditions has allowed for a poor safety culture in the workplace. Little effort or expense is invested in insuring the wellbeing of an employee. The proactive approach is at odds with the culture. Employers are not liable to the same degree when an employee is injured on the job.
The aviation industry is well aware of the concept of system safety. Supporting and enhancing the continued safety of the flying public underlies nearly all training, regulation, and working procedures in the industry. Most of this emphasis, however, is placed on the air worthiness of equipment and crews. Safety is also relevant to the maintenance workplace. The aviation maintenance system is not safe until all of the system's components are safe, including the maintenance workers. Unsafe maintenance system elements increase operating costs and reduce efficiency and effectiveness. Additional costs may arise from Workers' Compensation or health insurance claims or premiums, from regulatory fines, from lawsuits, from labor grievances, and from increased investigative or training requirements. Maintenance effectiveness suffers when there is a shortage of qualified people, such as Aviation Maintenance Technicians (AMTs), or if these people are concerned about their personal health and safety. Apart from the monetary impact of poor safety on the organization and the potential for compromising the safety of aircrews and the flying public, there is the very real human cost to the maintainers. We sometimes tend to lose sight of the pain and suffering, psychological and family stress, lifestyle and quality-of-life adjustments, and career-shortening implications of workplace injuries. These points are brought into sharp focus whenever those injured in workplace accidents recount their experiences.1Though the aviation industry is constantly searching for ways to reduce costs and increase productivity, there are societal trends that make this a challenge. These legal, ethical, financial, and humanitarian trends also increase workers' expectations about their personal safety

and health. Since there are probably no risk-free jobs, managing the residual effects of risks has become as important as eliminating hazards to reduce risk. Human Factors addresses the characteristics of human workers and their environment that affect performance. Workplace safety is directly related to workers' ability to perform their jobs without making errors. Thus, human factors methods can be used to reduce errors and increase safety. In this chapter, we discuss the major human factors issues related to aviation work place safety. Our focus here is the safety of the workers themselves, not equipment air worthiness, although these two issues are directly related. We cannot provide enough information in this Guide for readers to develop a complete workplace safety program. Workplace safety is a very complex topic. There is enough information in the chapter, however, to allow readers, with proper professional assistance, to determine if existing or planned workplace safety programs attend adequately to the human component.

Most of the preventative action on the part of an employer is focused against theft and not on safety. The risk of crime is easier perceived and considered a greater threat. This is where resources are put first.

4.18 Limited Business Planning

The success of many businesses is the result of the ability to plan ahead. Potential market opportunities in the future are anticipated and the necessary steps are taken in advance to respond accordingly. Some businesses such as Toyota are reported to have business plans that extend to the next one hundred years.

For a business plan to be relevant in the long term, it requires a predictable economic environment. Unfortunately most developing countries lack this kind of stability. Government reshuffling, ethnic clashes, general strikes, excessive inflation, and natural disasters make it very difficult to make an accurate assessment concerning what is ahead.

In the West, many businesses are interested in developing a long-term relationship with a customer. An immediate profit is not as critical when compared with the potential of repetitive future earnings. This can be witnessed in different industries through special introductory offers or initial low interest payments. A small initial loss might even be acceptable because of perceived certainty of later gains. Airlines also employ this strategy with mileage plans and little perks for returning customers.

The unpredictable economic environment of many developing nations makes long-term planning difficult. Drastic changes in a government can quickly remove a favorable business connection. War, ethnic tension and subsequent looting can destroy infrastructure. Corruption, inflation and a multitude of other conditions further threaten economic stability.

These events can affect the aviation industry in different ways. A government official may suddenly revoke an air operator license in favor of a competitor. A profit making route may become a conflict zone. General strikes may close an

airport. An aging aircraft may suddenly become unusable.

Businesses in these countries tend to focus on immediate opportunities. The emphasis is on making money now because the future is too uncertain. The proverbial bird in the hand is definitely worth more than two in the bush where the likelihood of a successful catch is slim. Investment into infrastructure with long term benefits is minimal. The value placed on customer satisfaction is also of reduced importance. Too many outside factors might interfere in a clients return. Some businesses may have a clear monopoly, making customer care irrelevant.

In Mali, West Africa the local aviation refueling service would repeatedly run out of fuel. There was adequate tank storage space at the airport. Yet somehow orders for fuel shipments from the coast would only take place once the tank was empty. Only the stoppage of revenue would motivate corrective action to be made. As the only fuel provider in the country, no other company could benefit from their inactivity.

4.19 Poor Maintenance Philosophy

The poor quality of maintenance in the developing world is a major concern. Often the absolute minimum is done to keep a vehicle or component functioning. There are multiple reasons for the low priority given to quality maintenance. These include a lack of planning, lack of resources, disregard for regulations and a general tolerance of substandard conditions by the community.

A short-term business foresight will determine the attitude towards regular maintenance. When a company is focused primarily on immediate profits, it is unwilling pay for costly maintenance that could possibly be postponed. The desire to make money now with a piece of equipment supersedes the need to ensure its longevity.

Preventative maintenance is primarily of value in the future. The risk management expert James Reason suggests that the financial benefit of this type of maintenance is only realized after approximately two years. This time frame may fall beyond the planning scope of a company in the developing world. The immediate result of preventive maintenance is cost and aircraft downtime. The potential value of a longer functioning component in the future is not realized.

The financial resources available to companies in the developing world are usually limited. An airline may have overextended itself in the initial purchase of an aircraft. The ability to afford only the oldest of airplanes for a fleet reveals a distinct lack of funds. Costly maintenance is delayed until absolutely necessary. A common phrase that describes this philosophy is, "If it ain't broke, don't fix it." This mentality is not compatible is safe aviation technology practices.

In the West, an aircraft is considered airworthy when all manufacturers' procedures and all government regulations have been complied with. In developing countries, an airplane is airworthy if it can get airborne. Airworthiness from a legal perspective is often meaningless. Lack of regulatory oversight, enforcement, and knowledge will result in a general disregard for regulations.

Many developing nations are located far from local service centers. The delivery of aviation parts becomes very expensive. As an example, the cost of shipping a

replacement component to Mali, West Africa was approximately ten times higher than to North American destinations. This included the additional insurance that the manufacture required for certain locations.

Allowances have been made by aircraft manufactures and aviation authorities to permit certain redundant items on the aircraft to be inoperative for a specified time period. The repair of some critical items could be deferred for 72 hours. This would allow an airline to continue operating an aircraft for three days while the necessary parts were ordered, shipped, and prepared for installation. In modern industrial nations, this time frame is achievable.

Fast and reliable postal delivery services are seldom available in developing nations. Often a delay of several additional days can occur. Delivery may further be postponed by custom agents. The time frame specified by the aircraft manufactures and aviation authorities is often insufficient. Unable to meet these requirements, many air transport providers in the developing world simply ignore these deadlines and operate aircraft without complying with these limitations.

The general public in poor nations has a greater acceptance for substandard conditions. Discomfort, delays, and cancelations are encountered daily in a variety of ways. Similar experiences are expected and tolerated in the air transport business. If the low expectations of passengers are already satisfied, there is little perceived need invest in fixing and maintaining equipment.

Chapter: 5

Interpretation of Results

The current situation in the air transport industry of developing countries is a clear reflection of the general socioeconomic conditions in these nations. The cultural influences, mismanagement, and corruption experienced in civil aviation are common throughout the government and other business sectors. Focusing on one industry alone as a target for improvement instead of the whole might prove impossible. Although temporary progress may be achieved, the negative influence of adjacent infrastructure, industries, and government agencies will cause friction until a common lower standard is restored.

The aviation industry in developing countries often receives more attention than other shortcomings in these nations. Airplane accidents generally are leading news items in the media. Aviation acts as a bridge in connecting these nations to the industrialized world. This brief contact might reveal conflicting and insufficient operating standards. When passengers from modern industrialized nation are killed on board an aircraft from the developing world, these differences are highlighted.

The response from Western governments to the air transport industry in these struggling nations is to warn its own citizens and ban these foreign aircraft from entering its airspace. This protective action deals with the problem through containment. Actual improvement in the aviation sector of developing nations is more difficult to achieve.

Permanent progress in air transport in developing countries requires recognition of the problems, a willingness to change cultural behaviour, and a determination to complete the task. Specific techniques can be incorporated from other industries that have operated successfully in the developing world. Partnerships with airline operators from modern nations are an effective method to improve standards.

5.1 Recognition of the Problem

Some developing countries consider their aviation industry to be satisfactory. The lack of compliance, unreliability, and accident rate share a commonality with other local industries. Passengers and clients appear willing to accept these conditions. When the customer has low expectations, additional costly effort to exceed them is not considered worthwhile.

Awareness is needed that some traditional attitudes are not compatible with aviation safety. The purpose is not to criticize any culture but to determine which behavioural traits have a negative influence on the industry. Efforts need to be made to overcome these social characteristics and make them more attuned to the industrialized world counterpart.

Certain technologies are more readily compatible with the developing world than others. One example is the cell phone. This device is immensely popular in most nations. While land telephone lines are expensive to position and prone to theft and damage, cell towers are abundant also in war torn Afghanistan. Prepaid telephone

scratch cards make revenue collection simple, even amongst nomadic cultures.

Aviation involves complex technologies which are not easily integrated in some societies. Aircraft are designed and manufactured by Western engineers and are intended initially for modern industrialized nations. The regulators assume that the future operators will understand and comply with the original style of instructions and procedures. Unfortunately in the later life of these aircraft they end up in the procession of nations that have little in common with the intended market.

It is unlikely that the aviation manufacturers will change their product to accommodate the culture of poorer nations. It therefore becomes necessary for developing cultures to adjust their attitudes and social behaviour in order to successfully integrate this advanced technology in their region. Recognition of this fact and commitment towards change are required by all participating stakeholders before lasting improvement can take place.

Many popular self help and addiction recovery programs have a sequence of similar steps towards the path of improvement. The first one is the recognition that one has a serious problem and needs outside help to deal with it. Unless a struggling individual has come to that point, any criticism, offers for assist, and pleas for change are unwelcome and ineffective.

The situation in the least developed countries is no different. These nations need to recognize their shortcomings and then be willing to commit to the process of improvement before any progress can be made. Until that time, any effort by the West to encourage change is considered meddling or post-colonial interference.

Several technologically advanced industries have been able to operate with success in developing countries. The most prominent businesses have belonged to the mining industry. Companies from Europe, North America and Australia have invested much effort and energy to conduct their activities as safely as possible.

A visit to a mine site from Rio Tinto or AngloGold reveals a stark contrast with the surrounding African countryside. Roads are swept clean of rubbish. Street signs and markings are bright and clearly visible. Vehicles drive politely and in accordance with speed limits. Helmets are worn by all motorcyclists. Company houses are clean and neat.
The rare success demonstrated by these industries is the result of three actions. Management has made a total commitment to uphold one global standard regardless of the cultural context. Extra training and education will be provided to raise the labour quality to the required level. A system of positive reinforcement and incentive based rewards are used to encourage sustainable compliance. Although the profitability of the mining industry is very different than in aviation, these same principles can also be incorporated in air transport.

5.2 One Global Standard

The regulations and best operating recommendations for air transport have been well defined. A century of flight experience has given industrialized nations good insight towards developing proper standards. A decision needs to be made by less developed nations to adopt this global standard.

Compliance in modern industrialized nations is seldom optional. Government regulators, safety advocates, media coverage, workers unions, other competitors and clients are enforcing or influencing the need for higher standards. In the developing world the situation is different. These outside forces have little or no influence on an airlines performance. Compliance is voluntary.

When an air transport provider from a modern industrialized nation is working in the least developed world, it experiences few outside forces that encourage safe conduct and compliance. It is the internal influences that sustain performance. Experience, previous training, and a respect for regulations (whether enforced or not), become the motivation for upholding higher standards. Ultimately it is the decision of the operator to abide by a certain standard.

5.3 Improved Training and Education

The need for additional training and education is vital if an improvement in air transport to take place. Instruction must go beyond teaching technical standards by first introducing what a "standard" implies. Training needs to address core values and social behaviours and how these affect aviation.

Several excellent educational Safety Awareness programmes are available in the West. These informative teaching tools have been produced by various government aviation authorities, manufacturers, and safety advocates. With minor modifications, these informative teaching tools can be adapted for other cultures.

There are various games and simulations that can be used to improve a new employee's understanding of basic aviation principles. The concept of limitations can be taught by demonstrating weights being added to a floating board of wood. Although plenty of space remains on the board there is a definite limit before it capsizes. The importance of centre of gravity and cargo positioning can also be demonstrated this way.

The author of this thesis has developed a simple role playing dice game that teaches the value of buying protection against the sixteen most common hazards in aviation. Ignoring the safety systems might allow for some quick profits but the greater risk will eventually lead to failure. An employee must learn the benefit of planning and preparation to deal with various random dangers.
In Afghanistan many of the ground crew would come to work wearing traditional leather sandals. Exposure to machinery, tools and heavy baggage put their feet in constant danger. The company policy of needing proper foot wear was repeatedly ignored. Posting safety policies around the workplace and constant verbal reminders had little effect. Success finally came from a pilot with additional cultural insight. He addressed an individual personally and stated, "Abdullah, your feet are most important to me. I would be most grieved if something happened to them. Your work here is most vital. I would be ashamed if I had to send you home to your family with crushed toes. Please honour me by wearing appropriate work shoes."
Only an understanding of the local culture and values allows for successful communication. The certain style and choice of words are more affective in a

particular culture. In this example, appealing to friendship and honor resulted in full compliance and an improvement in safety.

Human Factors

Human error has been documented as a primary contributor to more than 70 percent of commercial airplane hull-loss accidents. While typically associated with flight operations, human error has also recently become a major concern in maintenance practices and air traffic management. Boeing human factors professionals work with engineers, pilots, and mechanics to apply the latest knowledge about the interface between human performance and commercial airplanes to help operators improve safety and efficiency in their daily operations. The term "human factors" has grown increasingly popular as the commercial aviation industry has realized that human error, rather than mechanical failure, underlies most aviation accidents and incidents. If interpreted narrowly, human factors are often considered synonymous with crew resource management (CRM) or maintenance resource management (MRM). However, it is much broader in both its knowledge base and scope. Human factors involves gathering information about human abilities, limitations, and other characteristics and applying it to tools, machines, systems, tasks, jobs, and environments to produce safe, comfortable, and effective human use. In aviation, human factors is dedicated to better understanding how humans can most safely and efficiently be integrated with the technology. That understanding is then translated into design, training, policies, or procedures to help humans perform better. Despite rapid gains in technology, humans are ultimately responsible for ensuring the success and safety of the aviation industry. They must continue to be knowledgeable, flexible, dedicated, and efficient while exercising good judgment. Meanwhile, the industry continues to make major investments in training, equipment, and systems that have long-term implications. Because technology continues to evolve faster than the ability to predict how humans will interact with it, the industry can no longer depend as much on experience and intuition to guide decisions related to human performance. Instead, a sound scientific basis is necessary for assessing human performance implications in design, training, and procedures, just as developing a new wing requires sound aerodynamic engineering. Boeing has addressed this issue by employing human factors specialists, many of whom are also pilots or mechanics, since the 1960s. Initially focused on flight deck design, this group of about 30 experts now considers a much broader range of elements (see graphic), such as cognitive psychology, human performance, physiology, visual perception, ergonomics, and human-computer interface design. Applied collectively, their knowledge contributes to the design of Boeing airplanes and support products that help humans perform to the best of their capability while compensating for their natural limitations. Because improving

human performance can help the industry reduce the commercial aviation accident rate, much of the focus is on designing human-airplane interfaces and developing procedures for both flight crews and maintenance technicians. Boeing also continues to examine human performance throughout the airplane to improve usability, maintainability, reliability, and comfort. In addition, human factors specialists participate in analyzing operational safety and developing methods and tools to help operators better manage human error. These responsibilities require the specialists to work closely with engineers, safety experts, test and training pilots, mechanics, and cabin crews to properly integrate human factors into the design of all Boeing airplanes. Their areas of responsibility include addressing human factors in

- Flight deck design.
- Design for maintainability and in-service support.
- Error management.
- Passenger cabin design

5.4 Rewards and Incentives

A system of rewarding effort and compliance has a significant impact on the performance of an employee. Some companies give monthly financial bonuses when certain goals have been attained. Money is a great incentive. In the book "From Worst to First", the author Gordon Bethune reveals the positive impact that cash bonuses had on employee conduct. Each employee of Continental Airlines was recognized for their contribution to on-time performance and was rewarded when company goals were achieved.

Several mining companies employ a similar system in developing nations. The safety benefit is as much as 10% of the monthly salary. Different departments are responsible for the performance of their activities. Drivers, for example, are held accountable for roadside safety. An accident by one individual results in the loss of a bonus for the entire group. Social pressure acts as a regulating force. Other employees become active in ensuring that their co-workers are complying with standards.

In the past, non-compliance resulted in punishment. The response to an incorrect action was immediate. The offending individual would be fined, suspended or dismissed. Actual compliance was not rewarded. Employees in this work culture would focus on keeping violations hidden and not drawing attention to themselves.

A group oriented, incentive based pay system evokes a different response. Community ties and social pressures are often stronger in developing nations. Less motivated employees are provoked to action by their other co-workers. They want to be seen complying not just by supervisors but also by their peers. Important planning and reward principles are taught. Employees learn that their proper and consistent efforts now will result in future benefits.

Monetary

Monetary incentives reward workers for performance and productivity through money. These incentives include employee stock options, profit sharing plans, paid time off, bonuses and cash awards. Additional monetary incentives include annual or semi-annual bonuses, such as mid-year and end-of-year rewards. These incentives encourage friendly competition between associates when linked to job performance. Monetary rewards motivate employees to produce optimally.

Non-Monetary

Non-monetary incentives reward employee performance through perks and opportunities. These rewards include flexible work hours, training opportunities and the ability to work independently. The rewards and incentives are valuable to an employee because they allow workers to learn new skills and pursue advancement opportunities. For example, a recent graduate may view an exemplary training program within an organization as more valuable than a higher base salary because he feels the learning opportunity will benefit his career.

Employee Recognition

Employees who receive recognition for their work accomplishments tend to have increased morale and positive workplace attitudes. Employee recognition is an incentive employers utilize to offer feedback and encouragement to employees. Employee recognition rewards include verbal praise, award ceremonies and public announcements for a job well done. Workplace recognition rewards occur frequently such as at the end of the day, week or at the conclusion of the sales month.

Employee Assistance

Many employers offer rewards and incentives through employee assistance programs. These programs help workers maintain a balance between work and home life by supporting workers' mental and physical well-being. For example, many programs provide counseling services to help cope with stress, family issues and substance abuse. Employee assistance programs also offer discounts to join fitness centers to encourage an active and healthy lifestyle. Some programs help working parents find daycare and other activities for their children. The purpose of these programs is to support workers with their home responsibilities so they can remain focused on their jobs while they are at work. Small businesses can contract with an employee assistance firm to provide the services that workers need.

5.5 Partnerships

One of the most effective methods of improving air transport in the developing world is through partnerships with aviation industries from modern, industrialized nations. This allows for an increased exposure to proper standards, access to additional resources, and international recognition. The benefit for the industrialized nation is a possible expansion of markets and source of cheaper labor for less skilled tasks. Many countries around the world have employed specialized staff from fully industrialized nations. This permits immediate access to qualified personnel to work in more advanced industries. Exposure to globally accepted standards and operating practices is achieved. Knowledge and experience is gradually transferred to local employees. As the industry matures, more responsibility can be assumed by the nationals. Airlines in the Middle East and Asia often have Western flight crew members aboard their airplanes fulfilling this vital transition role.

Air carriers from industrialized nations usually have greater resources at their disposal. These companies have larger financial reserves, better credit ratings, and closer access to other quality services. A partnership extends these advantages to a less developed nation. Newer aircraft and better lease arrangements can be negotiated. Training facilities and costs can be shared. Access to specialized maintenance and information technology services may also be improved.

Additional benefits of a partnership with a well established, successful airline can result in an increased reputation, better connectivity, and ultimately an increase in traffic. Two examples of successful partnerships are with Virgin Nigeria and Kenya Airways. Both of these African airlines are partially owned by European airlines. Virgin Nigeria was co-founded by London based Virgin Atlantic Airways. It is one of the few African airlines allowed to fly to North America. Kenya Airways is partially owned by Air France-KLM. These airlines benefit from the positive reputation of their European counterpart. The partnership provides additional destinations through code sharing programmes. These improved transportation links to international markets enables increased economic growth from foreign investments and tourism.

Businesses in the developing world operate differently than their counterparts in developed nations. The style of management is more autocratic in nature. Productivity relies heavily on manual labour and less on technology. Employees tend to be very limited in what tasks they are allowed to perform. The unpredictable economic and political situations make it difficult for long term planning. The business emphasis tends to be towards making money quickly with less thought towards the future. The social characteristics that are common amongst individuals have a considerable influence on the workplace.

Chapter: 6

Conclusions and Scope for Future Work

Improving air transport in the developing world remains a difficult task. The cultural influences, common business characteristics, and government limitations will continue to hinder the pace of positive change taking place. These factors have deep seated historical roots that cannot easily be deracinated.

The birth of aviation took place in nations that had previously become industrialized. Many social and economic changes brought on by the industrial revolution had already taken place. The advent of commercial aviation required only minor adaptations. The need for operating standards and government regulations emerged gradually and was readily accepted.

Developing countries have been less fortunate. Many have been former colonies of dominant nations. Industrial progress was hindered in favor of resource collection for their master states. Only limited socio-economic changes have occurred. Educational opportunities are minimal. National boundaries inherited from retreating European powers have resulted in conflict between rivaling ethnic groups competing for land, resources and power. Recent political independence has been hampered by mismanagement and corruption. Regulating a complex industry such as aviation is still beyond the ability of some of these nations. Many social attitudes and customs remain incompatible with the safe and proficient operation of aircraft.

The aviation industry highlights these many differences more than other activities might. It makes an excellent starting point for initiating national development and can serve as a catalyst for other social and economic improvements.

Previous efforts by modern nations to assist the struggling aviation industry in developing countries have not been successful. Funds given towards infrastructure improvements have been misspent. Donated equipment has been either too old or too sophisticated to be maintained properly by inexperienced personnel. International regulatory agreements and memberships have had little impact on upholding standards. The recent action of blacklisting certain airlines has only lead to isolation.

The ideal approach to improving air transport in the developing world is a managerial and technical partnership with reputable aviation companies and regulators from industrialized nations. It is such cooperation which provides a consistent exposure to globally established standards.

Specific training is needed that addresses certain social characteristics and their negative effect on aviation. Other training programs from Western aviation authorities, safety advocacy groups and aircraft manufacturers need to be modified to communicate more effectively to other cultures.

Various national improvements need to take place in the areas of education, infrastructure, and government reform. This will result in better qualified personnel, ease of operations, and enforcement of regulatory compliance. Sustainable economic

progress in aviation and other industries should follow.

It may take many years until the safety and quality standards of aviation in the developing world will reach acceptable levels. The challenges and obstacles may appear insurmountable. There is an African proverb that states, "How do you eat an elephant? One bite at a time." With appropriate assistance, guidance and commitment, improvement in air transport is achievable.

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Appendix

Abbreviations

ASECNA	Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar (Agency for the Safety of Aerial Navigation in Africa)
CAA	Civil Aviation Authority
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
JAA	Joint Airworthiness Authorities
KLM	KoniklijkeLuchtvaartMaatschappij (Royal Dutch Airlines)
NOTAM	Notice to Airmen
NTSB	National Transportation Safety Board
UN	United Nations