ASSESSMENT OF EMERGENCY RESPONSE PLAN AND MANAGEMENT STRATEGIES IN NIGERIA AIRLINES

BY

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CERTIFICATION

This is to certify that this research thesis was written by Amaechi, Chigozie 20074670338 under the supervision of Dr C. C. Ibe.

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DEDICATION

DEDICATED TO THE GLORY OF GOD THE GIVER OF ALL GRACE AND KNOWLEDGE.

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Most sincerely, I appreciate the Almighty God for granting me the enablement in all dimensions to accomplish this flight. From the clearance to the taxi and thresholds for take off and the entire flight he made provision for a good weather, and strength and the grace to travel at all times.

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TABLE OF CONTENTS

CERTIFICATION ii

DEDICATION iii

ACKNOWLEDGEMENTS iv

ABSTRACT v

CHAPTER 1: INTRODUCTION

1.0 Background to the study 1-3

1.1 Statement of the Problem 3-4

1.2 Objectives the Study 4

1.3. Research questions 5

1.4 Research Hypothesis 5

1.5 Significance of the Study 5-6

1.6 Scope of the Study 6-7

1.7 Thesis Outline 7

1.8 Definition of Terms 7-9

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

2.1 Introduction 10

2.2 Review of Safety in and Around Airports 10-12

2.3 Theoretical Framework 13-15

2.4 Airport Safety Priorities 15-17

2.5 The Safety Implications of New Technologies 17-18

2.6 Disaster Management Plans 18-21

2.7 A Survey Of Global Aviation Emergency Incidents 21-40

2.8 Empirical Review of Airline Emergency Response Plan and Management 40-52

2.9 Summary of the Review of Related Literature 52

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Conceptual Framework 53-55

3.2 Research Approach 55-56

3.3 Research Strategy 56

3.4 Data Collection Method 56-58

3.5 Sampling Selection 58-60

3.6 Validity 60

3.7 Reliability 61

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1 Analysis of Emergency Plan and Response Management Service Quality for the various airlines 62-74

4.2 Discussion of Results 75

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary of Major Findings 76

5.2 Conclusions 76-77

5.3 Recommendations 77-93

5.4 Contribution to Knowledge 93-94

5.5 Area for Further Study 94

REFERENCE **95-96**

APPENDIX **97**

ABSTRACT

Emergency Plan and Response Management is one of the most important determinants which affect global competitiveness of the aviation industry. The study examined Nigerian airlines' emergency planning and response management services, including seven dimensions of services defined by Gronroos t-test model with 95 percent confidence. Satisfaction of airlines customers was measured and we observed that passengers were not satisfied within 7 Dimensions of Gronroos service quality Model in three airlines namely Aero, Arik and Dana airlines. But in all the attributes for Air Nigeria we saw satisfaction of passengers and other airline workers. This was closely followed by Aero and Arik airlines which exhibited close satisfaction in the number of ERP and management service attributes (23 out of 31 attributes accessed). Dana airline was worse off with only 2 out of 31 attributes showing some considerable level of satisfaction by respondents. In conclusion, managers of Nigerian airlines should identify passengers' attitude and opinions about their provided emergency planning and response management services and in result they can create modifications and strengthen their weak points to increase satisfaction level among their consumers.

CHAPTER 1
INTRODUCTION

1.0 BACKGOUND TO THE STUDY

During the last ten years 82 percent of the world's jet aircraft fleet accidents occurred during take off and landing phases and accounted for 58 percent of all onboard fatalities and all third party fatalities. Over the next 20 years annual passenger traffic is set to grow by as much as 168 percent. The need to increase airport capacity in an era of decreasing public tolerance of the environmental effects such as noise, air pollution and third party risk of airports, lead actors in the air transport domain to devise new technologies and innovative ways of operating airports and aircraft. However, developments give rise to concerns about the emergency of new hazards and difficulties in containing existing hazards in and around airports.

There are effective ways of managing and containing the risk which require initiatives. A common framework for management of the risks outlined is proposed and the following recommendations for action by the European Union are made:

- Mandatory airport licensing including a requirement to establish, maintain and ensure adherence to an integrated safety management programme.
- Mandatory collection of data on ground-based incidents, with appropriate emphasis on organisational and corporate culture factors.
- Mandatory inclusion of third party risk in Environmental Impact Statements for airports.
- The development of common standards for the safety assessment of operations.
- Further research to bridge current gaps in knowledge.

However, aviation accident is an occurrence on board an aircraft resulting in injury or death to one or more persons. The United States National Transportation safety Board defines aviation accident as an occurrence associated with the operation of aircraft which takes place between the times any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury or in which the aircraft receives substantial damage. An aviation incident on the other hand is an occurrence other than an accident associated with the operation of an air craft, which affects or could affect the safety of operations. Other countries including Nigeria adopt similar approach, although there are minor variations, such as to the extent of aviation related operations on the ground, covered, as well as with respect to the thresholds beyond which an injury is considered serious or the damage is considered substantial. For instance, a hull- loss accident is one where the damage to the plane is such that it must be written off, or in which the plane is totally destroyed. Air accident as we all know tend to make national and even international news. It is always breaking news. This is because in major airline accidents, hundreds of passengers may be affected like the three examples above. These people are mainly important people of their prime age. Consequently, it attracts family members at the air ports at either end of the flights who are ready for interviews and providing pictures of anguish on television news hence the tasks before the industry becomes plain.

In the light of the above, the entire industry and the government bodies who regulate and support this, must put a great deal of effort into making air transport not only appear safe, but also demonstrate that it is the safest mode of transportation available.

This is the task that confronts all stakeholders in the aviation industry in Nigeria, aviation accidents occur at the take off and landing stages of the journey.

1.1 STATEMENT OF THE PROBLEM

The aim of this study is to establish that there is an issue which needs to be addressed in relation to the management of safety in and around airports. This issue arises because of the interaction of a number of different trends (in technology, traffic and environment). The interaction of these recent trends poses an increase in identifiable risk. Another reason for specific immediate attention to airport safety lies in the emerging evidence which shows that the risk to the population living around the airport due to possible aircraft accidents, is comparable to the risk around chemical plants, which are strictly regulated in that regard. And finally, recent events (Dusseldorf 1996 Heathrow 1997) show that the safety of large numbers of occupants of terminal buildings may be jeopardized in case of an emergency (for example, fires).

The precise identification of the parameters of the risk may be relatively uncertain because appropriate data of the (accidents, incidents, audits, etc) are not systematically collected on process relevant to safety, specifically in and around airports. Furthermore, the institutional framework of accountability for safety is diffused between airport authorities, airlines, civil aviation authorities and other airport users in a way which does not facilitate an effective response to the safety issues which are emerging. This study will seek, therefore, to identify the safety parameters of these emerging trends in and around airports, outline the type of countermeasures which need to be instituted, identify

the need for further research to clarify gaps in the evidence, and make appropriate recommendations in the light of existing evidence.

Airlines should not attempt any hazardous waste operations unless employees have been trained in accordance with the provisions of emergency response plan and management. Without this training, the only option open to an airline is evacuation and notification of appropriate agencies capable of handling this type of situation.

1.2 OBJECTIVES THE STUDY

Accidents in the air transport industry are critical and their impact on the society is always devastating and traumatic. This study has become very topical given the accidents in the aviation sector in the last few years that claimed the life of many Nigerians including innocent school children, our dear future leaders. Consequently, this study sought to:

1. Evaluate the level of adoption of emergency planning and response management by Nigerian airlines;
2. Evaluate the training opportunities to all employees for their roles in all emergency plans;
3. Evaluate airline drills to practice response to emergency situations;
4. To determine all other activities necessary in the development and implementation of an effective Emergency Response Plan.

1.3. RESEARCH QUESTIONS

In order to determine how airlines should work together to manage a major crisis such as aircraft accident, the following questions are pertinent:

1. What is the level of adoption of emergency planning and response management by Nigerian airlines?

2. What is the extent of training in the area of emergency planning and response management in the Nigerian airlines?

3. To what extent are airlines drills to practice response to emergency situations?

4. What are the activities necessary in the development and implementation of an effective Emergency Response Plan?

1.4 RESEARCH HYPOTHESES

To evaluate airlines preparedness and to learn how to improve its disaster planning, the following hypotheses are presented in the study:

1. Nigerian airlines have not fully adopted emergency planning and response management.

2. Training in the area of emergency planning and response management has not been fully undertaken by Nigerian airlines.

3. Airlines drills to practice response to emergency situations have not improved safety.

1.5 SIGNIFICANCE OF THE STUDY

The goals of emergency response plan are, in order of priority, to protect the lives and health of employees, and protect and minimize damage to company property in the event of an emergency. This thesis provides guidance for the production of a set of practicable

guidelines for emergency procedures' manuals that could be adapted and adopted by airline in Nigeria. To this end, an investigation was undertaken of seven main areas: 'Adoption', 'command and management', 'planning', 'training', 'exercises', 'resource management' and 'communication & information management'

There is enough evidence from past accidents that many airlines, when acting independently, do not have effective plans to manage post-accident crisis. Even leaving moral responsibilities aside, this cannot be acceptable in an industry that is entirely based upon public confidence. The damage done to the industry as a whole and the airline(s) involved would be beyond calculation. The high level of integration and globalisation in this industry provides extensive scope for the development of guidelines for emergency plans for airline partnerships, in order to determine how airlines should work together to manage a major crisis such an aircraft accident.

To downplay the detrimental impact any accident might have, any partnership has to make sure that it can effectively respond to a major crisis at network level. This would require a close working relationship between airline partners based on a high level of coordination and cooperation. To achieve a standard level of response, airlines need to develop a process that would allow for auditing, standardisation of procedures and training, exercise and mutual support.

1.6 SCOPE OF THE STUDY

Our study does not try to investigate emergency response planning and management in all the airlines operational in Nigeria. Four airlines were selected for study, they include:

Air Nigeria, Arik airline, Aero and Dana airlines. A delimitation made is to exclude foreign airlines operational in Nigeria. The purpose of the thesis is not to find optimal ERP strategies for airlines under but rather the extent of adoption of ERP strategies as practiced in other parts of the world.

1.7 THESIS OUTLINE

Chapter 2 gives an overview of the, for the thesis, relevant theoretical framework with the focus on issues bothering on aviation safety. In the third chapter data collection, methodology and methodological problems are presented and evaluated. A shorter description of the empirical findings from the study can be found in chapter 4 along with a test of used variables and analysis from the performed Groonoon's model. The thesis ends with chapter 5 where the conclusion of the study is presented.

1.8 DEFINITION OF TERMS

COMMAND: The act of directing and/or controlling resources at an incident by virtue of explicit legal, agency, or delegated authority.

COORDINATION: The process of systematically analyzing a situation, developing relevant information, and informing appropriate command authority of viable alternatives for selection of the most effective combination of available resources to meet specific objectives. The coordination process does not involve dispatch actions. However, personnel responsible for coordination may perform command or dispatch functions within the limits established by specific agency delegations, procedures, legal authority, etc.

DISASTER: A sudden calamitous emergency event bringing great damage, loss, or destruction.

EMERGENCY: A condition of disaster or extreme peril to the safety of persons and property caused by such conditions as air pollution, fire, flood, hazardous material incident, storm, epidemic, riot, drought, sudden and severe energy shortage, plant or animal infestations or disease, the Governor's warning of an earthquake or volcanic prediction, or an earthquake or other conditions, other than conditions resulting from a labor controversy.

EMERGENCY MANAGEMENT (Direction and Control): The provision of overall operational control and/or coordination of emergency operations at each level of the organisation, whether it be the actual direction of field forces or the coordination of joint efforts of governmental and private agencies in supporting such operations.

EMERGENCY PLANS: Those official and approved documents which describe principles, policies, concepts of operations, methods and procedures to be applied in carrying out emergency operations or rendering mutual aid during emergencies. These plans include such elements as continuity of government, emergency functions of governmental agencies, mobilization and application of resources, mutual aid, and public information.

HAZARD: Any source of danger or element of risk.

INCIDENT: An occurrence or event, either human-caused or by natural phenomena, that requires action by emergency response personnel to prevent or minimize loss of life or damage to property and/or natural resources.

RESPONSE: Activities that address the short-term, direct effects of an incident. Response includes immediate actions to save lives, protect property, and meet basic human needs. Response also includes the execution of emergency operations plans and of incident mitigation activities designed to limit the loss of life, personal injury, property damage, and other unfavorable outcomes. As indicated by the situation, response activities include: applying intelligence and other information to lessen the effects or consequences of an incident; increased security operations; continuing investigations into the nature and source of the threat; ongoing public health and agricultural surveillance and testing processes; immunizations, isolation, or quarantine; and specific law enforcement operations aimed at preempting, interdicting, or disrupting illegal activity, and apprehending actual perpetrators and bringing them to justice.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

2.1 INTRODUCTION

Emergency planning is a necessary and critical part of planning in today's unforeseen economic and emergency situations. It is the responsibility of airlines and corporations to have a clearly defined emergency/disaster plan in place. Most planners don't already have a plan for the unexpected; however, it's something in today's economical and uncertain times we can't afford to take lightly. By planning on the front end of the travel or event, you will be protecting your client and your company physically and financially should any unforeseen emergency situations arise. Outlining a disaster plan for every scenario is something all of us in the aviation industry need to be clearly aware of at all times no matter where the program or event is taking place in the world today. As seen, recently after the 9/11 tragedies, we have to plan for the unexpected and unthinkable. By having a clearly defined emergency/disaster plan and checklist, your client will see that they are working with professionals that have their best interest in mind first and forth most. This will build credibility with the client as well as a greater comfort level in doing business with you and your organization.

2.2 REVIEW OF SAFETY IN AND AROUND AIRPORTS

Rapidly increasing traffic volumes and forecasts of continued growth into the next decades put a strain on airport capacity. Airbus Industries, for example, predicts an average annual passenger traffic growth rate of 5.0 per cent during the next 20 years, which means that during this time traffic, will increase by 168 per cent (Airbus Industries, 1998). At the same time public tolerance of the environmental effects of air

traffic around airports such as noise, air pollution and third party risk would appear to have decreased. These conflicting trends leas airports, airlines, air traffic control organizations and the aircraft and equipment industry to devise new technologies and innovative ways of operating airports and aircraft in order to meet both the capacity demands and the environmental limitations. Safety is not the objective of these developments; it is a mere constraint. Consequently, new hazards emerge and existing hazards become difficult to contain unless adequate attention is given to safety aspects in this combination of emerging trends.

In addition, a new dimension, third party risk, presented itself as a safety concern in a growing number of countries. Airports are hubs in the air transport system. Consequently, their presence causes a convergence of air traffic over the area surround the airport. For the population living in the vicinity of an airport this implies involuntary exposure to the risk of aircraft accidents. Although the probability of an accident per flight is very small (typically in the order of 1 in one million), local risk levels around airports are higher than one might expect. This is caused by the fact that, while the probability of an accident per take-off or landing is very small, the number of landings and take-offs is often very large (typically several hundred thousand). The resulting annual probability of an accident at a typical large airport is therefore much greater than the small probability of being involved in an aircraft accident as a passenger.

In addition, accidents tend to happen during, accidents tend to happen during the take-off and landing phases of flight and hence close to an airport. Safety data from studies show

that approach and landing phase accidents account for a significant proportion of fatal air transport accidents.

From Table 2.1 it can be seen that 82 per cent of the world jet aircraft fleet accidents from 1988-1997 occurred in these flight phases and accounted for 58 per cent of all fatalities (Anon, 1998). Historical data confirms that aircraft accidents involving considerable numbers of third party victims occur several times a year. Probably the best known example is the tragic accident of a Boeing 747 in suburban Amsterdam in 1992. Recent accidents occurred in Taiwan (Taipeh), Russia (Irkoetsk), Paraguay and Zaire (219 3rd party victims). This environmental effect is of growing significance to airports safety responsibility and decision making on airport development and land-use planning for airport regions.

Table 2.1: Accidents and Onboard Fatalities by Phase of Flight, Worldwide Commercial Jet Fleet 1988-1997

	Accident (100 per cent)	Fatalities (100 per cent)	Exposure (Percentage of flight time based on flight duration of 1.5 hours) (100 per cent)
Taxi,Load,Parked	8	0	-
Takeoff	16	6	1
Initial climb	5	5	1
Climb (flips up)	7	23	14
Cruise	9	9	57
Descent	2	10	11
Initial approach	6	17	12
Final approach	11	26	3
Landing	36	4	1

Source: Boeing Commercial Airplane Group (1999). Retrieved from www.boeinggroup.com on 12/4/2010.

2.3 THEORITICAL FRAMEWORK

Airports play an important role in the safety of air traffic. A recent analysis of accidents showed that around 30 per cent of these accidents involved at least one airport related factor in the causal chain leading up to the accident (Khatwa, et al 1996). Airport related factors in this case are taken as those factors which are specific to the airport environment but are not necessarily owned by the airport (and may thus include issues such as snow. Fog, inadequate ATC guidance, etc.). The relative importance of airport casual factors may be estimated from their relative frequency of occurrence in causal chains of accidents in the above-mentioned dataset. To this end, the 76 different airport related causal factors found, were grouped into seven categories. These categories are:

- Lighting and making (approach lighting, sign lighting, stop bar lighting, etc.)
- Runways and taxiways (runway length, obstructions, taxiway surface condition, etc.)
- Information (aerodrome hazard notifications, weather reports, runway information, etc.)
- External hazards (snow, fog, turbulence, wake vortex, etc.)
- Apron and ramp 9apron/ramp congestion, apron/ramp surface condition, etc.)
- ATC operations and procedures (approach procedures, communication phraseology use, separation judgment, etc.)
- Aerodrome – other (aerodrome structure, VASI/PAPI, etc.)

Recent European accident investigations have, for example, highlighted major deficiencies in the safety systems of many organizations in European airports; two examples of these include the incident at Daventry in 1995 and the accident in Edinburgh

in 1991 which highlighted organisational and regulatory failures in the maintenance domain and in ground handling operations respectively.

The evidence presented here sheds light on the safety problems associated with airports and provides information on the broad categories of accident casual factors which are currently a threat to safety of an airport. It is expected however that new developments and changes in traffic volume will have an influence on the nature of these accident casual factors. This briefing will examine how these factors will change as a result of new developments, in particular technological and operational, and in view of the predicted growth in traffic volume.

2.31 THE INSTITUTIONAL FRAMEWORK

Airports are related in accordance with ICAO standards, Airports in many countries are not licensed however, primarily because they are or used to be state-owned/operated. The absence of licensing systems with a periodical renewal process does not facilitate strict regulatory oversight.

In addition, the regulations regarding airports prescribe, in accordance with ICAO Annex 14, what an airport should have as equipment and infrastructure. National authorities regulate adherence to these standards. At national level requirements are needed regarding the way in which the airport should be operated and how safety should be managed. Some countries, even Nigeria have established national regulations concerning the management of safety and are considering a harmonization of their regulations in this regard.

2.32 THE ORGANISATIONAL FRAMEWORK

Airports are complex multi-organisational systems, with diverse safety standards and practices. Frequently, there is a lack of integration amongst airport users with regard to these safety standards and practices. In view of the multi-organisational nature of risk in the operation of airports, the lack of a mechanism to integrate the safety standards and practices of the different actors in and around the airport has a detrimental effect on safety.

Such a mechanism is difficult to establish since the respective actors in the overall airport organisation are subject to different regulatory regimes. These include aircraft maintenance, flight operations, ground handling including fuelling, security services, airside services and air traffic control. Even where some of these processes are frequently done by the organisation, they are usually subject to different management systems, different training standards and exhibit a different safety culture.

2.4 AIRPORT SAFETY PRIORITIES

The following critical issues need to be addressed in order to prevent an increase in the airport-related safety deficiencies which may result from operational and technological developments. Safety concerns resulting from operational developments.

2.41 THE WIND AND TURBULENCE ENVIRONMENT OF AIRPORTS.

The wind and turbulence environment at airports is a matter of growing concern. Airports tend to attract corporate real estate. Offices and other buildings are increasingly being

located in the immediate proximity of runways. The wind turbulence caused by these buildings has been such that in some cases aircrews have temporarily lost control of the aircraft shortly before touchdown or shortly after lift-off resulting in serious incidents. Due to the large monetary value of building space at airports, the pressure to allow such building activities will continue to grow. The current ICAO obstacle clearance criteria do not provide adequate protection. Alack of understanding of the turbulence aerodynamics and aircraft dynamic responses to turbulence upsets hampers the development of appropriate regulation.

2.42 WAKE VORTEX

Wake vortex constraints govern the minimum required distance (separation) between aircraft lined up sequence on the approach to the runway. During peak capacity operations, this distance effectively determines runway capacity and thus airport capacity.

Capacity constraint lead air traffic control organizations and airports to considering a reduction in separation minima from the current minima under certain conditions. At the same increasing use of parallel runways or other combined use of runway configurations and the future arrival of Very Large Aircraft gives rise to a possibly worsening wake vortex environment at airports. These developments do increase the risk of loss-of-control accidents in the final approach and landing phase. Wake vortex modeling is currently being researched as is the use of ground based or airborne sensors to identify and locate wake vortices and the development of associated procedures. These developments must be examined with a view to developing certification standards.

2.43 SAFETY OF NOISE ABATEMENT PROCEDURES

Environmental constraints, and in particular the noise issue, are increasingly becoming the limiting factor in airport capacity. This, turn, leads to airports and ATC organisations to develop advanced arrival and departure procedures such as Continuous Descent Approaches, Reduced Flap Approaches, Delayed Gear Approaches, etc. Such procedures may bring about a reduction in safety margins and therefore need close scrutiny. In addition, there are workload concerns and error proneness concerns. Also the pressure to maximize noise preferential runway utilization leads to the consideration of relaxed crosswind limitations by airport and ATC organisations which may put aircrews close to controllability limitations. In addition controller workload concerns with regard to the advanced procedures must be carefully considered, particularly when utilizing mixed modes.

2.5 THE SAFETY IMPLICATIONS OF NEW TECHNOLOGIES

2.51 ENHANCED AND SYNTHETIC VISION SYSTEMS

Head up displays are increasingly finding their way onto civil flight decks as a cheap alternative to autoland systems to allow operations under reduce weather minima. Although such systems are attractive alternatives to conventional systems, certifiability poses a serious safety concern. The same is true for Enhanced and Synthetic Vision Systems (E&SVS). These systems offer a potential safety improvement, but when utilized to reduce operational minima may pose safety problems. In view of the fact the investment in such systems by operators is likely to be made only if, addition to a potential safety benefit, a financial return can be generated through less cancelled flights and the associated competitive edge; the safety implications should be reviewed. A safety

concern related to these technologies lies in the fact that emergency response units may have trouble locating an accident aircraft on the airport in zero visibility conditions.

2.52 VERY LARGE AIRCRAFT

The introduction of Very Large Aircraft will give rise to problems of compatibility with the existing design and infrastructure in many airports. Such aircraft are likely to require more ground service equipment at stands than current aircraft. Problems of access to ground service equipment in congested airport apron environments may increase the risk of aircraft damage, which has the potential to compromise flight safety.

2.6 DISASTER MANAGEMENT PLANS

Air accidents frequently occur near, rather than at, airports. Therefore integrating the activities of local and airport emergency services becomes a major issue for planning. ICAO requires major accident simulations and exercise on regular annual basis. However this requirement does not encompass planning for potential accidents outside the airport limits. Furthermore recent experience of major disasters has highlighted the importance of planning to manage the traumatic aftermath of major disasters for survivors, relatives and operational personnel. Recent US regulations place requirements on airlines to drew up plans commit resources to dealing effectively with the traumatic aftermath of aviation disasters (Federal Family Assistance Plan for Aviation Disasters). Consideration should be given to how such a scheme could be instituted in Nigeria. Planning for an effective response to disaster at or near an airport places a particular requirement for co-ordination between emergency services, for both short term and long term response; it should encompass such aspects as the accessibility of potential accident site near the airport to

emergency vehicles. Experience has also shown the critical importance of effective and comprehensive debriefing following emergency exercises. Such debriefing should include all staff that has a role in the disaster response and is essential if the organisation is to evaluate its preparedness and to learn how to improve its disaster planning.

2.61 MANAGING RISK

A common, high safety at an airport cannot be achieved by any single actor since the level of safety at the airport is to a large extent governed by the interaction of multiple organisations. An integrated safety management system involving all organisations operating at the airport is thus required. An example of such a program is the Integrated Safety Management System at Amsterdam Schipol Airport. In this system, the airport itself, the main airlines, a representative of all other airline operators, ground handling providers, refueling services, and the air traffic control organisation work together to improve safety. To that end, parties have established a Terms of Reference, have regular meetings and use a common Operational Airport Information System. All participating organisations are connected to this system and enter information on air and ground incidents into a common database. This information exchange, the regular meetings and common objectives provide the necessary premises for the early identification of safety bottlenecks, the design of achievable corrective measures and their effective implementation. Consideration needs to be given to how this approach could be developed on a national level.

2.62 A COMMON METHODOLOGY FOR RISK ASSEESSMENTS

In order to promote fair competition and equally high levels of safety across Nigeria, there should be a common frame of reference for the assessment of new procedures and technologies with regards to safety. While current regulations provide adequate guidance for airworthiness assessments of systems, they do not adequately support the procedural aspects of the safety assessment of new technologies and advanced procedures. In fact, a commonly accepted method which specially addresses the human operator and the procedural aspects in an appropriate manner does not yet exist.

2.63 A COMMON FRAMEWORK FOR MANAGING THE RISK TO THIRD PARTIES

Increasing traffic volumes stretch the air transport infrastructure to its limits and require a considerable increase in available airport capacity. Increases in airport capacity usually necessitate new or improved runways and terminals, and changes in route structures and traffic distributions. Such developments bring about the need to prepare environmental impact statements that also address the issue of third party risk. This has led to considerable progress being established in methods and models for the calculation of third party risk around airports. The results of these calculations often carry a high political charge and from (party of) the basis of far-reaching and very costly infrastructural developments. In order to secure the well being of Nigerian citizens, but also in support of fair competition among Nigerian airports, Nigerian legislation in this regard is necessary. A further reason for urgent Nigerian action is the fact that apart from legislation on noise, there is still relatively little national airport legislation and in particular legislation on land use around airports. The establishment of risk tolerability

criteria for land use planning purposes as well as common risk assessment methodologies should be pursued.

2.7 A SURVEY OF GLOBAL AVIATION EMERGENCY INCIDENTS

Four terrorists hijacked United Airlines flight 93, which departed Newark and was destined for San Francisco. The plane crashed in Somerset, Pennsylvania killing all 45 persons on board. The intended target of that hijacked plane may never be known, but it is believed that it was bound for the White House. It is important to point out that due to the bravery of the passengers in overpowering the hijackers on that doomed flight; the aircraft was prevented from being used as a missile. Also, five terrorists hijacked American Airlines flight 77, which departed Washington Dulles Airport and was destined for Los Angeles. The plane was flown directly into the Pentagon. A total of 189 persons were killed, including all who were onboard the plane. In addition, five terrorists hijacked American Airlines Flight 11, which departed Boston and was destined for Los Angeles. The plane was flown directly into the north tower of the World Trade Center. On board the aircraft were 81 passengers, nine flight attentions and the two pilots. Moreover, five terrorists hijacked United Airlines Flight 175, which departed Boston and was destined for Los Angeles. The plane was flow directly into the south tower of the World Trade Center. On board the aircraft were 56 passengers, seven flight attendants, and the two pilots.

In the end, more than 3000 persons were killed in these four heinous attacks. I'm sure that each and every one of us has thought about what it must have been like for those passengers in their final moments on each of those four ill-fated airliners on September

11th, 2001. Thousands of innocent lives were lost because of fanatic martyrs who believe in some of a fantasyland after-life. United hijackers of the past, there are no demands to be met or negotiation to be had. These people have only one motive; to kill as many Americans as possible and be willing to die for the cause. That is scary. For the foreseeable future, passengers will board commercial airliners with a newfound type of anxiety. After all, our domestic security was breached and our air transportation system was violated. We can't help but wonder if the passenger sitting next to us has been properly screened and is not armed with a box cutter, knife, or other weapon with the explicit intent to harm Americans. Things are different today, that's for sure.

In the aftermath of the 9/11 attacks, we have stepped-up security at airports and have become extra vigilant for suspicious activities in our aviation environment (as well as other high-risk environments). Today, when boarding an aircraft, the average passenger fears a hijacking more than any other element of flight. However, if we put things in perspective, an airline passenger has at least a 100 percent higher risk of being seriously injured or killed by human error than by terrorist activity. Therefore, the gist of this article is not about terrorism, per se, but how serious the consequences can be when human error is left unchecked.

THE HUMAN ELEMENT: That by which we have physical or mental control to recognize, change, prevent, or mitigate a situation. Approximately 80 percent of all air crashes fall into this category. While the previous definition called it "pilot error," the term has been changed to "human error" to more realistically reflect that anybody who acts in a support capacity of a flight may contribute to the error chain. Not just the pilot.

Of the previously cited 80 percent, the NTSB (National Transportation Safety Board) further breaks down human errors into the following categories:

Table 2.2 NTSB HUMAN ERROR CHART

Unprofessional Attitudes	47%
Visual Perception Misjudgment	19%
Pilot Technique	21%
In-flight Judgment or Decision	5%
Improper Operation of Equip.	6%
Unknown Causes	4%

Source: www.planecrashinfo.com, retrieved on 12/4/2011

Continuing with statistical data, the following two tables depict the causes of accidents (in percent) from the 1950's through the 1990's. Note that "pilot error" has, and still does, account for the highest percentage of accidents.

Table 2.3: Accident Causes by Category (Percent) (1)

Cause	1950s	1960s	1970s	1980s	1990s	Total
Pilot Error	41	34	27	28	27	31
Pilot Error (weather related)	9	17	14	15	14	14
Pilot Error 9mechanical related)	6	5	4	3	4	4
Total Pilot Error	56	56	45	46	45	49
Other Human Error	2	7	8	6	8	7
Weather	16	11	15	15	14	14
Mechanical Failure	20	9	19	19	24	21
Sabotage	5	4	11	13	8	8
Other Cause	1	3	2	1	1	1

Source: www.planecrashinfo.com, retrieved on 12/4/2011

The tables above and below are compiled from the www.planecrashinfo.com accident database, representing 1,834 accidents from 1950 through 1999. The table above uses 1,286 accidents where a cause can be identified and excludes accidents where a cause could be determined. The table below includes all 1,834 accidents including those where a cause could not be identified. "Pilot error (weather related)" represents accidents in whish pilot error was involved but brought about by weather related phenomena. "Pilot error (mechanical related"" represents accidents in which pilot error was involved but

brought about by mechanical failure. “Other human error” includes air traffic controller error, improper loading of aircraft, fuel contamination, improper maintenance etc. Sabotage includes explosive devices, shoot downs and hijackings. “Total pilot error” is the total for all types of pilot error. Where there were multiple causes, the most prominent cause was used.

Table 2.4: Accident Causes by Category (Percent) (2)

Cause	1950s	1960s	1970s	1980s	1990s	Total
Pilot Error	21	24	18	21	20	22
Pilot Error (weather related)	6	12	9	11	11	10
Pilot Error (mechanical related)	4	3	3	2	3	3
Total Pilot Error	37	39	30	34	34	35
Other Human Error	2	5	5	4	6	4
Weather	10	7	9	11	11	10
Mechanical Failure	13	14	12	15	18	14
Sabotage	3	3	7	10	6	6
Other Cause	1	2	1	1	1	1
Undetermined or missing	34	30	36	25	24	30

Sources: BACK Associates and www.planecrashinfo.com accident database, 1980-1999. Retrieved on 12/4/2011

Table 2.5: Mortality Risk by Type of Scheduled Service 1987 - 1996

Advanced-world[1] domestic jet	1 in 8 million
U. S. Commuter[2]	1 in 2 million
Developing-world[3] domestic jet	1 in 500,000
International jet within advanced-world	1 in 5 million
International jet between advanced-world and developing-world	1 in 600,000
International jet within developing-world	1 in 400,000

Source: BACK Associates and www.planecrashinfo.com accident database. Retrieved on 12/4/2011

1. Advanced-world air carriers have home offices in economically advanced, technologically advanced and politically democratic countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, the United State and the United Kingdom).

2. Includes service by reciprocating-engine aircraft and turboprop aircraft.

3. Developing-world air carriers have home offices in countries other than countries categorized for the purposes of this study as economically advanced, technologically advanced and politically democratic.

2.71 WHAT KIND OF ERRORS DO HUMANS MAKE IN AIRPLANES

Errors can be diminished to a certain extent, but will always exist. It's just a fact we have to deal with. This holds true for all events in life, not just aviation. If you track the roots of any disaster, there is bound to be some kind of human error in the equation, even if it is not apparent at first. An example of this would be the crash of United Flight 232 in Sioux City, Iowa in 1989. Sure, it was catastrophic failure and NOT pilot error. But…if you track the maintenance history back for a period of time you will come to realize that a mechanic was not doing his job properly and certain inspections were not complied with. Eventually, this lead to catastrophic engine failure and a total loss of hydraulic systems in that DC-10. The point is, even though the accident was classified as mechanical failure, the roots go back to a human who made an error. Thus error included a blatant violation of the aviation Regulations, a judgment decision, and possibly pressure to save time and money.

a. ALCOHOLIC PILOTS

As a passenger on a commercial airliner, we should feel pretty self-assured that our pilots are not intoxicated. However, this wasn't the case on July 1st, 2002 in Miam. The researcher when the crew of an America West Airlines Airbus 319 attempted to takeoff an aircraft while under the influence of alcohol. And while this situation is highly unlikely, the possibility does exist (as demonstrated recently by this flight crew).

Although the aircraft had already pushed back from the gate and began taxiing towards the active runway, the ground controller told the crew they needed to return to the gate immediately. At that time both pilots were arrested and charged with not only operating an aircraft under the influence, but also with vehicular DWI since the state of Florida has a .08 threshold for operating a motor vehicle. Thanks to the observation of a security screener in Miami, that flight crew was apprehended and arrested before that aircraft took to the sky.

This flight terminated with no injuries or loss nor life. The pilots went to jail and the passengers were put on another flight and eventually arrived at their destinations. Could the outcome have been different and far more tragic? The researcher think you know answer to that question. But what about other flights? Do you think pilot learn from these lapses of reason or judgment? Apparently not. In January 2001, Northwest Airlines fired a pilot after discovering that he flew a DC-10 aircraft carrying 59 passengers from San Antonio, Texas, to Minneapolis-St. Paul, Minn. A Northwest employee smelled alcohol on the employee's breath after the plane landed. A Breathalyzer test showed that the pilot's blood-alcohol was.056, exceeding the FAA limit. In 1990, three intoxicated pilots were arrested after flying a Northwest Airlines Boeing 727 carrying 58 passengers from Fargo, N.D., Minneapolis. Federal authorities were tipped off by an inspector who had learned the three had been drinking heavily at a bar the night before their flight.

So how does this relate to human error? Take a look at the NTSB HUMAN ERROR CHART above. Notice that Unprofessional Attitudes tops the list at 47%. Do you think piloting an aircraft drunk falls under that category? I'd say so! Another factor would be

In-flight Judgment of Decision, which comprises 5% of the chart. A Judgment and decision-making rating would be considered poor for any of the aforementioned crews.

b. CONTROLLED FLIGHT INTO TERRAIN

One of the most disturbing and continuing errors committed by a flight crew is called CFIT (Controlled Flight into Terrain). There are many definitions of CFIT, but all yield the same result. Your author defines CFIT as the following: "When a perfectly airworthy aircraft, under complete control of the pilot(s), is inadvertently flown into the ground, an obstacle, or water little or no awareness by the pilot(s) until it's too late." CFIT accidents account for a large percentage of aircraft accidents and generally occur during the approach and landing phase of a flight. In light of the severity of this type of human error, THE RESEARCHER has included two examples. Korean Airlines Flight 801 and what's known in the business as the "classis" CFIT 801: AUGUST 6TH, 1997. AGANA, GUAM The first example of a CFIT accident involves a Boeing 747 operated by Korean Airlines. A classic example of a perfectly airworthy aircraft being flown inadvertently into terrains (in this case, Nimitz Hill). As is so typical of a CFIT event, this one occurred only a few miles from the airport. The weather conditions at the time included heavy rain and low visibility. The pilots had to rely on instruments for the approach to landing, since there were no outside visual cues. To compound the situation, part of the ILS (Instrument Landing System) was inoperative. Instead of a gradual, fixed descent to the runway, the pilots had to perform a series of letdowns at prescribed points. If you look at the transcripts of this accident, you will notice that the crew was uncertain about the status of the ILS during the entire approach. Mountains are not very forgiving. And in this case, flying at the wrong altitude caused this 747 to clip the top of that mountain.

There were a series of other factors that contributed to this accident as well, including pilot fatigue. When an aircraft is involved in an accident, there is going to be a "chain" of factors involved. This is referred to as the "error chain." No single factor may have caused that 747 to crash. But when you sum those factors up, that is when the likelihood of an event of this magnitude can occur. After its formal investigation, the NTSB released the following official conclusion in reference to KAL 801. Note how much human error played a role in the accident sequence:

In its official conclusion as to the probable cause of this accident: "The National Transportation Safety Board determines that the probable cause of the Korean Air flight 801 accident was the captain's failure to adequately brief and execute the no precision approach and the first officer's and flight engineer's failure to effectively monitor and cross-check the captain's execution of the approach. Contributing to these failures were the captain's fatigue and Korean Air's inadequate flight crew training. Contributing to the accident was the Federal Aviation Administration's (FAA) intentional inhibition of the minimum safe altitude warning system (MSAW) at Guam and the agency's failures to adequately manage the system." "The safety issues in this report focus on flight crew performance, approach procedures, and pilot training; air traffic control, including controller performance and the intentional inhibition of the MSAW system at Guam; emergency response; the adequacy of Korean Civil Aviation Bureau (KCAB) and FAA oversight; and flight data recorder documentation. Safety recommendations concerning these issues are addressed to the FAA, the Governor of the Territory of Guam, and the KCAB" EASTERN AIRLINES FLIGHT 401: DECEMBER 29TH, 1972.

EVERGLADES, NEAR MIAMI, FL Eastern Airlines Flight 401 has come to be known as the “classis CFIT case study. This was the point in time that airlines began to recognize the need for crew coordination, delegation and cockpit resource management. In this example, we have three highly qualified flight crewmembers (captain, first officer, and flight engineer), each with a substantial amount of flight time and experience. This flight, from New York to Miami, was routine and uneventful until arriving in the researcher vicinity. At that point, when the landing gear extended, the nose gear light failed to illuminate. The main gears were confirmed down. All three crew members became so fixated on the landing gear light, on one noticed that the autopilot had disengaged at 2000 feet and the L1011 was slowly descending towards the Everglades. At the time the air traffic controller asked “how are things coming along out there” (in reference to working on the nose gear problem), the aircraft was at 900 feet. By the time the crew had recognized how dangerously low they were, it was too late. The aircraft had impacted the ground. So you say “how could this happen?” Before CRM (Crew Resource Management) training became mandatory for airline crews, pilot tended to work on a more autonomous level. Group climate, synergy, coordination, and delegation were non-existent. The captain was considered “God” and what he said went! In this case, the captain did not delegate responsibility at all. The way this should have been handled, and the way it is taught nowadays, is somebody must always be flying the aircraft. The other pilot…or in this case pilots…should be troubleshooting the problem and offering solutions. Input! Working as a team arrive at a solution and then have the captain make the final decision. That was not the case here.

Air traffic control also took part of the balm for their part in not effectively monitoring the progress of the flight. When the controller asked "how are things coming along out there," what should have said was something to the effect of "Eastern 401, I'm showing you at 900 feet…altitude alert…you are below my minimum vectoring altitude…climb immediately." That very statement could have possibly prevented this whole tragedy. A more assertive command by the controller is what we were looking for there. So again, we have an accident where a perfectly airworthy aircraft, under complete control of the pilot (s), was inadvertently flown into the ground, with little or no awareness by the pilot (s) until it was too late.

c. LANGUAGE BARRIERS/NON-ASSERTIVE BEHAVOUR

One of the requirements of becoming a pilot in the United States is to be able to read, speak, write, and understand the English language. Although flight crews in other nations (in this case Colombia) are also required to have these English language skills when flying into the United States, there is much room for improvement. The following case identifies language barriers coupled with non-assertive behavior by the crew. The hesitancy of the crew to recognize a fuel-critical situation and be able to verbalize this situation with US air traffic controllers contributed to this accident.

AVIANCA AIRLINES FLIGHT 052: JANUARY 25TH, 1990. COVE NECK, NY. It was raining about as hard as ever seen and it was very windy as well. My home was located about 50 miles east of Cove Neck. When the news broke in and informed us of that tragic crash, my stomach dropped to the floor. The weather had to have something to do with the crash. The aircraft were even attempting to land at JFK that night. Although the

weather was bad that night, it was not the single factor that caused that 707 to run out of fuel. But, when you combine fatigue, language barriers, and non-assertive behavior with the weather, you have the ingredients for human failure.

In its official conclusion as to the probable cause of this accident: "The National Transportation Safety Board determines the probable cause(s) of this accident/incident as follows." "The failure of the flight crew to adequately manage the airplane's fuel load and their failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred. Contributing to the accident was the flight crew's failure to use an airline operational control dispatch system to assist them during the international flight into a high-density airport in poor weather. Also contributing to the accident was inadequate traffic flow management by the FAA and the lack of standardized understandable terminology for pilots and controllers for minimum and emergency fuel state. The Safety Board also determines that windshear, crew fatigue and stress were factors that led to the unsuccessful completion of the first approach and thus contributed to the accident."

d. CREW COOEDINATION/DECISION ACTIONS

CRM (Crew Resource Management), of lack of it, played a huge role in this example. With CRM training, crews are taught how to use all available resources for a safe and efficient flight. That training was obviously not provided to the crew of this Lockheed L1011.

Amongst other things, CRM training teaches pilots how to communicate, delegate, work as a team, and use all available resources in making decision. Although the captain is still the final authority as to the final decision, there is equal input to make the decision from all available people and resources. Crews that have been though CRM training has proven to be safer, better pilots. (particularly during adverse or abnormal situations). (SAUDI AIRLINES FLIGHT 163: AUGUST 19TH, 1980 RIYADH, SAUDI ARABIA)

This tragic accident brought about many questions. One of the most pressing issues was why didn't the crew evacuate the aircraft after landing? Instead, all aboard died while smoke and fire consumed the cabin. The confusing part of the scenario is that the crew managed to fly the aircraft back to Riyadh safety and perform a normal landing, but after they landed, they did not stop the aircraft as soon as possible and begin an emergency evacuation. That was what the standard operating procedure and checklist called for. Instead, they let the aircraft roll down the runway for almost 3 minutes. The engines weren't shut down for approximately another 3 minutes, preventing to rescue personnel from entering the aircraft. Additionally, because of the unfamiliarity of the emergency exists, the rescue personnel required even more precious time to enter the aircraft. In all, 23 minutes elapsed after landing before rescue crews could access the fuselage. But it was too late…all 301 people aboard had perished.

Contributing factors in this accident included a lack of crew coordination, the failure of the captain to delegate responsibility to the other crew members, the First Officers limited experience on the L1011 and lack of support to the captain, and the Flight Engineer (who

was dyslexic) rifling through the operations manual the whole time repeating to himself "no problem".

e. RUNWAY INCURSIONS

The Federal Aviation Administration defines a runway incursion as "Any occurrence at an airport (with an operating control tower) involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of separation with aircraft taking off, intending to take off, landing, or intending to land"

KLM AND PAN AM (2) 747'S: MARCH 27TH, 1977. TENERIFE, CANARY ISLANDS Runway incursions are another hot topic in the aviation world these days. The example that is used here illustrates the worst air disaster to date as far as loss of life goes, with 583 people killed. How did those highly experienced pilots for two major airlines (at the time) manage to bring a pair of jumbo jets together right on the airport and kill that many passengers? Human error played a huge role in this event. One again, we go back to the accident chain of events. Weather, crew fatigue, and language (phraseology) were all factors. If just one of those factors were omitted or mitigated from the sequence, perhaps the outcome would have been different.

In it official conclusion as to the contributing factors in this accident, the Secretary of Civil Aviation, Spain reports:

"The fundamental cause of this accident was the fact that the KLM captain:

1. Took off without clearance.
2. Did not obey the "stand by for take-off" from the tower.

3. Did not interrupt take-off when Pan Am reported that they were still on the runway.
4. In reply to the flight engineer's query as to whether the Pan Am airplane had already left the runway, replied emphatically in the affirmative.

Now, how is it possible that a pilot with the technical capacity and experience of the captain, whose state of mind during the stopover at Tenerife seemed perfectly normal and correct, was able, a few minutes later, to commit a basic error in spite of all the warnings repeatedly addressed to him? An explanation may be found in a series of factors which possibly contributed to the occurrence of the accident.

1. A growing feeling of tension as the problems for the captain continued to accumulate. He knew that, on account of the strictness in the Netherlands regarding the application of rules on the limitation of duty time, if he did not take off within a relatively short space of time he might have to interrupt the flight- with the consequent upset for his company and inconvenience for the passengers. Moreover, the weather conditions in the airport were getting rapidly worse, which meant that he would either have to take off under his minima or else wait for better conditions and run the risk of exceeding the aforementioned duty-time limit.
2. The special weather conditions in Tenerife must also be considered a factor in themselves. What frequently makes visibility difficult is not actually fog, whose density and therefore the visibility which it allows can be fairly accurately measured, but rather layers of low-lying clouds which are blow by the wind and therefore cause sudden and radical changes in visibility. The latter can be O m at

certain moments and change to 500 m or 1 km in a short space of time, only to revert to practically zero a few moments later. These conditions undoubtedly make a pilot's decisions regarding take-off and landing operations much more difficult;

3. The fact that two transmissions took place at the same time. The "stand by for take-off … The researcher will call you" from the tower coincided with Pan Am's "we are still taxing down the runway", which meant that the transmissions was not received with all the clarity that might have been desired. The whistling sound which interfered with the communication lasted for about three seconds.

The following must also be considered factors which contributed to the accident:

- Inadequate language. When the KLM co-pilot repeated the ATC clearance, he ended with the words, "we are now at take-off". The controller, who had not been asked for take-off clearance and who consequently, had not granted it did not understand that they were taking off. The "O.K." from tower, which preceded the "stand by for take-off", was likewise incorrect – although irrelevant in this case because take-off had already stared about six and a half seconds before.
- The fact that the Pan Am airplane had not left the runway at the third intersection. This airplane should, in fact have consulted with the tower to find out whether the third intersection referred to was C-3 or C-4, if it had any doubts, and this it did not do.

However, this was not very relevant either since the Pan Am airplane never reported the runway clear but, on the contrary, twice advised that it was taxing on it.

- Unusual traffic congestion which obliged the tower to carry out taxing maneuvers which, although statutory, as in the case of having airplanes tax the researcher on an active runway, are not standard and can be potentially dangerous.

Although contributing to the accident, the following occurrences must not he considered direct factors in it: the bomb incident in Las Palmas; the KLM refueling; the latter's take-off at reduced power; etc."

f. MID-AIR COLLISIONS

A mid-air collision is almost always caused by human error. Basically, two aircraft come in contact with one another in flight and almost always fall to the ground in an uncontrolled fireball. However, this is not always true. There are many documented cause where two aircraft collided in flight and both were able to be flown to a safe landing (although these are mostly smaller aircraft).

When an aircraft is flying at high altitudes (above 18,000') it is on an IFR (Instrument Flight Rules) flight plan. It is positively controlled by air traffic controllers, who assume the responsibility of separation between aircraft. Below 18,000' some aircraft may also be separated by air traffic control by they are mixed in with VER (Visual Flight Rules) aircraft which are responsible for their own separation from other aircraft. In either case, below 18,000 feet, all aircraft are collisions occur near an airport during a day! Most of these involved small, general aviation aircraft.

Statically, mid-air collisions are not very common or likely on a commercial airline flight. But, from the next example of human error, the possibility does still exist. The

airliner and cargo plane collided over southern Germany at 35,400 ft. Debris was spread across a 20 mile radius. Fifty-two children on a beach holiday were among the 69 aboard the Tupolev. The Tupolev pilot received contradictory instructions. The collision avoidance warning system (TCAS) told the pilot to ascend followed by an order from the Swiss air traffic controller to descend one second, so it repeated the command 14 second later. Thirty seconds later the two planes collided. The Swiss air traffic controller that guided the planes had no way of knowing the Russian pilot was receiving contradictory instruction from his cockpit TCAS unless told so by the pilot. Russian aviation officials said the pilot correctly gave precedence to the control tower, but Western aviation experts said pilots are trained to give precedence to the cockpit warning. (July 1, 2002.

BASHKIRIAN AIRLINES/DHL: JULY 1ST, 2002. UBERLINGEN, GERMANY: This is a relatively new accident. Therefore this accident is till under investigation and subject to months or even years of analysis before a final, unbiased conclusion is reached. One thing is certain though: Human error has again showed its ugly face in this accident. A large percentage of blame could be spread to the air traffic controllers. The Swiss are known for their systematic work ethic and precision of their craft. Unfortunately, it looks like there may be a big glitch in this case. We will just have to see where this case goes over the next few months.

g. BLATANT VIOLATIONS OF RULES/REGULATIONS/ETHICS

Celebrities are not immune to human error! In our final example of human-error accidents, I've decided to use a small, charter aircraft carrying I celebrity for our case study. This is to illustrate the point that human-error occurs in big and small airplanes and

it doesn't matter who you are or how much money you have. This was indeed a tragic crash that took the life of Analiyah Haughton and eight others in August of 2001. This was a combination of errors that not only involved the flight operation, but involved corporate management and decision-makers as well.

In aviation, we are trained to perform during times of normal, abnormal and emergency operations. We are trained on how every system works in our aircraft and what procedures to follow if those systems become inoperative. We learn how to execute instrument approaches in bad weather. We learn how to file a flight plan, check on weather, and computer our weight and balance and performance. In ground school, we learn what regulations we have to abide by to be safe and proficient pilots. If we are flying for hire, we learn how many hours we can fly during a 24-hours period, how much rest we have to have, and what the rules are concerning the consumption of alcoholic beverages.

What we don't learn and what can't be taught is JUDGMENT. Judgment is individual, and some people have a good command of it and some don't. in this case, the pilot of that chartered Cessna 402 used poor judgment when he knowingly and blatantly violated the rules, regulations and ethics that are required by a professional aviator. Singer/actress Aaliyah Haughton was killed, along with eight others, when the Cessna 402 she was flying on crashed while attempting to take off from Abaco Island, Bahamas. Pilot error was to blame. (August 25, 2001)

PRIVATE CESSNA 402: AUGUST 25TH, 2001. ABACO ISLAND, BAHAMAS: Just like the accident on the mid-air collision you read about, this one is still under investigation. Therefore, we can only work with the facts. Conclusions will come out after the NTSB finishes the investigation, which may be a while.

But what we do know is that:

1. The pilot had traces of cocaine in his body.
2. The pilot had traces of alcohol in his body.
3. The pilot was sentenced to three years probation on charges of crack cocaine possession 12 days before the crash.
4. Routine maintenance was not likely being performed on the aircraft.
5. The aircraft was 700 Ibs overweight on takeoff.
6. The aircraft was certified for 8 passengers including the pilot. There were 9 on board.
7. There was no evidence of a malfunction in the aircraft itself.

It is this type of "accident," and in this case the researcher use the word "accident" loosely, that causes a great amount of concern. Just like our example of the alcoholic pilots in the beginning of this article, we want to think that the crew of the aircraft we are flying in is professional, safe, and ethical, and will abide by the rules. After looking at this example, it's obvious that some pilots have a disregard for other people's lives. The most disturbing of all is the pilot's connection with crack cocaine. The researcher wonders if Aaliyah would have wanted to fly on that airplane if she knew more about the pilot.

In any event, this is another example of a perfectly good airplane being destroyed and 9 people loosing their lives because of human error bad judgment. Just a few examples of human error in aviation. The purpose of this article wasn't to scare anybody or say that aviation is not a safe form of transportation. It always has been and always will be the safest modes of travel. Statistically, you stand a much greater chance of being killed in a car accident than you do in a plane crash during your entire lifetime.

Conclusions were based on facts and findings of investigations. It is not the author's intention to point fingers or judge the outcome of an event with a tragic ending. The researcher simply waned to present the facts and make some additional comments for each example. Additionally, the crux of this article is to show that although most people fear a terrorist attack on their aircraft since 9/11, the chances are much higher that human error could play a bigger role in the outcome of your flight.

2.8 EMPIRICAL REVIEW OF AIRLINE EMERGENCY RESPONSE PLAN AND MANAGEMENT

This is to assist the airline management prepare a disaster and/or emergency response plan. It is not meant to be a guide for routine complaints or system maintenance problems. There issues should be dealt with by policy established by the various operating airlines management. A disaster or emergency can strike any airline at any time. In preparing your response plan keep in mind that when, not if, an emergency or disaster occurs, airline will become one of the top priorities in emergency medical services, fire fighting, sanitation, and general recovery of the emergency or disaster.

In designing your response plan keep it as simple and practical as possible. A complicated plan will only add to the confusion, and that's exactly what you don't want to happen! After you have designed your airline's "Emergency Response plan," train the system personnel. Mistakes made during training and rehearsals don't cost much, but mistakes made during the "real thing" could easily cost lives! Retraining or rehearsing the emergency response plan every 3 months will help new personnel become familiar with their role in the emergency plan, and will remind the experienced personnel of their role and perhaps identify areas of the plan that need improvement. Tabletop exercises are excellent ways to rehearse each individual role.

There are excellent training resources available to assist you in developing your emergency response plan.

a. NORMAL PROBLEMS

During the course of normal operations airline will have problems—some minor, some major. Take, for example, a major in flight incident: What should I do? Should I notify the public? If yes, do I just notify the passengers involved or everyone on the whole aviation system? And how do I go about putting out an emergency notice to passengers?

These are the questions that should be thought out now! And a plan must be drawn up and used when a problem occurs that will directly affect the safety of the airline. This study will help address a need for such a plan, and help you plan for a major emergency or disaster.

b. ORGANIZATION

Lines of Authority: Initial reaction to any emergency or disaster will be confusion. Therefore, a preplanned line of authority, including alternates in case the key people are unavailable, must be designed and ready for immediate implementation, with those individuals in these positions being aware of their designated authority during an emergency operation.

An office or area should be set aside and designated as an Emergency Command Center. The Command Center should be equipped with telephones, radios, airline maps and records and any other emergency equipment, which may be needed. During any emergency situation the Emergency Command Center would be activated and the personnel listed below would report for duty to the Command Center rather than their individual offices.

Types of authority positions could include:

1. **Emergency Coordinator:**

This individual would coordinate all emergency actions, airline personnel and equipment within the airline. The Emergency Coordinator will also coordinate with the law enforcement, fire fighting, medical personnel, and any other requests for aid, volunteer efforts, mutual assistance (other neighboring airline personnel or equipment and any contracted private assistance)

2. **Public Relations Coordinator:**

This individual would be responsible for news releases to the media, issuing emergency information bulletins to the public, and act as liaison between the airline and general

public in answering questions and addressing concerns. it is essential that the Emergency Coordinator and the public Relations Coordinator work closely together. It is also important that they be separate individuals because at the onset of any emergency a lot of people need to be mobilized in a coordinated effort (directed by the Emergency Coordinator) and the press and public need answers to their questions. Initially the Public Relations Coordinator will probably only be able to say, "This incident has occurred, and we are taking the following actions, (list the actions), and we will report more as we know more". The Emergency Coordinator will then feed information from the field to the Public Relations Coordinator, who then responds to the questions and concerns of the public and news media.

3. **Assessment Coordinator:**

This individual would coordinate the inspection of all airline physical facilities to determine that degree of damage to the facility and in coordination with the Emergency Coordinator, prioritize the repair, replacement or abandonment of any system physical facilities.

4. **Crew Foreman:**

This individual would coordinate, supervise and schedule personnel, equipment and material to facilities the repair or replacement of critical airline facilities which have been identified and prioritize by the Assessment and Emergency Coordinators. There may be several Crew Foreman if there are multiple site of concern, or multiple crews working in the field.

For some very small airlines, all of these functions may be the responsibility of one individual. In those situations, airline board members, clerical staff or even other interested volunteers must be trained and knowledgeable about the system and the response plan in the event that the operator is unavailable respond during an emergency.

c. CLASSIFICATION OF THE EMERGENCY OR DISASTER

Classifying the degree of the emergency or disaster will help in properly prioritizing activities and speeding the response time to implement the response plan. The classification phase, conducted during a training exercise will also be hopeful in designing the training of the airline personnel in their part of the emergency plan. Remember that mistakes made during the training don't cost much, but mistakes made during the "real thing" could cost lives!

The classification of the emergency or disaster will be decision of the Emergency Coordinator, which will be communicated by radio and/or telephone to the other personnel of the airline:

LEVEL I – NORMAL (ROUTINE): Personnel and equipment presently on duty can handle system problems. The "Emergency Command Center" not activated or manned.

LEVEL II – ALERT (MINOR EMERGENCY): Personnel and equipment presently on duty can handle system problems, but may require off duty or additional personnel to be put on alert, be re-routed to other than their normal working areas, or work additional shifts. The "Emergency Command Center" activated and manned.

LEVEL III – MAJOR EMERGENCY: Problems somewhat beyond the capabilities of the airline personnel and equipment, and may require a "Declaration of Emergency" to authorize shortcut procedures. Requires employees to work additional shifts and may need additional assistance of personnel and equipment, either by mutual aid or private contracts. The "Emergency Command Center" activated and manned.

LEVEL IV – DISASTER: Problems clearly and immediately beyond the capability of the airline. Recovery time will exceed one week, costs will be great, large amounts of assistance of personnel and equipment by mutual aid or private contracts will be required, extended shifts will be needed for at least one week. A "Declaration of Emergency" will be required; the "Emergency Command Center" activated manned.

d. FACILITY DAMAGE ASSESSMENTS

The "Assessment Coordinator" will determine the preliminary damage assessment priorities. The physical status of all physical facilities must be assessment. The need to repair, replace, or abandon airline physical facilities is required at this point.

Be sure to include an estimate of cost, including manpower and equipment, to restore the facility in order to help prioritize the rear work.

The Assessment Coordinator must consider the possible after of the repairs or replacement of the facilities, on the integrity of the airline itself after the emergency. After the completion of the preliminary damage assessment the Assessment Coordinator and the Emergency Coordinator will then decide which damage airline facility receives priority repair or replacement. This process of assessment and response coordination is usually quite informal and is facilities by the nature of the emergency. For example, a

staff member if informed of, or discovers a situation; he then reports it to his supervisor (the Emergency Coordinator) who then agrees with or expands the assessment and directs the employee to do some action. The Emergency Coordinator then works on mobilizing additional resources and sets up the command center.

The determination of priorities should be based on:

1. The unique design of the airline.
2. Medical/emergency care requirements.
3. Airline and travel needs of the public.
4. Fire fighting requirements.
5. How much good aircraft is remaining in the airline's fleet?
6. How to satisfy airline's passengers in the face of major disaster.

Pre-planning in this area could save the Assessment and Emergency Coordinators a lot of worry and hassle. If the situation is though through clearly now, rather than during an emergency, much better decisions will be made.

e. MAP OF THE AIRLINE AND FACILITIES

In your emergency response plan, inventory your system and identify the elements that would be most susceptible to damage in any emergency situation. Consider the different types of emergency such as earthquakes, floods, explosions, traffic accidents, sabotage, and fire. Also consider susceptible facilities such as: aircraft itself, apron, airline offices, and other ground handling facilities.

f. IMPLEMENTATION

Announce to employees the activation of the Emergency plan, using radio, telephone, or by any other means and have employees meet at their designated staging areas. Maintain a written log of messages and directives given during the emergency. This will help reduce confusion in the Emergency Operation Center and will also help in preparing the "After Emergency Follow-up Report", particularly if outside aid and assistance were requested.

Emergency Medical Facilities

Maintain a roster emergency medical treatment facility in your area for ease of maintaining airline supplies, moving aircraft from another terminal, or transporting injured personnel.

Emergency Assignments.

Ensure all personnel are aware of the airline emergency response plan, and their part in it. Personnel must be aware of the level of the emergency, staging areas, lines of authority, and their direct place within the organization.

In the event of an emergency or disaster, the employees will naturally take care of their families first. Provisions should be made to assure airline personnel that their immediate family members have been account for. Plans should include assisting employee's families in getting food, water, shelter and clothing. Employees will be better focused once their families have been taken care of. Staging areas should be set up so all personnel know where to report to work when they are able. Alternate areas should be assigned in the event a staging area is unsafe.

Emergency Personnel Roster

Maintain roster of personnel within the airline for emergency response notification. This list must be updated with the individual's name address, phone number, emergency job assignment, and primary staging area.

Issue identification cards to those employees who may require access to private property, cross police or fire lines, or who are authority to request or grant mutual aid. This roster will ensure proper lines of authority and communication is being used.

During the emergency, be sure ALL personnel working in the airline are placed on a duty roster, and appropriately tracked. This will ensure that they are being rotated for rest and food, and to keep track of where they are within the airline operating environment should they be needed elsewhere, or should they get injured and need help.

Fire Fighting/Law Enforcement Agencies

Maintain an updated listing of contacts within the local and neighboring fire fighting and law enforcement agencies, including their phone numbers and Emergency Operation Center (EOC) personnel, radio frequency, radio call signs and the EOC phone numbers. This listing and coordination will be critical for cooperation of the limited facilities and materials, particularly personnel, during the emergency.

Maintain a current Emergency Operation Center listing within your area. These agencies can help provide technical expertise, personnel, equipment and laboratory liaison.

If the local fire department or law enforcement agency is going to respond to an emergency for your system, each agency should know what hazards are at the site, what chemicals are stored at the facility and sheets for each chemical should be readily available.

Airport- based Emergency Planning Committee (AEPC)

All emergency response plans and courses of action should be discussed with the AEPC. This will facilitate communications and response efforts with the agencies with agencies that could be involved in the emergency.

g. DISPATCHING PERSONNEL AND EQUIPMENT

Ensure every affected individual is aware of the airline's emergency response plan and their in it. Personnel must be aware of the level of emergency, staging areas, line of authority, and their direct involvement within the emergency organization.

The Emergency Coordinator will advise the Crew Foreman as to the work assignments. The Crew Foreman will assign additional personnel (including volunteers) to the work crews, as needed.

Emergency Personnel Roster

Maintain a list of personnel within the airline's emergency response plan and their slot within the emergency organization. This list must be kept updated with the individual's home phone number, adder, and primary and alternate staging areas. Issue identification cards to those employees who may require access to private property, cross fire or police

lines, or those who are authorized to request or grant mutual aid and assistance. This procedure ensures proper lines of authority are being used.

Ensure that every person working within the airline, including all volunteers, is placed on a personnel roster which is organized by work crews, and maintained at the Emergency Operation Center. This will help ensure all personnel being rotated for rest, food, and to keep track of where they are within the system should they be needed elsewhere, or if they get injured.

i. REQUESTS/RESPONSE FOR EMERGENCY AID

Authorization to Request and to Provide Assistance

Pre-authorization of the position to request or to provide emergency assistance within the airline would enable the Emergency Coordinator the latitude to ensure all possible areas of assistance have been involved within the response effort. The elected officials of the airline should do this pre-authorization, with advice from legal council. It should be passed as an ordinance or policy so that the designated person has the authority in writing for confirmation if needed.

Commercial suppliers of Equipment Materials

A listing of commercial suppliers of equipment and materials within your local area should be kept up-to-date and available to the **Emergency Coordinator.**

Neighboring Agencies and Agreements

A listing of neighboring airlines and government agencies and contact people within them should be kept at the Emergency Operation Center. This list should include the types of specialized equipment, vehicles and trained crews that would be available if

needed during an emergency. A bilateral agreement Emergency Aid and Mutual Assistance should be negotiated with these systems and agencies.

k. PUBLIC NOTIFICATION/PRESS RELEASE

The release of information to the public and news media must be accurate and issued through the Public Relations Coordinator. The type of information given will vary with the airline and the type of emergency, but a generalized list must include:

- Centralized New Releases and statements to avoid contradictory or confusing statements.
- When responding to questions make only factual responses, never guess, speculate or exaggerate. If you don't know the answer to a question, tell the reporters "I don't know", and then give them an indication of when you might know or an explanation as to why the answer is unknowable.
- Inform the public of any possible damages to lives and properties.
- Inform the public of the availability and location of alternate travel arrangement.
- Implement airline rescheduling if need be.
- Arrange for an escorted news media tour. Only those media representatives who have proper identification should be allowed within the operating areas, and only with an escort. These tours must be pre-authorized by the Emergency Coordinator and Public Relations Coordinator. For safety reasons, do not allow the news media to wander around the emergency sites.

1. RECOVERY CHECKLIST

Designate a Post Emergency Coordinator

The Post Emergency Coordinator's duties would include the following:

- Document all contracts, agreements and emergency work or materials used during the emergency to ensure proper payments and reimbursements.
- Conduct a detailed safety inspection of the airline facilities.
- Coordinate the completion of all emergency repairs and schedule permanent repairs to the operating area.
- Notify key agencies (local and state health departments) of emergency repair status and the scheduled completion of the system repairs.
- Release repaired facilities and equipment for normal usage.
- Replace or authorize replacement of materials and supplies used during the emergency.
- Complete permanent repairs and replacements of the airline facilities.

2.9 Summary of the Review of Related Literature

However, various research efforts as it relates to aviation safety were extensively surveyed, noting key airport safety priorities and safety implications of new technologies in aviation. In addition, current disaster management plans as obtained globally was fully explored. An extensive survey of global aviation emergency incidents was carried out with particular reference to their respective causes. In all these, no particular reference was made to the emergency plans and response strategies adopted by the involving airlines. This study is empirical in all respects and the template for airline emergency response plan and management was suggested.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 CONCEPTUAL FRAMEWORK

A widely used method of measuring service quality is the gap analysis model, originally developed by Zeithaml, Berry, and Parasuraman in 1988, shown in figure 2.2 (Gronroos, 2000). The model concentrates on five 'gaps' which can impair the extent of emergency response and management service delivered. This study focused on Gap 5: the difference between airline experiences and expectations of service. The result can be either positive (the experience was better than the passenger though it would be) or negative (the experience was worse than expected). Although the other four gaps are also important factors, Gap 5 is the only one that can be determined solely from data collected from airline passengers and staff; in order to determine the other gaps; we would require data from the airline, itself. In order to measure Gap 5, which determines the difference between expectations and perceptions, the SERVQUAL instrument, developed by Parasuraman, Zeithaml and Berry in 1985 and improved by "Gronroos" (Gronroons, 2000) was adopted. It contained seven determinants; they are 'ADOPTION', 'COMMAND AND MANAGEMENT', 'PLANNING', 'TRAINING', 'EXERCISES', 'RESOURCE MANAGEMENT' and 'COMMUNICATION & INFORMATION MANAGEMENT'. Details from these service attributes are presented in Table 3.1.

Table 3.1: Emergency Plan and Response Management Attributes

	ADOPTION
AI	Support the successful adoption & implementation of the ERP and management
A2	Adopted ERP and management for all airlines departments ; as well as promote & incident management response organizations
A3	Monitor formal adoption of ERP and management by all local airports

A4	Establish a planning process to ensure the communication & implementation of ERP and management requirements, thereby providing a means for measuring progress & facilitate reporting.
A5	Designate a single point of contact to serve as the principal coordinator for ERP and management implementation.
A6	Designate a singe point of contact within each of the departments
A7	To the extent permissible by law, ensure that airline's preparedness funding support ERP and management implementation
	COMMAND AND MANAGEMENT
CM1	Coordinate & provide technical assistance to local entities regarding ERP and management institutionalized use Incidence Command System (ICS)
CM2	Manage all emergency incidents & preplanned (recurring/special) events in accordance with ICS organizational structures
CM3	Coordinate & support emergency incident & event management through the development & use of integrated multi-agency coordination systems
CM4	Institutionalize, within the framework of ICS, the Public Information System
CM5	Establish public information system to gather, verify, coordinate, & disseminate information during an incident.
	PLANNING
P1	Establish ERP and management baseline against future implementation requirements
P2	Develop & implement a system to coordinate & leverage all airline's preparedness funding to implement the ERP and management.
P3	Incorporate ERP and management into Emergency Operations Plans.
P4	Revise & update plans to incorporate ERP and management components, principles & policies, to include planning, training, response, exercises, equipment, evaluation & corrective actions.
P5	Promote intrastate mutual aid agreements, to include agreements with private sector & nongovernmental organizations.
P6	Participate in & promote airlines & interagency mutual aid agreements, to include agreements with the private sector & nongovernmental organizations.
	TRAINING
T1	Leverage training facilities to coordinate & deliver ERP and management training requirements in conformance with IATA.
T2	Complete training in airline emergency planning and response management.
T3	Complete training in airport emergency plans and local information control.
	EXERCISES
E1	Incorporate ERP and management into training & exercises.
E2	Participate in an all-hazard exercise program based on ERP and management that involves responders from multiple disciplines.
E3	Incorporate corrective actions into preparedness & response plans & procedures.

	RESOURCE MANAGEMENT
RM1	Maintains inventory response assets.
RM2	Develop airline's plans for the receipt & distribution of resources.
RM3	Ensure that relevant standards & guidance to achieve equipment, communication & data interoperability are incorporated into airline's acquisition programs.
RM4	Validate that inventory of response assets
RM5	Utilize response asset inventory for mutual aid requests, exercises, & actual events.
	COMMUNICATION & INFORMATION MANAGEMENT
CIM1	Apply standardized & consistent terminology, including the establishment of plain language communications Standards across public safety sector.
CIM2	Develop systems & processes to ensure that incident managers at all levels share a common operating picture of an incident.

Source: Compiled by Researcher, 2010

3.2 Research Approach

Four types of studies can be called research namely, reporting, description, explanation and prediction can be called research. Cooper and Emory (1995) define research as a systematic inquiry aimed at providing information to solve problems. Academic research needs to go beyond mere description, rhetoric and sales stories. Questions need to be posed and investigated; themes need to be analyzed.

It is easy to memorize a list of factors to use in distinguishing between quantitative and qualitative research paradigms. Quantitative research is objective; qualitative research is subjective. Quantitative research seeks explanatory laws; qualitative research aims at in-depth description. Quantitative research measures what it assumes to be a static reality in hopes of developing universal laws. Qualitative research is an exploration of what assumed to be a dynamic reality. It does not claim that what is discovered in the process is universal and, thus replicable (Mc Kereghan, 1998). This thesis is somewhat research because satisfaction should be described and it can not be measured by numbers, it is

quantitative research in the sense that we compare factors of emergency services together and find top priorities.

3.3 Research Strategy

Yin (1989) suggests that “empirical research advances only when it is accompanied by logical thinking, and not when it is treated as a mechanistic endeavour”. He indicates that case studies are preferred when “how” or “why” questions are being posed, when the investigator has little control over events and when the focus is on contemporary phenomena (Morrel, 2006).

The purpose of this thesis was to find information to answer “how” question. The study did not require control over behavioral events. The study focused on collecting, analyzing and comparing data to get the opportunity to find critical elements influencing emergency response and management and to make comparison between them.

3.4 Data Collection Method

Case studies can incorporate several different methods, including participant observation, structured or unstructured interviews and examination of documentary material.

Before considering systematic methods for collecting data, you should remember that informal methods for obtaining information from airline customers clearly produce information that is valuable. Everyone needs to recognize and use these everyday opportunities for customer feedback. Use this information to complement the more systematic forms of gathering feedback discussed here.

Many formal methods can be used to collect customer feedback data. Methods frequently used to gather customer feedback include focus groups, a mail-back postcard that is included among materials sent to customers, a mail survey, electronic kiosk, a telephone survey, a publication evaluation form included at the back of every copy, and a printed or in-person survey (which might include computer-assisted personal interviews or an intercept survey where you ask every customer attending a function or visiting a facility to participate). (Institute for Citizen-Centred Service, 2001)

3.4.1 Questionnaire and Interviews

The major difference between questionnaire and interviews is the presence of an interviewer. In questionnaire, responses are limited to answer to predetermine questions. In interviews, since the interviewer is present with the subject, there is an opportunity to collect nonverbal data as well and to clarify the meaning of questions if the subjects do not understand.

The written questionnaire has some advantage. For one thing, it is likely to be less expensive, particularly in terms of the time spent collecting the data. Questionnaire can be given to large numbers of people simultaneously; they can also be sent by mail. Therefore, it is possible to cover wide geographic areas and to question large number of people relatively inexpensively.

Another advantage of questionnaire is that subjects are more likely to feel that they can remain anonymous and thus may be more likely to express controversial opinions. This is more difficult in an interview, where the opinion must be given directly to the

interviewer. Also, the written question is standard from one subject to the next and is not susceptible to changes in emphasis and can be case in oral questioning. There is always the possibility, however, that the written question will be interpreted differently by different readers, which is one reason for carefully pre-testing questionnaire.

The format of interviews and questionnaire, as that of observational methods, can range from very structured to very unstructured, depending on how much is known about the range of possible responses. The research has utilized all of these approaches. Interviews were used to find critical factors of the emergency response and management and necessary to add in questionnaire, generally lasted a-half hours and were unstructured. Observation has been used to examine teams and personnel and facilities involved in emergency response and management improvement in action. This provides insights to get some other factors affecting the satisfaction. At the end, a questionnaire was designed and developed to get passengers idea about emergency response and management in the Nigerian airlines.

3.5 Sampling Selection

If the number of customers of interest is relatively small – not more than 60 – each could be contacted to obtain feedback. This is the census approach. In many cases, services or products are provided to a large group of customers – too large for a census approach. In such cases, a sampling approach is needed, and two options are possible:

- A judgment sample, in which you consciously select the customers you will contact from the entire group of customers served, and

- A probabilistic sample, in which customers you will contact are picked randomly from the entire group of customers served during the period interest (i.e. the past year).

In most cases, it is better to rely on a probabilistic sample than a judgment sample. Judgment sample may be biased because of the way customers are selected for the study. If a sample is biased, it is impossible to draw inferences about the entire group of customers served. As long as the response rate is high enough, probabilistic samples are not biased, so inferences can be made about the entire group of customers represented by the ones selected. (Institute for Citizen-Centred Service, 2001)

We preferred to use a probabilistic sample. The airline staff and passengers were selected randomly from local and international flight during one week.

3.5.1 Sample Size

The best advice for the novice researcher is to use as large a sample as possible. Large samples maximize the possibility that the means, percentages, and other statistics are true estimates of the population. They give the effects of randomness a chance to work. The chance of error goes down in direct proportion to the increased size of the sample. However, practical consideration is important too-for example, how many people are.

With random samples, it is possible to set the size of the sample according to how accurately you want to estimate the actual population parameters, or how much sampling error you are willing to accept.

At the result, 480 passengers and staff of Air Nigeria, Arik, Aero, and Dana airlines were picked randomly during a week to answer the questionnaire.

3.6 Validity

Validity refers to the accuracy of a measure and a measurement is valid when it measures what it is suppose to measure and performed the functions that it purports to perform. There are three major methods of estimating the validity of a data collection instrument. The greater the degree of validity of the data collection device, the more confident you will be that the results you achieve reflect true differences in the scores of your subjects and not some random or constant error, the degree of validity will reflect the degree to which we are controlling accounting for constant error.

The degrees to which valid measurements can be achieved are directly related to the level of the study design. Exploratory descriptive designs, by nature, have a low level of validation and must rely heavily on estimates of reliability. Level ll descriptive survey designs can achieve a greater degree of validity but must still rely heavily on reliability estimates. Level lll demands the highest degree of validity testing and uses reliability testing only to account for gaps in the attainment of validity.

Just as control over the independent variable must increase with the level of design, so must control for error in data collection. Methods of establishing validity of the measurement technique fall into one of three categories: self-evident measures, pragmatic measure. And construct validity. (Validity of Measurement, 2006)

3.7 Reliability

Reliability refers to the consistency, stability, of data collection instruction. A reliable instrument does not respond to chance factors or environmental conditions; it will have consistence results if repeated overtime or if used by two different investigator. Reliability demonstrates that the operations of the study – such as the data collection procedures – can be repeated , with the same result .(Yin 1984). The reliability of an instrument says nothing about its validity. It can be measuring the wrong concept in a consistent, stable fashion.

Cronbach's was used as an examination indicator to determine the reliability of the measurement scale of service quality after pilot test. The value of Cronbach's alpha is generally required to be over 0.7 and the calculated results were over 0.7 in 7 factors of service quality in Gronroos model. The figures representing as the output of pilot test, it was observed that the reliability of all service dimensions, in terms of Cronbach's alpha**,** was greater than 0.7. This meant that the Gronroos measurement scale, applied in this study, was reliable.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

4.1 Analysis of Emergency Plan and Response Management Service Quality for the various airlines

Based on the measurement scale for service quality proposed in the previous section, we further analyzed the differences in perceived quality between Nigerian airline staff and passengers. Here, respondents were asked to separately evaluate each service attribute, according to the gap between their perceptions and expectations, using a five-point Likert scale: Most effective, effective, fairly effective, not effective and not available. Five different scores were assigned: 5, 4, 3, 2, 1, to represent this five-point scale.

We used one sample t-test for our data analysis. The one-sample t-test procedure tests whether the mean of a single variable differs from a specified constant. This test assumes that the data are normally distributed; however, this test is fairly robust to departures from normality. The sample size in this study was more than 30 and based on 'Central Limit Theorem' we were allowed to presume the data were normally distributed approximately. A 95% confidence interval for the between the mean and the hypothesized test value was supposed. Satisfied staff and passengers must have received perceptions equal to or more than expectations (fairly efficient). So, the hypothesized test value in this study is 3 and it can split respondents into satisfied and unsatisfied categories and we can specify the null and alternative hypothesis as below.

$$\begin{cases} \text{Null hypothesis } H_0: \mu \geq 3 \\ \text{Alternative hypothesis } H_a: \mu < 3 \end{cases}$$

As noted earlier, we specify the level of sampling error (0.05).

The scores for each attribute were then tabulated; the results can be found in Appendix. As shown in Table 4.2, in most of items, there are negative mean differences and we can not say that our test value is located in 95% confidence interval of the difference. In another word, in most items, the null hypothesis can be rejected because the calculated value is larger than the critical value.

AIRLINE ONE: AERO

Table 4.1: ONE-SAMPLE TEST FOR AERO AIRLINE

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
A1	41.186	119	.000	.967	.92	1.01
A2	-2.915	119	.004	-.067	-.11	-.02
A3	-8.951	119	.000	-.650	-.79	-.51
A4	-20.822	119	.000	-.817	-.89	-.74
A5	-8.951	119	.000	-.650	-.79	-.51
A6	4.879	119	.000	.167	.10	.23
A7	4.674	119	.000	.183	.11	.26
CM1	4.879	119	.000	.167	.10	.23
CM2	4.879	119	.000	.167	.10	.23
CM3	-1.420	119	.158	-.017	-.04	.01
CM4	-24.393	119	.000	-.833	-.90	-.77
CM5	-20.775	119	.000	-.900	-.99	-.81
P1	4.381	119	.000	.167	.09	.24
P2	3.636	119	.000	.100	.05	.15
P3	20.822	119	.000	.817	.74	.89
P4	24.393	119	.000	.833	.77	.90
P5	36.180	119	.000	.917	.87	.97
P6	20.822	119	.000	.817	.74	.89
T1	35.133	119	.000	1.150	1.09	1.21
T2	35.133	119	.000	1.150	1.09	1.21
T3	4.879	119	.000	.333	.20	.47
E1	8.951	119	.000	.650	.51	.79
E2	-4.583	119	.000	-.150	-.21	-.09
E3	9.757	119	.000	.667	.53	.80
RM1	20.775	119	.000	.900	.81	.99
RM2	4.674	119	.000	.183	.11	.26
RM3	4.583	119	.000	.150	.09	.21
RM4	4.279	119	.000	.133	.07	.20

RM5	83.791	119	.000	.983	.96	1.01
CIM1	35.133	119	.000	1.150	1.09	1.21
CIM2	35.133	119	.000	1.150	1.09	1.21

SOURCE: Field Work (2011)

According to the figures listed in Table 4.1 above, and from the views of respondents , it can be seen that the perceptions of emergency response and management service quality attributes, for Aero airlines, were worse than expected in eight attributes cases and the scores had negative values. The top five attribute qualities for Aero airline were in the sequence of T1, T2, CIM1, CIM2 and RM5

As for respondents'' perceptions of the emergency response and management service quality of Aero airline, the worst five quality of attribute were CM5, CM4, A4, A3 and A4.

CM 5 was much worse than expected and it also has the least mean difference and shows most respondents agree that it is the worst attribute. T1, T2, CIM1, and CIM2 tied in their mean difference and were much better than expected and they were the first best attributes. However, in few items, the null hypothesis is rejected and this means that the general perception of respondents is that the performance ERP and management service quality of Aero airline is fairly as expected.

In comparison of 7 groups item means (i.e. 'Adoption', 'Command and Management', 'Planning', 'Training', 'Exercises', 'Resource Management' And 'Communication & Information Management), the first attribute was 'Communication & Information

Management' and 'Training' was the second. The others in priorities were 'Planning', 'Exercises', 'Resource Management', 'Adoption' and 'Command and Management'. So we can conclude that from the point of view of respondents, 'Command and Management' items were the worst expected and 'Adoption' items following.

Table 4.2: Descriptive Statistics of Interview Data with Aero Airline

	N	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error
A1	120	3.97	.257	12.130	.438
A2	120	2.93	.250	10.556	.438
A3	120	2.35	.795	2.078	.438
A4	120	2.18	.430	4.679	.438
A5	120	2.35	.795	2.078	.438
A6	120	3.17	.374	1.303	.438
A7	120	3.18	.430	4.679	.438
CM1	120	3.17	.374	1.303	.438
CM2	120	3.17	.374	1.303	.438
CM3	120	2.98	.129	57.432	.438
CM4	120	2.17	.374	1.303	.438
CM5	120	2.10	.475	1.252	.438
P1	120	3.17	.417	5.828	.438
P2	120	3.10	.301	5.382	.438
P3	120	3.82	.430	4.679	.438
P4	120	3.83	.374	1.303	.438
P5	120	3.92	.278	7.447	.438
P6	120	3.82	.430	4.679	.438
T1	120	4.15	.359	1.974	.438
T2	120	4.15	.359	1.974	.438
T3	120	3.33	.748	1.303	.438
E1	120	3.65	.795	2.078	.438
E2	120	2.85	.359	1.974	.438
E3	120	3.67	.748	1.303	.438
RM1	120	3.90	.475	11.289	.438
RM2	120	3.18	.430	4.679	.438
RM3	120	3.15	.359	1.974	.438
RM4	120	3.13	.341	2.820	.438
RM5	120	3.98	.129	57.432	.438
CIM1	120	4.15	.359	1.974	.438
CIM2	120	4.15	.359	1.974	.438
Valid N (listwise)	120				

SOURCE: Field Work (2011)

AIRLINE TWO: AIR NIGERIA

Table 4.3: ONE-SAMPLE TEST FOR AIR NIGERIA

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
A1	53.664	119	.000	1.833	1.77	1.90
A2	24.393	119	.000	.833	.77	.90
A3	86.632	119	.000	1.017	.99	1.04
A4	25.554	119	.000	1.683	1.55	1.81
A5	53.664	119	.000	1.833	1.77	1.90
A6	46.319	119	.000	1.817	1.74	1.89
A7	86.632	119	.000	1.017	.99	1.04
CM1	46.319	119	.000	1.817	1.74	1.89
CM2	53.664	119	.000	1.833	1.77	1.90
CM3	24.393	119	.000	1.667	1.53	1.80
CM4	24.393	119	.000	.833	.77	.90
CM5	20.775	119	.000	.900	.81	.99
P1	56.518	119	.000	1.850	1.79	1.91
P2	24.393	119	.000	1.667	1.53	1.80
P3	24.393	119	.000	1.667	1.53	1.80
P4	20.822	119	.000	.817	.74	.89
P5	40.817	119	.000	.933	.89	.98
P6	24.393	119	.000	1.667	1.53	1.80
T1	84.549	119	.000	1.933	1.89	1.98
T2	34.150	119	.000	1.167	1.10	1.23
T3	4.807	119	.000	.317	.19	.45
E1	14.636	119	.000	1.500	1.30	1.70
E2	14.636	119	.000	1.500	1.30	1.70
E3	9.757	119	.000	.667	.53	.80
RM1	46.319	119	.000	1.817	1.74	1.89
RM2	56.518	119	.000	1.850	1.79	1.91
RM3	8.928	119	.000	.633	.49	.77
RM4	3.711	119	.000	.383	.18	.59
RM5	4.987	119	.000	.550	.33	.77
CIM1	84.549	119	.000	1.933	1.89	1.98
CIM2	97.603	119	.000	1.950	1.91	1.99

SOURCE: Field Work (2011)

For Air Nigeria airline according to Table 4.3 below, all the service quality attributes were better than expected in all cases and the scores had positive values. The top five attribute qualities for the airlines were in the sequence of CIM2, CIM1, TI RM2 and P1.

As for respondents'' perceptions of the emergency response and management service quality of Air Nigeria airline, the least fair five quality attributes were T3, RM4, RM5, RM3 and E3. 'Complete training in airport emergency plans and local information control.' was the least attribute and it also has the least mean difference and though it shows most respondents agree that it is more than expected attribute.

'Developing systems and processes to ensure that incident managers at all levels share a common operating picture of an incident' was much better than expected and it was the first best attribute. However, in all the items, the null hypothesis is rejected and this means that the general perception of respondents is that the performance ERP and management service quality of Air Nigeria airlines is better than expected.

In comparison of 7 groups item means (i.e. 'Adoption', 'Command And Management', 'Planning', 'Training', 'Exercises', 'Resource Management' And 'Communication & Information Management), the first attribute was 'Communication & Information Management' and 'Planning' was the second. The others in priorities were 'Adoption', Command and Management', 'Exercises', 'Training' and 'Resource Management'. So we can conclude that from the point of view of respondents, 'Resource Management' items were the least expected and 'Training' items following.

Table 4.4: Descriptive Statistics of Interview Data with Air Nigeria

	N	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error
A1	120	4.83	.374	1.303	.438
A2	120	3.83	.374	1.303	.438
A3	120	4.02	.129	57.432	.438
A4	120	4.68	.722	1.681	.438
A5	120	4.83	.374	1.303	.438
A6	120	4.82	.430	4.679	.438
A7	120	4.02	.129	57.432	.438
CM1	120	4.82	.430	4.679	.438
CM2	120	4.83	.374	1.303	.438
CM3	120	4.67	.748	1.303	.438
CM4	120	3.83	.374	1.303	.438
CM5	120	3.90	.475	1.252	.438
P1	120	4.85	.359	1.974	.438
P2	120	4.67	.748	1.303	.438
P3	120	4.67	.748	1.303	.438
P4	120	3.82	.430	4.679	.438
P5	120	3.93	.250	10.556	.438
P6	120	4.67	.748	1.303	.438
T1	120	4.93	.250	10.556	.438
T2	120	4.17	.374	1.303	.438
T3	120	3.32	.722	1.681	.438
E1	120	4.50	1.123	1.303	.438
E2	120	4.50	1.123	1.303	.438
E3	120	3.67	.748	1.303	.438
RM1	120	4.82	.430	4.679	.438
RM2	120	4.85	.359	1.974	.438
RM3	120	3.63	.777	.760	.438
RM4	120	3.38	1.132	-1.292	.438
RM5	120	3.55	1.208	-1.573	.438
CIM1	120	4.93	.250	10.556	.438
CIM2	120	4.95	.219	15.751	.438
Valid N (listwise)	120				

SOURCE: SPSS Field Work (2011)

AIRLINE THREE: DANA

Table 4.5: ONE-SAMPLE TEST FOR DANA AIRLINE

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
A1	.815	119	.416	.017	-.02	.06
A2	2.026	119	.045	.033	.00	.07
A3	-62.797	119	.000	-1.033	-1.07	-1.00
A4	-58.745	119	.000	-.967	-1.00	-.93
A5	-97.603	119	.000	-1.950	-1.99	-1.91
A6	-40.817	119	.000	-.933	-.98	-.89
A7	-84.549	119	.000	-1.933	-1.98	-1.89
CM1	-59.902	119	.000	-1.867	-1.93	-1.80
CM2	-84.549	119	.000	-1.933	-1.98	-1.89
CM3	-119.516	119	.000	-1.967	-2.00	-1.93
CM4	-63.121	119	.000	-1.917	-1.98	-1.86
CM5	-50.322	119	.000	-1.850	-1.92	-1.78
P1	-25.968	119	.000	-.850	-.91	-.79
P2	-36.180	119	.000	-.917	-.97	-.87
P3	-47.550	119	.000	-.950	-.99	-.91
P4	-40.817	119	.000	-.933	-.98	-.89
P5	-75.649	119	.000	-1.917	-1.97	-1.87
P6	-69.089	119	.000	-1.900	-1.95	-1.85
T1	-32.726	119	.000	-.900	-.95	-.85
T2	-47.550	119	.000	-.950	-.99	-.91
T3	-83.791	119	.000	-.983	-1.01	-.96
E1	-84.549	119	.000	-1.933	-1.98	-1.89
E2	-59.018	119	.000	-1.900	-1.96	-1.84
E3	-119.516	119	.000	-1.967	-2.00	-1.93
RM1	-40.817	119	.000	-.933	-.98	-.89
RM2	-40.817	119	.000	-.933	-.98	-.89
RM3	-40.817	119	.000	-.933	-.98	-.89
RM4	-40.817	119	.000	-.933	-.98	-.89
RM5	-75.649	119	.000	-1.917	-1.97	-1.87
CIM1	-43.859	119	.000	-1.867	-1.95	-1.78
CIM2	-75.649	119	.000	-1.917	-1.97	-1.87

SOURCE: Field Work (2011)

As shown in the Table 4.5 below and from the views of respondents, it can be seen that the perceptions of emergency response and management service quality attributes, for

Dana airline, were worse than expected in almost all cases and the scores had negative values.

As for respondents'' perceptions of the emergency response and management service quality of Dana airline, the worst five quality of attribute were CM3, E3, A5, A7 and CM2. 'CM3 and E3' was much worse than expected and it also has the least mean difference and shows most respondents agree that they were the worst attributes.

'Adoption of ERP and management for all airlines' departments; as well as promote incident management response organizations' was much better than expected and it was the first best attribute. But in a few items, the null hypothesis cannot be rejected and it shows that with 95 percent confidence, respondents are satisfied in some parts of ERP and management performance. They are A1and A2. However, in almost all the items, the null hypothesis is rejected and this means that the general perception of respondents is that the performance ERP and management service quality of Dana airline is worse than expected.

In comparison of 7 groups item means (i.e. 'Adoption', 'Command And Management', 'Planning', 'Training', 'Exercises', 'Resource Management' and 'Communication & Information Management), the first attribute was 'Adoption' and 'Resource Management' was the second. The others in priorities were 'Planning', 'Training', 'Command and Management', 'Communication & Information Management' and 'Exercises'. So we can conclude that from the point of view of respondents, 'Exercises'

items were the worst expected and 'Communication & Information Management' items following.

Table 4.6: Descriptive Statistics of Interview Data for Dana Airline

	N	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error
A1	120	3.02	.224	17.582	.438
A2	120	3.03	.180	26.161	.438
A3	120	1.97	.180	26.161	.438
A4	120	2.03	.180	26.161	.438
A5	120	1.05	.219	15.751	.438
A6	120	2.07	.250	10.556	.438
A7	120	1.07	.250	10.556	.438
CM1	120	1.13	.341	2.820	.438
CM2	120	1.07	.250	10.556	.438
CM3	120	1.03	.180	26.161	.438
CM4	120	1.08	.333	19.471	.438
CM5	120	1.15	.403	7.267	.438
P1	120	2.15	.359	1.974	.438
P2	120	2.08	.278	7.447	.438
P3	120	2.05	.219	15.751	.438
P4	120	2.07	.250	10.556	.438
P5	120	1.08	.278	7.447	.438
P6	120	1.10	.301	5.382	.438
T1	120	2.10	.301	5.382	.438
T2	120	2.05	.219	15.751	.438
T3	120	2.02	.129	57.432	.438
E1	120	1.07	.250	10.556	.438
E2	120	1.10	.353	14.821	.438
E3	120	1.03	.180	26.161	.438
RM1	120	2.07	.250	10.556	.438
RM2	120	2.07	.250	10.556	.438
RM3	120	2.07	.250	10.556	.438
RM4	120	2.07	.250	10.556	.438
RM5	120	1.08	.278	7.447	.438
CIM1	120	1.13	.466	10.978	.438
CIM2	120	1.08	.278	7.447	.438
Valid N (listwise)	120				

SOURCE: Field Work (2011)

AIRLINE FOUR: ARIK

Table 4.7: ONE-SAMPLE TEST FOR ARIK AIRLINE

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
A1	52.555	119	.000	1.050	1.01	1.09
A2	2.503	119	.014	.050	.01	.09
A3	52.555	119	.000	1.050	1.01	1.09
A4	2.503	119	.014	.050	.01	.09
A5	52.555	119	.000	1.050	1.01	1.09
A6	40.817	119	.000	.933	.89	.98
A7	52.555	119	.000	1.050	1.01	1.09
CM1	40.817	119	.000	.933	.89	.98
CM2	36.180	119	.000	.917	.87	.97
CM3	-2.915	119	.004	-.067	-.11	-.02
CM4	3.289	119	.001	.083	.03	.13
CM5	5.169	119	.000	.183	.11	.25
P1	52.555	119	.000	1.050	1.01	1.09
P2	-2.503	119	.014	-.050	-.09	-.01
P3	-2.503	119	.014	-.050	-.09	-.01
P4	-2.915	119	.004	-.067	-.11	-.02
P5	52.555	119	.000	1.050	1.01	1.09
P6	-2.915	119	.004	-.067	-.11	-.02
T1	97.603	119	.000	1.950	1.91	1.99
T2	84.549	119	.000	1.933	1.89	1.98
T3	84.549	119	.000	1.933	1.89	1.98
E1	-46.648	119	.000	-1.067	-1.11	-1.02
E2	-47.550	119	.000	-.950	-.99	-.91
E3	-52.555	119	.000	-1.050	-1.09	-1.01
RM1	40.817	119	.000	.933	.89	.98
RM2	46.648	119	.000	1.067	1.02	1.11
RM3	30.017	119	.000	.883	.83	.94
RM4	30.671	119	.000	.950	.89	1.01
RM5	40.817	119	.000	.933	.89	.98
CIM1	69.089	119	.000	1.900	1.85	1.95
CIM2	56.518	119	.000	1.850	1.79	1.91

SOURCE: Field Work (2011)

With respect to the figures listed in Table 4.7, and from the views of respondents , it can be seen that the perceptions of emergency response and management service quality attributes, for Arik airline, were worse than expected in only eight cases and the scores

had negative values. The top five attribute qualities for Arik airline was in the sequence of T1, T2, T3, CIM1 and CIM2. As for respondents'' perceptions of the emergency response and management service quality of Arik airline, the worst five quality of attribute were E1, E3, E2, P4 and CM3

'Incorporate ERP and management into training and exercises' were much worse than expected and it also has the least mean difference and shows most respondents agree that it is the worst attribute.

'Leverage training facilities to coordinate and deliver ERP and management training requirements in conformance with IATA.' was much better than expected and it was the first best attribute. But in a few items, the null hypothesis cannot be rejected and it shows that with 95 percent confidence, respondents are satisfied in some parts of ERP and management performance. They are A2 and A4. However, in eight items, the null hypothesis is rejected and this means that the general perception of respondents is that the performance ERP and management service quality of Arik airlines is better than expected.

In comparison of 7 groups item means (i.e. 'Adoption', 'Command And Management', 'Planning', 'Training', 'Exercises', 'Resource Management' And 'Communication & Information Management), the first attribute was 'Training' and 'Communication and Information Management' was the second. The others in priorities were 'Resource Management', 'Adoption', 'Command and Management', 'Planning' and 'Exercises'. So

we can conclude that from the point of view of respondents, 'Exercises' items were the worst expected and 'Planning' items following.

Table 4.8: Descriptive Statistics of Interview Data for Arik Airline

	N	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error
A1	120	4.05	.219	15.751	.438
A2	120	3.05	.219	15.751	.438
A3	120	4.05	.219	15.751	.438
A4	120	3.05	.219	15.751	.438
A5	120	4.05	.219	15.751	.438
A6	120	3.93	.250	10.556	.438
A7	120	4.05	.219	15.751	.438
CM1	120	3.93	.250	10.556	.438
CM2	120	3.92	.278	7.447	.438
CM3	120	2.93	.250	10.556	.438
CM4	120	3.08	.278	7.447	.438
CM5	120	3.18	.389	.760	.438
P1	120	4.05	.219	15.751	.438
P2	120	2.95	.219	15.751	.438
P3	120	2.95	.219	15.751	.438
P4	120	2.93	.250	10.556	.438
P5	120	4.05	.219	15.751	.438
P6	120	2.93	.250	10.556	.438
T1	120	4.95	.219	15.751	.438
T2	120	4.93	.250	10.556	.438
T3	120	4.93	.250	10.556	.438
E1	120	1.93	.250	10.556	.438
E2	120	2.05	.219	15.751	.438
E3	120	1.95	.219	15.751	.438
RM1	120	3.93	.250	10.556	.438
RM2	120	4.07	.250	10.556	.438
RM3	120	3.88	.322	3.914	.438
RM4	120	3.95	.339	5.597	.438
RM5	120	3.93	.250	10.556	.438
CIM1	120	4.90	.301	5.382	.438
CIM2	120	4.85	.359	1.974	.438
Valid N (listwise)	120				

SOURCE: Field Work (2011)

4.2 DISCUSSION OF RESULTS

The results above examined Nigerian airlines emergency planning and response management services patterned in seven dimensions of services defined by Gronroos with 95 percent confidence.

Satisfaction of airlines customers measured and we observed that passengers were not satisfied within 7 Dimensions of Gronroos service quality Model. But in all the attributes for Air Nigeria we saw satisfaction of passengers and other airline workers. This was closely followed by Aero and Arik airlines which exhibited close satisfaction in the number of ERP and management service attributes (23 out of 31 attributes accessed). Dana airline was worse off with only 2 out of 31 attributes showing some considerable level of satisfaction by respondents.

Hence, the level of adoption of emergency planning and response management by Nigerian airlines should be improved. Airlines should have functional emergency planning and response management department which would be working in collaboration with other civil and military government agencies involved in disaster management. Personnel training in the area of emergency planning and response management in the Nigerian airlines should be made mandatory for all categories of personnel in the aviation industry. This would boost the airlines drills to practice response to emergency situations. The survey attributes are the activities necessary in the development and implementation of an effective Emergency Response Plan.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary of Major Findings

In the questionnaire, differences in respondents' perception and expectation have been examined in connection with Nigerian airlines emergency planning and response management services, including seven dimensions of services defined by Gronroos with 95 percent confidence.

Satisfaction of airlines customers measured and we observed that passengers were not satisfied within 7 Dimensions of Gronroos service quality Model. But in all the attributes for Air Nigeria we saw satisfaction of passengers and other airline workers. This was closely followed by Aero and Arik airlines which exhibited close satisfaction in the number of ERP and management service attributes (23 out of 31 attributes accessed). Dana airline was worse off with only 2 out of 31 attributes showing some considerable level of satisfaction by respondents.

5.2 Conclusions

As noted earlier, airlines need to explore the emergency planning and response management expectations and perceptions of customers to stay alive in industry's increasing competition. Knowing accurately what customers prefer, successful service companies are able to give customers exactly what they want by customizing the product or service, to surprise and "delight" them (Porter, 1980; Albrecht, 1992) and to make a core competency to overcome their competitors.

In our case study, we tried to explore and evaluate emergency planning and response management level in Nigerian Airlines. As mentioned in previous chapters, the customer satisfaction is acquired through emergency planning and response management service quality and we used Gronroos model measure service quality. After designing the questionnaire, data gathering and analysis, describing the conclusions is the last and most significant step of a research. In this chapter, we will present our findings and conclusions which we drawn based on the analyzed data.

5.3 Recommendations

In this section we will present the implication and recommendations based on the conclusions and statistics. We will address practitioners and management as well as provide ideas for theory and future research.

IATA recommends that all air carriers have emergency response plans to deal with public health emergencies. While a number of air carriers already have excellent emergency response plans in place, many do not. The following constitutes a sample template for an emergency response plan applicable to public health emergencies.

This recommendation has two primary objectives:

• Identify in broad terms how to prepare for a public health emergency.

• Provide checklists of actions that should be built into a public health emergency plan.

This sample template is purposely generic in order that it could be of use in different types of public health emergencies and in order to avoid having to produce new templates

specific to each emergency that might occur. It could be used by those air carriers that do not currently have their own public health emergency response plan. Additionally, air carriers that have developed a plan may find it useful to review it against the elements set out herein.

5.3.1 Preparation

For air carriers that already have an emergency response plan, most of the same resources will be used in cases of public health emergency. For those air carriers without a plan, IATA strongly recommends one is established as soon as possible and resources identified.

Before writing an emergency response plan, it is imperative that air carriers consult with their national health authorities in the development and implementation of their response plans for public health emergencies. Air carrier response plans should be aligned with the national plan.

5.3.2 Establishment of an Emergency Response Team (ERT)

An emergency response plan is of no use without a team to implement it. Air carriers are encouraged to establish an Emergency Response Team (ERT) as soon as possible. Such a team should consist of *executive*, *core* and *support* members. The ERT executive members should have primary responsibility for advising senior management of developments relating to a public health emergency and actions to be taken in response. ERT executive members might typically be:

• Director Emergency Response

• Medical Advisor (or designated medical representative)

• Communications Director (or equivalent)

The ERT core members might typically be from those externally-focused departments that would have direct and immediate operational contact with the consequences of a public health emergency. These include:

• Flight Operations

• In-Flight Services

• Maintenance

• Airports

• Cargo

• Security & Facilitation

• Station & Passenger Handling

• Operations Control

The ERT support members should be from those internally-focused departments required to support the activities undertaken by an air carrier to address a public health emergency. These include:

• Legal

• Risk Management

• Human resources

• Finance/Purchasing

5.3.3 Establishment of an Emergency Response Centre (ERC)

Some air carriers already have designated office space equipped with all of the communications and planning tools required to manage a response to a public health emergency. Air carriers that do not have such a facility are encouraged to establish one.

1. **Activation of the Emergency Response Team and Centre**

The department or individual within the air carrier that receives the information that could potentially necessitate an emergency response should immediately contact the Operations Control Director (or its equivalent) who should in turn contact the executive members of the Emergency Response Team, as outlined above.

The executive members should determine whether the Emergency Response Plan and Centre should be activated. If the decision is to open the ERC, all employees involved in the Emergency Response Team should be notified. If the ERC is activated, the ERT core and support members should be represented.

2. **Roles and Responsibilities**

Attached below are documents specific to each member of the Emergency Response Team. They outline the roles and responsibilities of each team member and contain a checklist of actions to be taken by each team member in the event of a public health emergency.

- **Director Emergency Response (DER)**

• Overall responsibility for emergency response and for directing the activities of the Emergency Response Team (ERT).

• Advise designated superior of the impact of the emergency on the company's operations and make relevant recommendations.

• Notify the Reservations Department of the need to lock in passenger information or for notifying the operating air carrier to do so when required (only for air carriers not using Departure Control System).

Emergency Response Checklist

Convene a conference call with the representatives responsible for responding to a public health emergency.

Verify the details of the emergency.

Determine whether it will be necessary to open the Emergency Response Centre.

Initiate a conference call with the airport(s) involved in the emergency.

If the air carrier has no DCS, notify the reservation department to lock in passenger information if appropriate for this emergency.

If necessary, open the Call Centre (if one is available) and notify the General Manager Call Centres (or equivalent).

Monitor developments and advise immediate supervisor as often as required.

❖ **Medical Representative (MR)**

• Initiate and maintain contact with all appropriate health authorities.

• Established point of contact for the IATA Medical Advisor.

• Make appropriate recommendations applicable to specific departments of the company, based on information received from the health authorities.

Contact the appropriate health authorities.

Contact the IATA Medical Advisor if appropriate.

Contact the company Medical Officer closest to the airport(s) where the emergency is in effect.

If appropriate for the emergency, contact the hospital(s) that are receiving passengers in order to obtain relevant information.

Determine whether there is a requirement to quarantine any equipment.

Determine whether there is a requirement to disinfect the aircraft.

Advise the Director Emergency Response of the actions required.

Advise Company Maintenance of the actions required and ensures that the aircraft is properly disinfected.

Assist Corporate Communications with press releases as required.

If necessary, advise Flight Operations and In-Flight Services of the requirements for medical examinations for crewmembers.

❖ **Communications**

External Communications

• Initiate and maintain liaison with counterparts at the appropriate health authorities, as well as any other agencies that may be involved.

• Act as established point of contact for IATA Corporate Communications representatives.

• Manage all communications to the media including the distribution of press releases as required.

• Keep the DER informed of significant developments in the media.

• Ensure the establishment of a communication channel that could be used by the general public to contact the air carrier. For example, publish a toll free number or establish a Call Centre that could manage enquiries from the families of passengers caught up in a public health emergency.

• Post appropriate communications on the company web site.

Internal Communications

• Communicate all necessary information to internal staff.

Emergency Response Checklist

Establish liaison with spokesperson for appropriate health authorities, the airports and any other agencies that may be involved.

Coordinate with IATA Communications representative.

Determine who the corporate spokesperson(s) will be.

Brief the corporate spokesperson(s).

Draft necessary press releases and review them with the Director Emergency Response (DER) and the Medical Representative.

Confirm with the DER every time a press release has been released.

Monitor ongoing press coverage and inform DER of any developments in the media.

Assist human resources in communicating all necessary information to internal staff.

❖ **Flight Operations**

• Communicate relevant details (i.e. as they affect Flight Operations) of the emergency to pilots and any applicable unions.

• Review procedures relating to onboard medical emergencies and advise operational flight crew accordingly.

• Ensure that flight crews laying over in affected areas (if applicable) have been provided with necessary guidance and have access to any assistance required.

• Closely monitor crew scheduling to try and avoid last minute crew manning problems.

Emergency Response Checklist

Ensure that all relevant information concerning the emergency has been communicated to the company pilots and the pilot association if applicable.

For an international public health emergency (e.g. Avian Flu), review procedures relating to onboard medical emergencies and advice pilots accordingly.

Ensure that flight crew staying over in affected areas have been provided with necessary guidance and have access to any assistance required.

Maintain close contact with crew scheduling to try and avoid last minute crew manning problems.

For a specific onboard medical emergency, contact the operating crew and ensure they get any necessary assistance (peer support team, employee assistance program, etc.).

When required, discuss the need for medical examinations with the Medical Representative and have arrangements made as required.

In situations where the crew is to be released from duty, ensure that Crew Scheduling is contacted.

❖ **In-Flight Services**

• Communicate relevant details (i.e. as they affect In-Flight Services) of the emergency to cabin crew and any applicable cabin crew union.

• Review procedures relating to onboard medical emergencies and advise cabin crewmembers accordingly.

• Ensure that cabin crews laying over in affected areas (if applicable) have been provided with necessary guidance and any assistance required.

• Ensure that the catering function is not interrupted.

• Closely monitor crew scheduling to try and avoid last minute crew manning problems (if the appropriate department to do so).

Emergency Response Checklist

Ensure that all relevant information concerning the emergency has been communicated to the company cabin crew and the cabin crew union if applicable.

For an international public health emergency (e.g. Avian Flu), review procedure relating to onboard medical emergencies and advice cabin crew accordingly.

Ensure that cabin crew laying over in affected areas have been provided with necessary guidance and have access to any assistance required.

Maintain close contact with Crew Scheduling to try and avoid last minute crew manning problem.

For a specific onboard medical emergency, meet the aircraft or, if impossible, contact the operating crew and ensure they any necessary assistance (peer support team, employee assistance program, etc.).

When required, discuss the need for medical examinations with the medical representative and have arrangements made as required.

In situations where the crew is to be released from duty, ensure that Crew Scheduling is contacted.

If it is necessary to quarantine any equipment involved in the incident (bottles, medical kits, galley equipment), ensure that the appropriate parties have been notified and arrangements have been made.

❖ **Airports**

• Ensure the clear flow of relevant information to and from all stations.

• Advice the stations according to their location and according to the information received from the Medical Representative.

• Keep the Director Emergency Response informed of the situation in the different stations.

• Instruct the stations directly involved in the emergency to lock passenger information in the reservations systems of both the operating and marketing carriers and, in the case of code sharing, to secure copies of appropriate passenger manifests (only air carriers using a Departure Control System).

Emergency Response Checklist

For an international public health emergency (e.g. Avian Flu), ensure that all relevant information goes to and is received from all stations.

Transmit information received from the Medical Representative to stations as appropriate to their location.

Maintain close contact with stations in affected areas.

Keep the Director Emergency Response informed of the situation at the different stations.

For the arrival station of an aircraft with a specific onboard emergency, verify the details of the medical emergency.

With the assistance of the Medical Representative, determine whether it will be necessary to quarantine any equipment and advise the station accordingly.

Ensure that personnel have been properly briefed and are available to meet the aircraft.

Ensure that the station has arranged for the passengers, crewmembers, cargo and baggage to remain on the aircraft until permission has been received from medical personnel to disembark passengers and offload cargo and baggage.

Determine if it is necessary to open the Passenger Centre and/or Family and Friends centre.

If air carrier uses a DCS, instruct the station to lock passenger information in the reservations system and secure copies of appropriate passenger manifests.

❖ **Maintenance**

• Continue regular activities and adapt any special procedures that are recommended by the Medical Representative as a result of information received from the public health authorities.

• If responsible for cleaning aircraft, ensure that aircraft have been properly disinfected when required and employ the methods and disinfectants recommended by the Medical Representative and the aircraft manufacturers.

• Ensure that personnel are properly protected and briefed.

• If another department is responsible for aircraft cleaning, that department should assume the latter responsibilities.

Emergency Response Checklist

For an international public health emergency (e.g. Avian Flu), Maintenance continues its regular activities and adapts any special procedures that are recommended by the Medical Representative as a result of information received from the public health authorities.

If disinfection of an aircraft is required, ensure that personnel are using methods and disinfectants recommended by the Medical Representative and the aircraft manufacturers.

Ensure that personnel involved in disinfecting the aircraft are provided with appropriate protective clothing and are properly briefed.

Notify the Director Emergency Response when the aircraft has been disinfected.

❖ **Cargo**

• Implement any recommendations made by the Medical Representative and the Public Health Authorities.

• When required, ensure safe and rapid transport of diagnostic specimens.

• Keep in mind that refusal to carry diagnostic specimens, may result in strong possibility that such specimens will be carried anyway but not declared. This may represent a much more serious hazard than a properly packaged and labeled specimen.

Emergency Response Checklist

For an international public health emergency (e.g. Avian Flu), Cargo continues its regular activities and adapts any special procedures that are recommended by the Medical Representative as a result of information received from the public health authorities.

When required, Cargo should ensure safe and rapid transport of diagnostic specimens.

❖ **Security & Facilitation**

• Communicate changes to the electronic transmission of Advance Passenger Information or manual data collection required by governments in the event of a public health emergency.

• Liaise with governments' border control agencies to facilitate a two-way flow of information between the air carrier and governments on emerging entry requirements.

• Work with government agencies to mitigate the impact of additional data collection on member airlines.

• Ensure any changes to passenger data collection requirements are communicated to the relevant internal department in order to facilitate the timely collection and transmission of such data.

Emergency Response Checklist

Establish liaison with relevant immigration/customs authorities to ascertain additional advance passenger information requirements

Establish liaison with relevant immigration/customs authorities to determine additional entry requirements for passengers and crew (such as certificates of vaccination)

Communicate additional requirements to Passenger Department

Ensure travel restrictions/additional data requirements communicated to internal travel department

❖ **Station Management**

• Implement directives provided by the Emergency Response Centre.

• Liaise with local airport authorities and ensure that the company's head office airport representative is briefed on how the emergency is developing and on any relevant rules at the local airport.

• Ensure that copies of all passenger manifests are kept for the minimum period recommended by the public health authorities for that particular emergency (if using a Departure Control System).

• Follow the below checklist when advised of a flight with a suspected communicable disease onboard.

Emergency Response Checklist

Whenever notified of an incoming aircraft with a medical emergency onboard, obtain as much information as possible from the source of the information (Pilot-in-Command, Flight Dispatch, System Operations Control).

Notify the Airport Authority of the in-bound medical emergency.

Determine if necessary to set up schedule of conference calls with System Operations Control.

Ensure personnel are properly briefed and are available to meet aircraft with the necessary equipment.

Instruct staff members to ensure that passengers remain seated so that medical personnel can reach the passenger(s).

Ensure the passengers, crewmembers, cargo and baggage remain on the aircraft until permission has been received from medical personnel to disembark passengers and offload cargo and baggage.

Quarantine equipment as required.

if a lengthy delay is anticipated in disembarking passengers, consider opening a Family and Friends Centre.

If required set up Passenger Centre to receive disembarking passengers and register them.

If station is in an affected area of an international public health emergency (e.g. Avian Flu), cooperate with the local airport and public health authorities.

If station is in an affected area of an international public health emergency (e.g. Avian Flu), keep the air carrier Airport Representative fully informed of the local situation.

❖ **Operations Control Centre**

• Liaise with Flight Dispatch to identify nature of any on-board medical emergency.

• Maintain open channel of communication to the Director of Emergency Response and advise if Emergency Response Centre needs to be activated.

• Maintain open channel of communication to arrival station involved in onboard medical emergency. Advise and be advised of developments.

Emergency Response Checklist

Upon being notified of a medical emergency onboard an aircraft; obtain as much information as possible from the source of the information (usually flight dispatch).

If the medical emergency could potentially necessitate activation of the Emergency Response Plan, contact the Director Emergency Response, the Medical Representative (or designated Medical Officer) and the Corporate Communications Representative.

If it is decided to activate the emergency Response Plan, notify the members of the Emergency Response Team.

Notify the station of the incoming aircraft and nature of the situation onboard.

Request that Departure Control print out the Passenger Name List and Passenger Name Record for the flight.

Monitor the situation through regular reports from the Flight Dispatcher responsible for the flight.

Provide the Director Emergency Response with regular updates.

❖ **Legal**

• Provide input on any legal aspects of contact with the media and regulatory agencies.

• Support internal departments relating to liability issues resulting from a public health emergency.

• Provide general support to all company departments as required.

Emergency Response Checklist

Assist Corporate Communications with Press Releases and contacts with regulatory agencies

Support General Claims (or equivalent) in addressing passenger/shipper claims for delays arising from emergency response procedure and compliance with quarantine and or sanitary regulations.

Work with Risk Management to assess potential liabilities.

Support all company departments as required.

❖ **Risk Management**

• Analyse how employees, agents and customers might be affected by a public health emergency.

• Ensure that insurance coverage is available.

• Ensure that Senior Management is aware of potential liabilities.

Emergency Response Checklist:

Analyse air carrier exposure to its employees, agents and customers created by the emergency and/or the emergency response.

Identify that insurance coverage is available.

Make required notification to insurers.

Identify and implement mitigation measures.

Document all expenses incurred for purposes of insurance recovery.

Advise Senior Management as and when necessary.

❖ **Human Resources**

• Provide support to all company departments as required, particularly with regards to Policies and Personnel Services.

• Put a system in place to ensure that all employees may be located in the event of an emergency.

Emergency Response Checklist

Locate and account for all affected employees.

If appropriate, keep contact with families of employees on business travel.

- **Finance/Purchasing**

• Make special provisions for budget, accounting and purchasing purposes if required.

• Ensure rapid procurement of all necessary equipment (for example biohazard Kits, gloves, masks etc.) as required by the different company departments.

Emergency Response Checklist

Identify costs associated with emergency: supplies/equipment, communication, transportation, quarantine, treatment, business interruption, etc.

Is emergency funding necessary and how much?

Is actual cash necessary?

Procurement of all necessary equipment (for example biohazard Kits, gloves, masks etc.) specific to a public health emergency.

5.4 Contribution to Knowledge

The major contributions of this study were:

- The examination of users' expectations and perceptions of Emergency planning and response management service quality in an Airline setting.
- The application of the service quality model, viz the Gronroos model, in an Airline setting.
- The attributes that customers have satisfaction in it have been determined and also the attributes that have less satisfaction for the Nigerian airlines in terms of emergency planning and response management have been showed.

- The seven Dimension of Gronroos model have been prioritized in this case study.
- 31 attributes have been derived and found by interview and questionnaire.

Managers of Nigerian airlines have identified passengers' attitude and opinions about their provided emergency planning and response management services and in result they can create modifications and strengthen their weak points to increase satisfaction level among their consumers. Also other airlines' managers can use these results to measure and compare with their passengers' satisfaction.

5.5 Area for Further Study

The airline industry faces a number of risks in today's climate. Airlines are operates in a very competitive environment. Airlines face substantial strategic, financial, operational and hazard risks. Airlines are exposed to the risk of catastrophic loss. Airlines are operates to the highest standards of safety and security and are work closely with all the relevant authorities to ensure that customer safety is paramount at all times. The airline industry is characterized by low profit margins and high fixed costs. The air transport business is sensitive to both cyclical and seasonal changes. Competition in the sector is intense and the decline in average ticket prices has been considerable due to over-capacity and the changed market situation. The study in solving "is ERM important to airline management and should ERM apply in the airline?" is advocated. In the study, ERM effects are to be determined and listed in the four main categories as benefits, opportunities, costs and risks.

REFERENCES

Airbus Industries (April, 1998). Global Market Forecast 1998-2017 (GMF'98). Information published on Airbus Industries Official Website http://www.airbus.com/

Anon (1998). Statistical Summary of Commercial Jet Aircraft Accidents, Worldwide Operations, 1988-1997, Boeing Commercial Airplane Group, Seattle, WA.

BACK Associates and www.planecrashinfo.com accident database, 1980-1999. Mortality Risk by Type of Scheduled Service 1987 – 1996 (April 12, 2011)

Boeing Commercial Airplane Group (1999), Accidents and Onboard Fatalities by Phase of Flight, Worldwide Commercial Jet Fleet 1988-1997 from www.boeinggroup.com (April 12, 2011)

Institute for Citizen-Centered Service, (2001), How to conduct Customer Surveys, December 2001. www.instituteforcitizencenteredservice.com (April 12, 2011)

Gronroos, C. (2000), "The perceived service quality concept – a mistake?" Managing Service Quality, Vol 11 No. 3.

Khatwa, R., Roelen, A.L., Enders, J.H., Dodd, R. and Tarrel, R. (1996). An Evaluation of Approach and Landing Factors Influencing Airport Safety. Paper presented at the FSF/IFA/IATA 49th International Air Safety Seminar (IASS), November 11-14, 1996, Dubai, United Arab Emirates.

Mc Kereghan and Donna L. (1998). Quantitative versus Qualitative Research – an Attempt to clarify the problem.

Morrel, K.(2006), Senior Research Fellow, Warwick Business School, University of Warwick (http://www.kevinmorrell.org.uk/).

Yin, I. (1989), Case Study research: Design and Methods (Rev. ed). Beverly Hills, CA: Sage Publishing.

Yin, I. (2006). 'Validity of Measurement', Design and Methods (Rev. ed). Beverly Hills, CA: Sage Publishing.

Zeithaml, A., Berry, L, and Parasuraman, U. (1988), "SERQUAL: a multiple-term scale for measuring consumer perceptions of service quality" Journal of Retailing, Vol. 64.

APPENDIX: SURVEY QUESTIONNAIRE