



ANALYSIS OF THE TREND OF FATALITY RATES OF AIR ACCIDENTS IN NIGERIA.

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ABSTRACT

This research tends to analyze the trend of fatality rates of air accidents in Nigeria. Data for the study was sourced from accident data base of the Bureau of Accident Investigation. A trend analysis was conducted on the secondary time series data collected. The trend analysis revealed an irregular pattern over time with its peak recorded between 2003 and 2005. The study concludes that there is an indication that the fatality rate of air accident due to security and safety lapses in Nigeria airports is not significant as the trend of air accident fatality in Nigeria is not regular which is occasioned by various peaks and troughs. Finally, the study recommends various security measures to be adopted by the air industry as well as some policy guidelines for government.

Key Words: crash, Safety, security, trend, time series, fatality..

1.1 Introduction

Development of aviation sector in Nigeria is believed to have begun when the Royal Air force plane made the pioneering flight to the race course in Kano, from Khartoum in the 1920s. The first civil airplane which flew from Lagos to Kano was privately owned. By 1936, the Royal Air Force threw open its airfields to commercial aviation. The first commercial flight to Nigeria was operated by the Imperial Airways which began its services to Nigeria with four-engine De Havilland DH86 bi-planes. British Overseas Airways Corporation (B.O.A.C) later introduced its airplanes - the Argonauts and Strato Cruisers which landed in Kano and Ikeja airports from London taking 14 - 15 hours (AIAA, 2013).

The growth and development of aviation in Nigeria mirrors the Nation's political growth, as air transportation grew as an instrument of colonial bureaucracy. This later had a negative influence on the structure and development of the industry, as a result of it being dominated by public sector. The problems of poor services have

consistently characterized the Nigerian Aviation industry, with the different stakeholders accusing one another for the inefficiency in service delivery. The inefficiencies in the sector has manifested itself in the frequent occurrence of air crash in the countries aviation sector. Despite effort by the Nigerian government through the Ministry of Aviation to curb the menace of crash cases in Nigeria, the problem has not totally disappeared from the system. However, the current and immediate past democratic dispensation have played a significant role in improving the aviation sector and investing rapidly into safety related facilities in airspace management system of the Nation.

The incessant air accidents and consequent loss of lives and properties is indeed night mare. Most travelers have now developed the phobia to fly which many have resorted to use the road amidst the delay and other constraints. Researches have been conducted in different aspect such as the estimating the effect of these crash, assessment of safety and security at airport but little or no study has analyzed the trend of air crashes in Nigeria. This study tends to bridge the gaps by providing quantitative probability values to forecasting fatality trends.

1.2 Research objectives

The main objective of this study is to determine the trend of fatality rates of air accidents in Nigeria from 1969-2012.

1.3 Research question

What is the trend of fatality rates of air accidents in Nigeria between 1969-2012?

1.4 Hypotheses

Ho₁: The trend of fatality rate of air accidents in Nigeria is not regular.

1.5 Significance of the Study

The basic tenet on which this study based is to determine the quantitative estimates and trend analysis which will serve as a guide for policy makers and other stakeholders in the aviation industry.

2.1 Review of related literature

According to ICAO (1992) submissions, it states that human resources are the most flexible, adaptable and valuable part of the Aviation system, but, it is the most vulnerable part of the system, which can adversely affect its performance. They went ahead to reveal that throughout the years, some three out of four accidents have resulted from less than optimum human performance. Therefore, by inference, one could deduce that air navigation operation effects are functions of human factors. However, this tends to reflect increasing training of Aviation personnel, which Nigeria should as a matter of urgency pursue.

The planning, development and management of the industry therefore reflected the peculiarity and weaknesses of public sector enterprises. The defunct Nigerian Airways was synonymous with the air transportation in Nigeria as a result of the law which made it the national carrier with the monopolistic right on domestic routes. This privileged position conferred by statute was however misused as a result of poor and corrupt management and this had negative influence on the planning and development of air transportation in Nigeria (Aderamo, 2006).

The airline had the core objectives of fostering confidence and satisfaction to all customers with the aim of generating profit to build its expansion drive in order to dominate the leadership position within Nigeria and among African airlines and at the same time competing favorably with other developed airlines. Unfortunately Nigeria Airways could not meet up with its objectives, as its services were characterized by incessant flight delays and cancellations, poor ground and air services, this accounted for the loss of patronage (Figure 1) and dwindling returns (Aderemo , 2010). The combined effect of mismanagement, commercial monopoly, growing cost, bad policies and unfriendly business environment resulted in the non-realization of the objectives for which the national carrier was set up and this was reflected in loss of passengers over time (Figure 1)

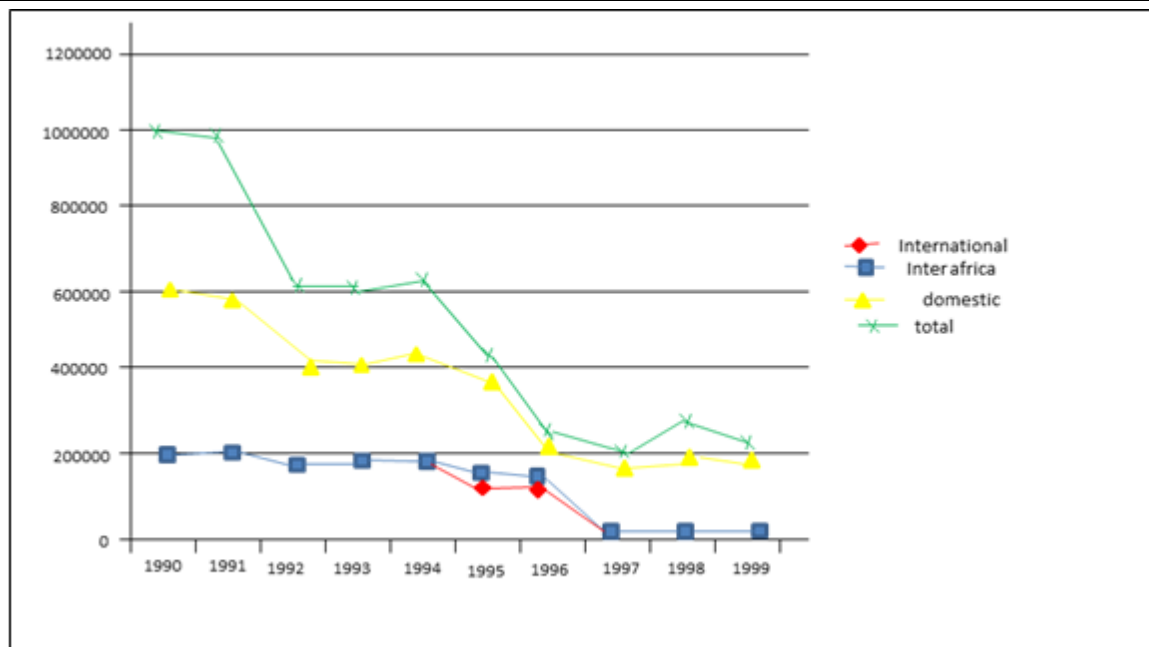


Figure1. Nigeria Airway passengers upliftSource: Adapted from FMA, (2003)

The deregulation of the airline sector in Nigeria brought about the appearance of indigenous airlines in the Nigerian airspace with a moderating effect on the local air transport scene. Their services were more efficient and effective when compared with the defunct national carrier. However, these airlines suffered the same faith as the national carrier as a result of bad policies, unfriendly business environment, poor management, rising cost of maintenance and bad infrastructure to support their business. Most of these airlines resorted to using cost cutting measures, such as the use of very old planes with poor maintenance to ply their routes. This accounted for the several plane crashes witnessed in the country in recent times. Before now the average age of the planes used within the Nigerian airspace was put between 26 and 30 yrs of age (FMT, 2007). The government however initiated a new capital base for the old airlines; this will see an end to the use of old and rejected planes of the western world in the skies of Nigeria (ATI, 2007). With effect from April, 2007, airlines operating in Nigeria were required to possess at least two new generation aircrafts, like Boeing 737-300 or its equivalent (ATU, 2007). The advent of the democracy in Nigeria in 1999 saw the government initiating policies which were geared to revamping all the sectors of the economy. These policies were witnessed by the influx of both foreign and national investors in different sectors of the economy which accounted for the increase in the number of local and international flights operated by local airlines.

3.1 Methods of Data Analysis

Data collected for the study was categorized according to the research objective in the study. For research objective one which was focused on the determination of the trend of air crashes in

Nigeria, a time series analysis was conducted using the historical crash data from the accident database of Nigerian Civil Aviation Authority.

3.2 Time series analysis.

Time series analysis and the ordinary least square estimates comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data (Saunders, 2007). These analyses were carried out using statistical software called STATA 12.0 and SPSS 20.

1969	197.0	87	4.93
1973	197.3	171	9.69
1978	197.8	16	0.91
1983	198.3	61	3.46
1991	199.1	33	1.87
1992	199.2	200	11.34
1995	100.5	25	1.42
1996	100.0	152	8.62
1997	100.0	15	0.85
2000	200.0	17	0.96
2002	200.2	92	5.22
2003	200.3	4	0.23
2004	200.4	22	1.25
2005	201.0	549	31.12
2006	201.0	132	7.48
2007	201.0	04	0.23
2008	201.0	23	1.30
2011	201.1	08	0.45
2012	201.2	153	8.67

Total	1764	100.00
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4.0 Results/Analysis

Ordinary Least Square (OLS) Estimates and Trend Analysis

To estimate the parameters we want a formula that informs us how to make use of the sample observations. Many rules are possible, particularly the one based on least squares principle. This principle asserts that to fit a line to the data values we should make the sum of the squares of the vertical distances from each point to the line as small as possible. The distances are squared to prevent large positive distances from being canceled by large negative distances. However, this rule is arbitrary but very effective, and is simply one way to describe a line that runs through the middle of the data. The intercept and slope of this line, the line that best fits the data using the least squares estimates of β_1 and β_2 , squares principle, are b_1 and b_2 , the least

Table 1. Air crash fatality in Nigeria from 1982-2012

Table 1.0 Data of air crash in Nigeria from 1969-2012(Source: NCAA database, 2013)

1 shows fatality rates of accident per fraction of year and respective percentages. The table further reveals that a total number of 1,764 lives were lost through air accidents between 1969 and 2012. More so, 1969, 1973, 1978 and 1981 recorded 87, 171, 16 61 and 33 deaths representing 4.93%, 9.69%, 0.91% and 3.46% respectively. In 1991, 1992, 1995, 1996 and 1997 the fatality rates were 33, 200, 25, 152 and 15 representing 1.87%, 11.34%, 1.42%, 8.62% and 0.85% respectively. The beginning of the millennium in Nigeria witnessed yet another catalogue of accidents. In 2000, 2002, 2003, 2004 and 2005, fatality rates were 17, 92, 4, 22, and 549 representing 0.96%, 5.22%, 0.23%, 1.25% and 31.12% respectively. Furthermore, fatality rates were 132 in 2006, 4 in 2007, 23 in 2008, 8 in 2011 and 153 in 2012 representing 7.48, 0.23, 1.30, 0.45 and 8.67 respectively.

It may be deduced that in the history of air disaster in Nigeria, the lowest fatality were recorded in year 2003, 2007 and 2011 with 4, 4 and 8 deaths respectively. However, it got to the climax in year 2005 with 549 deaths, 200 in 1992, 171 deaths in 1973, and 153 in 2012.

Table 2 Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.092 ^a	.008	-.054	39.17998

a. Predictors: (Constant), NUMOFFATALITY

b. Dependent Variable: NUMOFYEARS

Table 2 shows the model summary of the OLS with R square value of 0.008 which implies that only about 0.8% of the fatalities are explained in one tenth of the years in which accidents occurred.

Table 3 ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	208.801	1	208.801	.136	.717 ^b
Residual	24561.139	16	1535.071		
Total	24769.940	17			

a. Dependent Variable: NUMOFYEARS

b. Predictors: (Constant), NUMOFFATALITY

Table 3 shows the Analysis of Variance (ANOVA) table with F statistics of 0.136 which is less than 1. This implies that the computed F- value is less than the critical value. Hence, it could be

inferred that the difference between the mean of the dependent and independent variables is a function of chance or probabilistic.

Table 4 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	180.666	11.298		15.992	.000
	NUMOFFAT ALITY	.027	.073	.092	.369	.717

a. Dependent Variable: NUMOFYEARS

Table 4. Shows the coefficients from which the regression model is derived. It further reveals that the calculated t-value of 0.369 is less than 2, and thus falls within the acceptance region. We then, accept the null hypotheses that the fatality rate of air accident due to security and safety lapses in Nigeria airports is not significant, and that the trend of air accident fatality in Nigeria is not regular.

Table 5. Shows the residual statistics with the mean and standard deviation of predicted values of 183.0667 and 3.50463 respectively. This shows the extent of the deviation of the variables from their mean.

Table5 Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	180.7738	195.3893	183.0667	3.50463	18
Std. Predicted Value	-.654	3.516	.000	1.000	18
Standard Error of Predicted Value	9.237	34.665	11.802	5.754	18
Adjusted Predicted Value	175.1691	191.0244	181.9572	3.84575	18
Residual	-84.74276	20.22623	.00000	38.01017	18
Std. Residual	-2.163	.516	.000	.970	18
Stud. Residual	-2.242	.538	.009	1.009	18
Deleted Residual	-91.02435	25.83085	1.10950	41.36271	18
Stud. Deleted Residual	-2.621	.526	-.057	1.134	18
Mahal. Distance	.000	12.363	.944	2.855	18
Cook's Distance	.004	.187	.046	.073	18
Centered Leverage Value	.000	.727	.056	.168	18

a. Dependent Variable: NUMOFYEARS

5.0 Conclusion.

The study was set to determine the trend of fatality rates of air accidents in Nigeria. It was found that fatality rates of air accidents in Nigeria follow an irregular trend. This is evidenced by series of troughs and peaks, the peak being pronounced between 2003 and 2005.

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