



ANALYSIS OF FACTORS INHIBITING AVIATION CARGO LOGISTICS IN NIGERIA

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Abstract

This study examined the factors inhibiting aviation cargo logistics in Nigeria. The study adopted multi-stage sampling technique. Air cargo service companies were purposely selected. Eight (8) quoted air cargo companies were stratified and air freight forwarders of each company were equally randomly selected. Three hundred (450) questionnaires were distributed to the respondents and 445 were retrieved. Relative Importance Index (RII) was used to identify the major factors inhibiting aviation cargo logistics in Nigeria. The result showed that increasing fuel price (RII = 0.944), custom bottlenecks (R.I.I = 0.908), high cost of ground handling (R.I.I. = 0.906) and security treats (R.I.I = 0.842) are the most identified factors inhibiting aviation cargo logistics. Furthermore, the result showed that weather conditions and uncertainties at airports were ranked equally hence (R.I.I = 0.640) while changing inventory strategies and mode shifting have the least ranking with (R.I.I = 0.548) and (R.I.I = 0.517) respectively. Conclusively, the study recommended that since increasing fuel price, custom bottlenecks, high cost of ground handling and security treats are found to inhibit aviation cargo logistics, relevant stakeholders and Federal Government of Nigeria should design trade off to accommodate these factors.

Keywords: Aviation, Aviation Logistics, Air cargo, Fuel price.

Introduction

The aviation industry supports tourism and international business by providing the world's only rapid worldwide transportation network. Airlines transported 2.8 billion passengers and 47.6 million metric tonnes of air cargo in 2011, connecting the world's cities with 36,000 routes (Air Transport Action Group, 2012). Aviation sector plays an important role in the global economy by providing connectivity through the only rapid worldwide transport network. In doing so, the direct and wider impact on jobs and GDP globally is enormous contributing over 22 million jobs and US\$1.4 trillion in GDP. Moreover, the aviation sector makes contributions to other industries by facilitating their growth and supporting their operations. With a significant proportion of international tourists depending on air transport, the aviation industry supports 34.5 million jobs within tourism globally, contributing around US\$762 billion a year to world GDP.

Aviation logistics is an integral part of the current global logistics system, on a par with other types of transport. Airfreight services are already firmly established within the production chain of transport companies. It involves purchasing, shipping, and transportation, inventory, warehousing and delivery with the direct movement of a line of aviation or air terminal related to goods, people and supplies ordinary consumers' goods to armed forces supplies. The chief driver development is the trend towards globalization which in turn creates demand for fast, reliable and secure transport by air. Globally, more than one – third of the value of goods traded internationally is transported by air and therefore air cargo industry is considered as a barometer of Global Economic Health. From the point of view of airline industry, air cargo services contribute near about 20% of their revenue (Nasim, 2012).

With time-definite international transactions, production flexibility and speed characterizing much of the new economy, it is almost certain that air cargo would continue to play an increasingly vital role in the global economy. No other means of transportation is better equipped to meet the economic realities of the new era where global sourcing, selling and just-in-time logistics demand producers to receive and ship smaller quantities



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more frequently, quickly and reliably over long distances (Air Cargo sector,2014). Three reasons may explain this dramatic growth in airfreight. Firstly, there appears to be an industry trend towards the production of high value light-weight goods (Ari-Pekka and Hintsa, 2009). One of these is the new economy associated with the transport of fresh, perishable, high value produce intensified by the emerging 'farm to table' movement (Sim, Barry, Clift, and Cowell 2007). This is supported by statistics indicating that the transport of perishable food accounts for 14 per cent by volume of the total global airfreight (Achard, 2009).

Several elements make an airport world class and Nigerian airports need more than equipment to earn that level. Aviation logistics development can not only rely on air transport, but also has a comprehensive and efficient ground transportation, warehousing, packaging and other services, including freight forwarding, ground carrier, warehousing services and airline service throughout the process (Vidal, Crainic and Gendreau, 2012; Hoque, Mukit and Bikas, 2012; Roberge, Tarbouchi and Labonté, 2013; Johnson, Van-dewater and Wilson, 2014). According to airports survey reported by The Guide to Sleeping in Airports in 2017 revealed that Nigerian's Portharcourt, NnamdiAzikwe and MurtalaMuhammedInternational Airports are the 6th, 7th and 10th worst in Africa.Unfortunately, Nigeria seems to be lagging behind in air cargo business, with high population of goods importation from other part of the world despite all kinds of agricultural produce with ready markets both local and international.Historical cargo traffic statistics published by Federal Airports Authority of Nigeria (2014) for a 17 year period (between 1993-2009) revealed that about 1.286 billion kilograms of cargo were recorded in 19 airports while three others- Akure, Osubi and Kastina had no cargo traffic (Air Cargo Sector,2014).However, many challenges are limiting the sustainability of aviation logistics and air cargoes liftingby airlines in Nigeria but not limited to lack of modernized equipments, Nigerian customs and Immigration bribery.Others are the cost of aircraft and maintenance, high cost of freight, poor incentives and government's quality regulations, low volume of cargo to enhance huge investment in cargo aircraft, deficiency of cargo security, delay, poor intermodal communication, technology, harassment and extortion by law enforcement officials, high rate of robbery attack, multiple taxes, hike in fuel price and many others eroded the efficiency and effectiveness of aviation logistics in Nigeria.

Jet fuel is a major variable cost component in the operations of commercial airlines. Everybody appreciates the fact that when airlines pay more for fuel, the cost of air freight increases. This hasbeen the case even when the increase is only marginal. Explosive in fuel costs and growing customer demand has forced airfreight companies to look for a new ways of improve efficiency, lower costs and expanding their client base (Volga-Dnepr Airlines, 2012).In a situation where the cost of fuel is expected to double, the increase in air freight logistics cost will be vast. This will in turn affect and disrupting the traditional government postal services by providing efficiency aviation supply chain and timely deliveries across the globe.Between 2000 and 2018, there were enormousunsteadiness in aircraft fuel prices, with a marked eight-fold increase between 2000 and 2018. Despite continuous efforts of airlines and aircraft manufacturers to enhance operation and product efficiency, what they achieved cannot match the fluctuations in jet fuel prices (Air Transport Association, 2008).In 2012, the airline fuel bill was expected to reach almost \$200 billion, which was more than 30% of total operating costs (International Air Transport Association, 2012). This fuel price uncertainty is a major challenge inhibiting the air logistics industry in Nigeria which requires a research work. The implication of uncertainty in the fuel price will post warnings for the nations with industrialized standard citizens in regards to do business on certain airports or within certain countries.

Literature Review

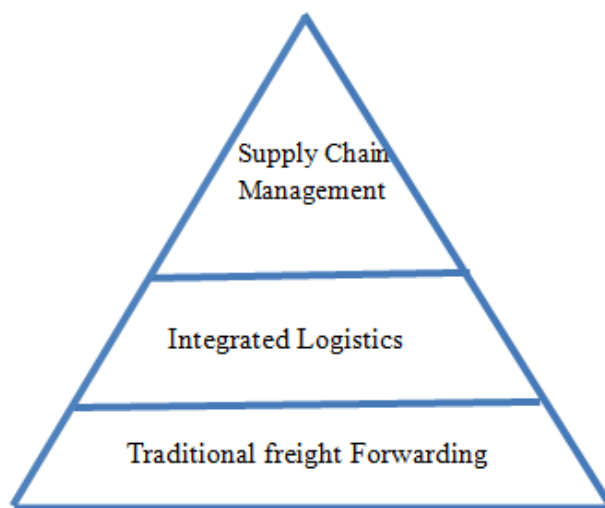
Conceptual framework of air cargo transportation structure

Airfreight forwarder is a third-party logistics (3LP) providers that has air cargo services as its core business. Today in case a company wants to decide what airfreight forwarder to choose, it probably should use the following set of criteria: infrastructural and informational abilities, equipment and fleet, distributional reach and route network. The majority of third-party Logistics Company provide services and solutions for the entire supply chain not only simple transportation (Yang, Hui, Leung and Chen, 2010),for this reason, the market is quite different from other markets and has more complexity(Petersen, 2007)



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Many companies are involved in transporting air cargo from one point to another; however, they can be classified into three main groups: airlines, freight forwarders and integrated providers (ArkadiyYurkanskiy, 2016). The majority of airlines (especially internationally) are combination carriers that carry both passengers and cargo. Air cargo can be shipped in freight airplanes and in passenger aircrafts (almost 60 % of air cargo worldwide). The market configuration is such that in order for the airline to operate it must have connections with freight forwarders and agents who act as an intermediary with customers (Belavina&Girotra, 2012). Normally airlines do not accept orders directly from customers, however in some cases an airline can serve as a forwarder as well. Integrated companies provide solution for the entire supply chain and are responsible for delivering goods from the origin to destination, working directly with customers and getting round the usual role of freight forwarders. The integration of air and ground services became a competitive advantage of integrated operators because a large number of manufacturing companies have the urge to manage and control international distribution networks and supply chains (figure 1). This situation has been an accelerator of division of cargo services into different groups. At the bottom stage, there are traditional cargo forwarders in which the forwarder is an intermediary between the customer and the carrier, responsible for transportation on ground, customs regulations and booking a space for the carrier (Bowen &Leinbach, 2004).



- Responsibility for design, optimization and management of supply chain solutions with customized information systems

Source: Bowen &Leinbach, (2004)

Figure 1. Freight services.

Air cargo transportation has a connection with passenger transportation, obviously, because both services employs aircraft as core mean of transport. Feng, Li, Shen, (2015) in their study of different publications have identified several differences between two above-mentioned types.

Airfreight transportation has a higher unpredictability level than passenger transportation in terms of capacity availability. Essentially, cargo forwarders have higher volatilities when dealing with capacity management. (Feng et al., 2015; Mongeau and Bes, 2003)

The reason for this is that usually customers of cargo shippers have to make a booking way ahead of the delivery date, whereas passengers can book their ticket couple of hours before the flight. Therefore, passenger airlines have more flexibility. (Wadud, 2013) "Cargo capacity forecasting is significantly more complex than passenger aircraft capacity forecasting. While the capacity of a passenger aircraft is fixed by its number of seats, cargo capacity depends on the container types used, which are further specified by multiple dimensions. For instance, the capacity may be enough in terms of volume but not in terms of weight when a heavy cargo arrives. Multiple dimensions are a key feature of freight, which render both complexity and uncertainty to airfreight capacity management." (Feng et al, 2015)



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The same as passenger transportation, airfreight operations contain both indirect and direct costs. Direct cost is a spending related to buying or renting the airplane and necessary facilities, as in combination with the service charges. Indirect cost is a spending connected with management expenses and ground handling services. Moreover, operation costs also include variable and fixed costs. Fixed cost that do not depend on the distance contain spending on taking off and landing, security, and ground operations. On the contrary, variable costs (i.e. the cost of fuel), depend on the distance of the flight (Chao and Hsu, 2014; Guimera, Mossa, Turtschi and Amaral, 2005)

Wenzel in his article for Nord/LB makes a general review of airfreight market. Due to specifics of this type of transportation, in comparison with other types, it is considered as a more value-adding type. It is also more frequently used for transportation of items that are more valuable and items that have to be delivered in a shorter period. Therefore, it is only logical that from the demand side, customer are willing to pay more to use air shipment. "The air cargo market is highly fragmented with fierce competition and excess capacity. The generally low switching costs for end customers intensify competition among the carriers. As a result, prices for air freight set rather supply oriented than cost-covering" (Wenzel, 2015). From the 3PL providers point of view there is a significant difference in demand in different parts of the world. For this reason, there is a problem of proper usage of airplane capacity. "The air cargo market is heavily concentrated and around 70% of the global freighter fleet is used by the top 20 air cargo carriers." (Wenzel, 2015)

Zou, Chunyan, and Dresner, (2013) acknowledges that the increase in freight volumes establishes a need for airlines that work with cargo as well to have appropriate and efficient revenue management schemes in order to minimize their losses. With regard to passenger transportation, such schemes are quite common and widespread and have been used for almost two decades. In fact, most of the methods were applied for freight management and therefore cargo operations are still highly dependent on ground rules of passenger schemes of revenue control. It is probably not a question of debate that airfreight is not the same as passenger operations; for example, shippers' booking patterns, capacity allocation uncertainty, demand forecasting and therefore passenger revenue management schemes should not be unadvisedly applied to the air cargo sector (Zou et al., 2013)

In general, there has been only a number of studies related to air freight revenue management (RM) questions. Kasilingam, (1996) established the main differences between passenger revenue management and freight revenue management. Very often passenger aircrafts carry cargo as well, so the amount of cargo depends on the type of the plane, number of passengers on board and how much luggage they have. "Therefore, air cargo capacity is stochastic in nature, and the uncertainty makes capacity allocation decisions more complex." (Becker and Nadja, 2007). One more important aspect of cargo that it is different to passengers is multi-dimensional structure of cargo capacity (weight, volume, and position in the aircraft cargo hold), flexibility in routing and path selection, and the cargo assignment request before the general sales. (Li, Bookbinder and Elhedhli, 2012)

In terms of costs and financing airfreight security, there is a difference in opinions. This is mainly because no one really has the intention to overspend. To begin with, governments are obviously under severe budget constraints. Although, operators will argue that they are not able to guaranty the integrity of their cargo when it goes further in the supply chain to be bundled for shipping. In addition, the vast majority of small forwarders do not possess the required amounts of money to make necessary investments in security. On the other hand, each large integrated operator often spends over 50 million euros a year on security. Ground handlers and airline companies claim that they already spend the cost of maintaining and controlling quality certification. Because the independent validator issue remains unclear (who certifies the validator, which are the standards, the price, etc.), the reaction of the different stakeholders is very uncertain. (Domingues, Macário, Pauwels, Van de Voorde, Vanelslander and Vieira, 2014)

It is important to mention ground handling costs with reference to the cost of freight transportation by aircraft. The activities that are related to freight handling are integrated or act as an integral part of airfreight supply chain. Apart from freight handling, such chain has different stages that depend on various actors involved in it. The so-called freight-forwarder is extremely important in the chain: it is responsible for door-to-door shipment of items from the point of sending to the point of receiving. Freight-forwarder plays a role of an agent in the



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relationship with air carrier, usually the airline and reserves a spot for a particular shipment, quite often together with other orders. (Janic, 2015)

The handling of air freight usually is divided to three following activities:

- Warehouse handling: collecting of freight for export flows, distribution of freight among the forwarding agents for import flows, building up and breaking down of pallets in the handling warehouse.
- Ramp transport: transportation of freight from the warehouse to the aircraft and vice versa
- Ramp handling: loading and unloading the aircraft (Burghouwt, Poort, Ritsema, 2014)

In respect to security, all experts agreed that 100% screening is not feasible, and therefore a risk-based approach is in order. This is consistent with both political strategic goals for strengthening air cargo security and the recommended policy package for the basis of a risk-based approach that proactively adapts security procedures to threat and risk levels. This, in turn, relates directly to the need of one harmonized air cargo security regulatory framework (Macário, Vieira, Mano, van Renssen, Van de Voorde, Pauwels, Domingues, Dawkins, Todd, 2012). Furthermore, intermodality is a feature of a transportation network in which more than one types of transport are used in order to organize a door-to-door delivery. Moreover, multimodality can be a characteristic of to what extent the transportation network is integrated. In that sense, higher level of intermodality results in higher integration and interconnection amongst modes and a more effective transportation network in general. (Reis, Fabian, Pace, and Palacin, 2013)

Intermodal cargo transportation service includes a number of integrated cargo players. The first one is called a Freight Forwarder, which is a company that operates with different agents in order to use every party involved fully, and enhance the overall efficiency of the transportation network. Those companies are extremely important in terms of generating synergies, which increase the total effectiveness and decrease unnecessary activities. Therefore, it is possible to say that the overall productivity is more than just a simple adding up the result every single player in the market. Speaking about multimodal transport, it is made of various single and nonintegrated transport operations and thus, the overall productivity is just a result of the simple adding up of different independent transportation operations. (Azzam, Klingauf, and Zock, 2013).

Calling upon the freight forwarders, it should be noted that they all are not equally skilled.

Different freight forwarders follow different processes of intermodal cargo transportation services and as such, they are likely to obtain different performances from the same set of dual systems. The air transport industry is going through a paradigm shift, due to the disintegration of the concept of modal superiority of the sector (Macário, 2011).

Typically regarded as independent nodes of the transport network airports benefit from a monopolistic market positioning, which allows them to keep their attractiveness even if they don't have a connection to the overall transport network. However, this reality is changing significantly and nowadays the interaction between transport modes is more intensive than what it was in the past, which has led to the concept of transport integration, co-modality and intermodality. Airports are no longer exceptions, being now important multi-modal interchanges and central nodes in the network. (Reis, *et al.*, 2013)

Air- and land-based connectivity is a necessary condition for the success of airports and the development of an airport city and other similar concepts. Although not all airports have embraced the concept of airport city, they all have been affected by the liberalization and deregulation phenomena and consequently, have changed their business model. The following picture depicts the evolution of airport business models over the last few decades. (Allroggen&Malina, 2014) Over time, airports have reduced their dependency on the aviation business and progressively increased the amount of non-aviation activity (such as: retailing, conference centers, amusement parks, business centers, etc.), in particular in the landside of the airport (from over 95% in the 1970s down to 30% currently). Thus, current airport business models are based on the generation of traffic, showing that the profitability of airports does not necessarily depend on the quantity of passengers, but rather the number



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of people that use the airport for any reason (for example, as a transfer between land-based modes of transport). (Macário, *et al* 2011).

Nowadays, an airport's economic development depends largely on the capacity to induce air- and land-based traffic to feed their non-aviation business. Consequently, in the current context fundamental conditions for the success of airports include (air- and land-based) connectivity, integration with the modal transport networks or the existence of co-modal services. (Lehner, 2013) The advance of high-speed railroads (HSR) brought major change to the dynamics of competition and cooperation with air transport. Until that moment, air transport ruled was undoubtedly the preferred mode of transport for longer distances; however, the situation completely changed with the construction of the first HSR routes. The reductions on the transport time on well-known rail routes can go up to 65%. Such reductions in time changed the transport paradigm and many passengers shifted from air to rail transport. (Reis, *et al.*, 2013)

Another key aspect of freight transportation and logistics in general is sustainable practices. Referring to the past and current small- and medium sized enterprises (SMEs) practices and their endeavors to engage into airfreight supply chain and airfreight network, a set of implications can be drawn to facilitate future-oriented directions of SMEs. The central clue is a need to decide where to compete and how to compete, it is an external view. On the one hand, SMEs need to clarify their strategic position in the supply chain and strategic focus. On the other hand, there is a deficit in internal capabilities, trust built up, management skills, team building, understanding of business etc. Again, when recalling the duality of markets and resources. Hence, combination of both perspectives is needed. (Beifert, Laima, and Gunnar, 2013)

The present research argues that SMEs involved into the air cargo forwarding or handling services as well as regional airports as the airfreight operations have to intensify collaboration partners with large and globally operating enterprises in the air cargo industry. This enables the small businesses, first, a better relationship positioning in the supply chain, since large airfreight forwarders as the first-tier logistics providers have focused on delivering multiple performance based on their competences. In this sense, SMEs could focus on the specific competences and offer differentiated services, thus meeting qualitative requirements of their customers. Through specific and differentiated services SMEs and regional airports are capable to gain a strategic position on the niche air cargo market, which is not fully penetrated by large air cargo forwarders and handling enterprises. In this regard, they could place more focus on building competences in the field of warehousing, airfreight handling and transportation. (Beifert et al., 2013)

Materials and Method.

The study was carried out in Murtala Muhammed International Airport, Lagos state. Lagos State is an African megacity which is located in south western Nigeria on the West Coast of Africa, within latitudes 6° 23'N and 6° 41'N and longitudes 2° 42'E and 3° 42'E. The State is flanked from the north and east by Ogun State, in the west by the Republic of Benin and the south by the Atlantic Ocean and Gulf of Guinea. The total landmass of the State is about 3,345 square kilometres, which is just about 0.4% of the total land area of Nigeria. According to projected population growth studies, it has been forecast that Lagos State population will reach 25 million inhabitants in the next ten years (2012), making the city the third largest in the world. As in 2006, the population of Lagos State was 17.5 million (Iwugo, Arcy & Andoh 2003). And Ikeja is the administrative capital of Lagos and it is a heavy business district and that is where the MMIA is located. Lagos is generally the hub of economic activities in Nigeria and specifically the country's financial, commercial and industrial nerve center with over 2,000 manufacturing firms and over 200 financial institutions (Adeoti and Osotimehin, 2011).

The Murtala Muhammed Airport is situated in Ikeja, Lagos state, Nigeria. It is the largest International airport and the major airport that is serving Lagos and the nation Nigeria. The airport is the busiest and mostly used and of course the commercial hub for regional airlines. It has two terminals known as the domestic and International wings, MMA1 and MMA2. These two terminals are located about one kilometer from each other, and have two runways which they share and it is suitable for small and medium jets, long range jets, regional airliners and large airliners. The cargo terminal is fully equipped to handle cargo flights and various cargoes are



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being received and dispatched from the MMA Lagos. Thereafter, MMA Lagos has been going through a series of development to meet the world standard (Federal Airport Authority of Nigeria 2014). From 2005 to 2007, the aviation industry experienced some growth which the result was that by 2008 passenger movement increased by 21 percent, cargo movement increased by 74.6 per cent and aircraft movement improved by 2.3 percent (Olalerin, 2009).

The study adopted purposive, stratified and simple random sampling technique. Air cargo service companies were purposively selected. Eight (8) quoted air cargo companies were stratified and air freight forwarders of each company were randomly selected in Lagos state. This comprises Bostel Express Logistics Solution Nig.Ltd, Cargoland Nigeria Limited, JaviAviation Support Services, Valvehandlers International Limited, Strategic Aircargo Nigeria Ltd, Medview Airline Limited, Middle East Airline, ziony Cargo. Simple random sampling was used to select number of respondents. The sampling frame was drawn from total selected population. Primary data was used. Data were collected through the aid of interview and questionnaires soliciting information from various respondents. 450 questionnaires were distributed to the respondents and 445 were retrieved (that is 98.9% were found analyzable). However, descriptive analysis was used to analyze collected data.

Relative Importance Index

From existing literature on the factors inhibiting aviation logistics in Nigeria and based on the preliminary investigation conducted at the outset of this study, it was possible to identify certain major factors inhibiting aviation logistics in Nigeria. The twenty-four factors identified were: Increasing fuel prices, security threats, changing inventory strategies, mode shifting, consolidation power, intermodals, inadequate road network, inadequate rail network, warehouse facilities, inadequate infrastructural, limited carrying capacity, weather conditions, costly mode of transport, political relation, uncertainties at airports, custom bottlenecks, choice of airport, difficulty in loading and unloading, O – D (Origin to Destination) demand, airport charges, lack of logistics operators, lack of airport locations, high cost of ground handling, high airport fees. A questionnaire was drawn up based on the 24 identified factors inhibiting aviation cargo logistics and was administered to the respondents (workers of the selected company). The respondents were asked to rank these identify factors inhibiting aviation cargo logistics based on their experience and encounter. The authors adopted a scale of 1–5 for the ranking analysis. To facilitate the analysis of the responses, the following numerical values were assigned to the respondents' ratings (Assaf, Musallami, & Shash, 1996; Ayantoyinbo 2014): 'Always'—5, 'Mostly'—4, 'Sometimes'—3, 'Seldom'—2 and 'Not-All'—1

Relative importance index was used to identify the main factors inhibiting aviation cargo logistics in Nigeria. The five point scale was converted to Relative importance index (R.I.I) for each factors, which is made possible to cross compare the relative importance of each of the factor as perceived by the respondent. The Relative importance index (R.I.I) was formulated using the following statistical expression (Assaf, et al., 1996 and Ayantoyinbo 2014)

$$R.I.I. = \frac{(5n_1 + 4n_2 + 3n_3 + 2n_4 + n_5)}{5N}$$

$$0 \leq (R.I.I.) \leq 1$$

Where:

$$n_1 = \text{Number of Respondent for always}$$

$$n_2 = \text{Number of repondent for mostly}$$

$$n_3 = \text{Number of respondent for sometimes}$$

$$n_4 = \text{Number of respondent for seldom}$$

$$n_5 = \text{Number of respondent for at all}$$

$$N = \text{Total number of respondents for each cause}$$



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Table 4.9: Relative Importance Index of Factors Inhibiting Aviation Cargo Logistics

S/N	Identified Factors Inhibiting Aviation Cargo Logistics	n1	n2	n3	n4	n5	N	R.I.I	Rank
1	High cost of ground handling	336	63	15	7	24	445	0.906	3
2	Limited Carrying Capacity	73	76	21	125	35	330	0.616	16
3	Inadequate ground transportation	101	89	123	95	36	444	0.656	12
4	Mode shifting	33	60	87	189	57	426	0.517	24
5	Poor warehouse facilities	246	63	46	60	17	432	0.813	6
6	Choice of airport	97	54	47	195	48	441	0.580	20
7	Poor Intermodals	252	53	56	54	28	443	0.802	7
8	Security threats	244	98	58	27	13	440	0.842	4
9	Costly mode of transport	187	83	68	72	29	439	0.749	9
10	Inadequate airside Infrastructural	232	55	71	53	27	438	0.788	8
11	Uncertainties at airports	107	81	77	134	37	436	0.640	14.5
12	Changing inventory strategies	55	47	124	162	55	443	0.548	23
13	Inadequate road network	268	26	86	30	20	430	0.829	5
14	Custom bottlenecks	323	73	23	18	8	445	0.908	2
15	Inadequate rail network	93	71	87	150	44	445	0.609	18
16	Freight forwarders	56	60	87	174	52	429	0.551	22
17	Lack of logistics operators	91	89	90	78	33	381	0.667	11
18	Lack of tug facilities	89	65	91	137	39	421	0.613	17
19	Lack of airport location	50	74	93	170	50	437	0.556	21
20	Difficulty in loading and unloading	176	76	99	62	32	445	0.736	10
21	O – D demand	74	74	99	155	43	445	0.591	19
22	High airport charges	122	62	106	120	35	445	0.652	13
23	Increasing fuel prices	362	49	29	2	3	445	0.944	1
24	Weather Conditions	83	88	134	94	36	435	0.640	14.5

Source: Data analysis, 2018

Findings and Discussion

The study shows that increase in fuel price (R.I.I = 0.944; Rank = 1) is the most important factors influencing aviation logistics. The implication is that fuel price increases have contributed to a decline in cargo and passenger aviation activity. This decline in activity adversely affected general aviation airports and the logistic services provided at these airports (such as reductions in air freight activities). Custom bottlenecks (R.I.I = 0.908; Rank =2), high cost of ground handling (R.I.I = 0.906; Rank =3) and security treats (R.I.I = 0.842; Rank = 4) were ranked in the second, third and fourth positions. Aviation security threats targeting commercial aviation and air cargo are incessant. From minor to extremely serious, the range of threats and attempted attacks vary on a day to day basis. Moreover, "Bottlenecking at most airports custom bay has caused long air cargo wait times—up to three to four weeks at times—causing demurrage for the freight forwarders or goods owners. Weather conditions imposed greater control on air transport than the land transport. Movement of air crafts requires fine weather and clear skies. It cannot be develop in the area of heavy rainfall or cold climate region. Also, snowfall, rainfall, foggy climate are very harmful for air transport and this could serve as a delay to air cargo logistics operations. As it is very costly mode of transport it is not useful for low value and bulky goods.



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Changing inventory strategies and modal shifting were ranked second to the last and last respectively. The implication of this result was established by Aviation Associations (2014).

Conclusion

The research identified various factors inhibiting aviation cargo logistics with twenty four (24) variables. The findings have shown that for airlines to beat logistics problems, they must ensure that decisions relating to aircraft fuel consumption is given highest value in their considerations. The current operational procedure for air cargo lift should be reviewed to reflect more friendly and flexible rapid aviation logistics. The ground charges based on the findings of this paper, is one of the factors why freight that should be moved by air opted for other mode instead. Again, there is need to address degenerate issues by all the stakeholders: airline service providers, Airport and Regulatory authorities and users of the services.

While attempting to satisfy the enabling air logistics environment, there will be trade-offs. This should be critically looked into in terms of charges by airport authorities, accessibility to airports, facilities for the provision of services to air cargo and other issues raised as factors militating/ inhibiting air cargo logistics in Nigeria.

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