

**STRATEGIC RESPONSES BY KENYAN AIRLINES TO THE CHANGES IN
THE PRICE OF AVIATION FUEL**

**BY
IRUNGU ERIC NDEGWA**

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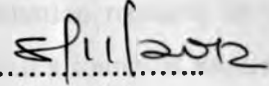
DECLARATION

This research project is my original work and has not been presented for a degree or any other examination in any University.

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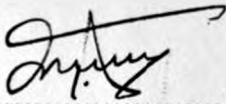
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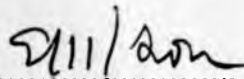
MR. IRUNGU ERIC NDEGWA
D61/61602/2010

This project has been submitted for examination with my approval as University Supervisor

Signed



Date.....



Dr. J. M. MUNYOKI
Senior lecturer, department of business administration
University of Nairobi

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DEDICATION

This study is dedicated to my parents. Thank you for taking me to school the first day and for walking with me since then. Thank you and God bless you abundantly.

ABSTRACT

The study sought to determine the strategic responses by Kenyan airlines to the changes in the price of aviation fuel. It further investigated whether Kenyan airlines had adopted financial and/or non financial strategies, the extent to which these strategies had been implemented and the level of success that they had with these strategies in responses to the changes in the price of aviation fuel. The study was based on a census of the six airlines operating in Kenya.

The respondents of the study were the Finance and Flight Operations managers in the respective airlines. A semi structured questionnaire was applied as the data collection tool which contained a mix of open-ended and closed-ended questions. Data was analyzed through the use of The Statistical Package for Social Sciences (SPSS).

It was observed that Kenyan airlines have adopted a number of strategies in response to the changes in the price of aviation fuel. These have been through fleet management decisions, weight reduction programs and modification of flight operations procedures. It was further observed that these strategies have been applied in differing degrees by the respective airlines with varying degrees of success based on the total savings achieved.

The study suggests further research studies in the area of the air traffic management and different operational practices hold some prospect for reductions in fuel usage or mitigation of environmental effects of aviation.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The aviation industry is critical to the success of the global economy. The industry connects the world to allow people to work together, to travel for pleasure, to become aware of regions outside their home countries and also to provide a means to rapidly carry freight from one part of the world to another. It is anticipated that aviation will continue to grow at 5% per year which means that every 14 or so years, the industry doubles (IATA, 2010).

Changes in prices affect every business either directly or indirectly. The one single unifying factor currently determining the profit or loss for airlines worldwide is the cost of Jet A1 otherwise called aviation fuel which constitutes 30 to 35 per cent of an airline's total cost of operation depending on oil price, aircraft type, age, engine efficiency and the overall management of operations in any particular airline. In general, airlines have such high fuel requirements that fuel is second only to labor as their single largest cost. This has meant that airlines the world over survive or fail on their ability to do two things, by either filling seats or by managing their fuel costs.

In the post credit crunch crisis era, the industry is at a crucial turning point in its history. According to The International Air Transport Association (IATA) never before has the industry been confronted by the current confluence of events. Airlines that are already stressed financially may find it difficult to deal with higher fuel costs and yet keep the price of their tickets competitive. Fierce competition among carriers limits the ability of airlines to raise ticket prices. The result may be fewer domestic seats available and quite possibly fewer domestic flights available according to some aviation analysts who believe the airlines will be flying fewer regional locations because these routes just are no longer economical.

1.1.1 The concept of strategy

According to Andrews corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal

policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers, and communities. Further, Mintzberg (1994) argues that strategy emerges over time as intentions collide with and accommodate a changing reality. Thus, one might start with a perspective and conclude that it calls for a certain position, which is to be achieved by way of a carefully crafted plan, with the eventual outcome and strategy reflected in a pattern evident in decisions and actions over time. This pattern in decisions and actions defines what Mintzberg called "realized" or emergent strategy.

1.1.2 Strategic responses

Strategic management emphasizes on monitoring and evaluation of external opportunities and threats in light of a corporation's strengths and weaknesses. This indicates that the environment is constantly changing and so it is imperative that an organization has to constantly adapt its activities to reflect the new environmental requirements. Having a strategy enables management to ensure that the day-to-day decisions fit in with the long-term interest of an organization. Without a strategy, decisions made today would have a negative impact on future results (Thompson, 1993). The major task of managers is to ensure survival of the companies they manage. In order to achieve success, the companies have to adequately adjust to meet environmental challenges. Failure to do this will cause the companies to experience a big strategic problem. Strategy is a tool which offers significant help that enable the firm cope with turbulent environment facing the firm (Johnson and Scholes, 2002).

In reaction to increasing fuel prices, there are two broad types of response airlines might make: increase the fuel efficiency of operations by adopting procedural and technical modifications and developments or minimize the impact in financial terms by adopting strategies such as fuel hedging to manage the risk of hikes in fuel price, and the imposition of fuel surcharges on passengers.

Although the two responses are not mutually exclusive, the financial approach is geared more towards short-term fluctuations in fuel price. Fuel hedging buys a

measure of stability in volatile markets, but would have little or no positive effect in stable markets of high fuel price. Fuel surcharges are effective only up to a certain level, beyond which increasing ticket prices would begin to stifle demand and therefore become counter-productive.

1.1.3 Fuel as an airline cost component

The airline industry is a service industry with a low level of profitability because it is labor, capital, and technology intensive. It is also affected by external environmental changes as well as internal operations. Among other things, jet fuel is a major component of commercial airlines' operational costs (Rao, 1999; Adams, 1997; Berrittella, La Franca, & Zito, 2009). Therefore, airline companies must always exercise cost control, especially after having experienced the extreme crude oil price increases and deadly financial crisis in 2008.

According to International Air Transport Association (IATA) statistics, in 2008 the global airline industry's fuel bill in 2008 grew somewhere between \$31 and \$165 billion, and lost about \$16.8 billion, which accounted for 31% of operating expenses at \$99/barrel Brent of oil. Thus, reducing fuel expense continues to top the agenda of the airline industry (IATA, 2008).

Further, Holloway (2003) illustrated that the fuel cost was among variable direct operating costs and he also pointed out that one of the fuel cost drivers was the age and the fuel efficiency of a particular carrier's fleet. In a study of fuel consumption, Doganis (1991) demonstrated that the fuel consumption greatly varied depending aircraft weight, cruise altitude amongst other technical variables. He further classified the labor and fuel costs as direct operation costs where labor is the first major cost and the fuel is the second major one. Berrittella et al. (2009) argued that the fuel cost relied on the weight and distance flown.

The discount airlines have been able to keep flights full in order to order to cover costs and keep prices low, but are hurt in quarterly earnings every time fuel prices increase in contrast to other non-discount carriers. Take for example, Kenya Airways

(KQ) which in the financial year 2010/11 achieved an annual turnover of KES 85 Billion resulting in a net profit of KES 3.5 Billion. In the same reporting period, KQ incurred KES 25 Billion in fuel costs which accounted for 31% of its direct operating costs.

1.1.4 The airline industry in Kenya

As at 31st December 2011, the domestic airline industry in Kenya had approximately 6 scheduled service passenger airlines and 33 chartered air operators including cargo carriers. The economic contribution of air transport is essential in Kenya, in view of three factors: the growth of foreign investment and international trade; the importance of tourism as one of Kenya's major industries; and the development of export oriented farming (fresh produce and cut flowers) that generates high volumes of cargo traffic and injection of much needed foreign exchange in the economy.

The development of Kenya's air transport is faced with a number of challenges including, the success of the liberalization introduced by the Yamoussoukro Decision which resulted in consolidation of the continent's air transport industry and introduction of strong competition from global carriers based outside the region including British Airways and KLM have been the major competitors, but also the recent emergence of Gulf based carriers which include Emirates, Qatar and Etihad appears now as a key factor in the market, especially in view of shifting traffic patterns and expanding traffic to Asia. (Iches, 2005). In addition poor or inadequate infrastructure, high costs of operation which include landing, parking and navigation fees, industry rivalry and reduced purchasing power by potential consumers continue to pose challenges for the Kenyan airline industry. The emergence of low cost carriers (LCCs) in the domestic airline industry has also lead to need to competitive positioning and reposition in order to stem erosion of revenues. For example, the growing threat of LCCs has forced KQ to consider establishing its own LCC to serve regional and domestic destinations (CAPA, 2012).

For the purposes of this study, focus was on the operators of jet engine aircraft operating scheduled passenger and cargo services, for domestic, regional and

international destinations. This is because of the high degree of commonality in terms of aircraft utilized, the similar nature of industry regulation and standards of operating procedures, design of operations and shared source of aviation fuel and fuel delivery systems. In this endeavor, the research further observed airlines operating in and out of Jomo Kenyatta International Airport (JKIA) as a common point of reference for strategies related to actual flight operations which include approach, landing, taxing and take-off procedures. Therefore the study sought to discern the strategic responses of airlines in Kenya to the significant increase in fuel prices in the recent past which are emergent in nature.

1.2 Research Problem

Given this potentially turbulent environment, the key to survival in the airline industry lies in whether an airline is able to clearly anticipate the patterns of change coming, the underlying forces driving these changes, and above all the ability to align its strategies to respond to a changing business and aero-economic environment. There is need to invest in the development of world-class capacity in information gathering, analysis and interpretation so as to facilitate faster but correct business decision-making. This will help enhance ability for rapid response to opportunities, threats and challenges in the market place.

There are numerous studies that have been done in the airline sector. However, researchers have so far focused on either purely financial or non financial strategies. A study by Berglund (2008) identified engineering and cabin, flight operations, ground operations and flight logistics as non financial strategies which could be used by airlines, which entailed aircraft modifications, changes in ground and flight operations and processes. In another study, Morrel and Swan (2006) proposed financial strategies centred on hedging on fuel prices, thereby effectively locking in the price per unit for a fixed future period ranging from six months to three years as a method of addressing commodity price risk, the commodity in this case being jet fuel. There did not appear to be such study that has been conducted on the aggregate strategies by Kenyan airlines to the best knowledge of this researcher. This research determined the strategic responses by Kenyan airlines to the changes in the price of aviation fuel. The study was guided by the research question:

What are the strategic responses by Kenyan airlines to the changes in the price of aviation fuel?

1.3 Research objective

To determine the strategic responses by Kenyan airlines to the changes in the price of aviation fuel.

1.4 Significance of the study

The airline operators will use the findings of the study to enable them to make better strategic and operational decisions and lobby the industry regulator for acceptance of radical strategies in use elsewhere in the world

The government will use the findings of the study for policy making as they will be able to understand what role it plays in enabling the airline industry realize economic savings on jet fuel through internal industry initiatives.

The academic community will use the findings of the research as basis for further research. This is because findings of the research shall be available for the academic community with recommendation of areas of further research to them.

Other stakeholders such as suppliers can better understand their role and influence in Kenya's airline industry.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter summarizes the information from other researchers who have carried out their research in the same field of study. Specifically it contains review of fuel as an airline cost component, jet fuel cost developments, theoretical review, empirical studies and airline experiences.

2.2 Strategic responses

Porter (2006) contends that every firm competing in an industry has a competitive strategy whether explicit or implicit. This strategy may have been developed explicitly through a planning process or it may have evolved implicitly through the activities of the various functional departments of the firm. Left to its own devices, each functional department will inevitably pursue approaches dictated by its professional orientation and the incentives of those in charge. However, the sum of these departmental approaches rarely equals the best competitive strategy. Porter (2006) further observes that increased attention to formal strategic planning has highlighted questions that have long been of concern to a manager: what is driving competition in my industry, what actions are competitors likely to take, and what is the best way to respond, how will my industry evolve and how can the firm be best positioned to compete in the long run? Competitive strategy is therefore a response initiative by a firm that takes offensive or defensive actions to create a defensible position in an industry and to counter turbulence. The objective is to cope successfully with the competitive industry forces that pose threats in order to remain a head of competitors and thus yield a superior return on the investment for the firm.

Kotter (2008) states that most successful change efforts begin when some individuals or some groups start to look hard at the company's competitive situation, market position, technological trends, and financial performance. They focus on the potential revenue drop when an important patent expires, the five-year trend in declining margins in a core business, or an emerging market that everyone seems to be ignoring. They then find ways to communicate this information broadly and dramatically,

especially with respect to crises, potential crises, or great opportunities that are very timely. Kotter (2008) further argues that this first step is essential because just getting a transformation program started requires the aggressive co-operation of many individuals. Without motivation, people won't help and efforts go nowhere.

According to Daft (2005), if there is one lesson that emerges from the role of change, it is that organization must run fast to keep up with changes taking place all around them. Organizations must modify themselves not just from time to time, but all the time. Most of the successful firms today thrive on change. Jacob (2007) gives a list of several factors that drive the need for change. These include: changing market forces, customer demands for quality and service, the introduction of new technologies by competitors, and people's desire for a greater say in shaping their own and their organization's daily operations and future directions.

On the other hand, according to Thompson & Strickland (2007) and Pearce & Robinson (2007), grand strategies are also called generic corporate strategies and provide basic direction for strategic actions. They are the basis of coordinated and sustained efforts directed towards achieving long-term business objectives. They can also be used to respond to environmental turbulence caused by various factors in firm's environment. They give the following twelve core generic corporate strategies: concentrated growth; market development; innovation; horizontal integration; vertical integration; concentric diversification; conglomerate diversification; turnaround; divestiture; liquidation and bankruptcy.

2.3 Environment and environmental turbulence

Strategic management places a lot of emphasis on the need for firms to understand their operating environment and the various factors that cause environmental turbulence which if not addressed, can have adverse effects on businesses and thus make them lose competitive advantage Porter (2006); Ansoff and McDonnell (2005). The objective of the adjustments is to cushion the firm from any adverse effects and

also to take advantage of opportunities which arise. Different organizations face different degrees of environmental uncertainty. There are some whose environmental uncertainty is very high. It is this element of uncertainty that makes strategic management important because managers do not like uncertainty. They try to eliminate or minimize its impact on their organizations.

According to Pearce and Robinson (2007), the remote environment comprises factors that originate beyond, and usually irrespective of, any firm's operating situation. This comprises economic, social, political, technological and ecological factors. The environment presents firms with opportunities, threats, and constraints, but rarely does a single firm exert any meaningful reciprocal influence. For example, when the economy slows and airline transport starts to decrease, an individual airline like Jetlink is likely to suffer a decline in business, but that airliner success in stimulating airline transport would be unable to reverse the overall decrease in airline transport. The four subsets above are largely responsible for turbulence in a firm's operations.

Ansoff and McDonnell (2005), define turbulence as a continued measure of the changeability and predictability of the firm's environment. The level of turbulence in the environment determines the threats and opportunities. Ansoff and McDonnell (2005), further states that there are five levels of environmental turbulence. They seek to explain complexity in the environment and firm's response. The various levels and inherent conditions/ states are described as repetitive (stable), expanding (slow increase in complexity and therefore slower in response), changing (fast but incrementally), discontinuous (turbulence) or surpriseful (new things emerging and cannot predict).

Some of the responses applicable to each of the above levels as presented by Ansoff and McDonnell (2005) include: The firm rejects change and maintains status quo, The organization becomes more efficient internally and pays little attention to the environment, The firm thus becomes market driven and tries to change to meet the

needs of the customers, change in strategic behavior, engaging in creativity and innovation respectively.

Ansoff and McDonnell (2005), define strategic diagnosis as a systematic approach to determining the changes that have to be made to a firm's strategy and its internal capability in order to assure the firm's success in its future environment. The process must be a pro-active one. They further argue that a firm's performance potential is optimum when the following three conditions are met: aggressiveness of the firm's strategic behavior matches the turbulence of its environment, responsiveness of the firm's capability matches that of its strategy and that the components of the firm's capability must be supportive of one another.

They further observe that firms in most industries today must: continuously survey the environment for signs of future discontinuity and potential surprises, cope with rapid saturation of markets, respond to frequent changes in competitive structure and dynamics, take advantage of opportunities in new growth industries, anticipate threats of invasion of their industry by alien technologies, respond to global competition, adapt to political upheavals, respond to social pressures on the firm and finally, cope with government regulation of business behavior. As a result of these factors, management confronts two key problems including each firm needs to diagnose its unique pattern of future challenges, threats and opportunities and each firm must design and implement its unique response to these challenges.

2.4 Cost drivers and strategic advantage

According to Horngren et al (2000), cost is a resource sacrificed (consumed) or foregone (given up opportunity) to achieve a specific objective. It is usually measured as the monetary amount that must be paid to acquire goods and services.

Harper (2005) further develops this that the organization's managers can predict, with some clarity, how costs will respond to management actions. In other words, it means managers can predict how cost will change, if at all, when they direct the organization to do something differently than it is being done today. To say an

organization understands its costs implies that the managers understand the underlying cause-and-effect relationship between the work of the organization and the costs of the organization. Therefore, a cost driver is a characteristic of an activity or event that causes that activity or event to incur costs and can be more or less under a firm's control

Blocher et al (1999) argues that it is necessary that a company focuses on activities which represent the sources of strategic advantage for it. Most traditional cost management efforts concentrate on operational activities and their traditional drivers costs. These traditional cost management efforts can be relatively easy to initiate, but may be narrow in focus because they seek to manage short-term operational costs and therefore they may not be able to give the company an overall competitive advantage. If competition is intensive, then focusing on operational activities and their cost drivers is necessary but may be insufficient. Therefore, the company should try to focus on structural and executional cost drivers because they can determine the long-term cost structure of an organization. They are used to facilitate strategic and operational decision-making.

According to Cooper and Slagmulder (1997), customers in highly competitive markets expect that each generation of products presents improvements. These improvements may include: improved quality, improved utility or reduced prices. Any of these improvements alone or any combination of them urge a firm to manage its costs to stay profitable. Furthermore, Cooper and Slagmulder (1997) pointed out that highly competitive markets are characterized by low profit margins, low customer loyalty and low first-move advantages. Not only do customers ask for cost management, also the intense competition between well-matched competitors increases the strategic importance of cost management. Cooper (1995) argued that in competitive markets where competitors are frequently technologically equivalent, it becomes increasingly difficult to maintain a sustainable competitive advantage.

2.5 Empirical studies and airline experiences

Several studies have been conducted to try and lower the fuel consumption and effectively, the cost to airlines in their operations. Hedging of oil prices has been seen

as the important activity to minimize the risk that occurs from the increased fuel prices. But hedging is defined by many authors in a different manner.

Smith and Stulz (1985) define hedging as a trading in a particular future, forward or option market. To do this a firm does not need to hold a distinctive cash position in the underlying commodity. Modigliani and Miller (1958) state that risk management is irrelevant to the firm and that shareholders can hedge on their own. They also argue that a company creates value only when they are making good investments which will lead to the increase of operating cash flows. Modigliani & Miller (1958) further argued that hedging can be considered as a zero net present value (NPV) decision. This assumption will require that the markets are efficient and transactions are costless, also the assumptions of Miller and Modigliani (1958) should hold. Under these circumstances a value of hedge will be zero. Because utilizing a hedge is extremely expensive it will make hedging as a negative decision (Nelson et. al. 2005). The existing theories are presuming that hedging itself is not value adding to the firm, instead using of derivatives can be considered value adding by relieving the variety of market imperfections through hedging (Adam & Chitru, 2006).

Faruqee et al (1996) views hedging as the instrument of managing price risk that involves the selling and buying of financial assets whose values are linked with commodity market. James (2003) defines the hedging term as equal and opposite effect in terms of fuel price changes. Kaminski (2004) defines hedging as any market participant who wishes to sell or buy commodity in some future time to manage the uncertainty of the market. Mattus (2005) says that firms using the hedging consider that hedging enables better financial management and planning and it protects the sellers and buyers of the commodity from the uncertain future shock of the market.

Airlines regularly undertake hedging to protect against sudden losses from rising fuel prices. But also lock in fuel prices to also prevent sudden gains from decreasing fuel prices. Therefore airlines hedge fuel to stabilize fuel costs (Morrel and Swan, 2006). Carter et al (2004) demonstrated that an organization can achieve big profits despite severe financial environment turbulence by using good hedging policies.

Non financial strategies are those that involve change in internal operations and related infrastructure. In a study of flight, ground and engineering operations by Berglund (2008), the researcher investigated the methods and configurations used for fuel conservation. This resulted in identification of eight generic strategies. In another study of sector potable water determination by Hoekstra et al (2005), he demonstrated the fuel cost reduction benefits of reducing the quantity of potable water carried onboard aircraft on long-haul flights as a means of reducing the total dead weight aboard the aircraft.

A similar study conducted by Transport for Canada (2008) proposed changes in flight operations. Further, the study summarized the non financial strategies that could be employed by airlines into four major categories which are engineering and cabin, flight operations, ground operations and flight logistics.

2.5 Summary

The chapter has presented strategic responses available to an organization, the environment and environmental turbulence and how it affects an organization, cost drivers and their relationship with competitive advantage. The chapter also examined empirical literature which has dealt with hedging and studies on non financial strategy implementation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter outlines the overall methodology that was used in the study. This includes the research design, population and sample size, data collection methods, research procedures, data analysis and presentation methods.

3.2 Research Design

A survey was selected as it is concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident or trends that are developing (Mugenda and Mugenda, 2003). According to Babbie (1990), it can apply questionnaires or structured interviews for data collection.

3.3 Target population

The population of the study consisted of domestic airlines operating scheduled passenger and cargo services based at Jomo Kenyatta International airport. Since the target population was small in number, the study targeted all the six airlines operating in and out of Jomo Kenyatta International Airport (JKIA) hence a survey was carried out on all the six airlines. (See Appendix I)

3.4 Data collection instruments

Primary data was collected using semi-structured questionnaires distributed to management and staff in airlines in Kenya. The study used questionnaires primarily due to their practicability and applicability to the research problem. The respondents of the questionnaire were senior managers in finance and flight operations departments, specifically Flight Operations and Finance Managers of the respective airlines. The questionnaire contained a mix of open-ended and closed-ended questions. The questionnaire was administered through personal administration by the researcher and also by personal drop off and pick up by the researcher.

3.5 Instrument validity and reliability

Validity was achieved by pre-testing the instrument to be used in order to identify and change any ambiguous, awkward or offensive questions and technique as emphasized by Cooper and Schindler (2003). University research supervisor was also used to ensure that the instrument had the right questions and that these were framed correctly.

Reliability on the other hand refers to a measure of the degree to which research instruments yield consistent results (Mugenda & Mugenda, 2003). In this study, reliability was ensured by pre-testing the questionnaire with a selected sample from one of the airlines. The wording of the questions and ranges for financial values were re-evaluated after testing the questionnaire on KQ finance staff, one of the selected respondents.

3.6 Data Analysis

The researcher used both quantitative and qualitative methods. The data collected was checked for completeness and coded for analysis. Descriptive statistics such as mean scores, cross tabulation, frequencies and variances were used to interpret the quantitative data. Data was analyzed through the aid of an appropriate statistical analysis tool. Content analysis was used to analyze qualitative data. Results from qualitative data are presented in prose form.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents and interprets the findings of the study. The main objective of this study was to investigate the strategic responses by Kenyan airlines to the changes in the price of aviation fuel. This chapter focuses on data analysis, interpretation and presentation. Frequency tables and percentages are adopted in presenting the results of the collected data.

4.2 General information

The study involved the Flight Operations and Finance Managers of the respective airlines. The total fleet for the six airlines was noted to be 56 aircraft, with Boeing aircraft representing 45% of aircraft operated by the airlines. Other types of aircraft constituted Embraer (18%), McDonnell 8/9 (18%), Canadair CRJ (11%), Fokker (5%), and MD 80/82 (4%) of the operators' fleets. There were no airlines with Airbus aircraft in their fleet. The average fuel cost was observed to be 13.3 billion for the target population for the financial year 2011/12.

4.3 Strategic Responses

The selected airlines indicated that they had formulated and implemented various strategic responses which were either financial, non financial or both. Non financial strategies were further categorized into fleet decisions, weight reduction programs and flight operations procedures.

4.3.1 Financial strategies

The respondents were asked to indicate whether their respective airlines engaged in any financial strategies in response to the changes in the price of aviation fuel through use of hedging instruments. Only two airlines, Kenya Airways (KQ) and Jetlink, representing 33% of the population reported to be engaging in fuel hedging practices. Further, these two airlines were 30% and 10% hedged respectively in relation to their annual fuel requirements. Both KQ and Jetlink reported as having had very favorable

results from fuel hedging practices, indicating an average of KSh. 8.5 billion in savings from fuel hedges in the financial year 2010/11.

4.3.2 Fleet decisions

The respondents were asked to indicate the degree to which their airline had factored fuel cost savings in fleet decisions covering aircraft acquisition, maintenance and operation. The results are given in table 4.1.

Table 4.1: Fuel cost savings strategies in relation to fleet decisions

Decision	Mean	Standard deviation
New aircraft acquisition	4.01	0.983
Engine selection/ upgrades	3.89	0.783
Retrofitting of winglets to aircraft	3.44	0.634
Aircraft hull exterior maintenance	3.83	0.839
Aircraft exterior wash	2.13	0.423
Engine core wash programs	3.89	0.823
Use of ground power units (GPU)	3.78	0.632
Adoption of electronic flight bag solutions	3.81	0.827
Weight reduction programs	4.02	0.892

Table 4.1 shows the extent of consideration given to fuel cost savings when making decisions on the above elements by the respective airlines. A five point Likert scale was used to interpret the respondent’s responses. According to the scale, those strategies which were not considered at all were awarded 1 while those which were considered to a very great extent were awarded 5. Within the continuum are 2 for low extent, 3 for moderate extent and 4 for great extent. Mean (weighted average) and standard deviation were used to analyze the data. According to the researcher, those strategies with a mean close to 4.0 were rated as to a very great extent while those with a mean close to 3.0 were rated to a low extent or even not considered at all. On the same note the higher the standard deviation the higher the level of dispersion among the respondents.

From the findings, the respondents indicated that the airlines comprehensively look at fuel cost savings when acquiring new aircraft ($M=4.01$, $SD=0.983$). Kenya Airways (KQ) in its response gave the example of the acquisition of nine Dreamliner aircraft which were selected for their exceptional fuel efficiency as compared to similar aircraft in its class from other manufacturers. Further, the respondents indicated that they also consider the same when selecting engines or upgrading the engines for their aircraft ($M=3.89$, $SD=0.783$). The airlines choice of engines was however further explained as relevant when acquiring brand new aircraft directly from the manufacturers as they will be outfitted with the engines of their choice based on the individual airlines performance requirements which include fuel efficiency. KQ gave an example of choosing General Electric GEnx-1B engines for its new Boeing 787 Dreamliner fleet which are expected to achieve between 15-17% fuel efficiency by delivering significant reduction in fuel burn. The study also established that the airlines considered retrofitting winglets to a medium extent ($M=3.44$, $SD=0.634$). The underlying reason given for the low consideration of this strategy was that airlines were barred from carrying out this modification on leased aircraft by the lease covenants which prohibit such modifications. The associated cost of carrying out and the down time required for such modification was also cited by a number of airlines as the reason for low consideration of this alternative for owned aircraft.

The study also revealed that airlines considered fuel reduction in carrying out aircraft hull exterior maintenance ($M=3.83$, $SD=0.839$). This was done to ensure smooth aerodynamics were maintained and reduction and/or elimination of drag due to discontinuous airflow over the hull due to dents and buckles which reduced fuel efficiency. The respondents also agreed that they took to a low extent aircraft exterior wash considerations on potential fuel cost savings ($M=2.13$, $SD=0.423$). The airlines indicate that they did not perceive there being much benefit for such programs in relation to fuel savings and that this was done with aesthetic considerations rather than fuel economy in mind. Further, from the findings, the respondents agreed to a great extent that they considered fuel savings in adopting engine core wash programs ($M=3.89$, $SD=0.823$), Use of ground power units (GPU) ($M=3.78$, $SD=0.632$), Adoption of electronic flight bag solutions ($M=3.81$, $SD=0.827$) and Weight

reduction programs (M=4.02, SD=0.892). The respondents indicated that engine core wash programs had become part of routine aircraft maintenance as it had been shown that by performing this procedure, carbon buildup is minimized and operating efficiency is maximized thus leading to fuel savings. GPUs were also observed as a popular strategy adopted by the airlines as the utilization of a small external diesel run power unit as a source of power for basic systems which include air conditioning, cabin lighting, basic instruments and flight controls while on the ground made the use of the onboard auxiliary power unit or running one engine unnecessary thus realizing fuel economy. Although electronic flight bag solutions are a new and emerging technology, the respondents further indicated that they had to a high degree factored fuel savings in considering and deploying such solutions in their respective fleets. Such solutions optimized the fuel requirement planning through faster and more accurate generation of performance calculations in addition to weight savings by eliminating paper based manuals and charts which could weigh as much as 36 kilograms. According to the respondents, weight reduction programs were driven by a great extent by fuel savings through various programs which are discussed in more detail in the next section.

4.3.3 Weight reduction programs

The respondents were asked to indicate the degree to which their airline had factored weight reduction in decisions covering aircraft configuration and flight operations. The results are given in table 4.2.

Table 4.2: Weight reduction programs

Weight reduction program	Mean	Standard deviation
Lighter cargo nets	2.65	0.364
Lighter cargo pallets/load devices (ULD)	3.01	0.267
Reduction of potable water onboard	3.89	0.685
Use of lighter catering trolleys	2.96	0.541
Use of lighter catering supplies	2.65	0.497
Onboard magazine Size/quantity	2.73	0.378
Reduced contingency fuel	3.97	0.374
Not carrying a spare wheel/fly away kit	3.78	0.679

Table 4.2 shows the degree to which airlines had carried out weight reduction programs with the objective of achieving savings on fuel costs. From the findings, the respondents indicated that they had to a low degree, opted for lighter cargo nets ($M=2.65$, $SD=0.364$), lighter cargo pallets/load devices (ULDs) ($M=3.01$, $SD=0.267$), use of lighter catering supplies ($M=2.65$, $SD=0.497$), and reduction of onboard magazine size/quantity ($M=2.73$, $SD=0.378$). The reason given for the low degree of implementation of these actions was indicated to be that a four out of the six respondents did not carry palletized cargo because of the size of their aircraft which carry loose cargo in the cargo bay, thereby rendering the use of lighter cargo nets and pallets/ULDs irrelevant. Further, only one airline (KQ) offered full service flights with the other airlines serving snacks onboard, therefore lighter catering supplies and trolleys were not relevant in their case. The study also established that the respondents had to a great degree, implemented programs including reduction of potable water onboard ($M=3.89$, $SD=0.685$), reduced contingency fuel ($M=3.97$, $SD=0.374$) and not carrying a spare wheel/fly away kit ($M=3.78$, $SD=0.679$). This was attributed to the ease and immediate result of implementation of the same as it did not involve any cost outlay, aircraft modification or regulatory approval.

Further, all the respondents indicated that the above programs had yielded positive results meaning fuel savings had been achieved. The respondents indicated that savings achieved were quantified as being between 3 and 5% of the total fuel expense in the financial year 2010/11. Additionally, the respondents unanimously indicated that they give heavy emphasis on the need for fuel conservation practices to flight crew and that they had indeed made changes to flight operations standard operating procedures with the clear objective achieving fuel cost savings.

4.3.4 Flight operations procedures

The respondents were asked to indicate the degree to which their airline had required performance of specific flight operations procedures in decisions covering aircraft configuration and flight operations. The results are given in table 4.3.

Table 4.3: Flight operations standard operating procedures

Procedures	Mean	Standard deviation
Early climb cleanup procedures	3.92	0.633
Idle reverse landing	4.10	0.982
Single engine taxi	4.02	0.892
Continuous descent approach	3.92	0.893
Taxi fuel calibration	2.11	0.927
Alternate airport evaluation	2.01	0.674
Reduced flying speed	3.89	0.823
Reduced flaps on take off	3.78	0.632
Reduced flaps on landing	3.81	0.827

Table 4.3 shows the extent to which the respondents had mandated the above flight operations standard operating procedures. From the findings, the respondents had to a great extent required that early climb cleanup procedures (M=3.92, SD=0.633), idle reverse landing (M=4.10, SD=0.982), single engine taxi (M=4.02, SD=0.892), and continuous descent approach (M=3.92, SD=0.893) procedures. However, the respondents also indicated that they had to a low extent, required implementation of taxi fuel calibration (M=2.11, SD=0.927) and alternate airport evaluation (M=2.01, SD=0.674) procedures.

Early climb cleanup procedures that were utilized by the airlines included early reduction of take off thrust to climb thrust, early stowing of slats and retraction flaps and reduction in climb gradient. Single engine taxi was also used by a large number of airlines since thrust generated by a single engine was deemed sufficient during taxi in to the terminal and taxi out to the runway and used half the amount of fuel as opposed to using both engines at low power. The respondents also indicated that continuous descent approach was used to a great extent in approaches to the runway. However, this was not done consistently due to instruction from air traffic control which directed approaching aircraft to maintain altitudes which made it impractical or otherwise unsafe to carry out this maneuver. Few respondents indicated that they had implemented taxi fuel calibration as they felt that it did not yield any significant savings on fuel to warrant performance of the same. Further, taxi time was considered

as being minimal, thus the fuel burn was only nominal as compared to the total trip fuel requirement.

Alternate airport evaluation was noted as not being a widely used strategy as most of the airlines surveyed served domestic or regional routes which minimized the need for alternate airports. The respondents further indicated that they had to a great extent required that flying speed be kept within normal as recommended by the aircraft manufacturers for the cruise phase of flying as this realized the highest economy on consumption of jet fuel. Further, it was ascertained that reduced flaps on both landing and take off had been implemented by a significant number of respondents as approaches and departures into JKIA were considered stable due to consistent and favorable wind and wind direction.

The respondents also indicated that the aggregate of the performance of the above procedures had indeed yielded savings on the total fuel expense, with 60% of the population assessing the savings to have been between 1 and 3%, while the other 40% indicated savings to between 3 and 5%.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of key data findings, conclusions drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn focused on addressing the purpose of this study which was to determine the strategic responses by Kenyan airlines to the changes in the price of aviation fuel.

5.2 Summary of the findings

The objective of the study was to determine strategic responses by Kenyan airlines to the changes in the price of aviation fuel. The study established that Kenyan airlines have to a high degree formulated and implemented various strategies to mitigate the changes in the price of aviation fuel. These strategies were a mix of both financial and non-financial strategies which broadly fell into three categories including hedging, fleet management and flight operations procedures.

These strategies have in aggregate been successful to varying degrees amongst the individual airlines but have had an overall positive effect. However, few airlines have developed and employed financial strategies, with most airlines depending on non-financial strategies to mitigate against changes in the price of aviation fuel. Further, few airlines have adopted information management systems and technology that may be harnessed to further optimize their operations with the objective of achieving fuel cost savings.

5.3 Conclusions of the study

The study concludes that Kenyan airlines have adopted a number of strategies in response to the changes in the price of aviation fuel. These strategies are both financial and non-financial in nature. On the financial strategies, the study concludes that hedging has generally been effective for the purpose of achieving savings on the cost of aviation fuel for the airlines that practice engage in this strategy, with the outcome recorded as having been very favorable among the respondents.

The study concludes that the airlines have given considerable attention to fuel cost savings when making fleet related decisions such as aircraft acquisition, engine selection and upgrading, aircraft maintenance amongst others. The study also concludes that the airlines have implemented a variety of weight reduction programs, with the most common being reduction of potable water onboard and reduced contingency fuel.

The study further concludes that changes in flight standard operating procedures are the most common strategies adopted, with airlines mandating to a great extent early climb cleanup procedures, idle reverse landing, single engine taxi and continuous descent approach procedures.

5.4 Recommendations

This study makes certain recommendations with both policy implications, as well as suggestions for further research.

5.4.1 Recommendation with policy implications

This study found that only two airlines engaged in fuel hedging practices in the entire population. This research study therefore recommends that more airlines consider engaging in hedging in order to mitigate against unfavorable changes in the price of aviation fuel.

The study also found that few airlines had adopted electronic flight bag solutions and other associated technology. This study therefore recommends that airlines be sensitized on the existence and benefits of this emerging technology for possible adoption and incorporation in their operations.

The study also indicated that there was need to upgrade navigation equipment so as to enable use of technology such as required navigation (RNAV) which would enable more accurate landings and take offs and for approaching aircraft, optimization of cruise altitudes through reduced vertical separation minimum (RVSM) and also re-evaluate the approach and descent paths into Kenyan airports to reduce holding times and patterns according to responses by the airlines on possible areas of improvement. The study therefore recommends that the government through the Kenya Civil

Aviation Authority engage the industry in dialogue on ways of how to adopt the above suggestions.

5.4.2 Recommendation for further studies

From the study and related conclusions, the study recommends further research in the area of utilization and penetration of emerging technology in the airline industry. The study also suggests further research studies in the most optimal approach and descent paths into Kenyan airports which minimize fuel burn and holding time for approaching aircraft.

5.5 Limitations of the study

The study findings cannot be generalized as being representative of the regional, African or global airline industry. This is because the study was specific to Kenyan Airlines which are underlied by the fact that the airline industry in Kenya is considered to be in its growth phase and is not yet fully matured.

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APPENDICES

APPENDIX I: INTRODUCTORY LETTER

Irungu Eric
School of Business
University of Nairobi
P.O Box 30197

Nairobi.

Dear respondent,

I am a post graduate student at University of Nairobi pursuing a course leading to a Masters Degree in Business Administration.

In order to fulfill the degree requirement, I am conducting a survey on "*Strategic responses by Kenyan airlines to the changes in the price of aviation fuel*"

As a manager in your airline, you are kindly requested to be part of this study. This is to kindly request that you accord me a few minutes of your time to fill in a questionnaire herein enclosed.

The information obtained will exclusively be used for academic purposes only and the findings of the study shall upon your request, be made available to you. Thank you in advance for your valued contribution to my academic pursuit

Yours faithfully,

Irungu Eric
MBA Student, University of Nairobi

APPENDIX II: QUESTIONNAIRE FOR AIRLINE MANAGEMENT STAFF

I. GENERAL QUESTIONS

1. What is the name of the airline?

2. How many aircraft are in your fleet?

3. Kindly give a breakdown of the number of aircraft in your fleet as per the individual make below:

Aircraft make (including variants)	Number in fleet				
	5 or Less	6-10	11-15	16-20	21 or more
Boeing (727/737/767/777)					
Airbus (300/310/320/330/340)					
Embraer (170/190)					
Canadair CRJ					
McDonnell (DC8/9)					
MD (80/82)					
Fokker (F28/70/100)					

II. AVIATION FUEL COST CHANGES MITIGATION- FINANCIAL STRATEGIES

1. What was the annual fuel requirement for the financial year 2011/2012 in Kenya Shillings?

- a) Less than 500 million
- b) Between 500 and 999 million
- c) Between 1 and 5 billion
- d) Between 5 and 10 billion
- e) Over 10 billion

2. Does your airline engage in fuel hedging?

- a) Yes
- b) No

3. If yes, to what percentage of your annual fuel requirement is the airline hedged?

- a) Less than 10%
- b) Between 11 and 25%
- c) Between 26 and 40 %
- d) Over 40%
- e) Not applicable

4. Has fuel hedging had an effect on the overall exposure to changes in the cost of fuel in the past financial year?

- a) Yes
- b) No
- c) Not applicable

5. On a scale of 1 to 5, with 1 being unfavorable (No cost savings achieved) and 5 being favorable (Cost savings achieved), to what extent has hedging been successful in your airline?

Very unfavorable					very favorable
1	2	3	4	5	

6. How much would you describe as having been saved through fuel hedging strategy in the past financial year? (in KSh. millions)

- a) Less than 100
- b) Between 100 and 250
- c) Between 251 and 500
- d) 501 and above
- e) Not applicable

III. AVIATION FUEL COST SAVING STRATEGIES- NON FINANCIAL STRATEGIES

7. Please indicate on a scale of 1 to 5, with 1 being not at all and 5 to a great extent; the degree to which your airline has factored fuel cost savings in the following decisions:

Decision	Extent				
	1	2	3	4	5
New aircraft acquisition					
Engine selection/ upgrades					
Retrofitting of winglets to aircraft					
Aircraft hull exterior maintenance					
Seat replacement/refurbishment					

Decision	Extent				
	1	2	3	4	5
Aircraft exterior wash					
Engine core wash programs					
Use of ground power units (GPU)					
Adoption of electronic flight bag solutions					
Weight reduction programs					

8. Please indicate on a scale of 1 to 5, with 1 being not at all and 5 to a great extent; the degree to which your airline carried out any of the following weight reduction programs

Weight reduction program	Extent				
	1	2	3	4	5
Lighter cargo nets					
Lighter cargo pallets/load devices (ULD)					
Reduction of potable water onboard					
Use of lighter catering trolleys					
Use of lighter catering supplies					
Onboard magazine Size/quantity					
Reduced contingency fuel					
Not carrying a spare wheel/fly away kit					

9. Do you assess the impact on fuel costs as a result of the above decisions as having positive results?

a) Yes b) No

10. How much would you describe as having been saved on the total fuel expense through the above strategies or combination of strategies in the past financial year?

a) Less than 1%
b) Between 1 and 3%
c) Between 3 and 5%
d) Over 5%
e) Negligible

11. How much emphasis is given on need for fuel conservation practices to flight crew?

a) Heavy emphasis b) Moderate c) Light d) None at all

APPENDIX III: SURVEY TARGET POPULATION

- 1. Kenya Airways**
- 2. Jetlink**
- 3. East African Safari**
- 4. African Express Airways**
- 5. Fly540**
- 6. Astral Aviation**