

Evaluation of Sustainable Development in Aviation Industry: A Case Study of Kenya Airways (KQ) and Eldoret International Airport

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Abstract

Sustainable Development is growth that meets the needs of the present without compromising that of the future generations to meet their own (WCED 1987). The deregulation of the aviation industry brought about exponential growth in this sector in developed countries such as USA France and some Asian countries. This growth has spread to Africa and in particular, Kenya. This evolution has however raised concerns on the sustainability of aviation business. This study considered the effect of aviation activities in regards to the triple bottom line (TBL) comprising of economic, social and environmental factors. It aimed to assess the sensitiveness of the aviation stakeholders in regards to the TBL and the strategies which they have adopted to ensure that the aviation sector grows sustainability. The research studied Kenya Airways (KQ), an industry leader in East Africa and Eldoret International Airport (EIA), one of the three international airports in Kenya. The study indicated that employees were not effectively sensitive to Aviation Sustainability hence not doing enough to achieve TBL balance. There also lack of sufficient legal infrastructure to support environmental sustainability.

Keywords: Sustainable development

1. Introduction

1.1 Background of the study

Sustainable development of aviation industry a case study of Kenya Airways (KQ) and Eldoret International Airport (EIA).

1.2 Purpose of study

To examine the how sensitiveness the aviation stakeholders are in regards to sustainable growth. The study also seeks to assess strategies put in place by aviation players within Kenya in an effort to ensure aviation grows sustainably. To make recommendations for curbing the risk factors at an early point and avoid any current of potential ripple effects

1.3 Objectives of the study:

- To establish out the strategies implemented by KQ to ensure economic, social and environmental growth of the aviation industry.
- To establish whether EIA has implemented strategies to ensure sustainable growth.
- To evaluate the knowledge gap within the aviation industry in regards to sustainability.
- To determine how knowledgeable the manpower in the local aviation industry is about sustainability in the industry and what measure they are enforcing
- To identify risk factors the aviation technologies, procedures, and practices pose to the local/regional environment.
- To establish whether the aviation sector is living up to its fair share of responsibility of its negative impact to the TBL.

1.4 Hypothesis/Research Question

KQ and EIA have done enough to ensure the aviation industry grows in line with TBL.

1.5 Significance of the Study

This research study will be significant to the management of KQ and EIA to establish whether the measures put in place are water tight and establish possible loop holes. The study will be beneficial to the general public enabling them to know the contribution the aviation industry has economically, socially and environmentally. The study would be a reference point for scholars in the future within this field.

1.6 Assumptions of this Study

Aviation/Aerospace technology has adverse effects to the environment. The industry has negative effects economically and socially.

1.7 Limitations of the Study

- i. Difficulty in acquiring security clearance to collect data at EIA and KQ.
- ii. Unwillingness of some respondents during the data collection process due to fear of victimization

2: Literature review

2.1 Introduction

Sustainability is the capacity to endure through renewal, maintenance, sustenance, or nourishment in contrast to durability, the capacity to endure through unchanging resistance to change.

There are three dimensions of sustainability

Environmental Sustainability

Economic Sustainability

Socio-Cultural Sustainability

Different stakeholders in the aerospace industry have channeled their efforts towards ensuring the sustainability of the aerospace industry. These stakeholders are namely:

Governments

Public and Users

Suppliers and Manufacturers

Cargo operators and Airlines

For several days through the summer of 2007, environmental groups gathered outside London's Heathrow Airport to rally against plans for runway expansion. Two months later, a U.S. Air Force C-17 transport took to the skies, its engines running on a coal-based synthetic fuel. These events, one an initiative of environmental and community activists, the other an initial step toward addressing the supply of a strategic military commodity, have differing motives for sure. Yet both highlight the growing attention to sustainability within the aerospace and defense (A&D) industry. For A&D companies, their customers' growing attention to sustainability presents a significant new business opportunity. Engine and airframe suppliers are already working closely with commercial airline customers such as Virgin and Continental to launch bio-fuel pilot programs. Looking further ahead, sustainability will be a key element in their expanding business of providing support services to their commercial and military customers. Effective support services will rest upon A&D companies' ability to provide high asset availability at a reasonable cost. In this regard, sustainable business practices can help to reduce costs, both environmental and economic. (Accenture Research fraternity)

2.2 The Government and Aerospace Sustainability

Governments in the world today are keen on ensuring the sustainability of the aerospace industry. The Aerospace industry constitutes a substantial source of revenue for some governments. These governments are thus keen on the growth of the industry. Whereas these governments view this industry as a key economic asset, they have an overall responsibility to the public which it puts premise on.

2.3 Environmental Sustainability

The Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) have come up with laws banning the use of propeller aircraft in populous areas. The legal cap put in place is to a threshold of 80db. This is to ensure the bio diversity is not harmed by the activities of the aerospace industry. (FAA and EASA supplements)

•**Jet Fuel Conservation:** Industry-wide effort with individual airlines taking continual steps to reduce fuel burn (winglets, operational improvements in the air and on the ground, engine wash, weight reduction, etc.)

•**Recycling:** Recycling throughout operations. Achievements have included one carrier recycling 58% of non-hazardous waste generated in 2009; another carrier implementing a fleet-wide/station-wide commingled recycling program.

•**Energy Efficiency:** Efforts go beyond aircraft fleet to purchase of renewable energy for offices and properties, use of efficient lighting, improved computer power management, among other initiatives (FAA report 2009)

Environmental sustainability involves reducing pollution waste and energy/resource consumption; minimizing or repairing environmental damage (for example, deforestation), controlling the disposal of harmful wastes, using renewable or recyclable materials and designs, reducing greenhouse gas (GHG) emissions and carbon footprint, educating supply chain and customers to support environmental practices and investing in green projects such renewable energy and land reclamation.

The aviation industry contributes to 2% of the world's total pollution (Rio declaration of 1992) The aviation industry adversely affects the ozone layer due to emissions of NO₂ and CO₂ and chlorofluorocarbons (CFCs) during the combustion of the fuel in the engines. This has led to penetration of harmful gases through the Ozone layer consequently rising the cases of cancer world over. These gases also have a greenhouse effect. There has been soaring temperatures leading to melting of ice caps and subsequently the rising of the sea level leading to floods and related effects.

Noise pollution produced by aircraft is another threat to the ecological environment. In the recent past high noise emission by aircraft has led some aircraft being decommissioned. The Concord was decommissioned due to its high emission levels among other reasons such as economic and safety concerns. Although it offered supersonic air travel, its operation was considered unsustainable

The National Environmental Management Authority (NEMA) has put a threshold on acceptable noise levels at airports at 85dbs. This amount is in regards to safety of the biodiversity within the aviation facilities. KQ operates Boeing and Embraer aircraft. These aircraft are propelled by gas turbine jet engines which produce emissions to the upwards of 89db. There are several types of aircraft operating at EIA with diverse engine orientation. Fly540 operates Dash 8s which have turbo prop engines with emission levels of up to 76db. (Heathrow airport report on noise Pollution)

2.4 Economic Sustainability

The International Civil Aviation Organization (ICAO), the United Nations Environmental Program (UNEP) and world governments have come up with a carbon trading policy. Companies which are going green are rewarded by tax cuts. The converse is experienced by other operators as they are subjected to heavy taxation due to their pollutant ways. These efforts by the governments encourage the use of green technology and also spur growth in the economy as more and more green specialists companies come up.

There has been continuous support by the governments worldwide in the development of clean energy. A recent example is the effort of the British government in contracting Solena in development of clean fuel. This is with the support of General Electric.

The US government through the FAA has partnered with industry stakeholders to sensitize the public on the advantages of Air travel. This has gone a long way in ensuring the socio- cultural sustainability of the aerospace industry. The efforts by the government have seen the sustained growth of flights within the country as more and more people embrace the use of air as a means of transport.

The number-one issue for the air cargo industry is the ever-increasing price of fuel. The average cost of a gallon of jet fuel has more than doubled, from 75 cents per gallon in 2001 to \$2.01 in the first seven months of 2006—the equivalent of about \$68 a barrel on average this year. At one point, jet fuel prices reached as high as \$2.50 a gallon. Two years ago, fuel represented approximately 22 percent of direct operating costs for airlines. Today, for most wide body planes, fuel now represents a greater percentage of total operating costs

Fuel price hikes are being driven by a number of factors: increased demand from India, China, and the Third World, insufficient refining capacity in the western hemisphere (which means fuel must be shipped from great distances), political instability in the Middle East and a lack of competition among fuel providers according to Accenture.

KQ incurred a lot of unnecessary losses due to the hedging strategy which the company adopted. The company bought six months' supply of fuel only for the fuel prices to fall by 50%. This rendered the companies air fares uncompetitive since other airlines who did not hedge during that period offered fairer price according to (KQ operations Supplement)

KQ has been on the receiving end of the economic downturn, as recently envisaged by their managements move to down size their operations. The move to cut back on their wage bill made economic sense but it obviously had a negative effect on TBL. The company ensured its survival at the expense of innocent workers who lost gainful employment.

2.5 Social Sustainability

The social dimension of sustainability relates to fair trading and beneficial business practices towards labor, the community and the regions in or with which a company conducts its business. A TBL organization seeks to benefit many constituencies, and not to exploit or endanger them.

Social cultural factors include: demographics character characteristics and trends; cultural norms, values and customs; lifestyle and fashion trends (green consumerism) and human resource management.

KQ laid off 546 of its workers in August 2012 citing economic sustainability as a reason for downsizing. Although the action had economic footing, it was not socially sustainable. The workers who lost their jobs could no longer pay for their children education. They could no longer enjoy the company's medical cover thus their lives were hanging on the balance. This also had an effect on consumer confidence due to the recent trend off ethical consumerism. The move was deemed as unethical by the public. KQ runs an ab-initio program aimed at training Kenyan nationals to be future pilots.

EIA has embarked on providing metrological services to local farmers within the airport. These services include the forecasting of rain. This enables the community within the environs of the EIA to practice precision farming. The airport staff and management engage the public during barazas to have a feel of challenges the community within the airport face and endeavor to find joint solutions. The airport fraternity supports education within the community and has built classrooms for a local school near the airport.

2.6 Review from previous research

Aviation emissions contribute to the radiative forcing (RF) of climate. Of importance are emissions of carbon dioxide (CO₂), nitrogen oxides (NO_x), aerosols and their precursors (soot and sulphate), and increased cloudiness in the form of persistent linear contrails and induced-cirrus cloudiness.

The recent Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) quantified aviation's RF contribution for 2005 based upon 2000 operations data. Aviation has grown strongly over the past years, despite world-changing events in the early 2000s; the average annual passenger traffic growth rate was 5.3% yr-1 between 2000 and 2007, resulting in an increase of passenger traffic of 38%.

Presented here are updated values of aviation RF for 2005 based upon new operations data that show an increase in traffic of 22.5%, fuel use of 8.4% and total aviation RF of 14% over the period 2000-2005. The lack of physical process models and adequate observational data for aviation-induced cirrus effects limit confidence in quantifying their RF contribution. An examination of a range of future technological options shows that substantive reductions in aviation fuel usage are possible only with the introduction of radical technologies. Incorporation of aviation into an emissions trading system offers the potential for overall (i.e., beyond the aviation sector) CO₂ emissions reductions. Proposals exist for introduction of such a system at a European level, but no agreement has been reached at a global level.

According to Kevin Welsh of Air Transportation Association of America (ATA) there has been an increased interest by airlines in the adoption of TBL. Airlines world over are becoming sensitive to the plea of the shareholders. The remission of taxes to the federal government is at an all-time high. The member airlines have not only dwelled on the economic bottom line but have embraced the social aspect of the business. This they have achieved by making safety of their employees a key consideration as far as the business is concerned. The member airlines have purchased gear e.g. safety boots, harnesses and reflector jackets for their crew members. The member airlines have made charitable contributions to the community. They have also put education as a top priority by paying tuition fees for local disadvantaged children. The environmental agenda has not been left out since member airlines have adopted various strategies: fuel efficiency and emissions reduction, energy efficiency programs, recycling/waste minimization and water conservation efforts.

The research produced the following results. At KQ various strategies have been implementing to ensure that the organization remains sustainable. The Mawingu program which is aimed at ensuring the company increases capacity to meet the demand. Under this plan the company has ordered for 8 Boeing 787 Dreamliners. This aircraft have 50% fuel efficiency than the 777. The Dreamliner also dwarfs its predecessors in endurance. This move has ensured that the company remains both economically and environmentally sustainable. The company also invests heavily on the social welfare of their employees. This they have done by purchasing safety equipment for their crew. KQ also runs an ab initio program which aims at sponsoring brilliant Kenyan students to undertake pilot studies in South Africa.

EIA have made some efforts towards being sustainable. The management's move of developing planting initiative has enabled the planting of more than 500 trees. This has reduced the carbon foot print which is a resultant effect of the airports activities. The fire departments move on not procuring fire extinguishers containing CFCs has helped conserve the environment. EIA has a water conservation strategy which aims at collecting the surface run off water through trenches and stored in underground tanks. The research clearly showed discontentment of workers in regards to social sustainability. The workers complained that the KAA and KCAA weren't doing enough to ensure their safety. They don't provide sufficient safety equipment to the workers.

The data collected showed contrasting efforts at EIA and KQ. It was evident that consistency needed to be there in the aviation industry. This would ensure the sustainability effort would be realized.

CHAPTER 3: METHODOLOGY

3.1 Research Design

The research primarily employed open ended interview-based methods off data collection.

This was mainly because of the flexibility that the method allowed for variable data collection. This interview method allowed enough of discretion on the part of the interviewee as some of the responses might have been controversial thus risking the interviewee's job security. The study adopted the bottom up mesh work type of interviewing. The interviewing process commenced with people on the ground first. These were basically the personnel at the KCAA engineering department followed by the metrology department at the airport. After appropriate consultations, the process proceeded to the personnel at the control tower then cargo handling facility. Clear cut questions had been drafted for each of the departments while still giving room for the interviewees to have an opportunity to exercise their discretion as appropriate. During this stage we managed to collect a substantial amount of data which the researcher analyzed and served as a backbone for the next critical stage of the research. Each department had its own initiatives and reservations on the topic of environmental sustainability of aerospace technologies. A few were a little vague but there was an element of knowledge on the same. After the first stage of the research was completed, a few questions were drafted (based on the responses obtained from the personnel interviewed in the first part of the data collection in the research process) to act as guidelines for interviewing environmental stakeholders mainly NEMA. An interview was secured and executed

with the Eldoret coordinator of NEMA. At NEMA, the questionnaire deliberated on the environmental condition of Kenya in its entirety before refocusing on the specific concern of the effects of the aerospace activities on the environment (social, political and ecological) while accordingly referring to responses received from the employees at KCAA and KAA. The questions included whether there were matters that impeded their watchdog responsibilities and whether their mandate as an organisation was clearly outlined in regards to aviation. There were a number of factors that hindered them from carrying out their duties. The last stage of data collection in Eldoret was an interview with the Airport manager on what efforts the airport and the KAA are making to ensure the growth of the airport remains sustainable.

A questionnaire was designed for the airport manager of EIA based on the responses obtained from the employees and the environmental watch dogs, and based on ICAOs standards and SARP. The interview brought to light a tale of efforts and counter accusations that are shown in the findings.

The second part of the research was carried out at KQ headquarters. The method used to collect data was open ended interviews guided by questionnaires. The data collection process targeted the supply chain department and the operations department. Interview sessions were carried out at the operations department to establish whether there are existing strategies to ensure sustainability is achieved in the organization. The questions were concise in manner with the aim of ensuring the respondents fully comprehend what they were being queried on. The questions posed aimed at establishing the knowledge of staff on sustainability.

The supply chain department was the next target department. The personnel interviewed gave the researcher an in depth look at how sustainable the company buying policy is. The interviewees also shed light on various social and environmental sustainability projects the company is involved in.

Observation was also used as a method of data collection. Observation of KQ's waste disposal culture was conducted on the ground. This involved establishing the ratio of dust bins to workers and the distribution of the same in the organization. The researcher also inspected the flight line and aprons at EIA to establish the pollution effect of the aircraft.

Secondary sources of information were also used as a reference point during the research. These were such as company reports, journals, Cap 394 and ICAO annex 18.

Study Area

Jomo Kenyatta airport is located in Embakasi, a suburb to the south-east of Nairobi county. The airport is situated 15 kilometers from Nairobi's Central Business District, and at the edge of the city's built up area. The Mombasa Highway runs adjacent to the airport, and is the main route of access between Nairobi and the airport; a rail link is planned.

The airport is the main hub of KQ, JetLink Express and Fly540. Jomo Kenyatta airport is served by a single Runway 06/24. Runway 06 is ILS-equipped, and is used for take-offs and landings.

Eldoret Airport, (IATA: EDL, ICAO: HKEL), is located in the city of Eldoret, in Uasin Gishu County, in the southwestern part of Kenya, close to the International border with Uganda. Its location is approximately 11 miles, by road, south of the central business district of Eldoret. This location lies approximately 167 miles, by air, northwest of Jomo Kenyatta International Airport, the largest civilian and military airport in the country.

EIA is a large airport that serves the city of Eldoret and the surrounding communities. Situated at 2,150 meters (7,050 ft) above sea level, the airport has a single asphalt runway that measures 3,475 meters (11,401 ft) in length.

3.3 Population of the Study

The population around KQ on a 3km radius is approximately 50000 people. This is because the area which it's situated is densely populated. The people residing there are mostly workers at the various industries within the area. There are residential homes near the facility which are of 90% permanent and 10% semi-permanent in nature. The surrounding community is of diverse tribal background. The composition of the population in terms of age is as follows:

Youth 60% , Children 30% , Elderly 10%

The ratio of men to women is skewed to the men standing at 2:1 due to the industrial nature of the area. The population around EIA on a 3km radius is approximately 2500 people. The area is an agricultural zone thus sparsely populated. The people within the airport vicinity are mostly farmers. The area has 95% permanent housing while the rest remain in makeshift houses. The community living there is largely Kalenjin with a few Kikuyu. The composition of the population in terms of age is as follows:

Youth 50%, Elderly 30% , Children 20%

The ratio of men to women is finely poised at 1:1

3.4 Sampling procedure and sample size

The researcher chose a sample size of 20 people. The composition is as follows; 1 official from Nema, 3 KCAA metrology officers at EIA, 1 Air Traffic Controller EIA, 2 technical stores officers KQ, 5 technical buyers at KQ Supply chain department, 2 Aeronautical Engineers KQ, 2 large scale farmers who live

around EIA, The airport manager EIA and the procurement manager KQ.

CHAPTER 4: DATA DISCUSSION AND INTERPRETATION

4. Economic Sustainability

The primary objective of any business is to make a profit, this has been the mode of judging a company's performance. The aviation industry has faced various challenges in this regard. The challenges are as follows.

4.1 Skyrocketing Fuel Prices

The number-one issue for the aviation industry is the ever-increasing price of fuel. The average cost of a gallon of jet fuel has more than doubled, from 75 cents per gallon in 2001 to \$2.01 in the first seven months of 2006—the equivalent of about \$68 a barrel on average this year. At one point, jet fuel prices reached as high as \$2.50 a gallon. Two years ago, fuel represented approximately 22 percent of direct operating costs for airlines. Today, for most wide body planes, fuel now represents a greater percentage of total operating costs.

Fuel price hikes are being driven by a number of factors: increased demand from India, China, and the Third World; insufficient refining capacity in the western hemisphere (which means fuel must be shipped from great distances); political instability in the Middle East; and a lack of competition among fuel providers

KQ has tackled this challenge by adopting a fuel hedging program. Their procurement department purchases fuel 6 months in advance. The move is aimed at safeguarding the airline from price fluctuation. The move has numerous advantages but also has its pitfalls. In 2005 the company hedged in anticipation of a high increase in fuel prices only for the converse to occur. This rendered the ticket prices offered by KQ to be on competitive against perennial rivals Emirates and Ethiopian airlines. This led to a sharp decrease in company revenue and thus the company posted dismal profits.

KQ uses heavy braking as opposed to reverse thrust policy. Reverse thrust is the negative thrust generated by the engines of an aircraft to enable braking during landing. Though the method is effective it uses a lot of fuel. The company has preferred to adopt heavy braking to stop the aircraft instead. The cost of purchasing or reworking the brake pads is 60 % less than purchasing the cost of reverse thrust.

4.2 Looming Security Threats

On Aug. 10, 2006, a plot to simultaneously blow up as many as 10 U.S.-bound passenger jets with liquid explosives hidden in carry-on luggage was thwarted with the arrest of 24 suspects in the United Kingdom. British and American authorities immediately instituted tough new passenger security measures.

According to respondents from KQ these acts of terrorism have led to loss of business. The US in particular has issued countless travel advisories to their citizens to desist from travelling to Kenya. The airline estimates that it lost almost 20% of business after the 911 incident. This they say was cause of the trickle-down effect brought about by the incidents effect on world markets.

EIA has also been adversely affected by the security threats. The airports primary business is cargo. The IATA and ICAO have passed laws to ensure water tight inspection of cargo. This move has impacted negatively on the economic bottom line of EIA. This is because the airport has had to procure new screening machines for cargo. The machines are very expensive to acquire leading to KAA and KCAA to dig deeper into their pockets. The new machines also require staff to be retrained on matters pertaining to handling of the machines which is very expensive. This makes the organizations in question to walk a tight rope as far as economic survival entails.

4.3 Revised Inventory Policies

With supply chain risk and the potential for disruptions growing, companies are questioning the wisdom of maintaining lean inventories. Retailers and manufacturers are now deciding to carry more safety stock to cover demand and avoid emergency air freight.

Five years ago, every company was trying to squeeze as much inventory out of the supply chain as possible. But companies that operate with low inventories, and run into supply chain problems, spend a lot on air freight. They now are trying to rein in those large bills. Businesses are also beginning to question the wisdom of offshoring all production to China.

Most manufacturers in the world are opting to manufacture in Europe and South America. The reason behind the shift is that although it's expensive to manufacture in these regions it's near the major markets thus in totality it's cheaper to manufacture there since these locally produced goods are trucked to market, not flown.

This trend has adversely affected KQ's fortunes. The airline operates a cargo wing which runs across Europe Africa and Asia. The cargo wing relies on companies that offshore to China. The recent trend of avoiding offshoring to China has immensely affected the revenues of the cargo wing. KQ has tried to market the advantage of using air freight but it has largely fallen on deaf ears. This has led to suppressed growth of this wing of business.

EIA has not been left out of the fray. The airport mostly relies on cargo business for 60% of its annual revenue. The management of KAA has noticed dwindling returns from the cargo industry. This has been attributed to organizational cost cutting measures of eliminating air freight costs. The EIA management has responded with

lowering landing tariffs to act as an incentive to potential customers but it has proved to be an action in futility. The response from the market has been positive but has not met the threshold

4.4 Mode-shifting (Substitutes)

Higher costs and tougher security requirements are causing companies to re-examine their use of air cargo. In the United States, ground transport is now competitive with air freight up to 1,000 miles. Shippers are increasingly optimizing supply chains to rely on cheaper ground and ocean shipment.

Companies are considering ways to avoid expensive air transport and shift to cheap maritime shipment. A service that takes 10 to 20 days of variability out of the supply chain has a huge effect on inventory levels, cycle times, and product availability. That's the true value of the service. Air freight has always benefited from unforeseen supply chain problems. Almost half of airborne freight from China has been upgraded from ocean because of an emergency. This upgrade may soon be affected by the efficiency and speed of maritime travel. The long lead times are being eliminated and companies such as KQ are feeling the pinch.

This has not only been experienced in the cargo industry only passenger traffic has greatly fallen. The Kenyan market has embraced other modes of travel as alternatives to perennial air dominated routes. This has been brought about by improved infrastructure across the country. Tourist can now take road trips to Mombasa since it has a good road. This has affected the companies plying that route. KQ in particular has been adversely affected by this as the number of passengers plying the coastal routes has decreased.

4.5 Consolidating Power

As with the transportation industry as a whole, air cargo is experiencing a consolidation trend, with large transportation and logistics companies acquiring small freight forwarders.

UPS and DHL are pursuing a one-stop shopping strategy for the customer. In the process, they are buying up freight forwarders in clusters to achieve economies of scale. An indication that this is happening is the Air France-KLM merger—the first consolidation across geographical boundaries.

Restrictions on cross-border ownership and the designation of traffic rights by carrier nationality have prevented further global consolidation. But even if carriers don't merge, there is clearly a trend toward cross-company, cross-continent cooperation among carriers.

This has been envisaged by KQ move to join the Sky team. These alliances are very beneficial to member airlines. They reduce competitive rivalry and minimize customer power. KQ membership ensures that the airline can offer one ticket for destination like the US. This it achieves by entering an agreement with Emirates to split the spoils. KQ flies the passenger to London and Emirates flies the passenger to Washington.

Previously KQ couldn't benefit from the US route since it doesn't have direct flights to the US. The move also allows emergency AOG (Aircraft On Ground) services to be availed to KQ. If KQ is in need of an APU (Auxiliary Power Unit) for an aircraft which is grounded and the part is not available, KQ may get one from a member airline through an exchange order. KQ will pay a daily flat rate to the friendly airline until it returns its own APU into serviceable state and remits the part back borrowed one to the owner. This eliminates the costs of grounding of an aircraft and ensures the part failure has minimal financial impact on KQ

4.6 Environmental Sustainability (ecological)

Environmental sustainability involves making decisions and taking action that are in the interests of protecting the natural world, with particular emphasis on preserving the capability of the environment to support human life. It is an important topic at the present time, as people are realizing the full impact that businesses and individuals can have on the environment.

4.7 Planting of Trees

Estimates of total aviation RF (excluding cirrus) in 2050, using fuel usage growth factors of 2.7 to 3.9 over baseline year 2000, are 3 to 4 times greater than the 2000 value. The IPCC (1999) forecast that global aviation CO₂ emissions could reach 2,300 million tonnes annually (high estimate) by 2050 if left unmitigated. Lee et al's updated study reports the A1 emissions scenario as similar to the upper range IPCC (1999) level. The earth's capacity to absorb anthropogenic CO₂, and therefore the level to which emissions will have to be reduced in the long-term, is around 5,000 million tonnes annually (Stern) - around twice the estimated level for 2050 aviation emissions if left unmitigated.

In response to the above data EIA (KAA) has a tree planting project extending over 600 acre tract of land within the airport. This is with the aim of reducing the effect of the greenhouse gases produced by the facility. The airport management has also established a tree nursery sprawling over 100 acres. These seedlings are meant to support future nurturing of forests. The planting of the trees will go a long way in reducing the effects of the greenhouse gases. The trees reduce the levels of CO₂ in the atmosphere which goes along way reduction of world temperatures.

4.8 Certification

Environmental Impact Assessment, a statutory requirement by the government, was carried out before the opening of EIA. At the time, NEMA had not been gazetted thus KAA had to outsource the process and its

implementation from a foreign body. The facility met the minimum ICAO Environmental requirements. Thus it was given a clean bill of health to start its operations

4.9 Water Initiative

EIA has a water recycling initiative which ensures that all the water used is treated and channeled back into circulation. This they have achieved by leading rain water through drains to a central water holding point where the water is treated and reused.

4.10 Avoidance of Chlorofluorocarbons (CFCs)

CFCs are organic compounds, and contain carbon, fluorine and chlorine atoms. The most notable effect of CFCs on the environment is the depletion of the ozone layer. The ozone layer is essential to most life on Earth, as it shields life forms from a large portion of the ultraviolet (UV) rays from the sun. Depletion of the ozone layer can lead to various problems for humans and other life forms on Earth, which has led to strong regulation being imposed on CFCs.

At the Fire Department all extinguishers are environmental friendly. The department procures only water based extinguishers as opposed to those that have CFCs bases which have adverse effects to the ozone layer. It is also a requirement that the extinguisher meet a certain threshold of environmental standard for it to be procured. Suppliers' products are vetted prior to supplying the facility with products after they meet minimum industry standards.

4.11 Limiting encroachment

The airport has maintained encroachment of human settlements bay by fencing of the boundaries to ensure that the surrounding population are not exposed to noise pollution generated by the facility due to their proximity to the airport. The approach of the airport also is also sparsely populated thus limiting the noise exposure to the settlement in the vicinity of the airport.

4.12 Garbage Collection Initiatives

The airport has outsourced the garbage collection process. Before settling on one garbage collection company, KAA ensured that the methods of disposal practiced by the company have been deemed plausible by NEMA. The dumpsite was visited by the NEMA officials and once they were satisfied the tender was allocated to them by management of the airport.

4.13 Green Technology

The KCAA engineering department has ensured that the transmitters/transceivers used at the airport have met the set ICAO environmental stipulated standard of emission. This compromise has ensured safe adoption of aerospace communication technologies while having a keen eye for environmental conservation.

The EIA airport has made a huge step towards energy conservation by installing light emitting diodes (LED) runway lights. These lights have low emissions and are great energy conservers. They are also highly effective and also improve night vision to the pilots during landing as opposed to the traditional filament based lighting systems.

4.14 Environmental Legal Challenges

NEMA which is the national environmental watchdog has been rendered toothless in implementing its environmental conservation mandate. The body lacks the ability to prosecute environmental offenders and particularly in aviation circles. This lack of ability to prosecute has been brought about with the lack of supporting legislature to put the offenders to task. It was evident that there was no clear environmental obligation by aviation sector to NEMA. Thus it was envisaged that airports and airlines were not in NEMA jurisdiction. This raises eyebrows as to who should check the aviation/aerospace sectors environmental compliance.

4.15 Carbon Off-setting program

KQ launched its Carbon Offset Program that offers customers the opportunity to offset the Carbon dioxide (CO₂) emissions related to their flights. The program has been developed in cooperation with International Air Transport Association-IATA.

The Nobel Prize winning, Intergovernmental Panel on Climate Change (IPCC) indicates that aviation contributes around 2% of man-made carbon dioxide (CO₂) emissions. The carbon emissions have been known to contribute to climate change including global warming.

By Offsetting Carbon, one will contribute to the global efforts for reducing further air emissions and cleaning the environment hence help in meeting the challenge of climate change. KQ's Carbon Offset Program is QAS Approved. The inbuilt IATA carbon calculator is based on the ICAO methodology and enhanced with real airline data, using actual fuel burn, travel class, taking into consideration the load factor and weight for passengers and belly cargo for a given city pair. The calculator informs the passenger of the actual distance of the flight in question and calculates the level of emissions created by that flight per person. Furthermore, the passenger is being informed of the financial contribution devoted to environmental sustainability projects; this contribution is VOLUNTARY.

KQ collects carbon offset contributions on behalf of Passengers to be invested in high quality environmental projects that were identified to have a socio-economic impact and reduce carbon emission in developing countries.

The IATA Carbon Offset Program invests in UN-Approved Certified Emissions Reductions- CER projects and high quality VER projects generating high quality carbon credits. KQ will support projects within developing countries in line with the UN's Cleaner Development Mechanisms-CDM

4.16 Social Sustainability

Social sustainability is growth that considers the welfare of the surrounding communities and ensures the business affects the community and workers in positive way.

4.17 Education

As part of its commitment to Corporate Social Responsibility, KQ has donated desks to Iloirero Primary school within Amboseli National Park in Kajiado District. The primary school which is located within the Eselenkei group ranch received 70 desks at a cost of Ksh 215,000 from the airline.

The school is located next to the Selenkay Conservancy run by the Gamewatchers Safaris and has a population of 350 students, 74 of whom are in nursery while the rest in primary. It has 6 built up classrooms to accommodate the students.

KQ has identified education as a means of promoting sustainable growth in the continent of Africa and for this reason we are giving back to the community across Africa by investing in education infrastructure, which is key to poverty reduction. KQ is committed to improving education facilities to aid in the creation of a conducive learning environment.

KQ provided support to a school for children with special needs, by building a dining hall for them as part of its CSR initiatives. The school, located in Chuka, Eastern Kenya, is known as the Ikuu Special School for children with autistic and mentally disabilities.

Zambia - KQ partnered with the Zambian Ministry of Education to promote the 'Education for All Campaign'. The partnership sponsored Zambian pupils on a trip from Lusaka to Nairobi for an educational exchange program

Furniture- Chairs and desks were donated to Chaua Primary School and Chigodi Primary School in Malawi.

Tractors Donation - KQ donated 14 tractors to Youth Polytechnics across Kenya for use as learning materials for students pursuing motor vehicle related courses.

KQ runs an ab-initio pilot training program. This program is meant to train qualified Kenyan pilots who have met the selection criteria. The program is open to any young Kenya below 24 years who has an aggregate grade point of B+ in KCSE. This ensures free and non-discriminative selection. Those selected are trained in South Africa and successful trainees are given jobs at KQ.

EIA supports adjacent schools with funding to procure desks and chairs for the needy students. The airport has also sponsors various schools within the Kasperet area to build classrooms. This has enabled the schools to increase in capacity. The free primary education had caused an influx of students thus the project has enabled the schools to cope with demand for education from the locals.

4.18 Safety of personnel

KQ has a strict safety policy where each new employee is required to go for mandatory safety training. The safety training aims at impacting safe working behavior. It also informs the employee on emergency response methodology. The training equips the employee with knowledge of work place hazards within the airlines facility and incidences which have previously occurred within the organization. It also sensitizes the employee on reporting protocol. The training program ensures the safety of the employee is guaranteed by informing the new employee on how to be safe.

KQ requires that each and every employee to wears safety gear relative to the employees work environment. This means that if an employee works in the store for example he is required to where safety boots to avoid his feet from getting hurt during work. If an employee is an air frames maintenance engineer then he or she is required to put on safety boots a reflector jacket and a harness during maintenance of the aircraft mainly C-Checks. The company procures the boots for the workers yearly and all other safety equipment which the employees may require.

KQ has equipped each room within its facility with smoke detectors. These detectors have sensors which trigger water extinguishers to run in case of a fire. The sprinkler extinguishers are fixed on the ceiling and connected to water main pipes. This ensures that water does not run out since there is continuous flow of water within KQs facility. These extinguishers are supplemented by portable powder extinguishers with sodium bicarbonate base. These are vital during fires caused by electrical faults.

The KCAA and KAA management has also made considerable efforts towards ensuring the safety of their staff is ensured. The two bodies have purchased reflector jackets for their workers to increase visibility. The fire department also has equipped its officers with advanced firefighting equipment. Though efforts have been made

there were obvious loop holes within the system. It was evident that not all employees had the required safety gear on. This made the researcher to draw following conclusions that either there was in appropriate training of the personnel or the equipment procured weren't enough. It was also clear that the safety culture wasn't engraved in the employees operations within EIA.

At EIA the integration of the safety function within the management of KCAA and KAA was lacking. Thus leading to the organizations disjointed approach to safety. This was however not the same for KQ as there was a safety management hierarchy. The head of safety reported directly to the company's CEO. This has enabled the company to develop a good safety culture within the company.

EIA lacked an incident and accident monitoring system. Thus the organizations (KCAA and KAA) could not track their performance as far as safety is concerned. This evidently put the two organizations on the back foot as far as safety performance is concerned. At KQ there was an elaborate accident and incident reporting system. This system had the capability of generating a daily report on safety to each of employees within KQ. The report is transmitted via the company's intranet.

4.19 CSR policy

Corporate social responsibility covers policies which an organization adopts for the good and wellbeing of stakeholders, taking a more proactive integrity based approach. KQ has an elaborate CSR policy which aims at ensuring all stakeholder interests are observed by the organization. The various areas covered by the companies CSR policy are as follows.

Human rights: this refers to issues such as child labour, working conditions, wages and exploitation. KQ is increasingly aware that it can influence such issues, not just here in Kenya but also in areas of the world from which they source supplies. KQ buyers are aware of the International Labour Organizations four core 'rights' relating to people and work: Freedom of association (recognition of workers' rights to form trade unions); Elimination of slave labour; Elimination of child labour and Elimination of discrimination in employment. KQ buyers do not procure any parts from any supplier who does not adhere to these standards that ensure KQs supply is ethical.

Equal Opportunities have been the subject of legislation in Kenya since 1990s any discrimination on the basis of sex, disability, religion/benefits, sexual orientation and age is forbidden. KQs management has recognized this fact and has made various efforts to ensure this is achieved. The recruitment of employees is done electronically to ensure a freer and fairer selection process. The selection of employees within the organization does not discriminate those with disabilities except for the selection of pilot who must meet the medical requirements of CAP 394 and related ICAO stipulations.

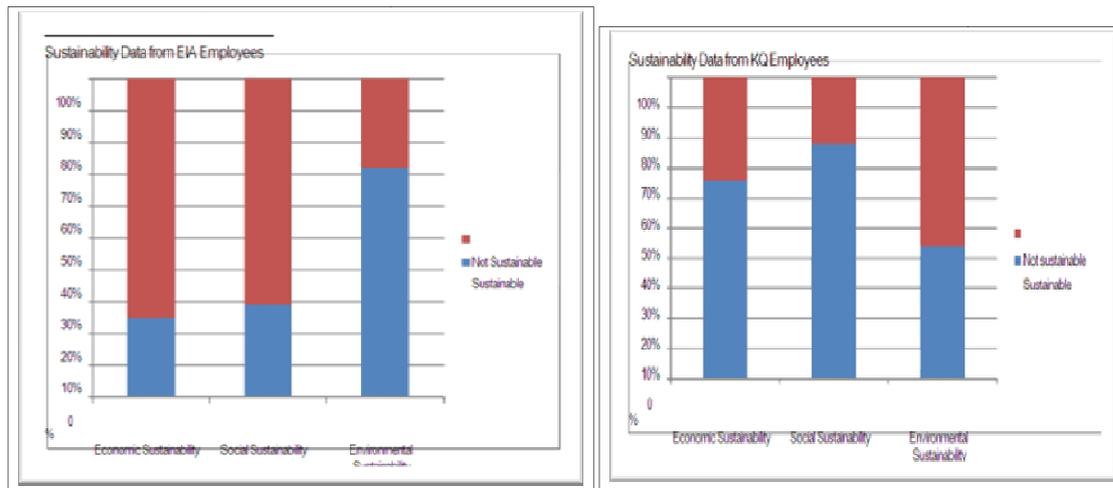
Ethical trading has increasingly come into prominence in recent years. How can organizations reconcile their obligations to shareholders- above all, their obligations to achieve the maximum profit advantage and capital growth- with broader standards of ethical behavior? For example, is it permissible for an organization to keep labour down by exploiting poorly paid workers? These are issues that KQ's management has had to look into over the years for the company to achieve ethical excellence. KQ's management is bent on achieving maximum profits with zero exploitation as the research finding showed. This is largely driven by the stakeholders' stance. Though some KQ stakeholders may hold shares in the company, they do not hold the responsibilities for making profit-maximizing strategies. Free from constraint, they look with repugnance on activities that violate basic human rights. This has led to KQ's key focus on ethical trading.

CHAPTER 5: DATA PRESENTATION AND INTERPRETATION

This research presents its processed data in graphical perspective. This is the method deemed most ideal for vivid presentation of the findings.

5.1 Economic Sustainability

This refers to an organizations ability to remain competitive. A sample from each organization was queried on this analysis. The respondents from EIA were 4 employees within the airport. 1 of the 4 thought the company was economically sustainable while the rest thought the company was economically not sustainable. This represents 25% and 75% response respectively. Of the 9 KQ workers queried on the economical sustainability of the organization, 66.6% thought the company as being economically sustainable while 33.3% thought the converse. The following is a graphical representation of the same.



5.2 Environmental Sustainability

The respondents of EIA environmental sustainability query were 7. 1 NEMA official, 3 KCAA employees, 1 ATC and 2 large scale farmers. Of the respondents, 72% had the view that EIA was Sustainable in regards to the ecological environment while 28% were converse.

KQ respondents were 9 constituting of: 2 Aeronautical Engineers, 2 technical stores employees and 5 technical buyers. 56% respondent that KQ was not doing enough to achieve environmental sustainability while 44% were satisfied with the current efforts undertaken by the company towards ensuring environmental sustainability.

5.3 Social Sustainability

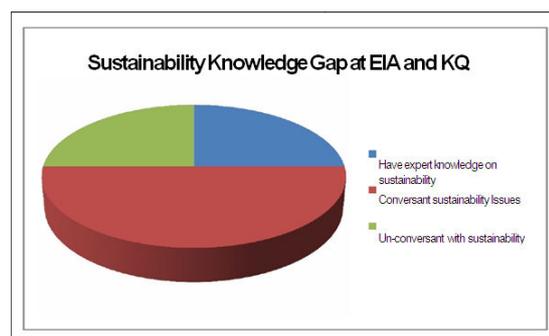
This refers to fair and beneficial business practices toward labour, the community and the regions in or within the area which a company conducts its business. A TBL organization seeks to benefit many constituencies, and not to exploit or endanger them.

The question of whether EIA was doing enough to achieve social sustainability was posed to 7 respondents. 29% of the respondents thought the EIA was doing enough as far as achieving social sustainability is concerned while 71% thought the converse.

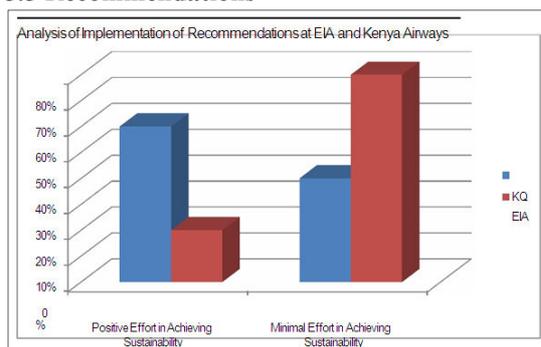
The same question was posed to 9 KQ staff on the company social sustainability state, 78% of whom were satisfied with the company's efforts against 22 %.

5.4 Sustainability Knowledge Gap

One of the key objectives of the research is to establish the sustainability knowledge gap within the community, the EIA and KQ employees. The question was posed to 20 respondents comprising 1 official from Nema, 3 KCAA metrology officers at EIA, 1 Air Traffic Controller EIA, 2 technical stores officers KQ, 5 technical buyers at KQ Supply chain department, 2 Aeronautical Engineers KQ, 2 large scale farmers who live around EIA, The airport manager EIA and the procurement manager KQ. The response was as follows: 25% of the respondents had adequate knowledge of what sustainability entails, 50% of the respondents were familiar with the term but did not have enough knowledge on the same and 25% weren't familiar with the term. Here is graphical representation of the same.



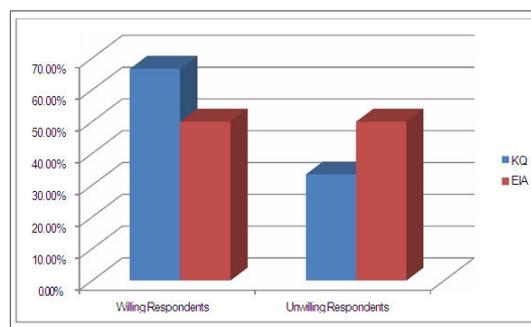
5.5 Recommendations



One of the objectives of the research is to establish whether EIA and KQ have done enough to ensure they achieve the status of being TBL organizations. After an analysis of the organizations efforts to achieve sustainability, follow up interviews were done by the researcher to see whether some of the recommendations made were being implemented by the organizations. The data is as follows: Out for 5 employees queried at EIA 1 thought there was some effort being made after the recommendations were made while 4 thought the situation remained the same. This represented a 20% and 80% response respectively. Out of 5 employees queried at KQ, 3 admitted seeing improvements after the research was carried out and recommendations made while 2 thought the converse. This represented a 60% and 40% response respectively. The following is an analysis of the data

5.6 Willing and Unwilling Respondents

The researcher faced a lot of challenges in getting willing respondents. The following is an analysis of willing against unwilling respondents in both EIA and KQ. In EIA out of 30 people requested for an interview 15 refused. While at KQ out of 30 people requested for an interview 10 declined. The employees at both facilities cited victimization as a reason for declining. The following is a comparison of the two organizations



CHAPTER 6: RECOMMENDATIONS

The aviation industry in Kenya is growing at exponential rate. This growth has brought the question of whether the industry is sustainable. The research which was conducted at EIA and KQ put this to test. The findings of the research showed that both EIA and KQ had made efforts towards being TBL organizations. KQ has initiated carbon offsetting programs, it has supported various school projects within the country, the decision to adopt heavy braking instead of reverse thrust are just but a few strategies to ensure this. EIA has also made steps in ensuring the facility remains sustainable. This the management has achieved by setting up a tree planting initiative. EIA management (KCAA and KAA) have sponsored the building of classrooms for surrounding schools. Despite the efforts by EIA and KQ the researcher recommends the following to further the TBL course.

6.1 Economic and Environmental Sustainability Recommendations

Aircraft are the biggest polluters in the aviation industry. Logically, the bigger they are and the older they are the more they pollute. When aircraft age, their combustion efficiency goes down proportionately thus they become both environmentally and economically unviable. KQ should invest in keeping a lean fleet to ensure they have a low carbon foot print. The lean fleet comes with new fuel efficient engines e.g. the Generation X engines fitted on the Boeing 787.

KQ should invest in clean energy and sustainable fuel projects. With advancement in technology, low emission fuels are being developed and so are the aircraft which support this type of fuel. Though it may incur the company a high initial cost to modernize their fleet, the gains are insurmountable since the cost: profit ratio per flight route decreases ensuring greater profits margins are realized airlines while conserving the environment.

The aviation sector does not function in isolation; it is aided by other players in the economy. The aviation fraternity is pegged with the responsibility of ensuring that all partners adopt its going green policy by ensuring that no tenders are allocated to companies who have poor environmental conservation policy. This is in terms of ethical trading and ethical supply chains. This ensures that there is no customer backlash due to unethical supply

and that environmental conservation is upheld.

The EIA equipment such as runway lights should be low emission and low energy consuming options, for example, the use of Light Emitting Diodes (LED) bulbs for the runway lights. The communication equipment should also be low emission and environmentally viable. These have operation, economic and environmental advantages

6.2 Social Sustainability Recommendations

The aviation industry is constantly growing and any form of growth requires a substantial increase in space, but the population is also growing at an equal rate if not greater. This creates a quagmire of some kind as both entities are fighting for one scarce resource, land. The EIA should ensure that the airport land is fenced to prevent human encroachment. Fencing also checks the level of human exposure to noise pollution and other localized aviation related pollutants.

KQ and EIA should train their worker on sustainability issues. From the research it was noted that there was an evident knowledge gap as far as sustainability is concerned. The training recommended should enable the employee to know his or her role as far as sustainability is concerned. The training should also sensitize the employee on actions that promote TBL. Some employees in the aviation industry are unaware of their due responsibility in regards to environmental conservation. The only way to eradicate this ignorance which may lead to negligence is for the organizations to hold educational field days and other sensitizing campaigns. This is with the aim of educating the employees in sustainable development.

Human rights within EIA and KQ should be upheld. This recommendation was made necessary by the overall feeling of employees that they would be victimized if they participated in the research. The right to speech as provided for by the International Labor Organization should be upheld and other employee rights stated there in

6.3 Other Recommendations

Every establishment needs a watchdog to ensure that everything follows clearly outlined direction. The government of Kenya thought it wise to come up with a body which was to oversee the conservation of our environment that led to the formation of NEMA. The body brought great hope when it was gazetted in 2004. Although NEMA has achieved many landmarks, the study revealed that NEMA has faced major impediments in its effort to implement its mandate and particularly in the aviation sector. The first hindrance was of statutory nature. The legislature which is tasked with the responsibility of synthesizing of laws needs to formulate laws that empower NEMA to prosecute environmental offenders with ease. The study revealed that many environmental violators are not able to be brought to justice due to lack of adequate laws to support their prosecution. This was particularly the case in regards to the aviation sector. Since aviation is a fast growing sector of the economy there is need for the executive to define NEMA's mandate in regards to aviation to weed out any sort of ambiguity.

There should be mandatory NEMA compliance to environmental guidelines by the aviation sector. As per the findings there was no environmental obligation to NEMA by aviation industry. This should change since in order to streamline the environmental conservation efforts, all players in the economy should contribute and the aviation sector is no exception. There should be a renewable compliance certification by NEMA given to aviation facilities and institutions. Such certification will enable and compel the aviation industry to play its role in environmental conservation.

The government should encourage environmental conservation by introducing tax cuts for companies which adopt green technology. Tax cuts can act as good incentives for companies to move more towards adopting more eco-friendly technology and practices. This effort may also motivate small players in the aviation sector who might otherwise find it economically challenging in shifting to use green technology and practices.

The study indicated existence of lack of harmony between KCAA and KAA who should otherwise be working hand in hand. There were cases of open rampant counter accusation and blame games between the two organs. These two bodies work very closely together and therefore it is imperative that harmony exists between them for greater efficiency of both of their services to the industry

6.4 Conclusion

The process of collecting data and getting finds was tedious but very informative undertaking. This stage was instrumental in drawing conclusions on how sustainable the aviation industry is. The findings obtained after careful analysis bore fruit to precise recommendations to EIA and KQ. The research was very successful and achieved its intended purpose. The findings showed that though EIA and KQ had made considerable steps toward achieving TBL, there was still room for improvement. The rapid growth of the industry means that the aviation industry must keep up. The completion for scarce resources is rife. The profit margins must increase but at what cost? Tighter times are yet to come and EIA and KQ need to come up with proper strategies to ensure their sustainability. The ability to view business in Triple Bottom Line could be the secret to realizing the 'economic bottom line'.

The research proposed some strategies to the management of both establishments, which if put into action could mitigate the effects of their previous actions and change the tide of their business.

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- Mr. Peter Wafula, Airport Manager, Eldoret International Airport, Eldoret and Kenya
- Mr. Willian KombeManassa, Air Traffic Controller, Eldoret International Airport, Kenya
- Mr. Festus Chepkwony, Engineering Department, Kenya Civil Aviation Authority, Eldoret

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