INVESTIGATION OF CAPACITY MANAGEMENT STRATEGIES: THE CASE OF KENYA AIRWAYS

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DECLARATION

This Project is my original work and it has not been presented for a degree in this or any other University or Institution of Higher Learning.
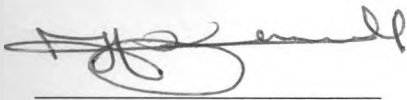
20th October, 2006

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This Project has been submitted for examination with our approval as the MBA Student's Supervisors, in the Department of Management Science, School of Business, University of Nairobi.

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ABSTRACT

The Airline industry is experiencing substantial passengers and cargo growth, outstripping Airline capacity expansion (Bisignan, 2004). This has mainly been attributed by globalization and deregulation of the Airline industry encouraging world trade. The imbalance between the growth and capacity expansion is known to cause delays and sometimes flight cancellations increasing Airport congestions by frustrated travellers. This situation is getting worse, particularly in Africa, where most connections for destinations within Africa have to be made through Europe making these flights very expensive and tiresome.

It was in this realization that Kenya Airways, opted to expand its operations with an aim of being a dominant carrier in Africa while maintaining a large international network via alliances with Nairobi as its hub. Since Airlines tend to fly similar routes with similar services often matching prices (Dimitri *et al*, 2002), Kenya Airways opted to differentiate its operations by replacing its old fleet with 22 dominantly Boeing manufactured aircraft to serve more destinations through Nairobi(Kenya Airways, 2005). It is against this background, that it became necessary to establish Kenya Airways capacity management strategies for this expansion program. The objective was to establish strategies for enhancing operations efficiency at Kenya Airways and consequently challenges in the Airline Industry.

Primary data was collected by way of survey questionnaires forming the basis of this study. Data was analysed by use of descriptive statistics. The survey findings show that 56% of Kenya Airways operations have the right capacity which was achieved mainly by a radical change and benchmarking of its decentralized operations. The Airline placed a deliberate training program which produced flexible work teams to provide services through variable shifts to serve tightly scheduled in-transit flights. These operations are further integrated through Information Technology which provides a platform for a rapidly growing E-Ticketing strategy. The study however, recommends further increase in capacity beyond the current level by addressing some of its shortfalls by hiring and training more technical and flight crew meant to improve the current low level of quality assurance and customer focus while sustaining a high level of safety and efficiency bound to deteriorate with time.

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CHARTS

LIST OF ABBREVIATIONS

AMO	Aircraft Maintenance Organization
AOC	Air Operators Certificate
Doc	Document
EAA	East African Airways
EAC	East African Community
El Al	The National Airline of Israel
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IT	Information Technology
KLM	Dutch Airline
MBA	Master of Business and Administration
MD	McDonnell Douglas, was a major American aerospace manufacturer
SARS	Severe Acute Respiratory Syndrome
SPSS	Statistical Package for Social Sciences
US	United States (of America)

CHAPTER 1:   INTRODUCTION

1.1   Background

The globalization of the worldwide economy, coupled with airline deregulation and trade expansion, has caused a boom in air travel. This rapid growth has not been paralleled by a similar expansion in the national airspace infrastructure, resulting in congestion, delays and widespread frustration. The problem is quickly reaching gridlock proportions and the pressure for solutions is increasing. The solution is seen in the need to increase capacity, but so many complexities, such as limited budgets, and seasonality of passenger travels hinder expansion (Dimitri *et al.*, 2000).

According to Watson (1997), the airline industry has not only brought the rapid growth but also competition in the domestic market which is further complicated by minimal product differentiation and soft brand loyalty. Airlines tend to fly similar routes at similar times with similar equipment and service and often matching prices (Dimitri *et al.*, 2000). The need therefore is for an airline to differentiate its performance in order to have a competitive edge over its competitors (Watson, 1997).

It is in view of the forgoing that Kenya Airways formulated a strategic plan which allowed it to invest and expand its operations. The aim was to be a dominant carrier in Africa with notable presence in Asia, Europe and the Americas, while operating a modern fleet of between 30 to 40 aircraft, in the next 10 to 20 years. Through Northwestern (a KLM partner), Kenya Airways/KLM partnership is to cover several destinations in the US, Europe, Asia and African (Kenya Airways, 2005).

With the progressive implementation of this plan, Kenya Airways has become one of the leading Airlines in the Air Transport Services and the only national carrier in Africa to have been fully privatised. Through its East African Airways (EAA) ancestry, it is also one of the longest-serving and long distance African airlines having been established on 28th January, 1977. This was after the demise of EAA and the break-up of the East African Community (EAC) the same year. Upon its establishment, Kenya Airways progressively replaced its Super VC10, Boeing 707, B707, B757, Fokker 27 and Fokker 50 aircraft with its present fleet of twenty two new aircraft. To keep in pace with the challenging business environment, Kenya Airways re-introduced a cargo division in April 2004 and thereafter, reabsorbed Flamingo Airlines in the year 2005 (Kenya Airways, 2005).

Subsequent to the withdrawal of travel advisories against Kenya, the strong recovery from SARS and cyclic economic growth factors, there has been increased passenger traffic to Kenya, which prompted Kenya Airways to add new aircraft in order to serve its destinations as indicated in Tables 1-T1 and 1-T2 below respectively.

Table 1-1: Kenya Airways fleet operational capacity

| Model | No. | crew | Seats | | Speed | | |
			Economy	Premier	Km/Hr	Range (Feet)	Altitude
B737-700	4	7	100	16	797	4,074	41000
B737-300	5	7	100	16	787	4,074	37000
B737-200	3	6	89	12	720	4,074	35000
B777-200	3	13	294	28	1,040	11,500	35000
B767-300	5	9	196	20	850	11,320	41000
SAAB340	2	3	37	_	523	1,730	25000

Source: Kenya Airways, 2005

Table 1-2: Kenya Airways Destinations

REGION	DESTINATION
Domestic	Kisumu, Lamu, Malindi, Mombasa, Nairobi
Africa	Abidjan, Accra, Addis Ababa, Bamako, Bujumbura, Cairo, Cape Town, Dakar, Dar-Es-Salaam, Djibouti, Douala, Entebbe, Harare, Johannesburg, Khartoum, Kigali, Kinshasa, Lagos, Lilongwe, Lubumbashi, Lusaka, Mahe, Maputo, Seychelles, Yaounde, Zanzibar
Asia (Including Middle East)	Bangkok, Dubai, Hong Kong, Mumbai, Shanghai, Guangzhou
Europe	Amsterdam, Istanbul, London and Paris

Source: Kenya Airways, 2005

1.2 Capacity in the service industry

Lovelock (1992) defines capacity of a service as the highest possible amount of output that may be obtained in a specific period of time with a predefined level of staff, installations and equipment. Capacity defines the firm's competitive boundaries, specifically, the firm's response rate to the market, its cost structure, workforce composition, level of technology, management and staff support requirements, and its general inventory strategy. If capacity is inadequate, a service firm will lose customers or altogether lose its competitive advantage. If capacity is excessive, a company may have to reduce its prices to stimulate demand, underutilize its

workforce, carry excess inventory or seek less productive services to stay in business. This shows that, capacity at all levels will not be constant even for constant demand as it is affected by both external and internal factors which include government regulations, union agreements, supplier capability, service design, personnel and jobs, process flow, equipment capabilities, maintenance, quality control systems and management capabilities among others.

This variability and fluctuations thereof, call for a service with the ability to cope with changes in demand. Failure to cope, caused by bottlenecks in a system, results in an inflexible operation which does not effectively provide the desired service offering. The important issues here are range and response; how far capacity can be altered, how easy it may be changed and what difference in cost and quality implications are encountered at each level of response. In coping with variability, effective and potential capacity is required since they are short term and relate more to team and individual resource levels. Long term increases and decreases in capacity that relate to hub and network system are associated with building new facilities or purchasing additional equipment and recruiting substantially more personnel and are equally worth planning for. These two strategies require that a distinction be made between maximum capacity and optimum capacity of service operations because of the customer's direct interaction with the service facility. In order to do this, the levels of demand ought to be estimated. This can be done by forecasting techniques or by known demand from existing customer orders. Even in these cases, there are still elements of uncertainty caused by the no-show syndrome. While historical trends are helpful in forecasting they do not take account of random effects in the short term, for example the effect of changes in weather (Armistead & Clark, 1990).

1.3   Statement of the Problem

Capacity management problems are caused by, among others, uncertainty of demand often caused by uncertainty of orders and resources required to satisfy these orders. This is so in the airline industry, where business depends on the presence of customers as service is offered (Murdick *et al,* 1990) and strong seasonality in demand (Slack *et al,* 2001). These changes and the ever turbulent business environment have contributed in the continuous shift in fame and fortune in the airline industry. Pioneers and once big brand names such as Pan-Am and British Overseas Airway Corporation (BOAC) have all but gone. However, those airlines that have survived and made considerable success have continued to commit their resources and strategically managed their capacities in order to satisfy their demand requirements. In the 1990s, the *open sky* agreement emerged, in addition to deregulation by most governments with its low

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entry barrier, and allowed many airlines to start up sometimes for only a brief period due to intense international competition (Doganis & Routledge, 2001).

Southwest Airlines has managed to stay in business by providing a superior customer satisfaction that is hassle-free through E-ticketing and Internet check-in for all its flights. By using information technology, the airline provides easier reservations and eensures timely departures and arrivals that is cost effective and at passengers' satisfaction. With this and customer loyalty program, the airline avoids flying empty seats thereby maximizing total net revenue. In addition, Southwest uses Boeing 737 aircraft, through which it gets great discounts from Boeing. It also bundles with credits telephone companies, car rental agencies, hotels, and credit card partners as an extra benefit to its customers. JetBlue Airlines uses similar strategies to those of Southwest Airlines, but in addition offers new planes, leather seats and live satellite TV with DIRECTV programming. United Airlines on the other hand uses bilateral and multilateral alliances to provide its customers with more choices, gainful reservations, and baggage handling to gain a competitive advantage (Freiberg & Freiberg, 1997).

Air Canada, a large-network airline, has a strategy based on creating and operating a large network domestically and internationally via alliances. Air Canada and other large network carriers use an elaborate yield management system to fill-up flights with more price sensitive travellers while not allowing too much "diversion" or "spill" by the high yield business travellers (Freiberg & Freiberg, 1997).

Air Pacific on the other hand increased its competitiveness by having its schedules re-aligned to match its capacity to market demands and is using wide bodied airliners to increase capacity in specific routes. The airline has in addition, improved its flight management by entering into a new code-share agreement with Air Vanuatu, and Canadian Airlines. This has forced them to produced new manuals, adjust flight-time, duty-time limitation schemes and enhance training of its flight crew (Freiberg & Freiberg, 1997).

According to Bisignan (2004), the international passenger traffic growth in 2004 substantially exceeded the expectations for the year, with passenger and cargo growth outstripping capacity expansion. The better-than-expected growth was attributed primarily to improved traffic trends, a strong recovery from the SARS crisis and the impact of cyclical economic growth factors.

For Kenya Airways to survive and record success along its competitors, it has continued to commit its resources and restructure its operations since inception. However, the airline's past

success is no reason for it to rest in its endeavours, especially in a turbulent and rapidly growing industry where the quest for survival and performance improvement is required to gain competitive advantage. In its five year strategic plan, Kenya Airways developed an expansion strategy with the aim of being a dominant carrier in Africa with notable presence in Asia, Europe and America. To keep in pace with its plan, Kenya Airways re-introduced KQ cargo and launched KQ express cargo on its Nairobi-London route, a service expected to reduce cargo delivery time out of Nairobi to two days from four days. In July 2004, Kenya Airways reabsorbed its domestic subsidiary Flamingo Airlines and increased its flights following the withdrawal of travel advisories. With the increased domestic passengers in 2005 by 5% compared to 2004, the airline requires an effective capacity improvement plan to match the resulting increased demand. With this ambitious plan, the airline must manage difficulties that may arise in synchronizing demand and supply failures to which would result lost opportunity to attend to certain customers when demand is higher and incur losses when demand is low from unused capacity (Kenya Airways, 2005).

It is against this background that it was found necessary to explored Kenya Airways operations, from 2004 to 2005, established the capacity expansion strategies in place to match fluctuating customer demands occasioned by their expansion program.

1.4   Objectives of the Study

The objectives of the study were: -

   i)   To establish the capacity management strategies needed to enhance operational efficiency in the airline; and

   ii)   To establish challenges in capacity management in the airline industry.

1.5   Importance of the Study

The study has provided an opportunity with wide implications across a broad spectrum or various individuals and organizations, including Kenya Airways, scholars and practitioners in the industry. It shows a diversity of techniques of capacity management in the Airline industry.

The specific benefits to the various parties include:-

i)   Kenya Airways

   Kenya Airways is in the process of expanding its operations with the aim of being a dominant carrier in Africa with notable presence in Asia, Europe and the Americas.

Findings of this study provide an opportunity to establish capacity management strategies in order to ease demand requirements due to this expansion.

ii) Airline industry

The international air traffic growth has substantially exceeded expectations with passenger and cargo growth outstripping capacity expansion. Hence the findings of this study boost the understanding of the strategies that are used in capacity management and consequently contributing to improvement of similar operations in the Airline industry.

iii) Academia

Capacity management remains a critical area in research, considering that little research work has been done in capacity management in the airline industry. This study therefore, addresses this gap and provides an ample base for future research thereby contributing to the existing literature.

CHAPTER 2:   LITERATURE REVIEW

2.1   Capacity Management

According to Armistead & Clark (1994), Capacity management is the process of planning, analyzing, sizing, and optimizing capacity to satisfy demand in a timely manner and at a reasonable cost. Doganis & Routledge (2002) explains that demand for air services depends on the increasing needs for cargo shipments, business passenger demand, leisure passenger demand, all influenced by a highly seasonal, and often directional macroeconomic activity in the markets which calls a capacity management process which is proactive and responsive to these demands. This is because resources cannot be added after a problem has happened without impacting performance. Armistead & Clark (1994) see capacity management as process with a broad scope that brings together business, service, and resource capacity needs to ensure optimal use of the resources to achieve the required levels of performance. In this regard, the manner in which capacity is managed is influenced by objectives which determine what must be achieved by an operating system structure, which influences what is feasible. Capacity management, therefore, is the most critical and strategic decision area of operations incorporating decisions on how to balance demand and the capability of the service delivery system to satisfy the demand. A service firm's success or failure in the process of balancing quality of service and resource management, expressed in terms of resource productivity, depends on its skill in managing capacity to match demand (Armistead & Clark, 1991).

In order to satisfy demand, service load, capacity task management and capacity leakage are very significant. In addition, the relationship of service capacity levels, its quality level and its methods of resources management should increase capacity (vanLooy *et al.*, 1998). How much to increase capacity depends on the volume and certainty of anticipated demand, growth strategic objectives, customer service, competition, and the cost of expansion. Hence, the highest possible amount of output that may be obtained in a specific period of time with a predefined level of staff, installations and equipment is the capacity of a service firm. A system has capacity if it has at least some of each of the resources which are needed to perform its function (Lovelock, 1992).

The aim, therefore, of capacity management in an airline is to minimize customer waiting time and to avoid idle capacity, with the goal of attending to demand in time and in the most efficient way possible (Adenso-Díaz, *et al*, 2002).

2.2 Capacity Management in the Service Sector

Service firms seek growth of their business units, in their overall market and in their respective market share. This is because the greater the market share in terms of volumes, the greater is the profits for the organization. However, difficulties in increasing capacity bring about greater costs and overstretching present equipment and labour leading to other problems. At the same time insufficient capacity can result in turning down orders which could lead to customer dissatisfaction and the reality of declining demand too. Because of its importance, these firms should integrate business, growth and capacity planning for their own long-term health (Ng, *et al.*, 2001). Most do this by attempting to match capacity levels with their expected demand (Klassen & Rohleder, 2002). Typically, the objective of these firms is to develop a capacity profile that matches demand profile and yet retains its economic viability. Dilworth (1992) and Nahamias (2001) note the need for an optimum choice of capacity that may be a close fit to demand profile by using appropriate forecasting models to arrest seasonal demands problems. In practice, imbalances are managed by managing supply for a fixed demand, or managing demand for a fixed supply. Fitzsimmons and Fitzsimmons (1994), Karmarker (1996) and Sasser (1976) stress the importance of concurrently evaluating capacity and demand strategies.

2.2.1 Problems in Managing Capacity in the Service Sector

Capacity planning would be a lot easier, however, many complications are brought about by insufficient flexibility to change service process as a means of adjusting capacity in order to match demand (Ng *et al.*, 2001) and the Strong seasonality in demand (Slack *et al*, 2001). This is further complicated by the presence of the customer defining personal service specifications, often when the service is actually being offered (Murdick *et al*, 1990) and perishability of service, in that each day a service is not profitably used, it cannot be saved (Thomas, 1978).

In view of these problems, careful management is required while selecting capacity additions. This is because of the impact of changing facility focus and balance among production stages. This will in turn require the degree of flexibility of both the facilities and the workforce whose performance is further complicated by experience specifically when introducing new processes or equipment. One way would be to increase the number of services in parallel with increasing the number of service outlets. This too has challenges on quality of service offering. And further there are the likely effects of different economies, such as economies of scale, diseconomies of scale and economies of scope.

As capacity at a given site increases, there will be economies of scale. Adding sites to a service firm also produces some limited economies of scale. This is because fixed costs are still distributed over a greater volume. Diseconomies of scale are also evident as service firms acquire too many sites and the complexity becomes increasingly unmanageable. Multi-service firms often experience in addition the economies of scope which is related to offering services at a single site. This is less expensive than at separate sites (Fitzgerald *et al*, 1991)

In summary, problems in capacity management emerge from the manner in which forecasting, prioritizing, scheduling, altering bottle-necks, capacity and coping strategies are used (VanLooy *et al.*, 1998). In a sense, capacity management has a considerable impact on the quality of the service perceived by customers (Rhyme, 1988).

2.2.2 Capacity Expansion Techniques in the Service Sector

Capacity expansion requires addition of equipment and/or personnel at current site, duplication of existing services in additional locations, addition of new services at current locations, or a combination of these to meet a growing demand for service. Planning issues can therefore be seen to revolve around the addition of equipment and personnel into a cramped facility and this will affect service delivery. Hence, the need for flexible plant, flexible process, and flexible workers or allow for frequent capacity additions versus external source of capacity and in addition whether this should be done at a single site or at multiple sites (Sasser, *et al*, 1982).

According to Meredith (1992), before deciding on which capacity plans to adopt, firms need to be aware of the consequences of each plan, given the circumstances and consideration of product mix, set-up time, culture, different economies and scope, and demand. Consequently operations managers must understand the composition of their capacity, the degree to which it can be changed, the speed of reaction (Slack et al, 2001), and the costs involved (Heskett, et al., 1990). Therefore, capacity expansion strategies to be adopted will depend on whether the service firm is at the growth stage or maturity stage. Commonly used strategies in a single-site firm with highly volatile demand, include shifting resources, using customer co-production, or appropriately managing full time staff. The ability to shift resources from other tasks to where they are needed can be achieved through commonly cross-trained personnel to fill in positions when needed. A service that has ability to cross train employees to cover for each other when it gets busier will likely schedule fewer staff than a service that is not able to cross train. Cross-trained employees are quite valuable despite their high cost (Klassen & Rohleder, 2002).

The use of customer co-production where a customer does some or all work in a transaction, as with E-ticketing, is a means of self-service to smooth demand whenever demand increases. These additional customers also provide labour to help meet this demand (Sasser, *et al*, 1982).

Having fewer full-time staff is always more profitable as the staff work slightly faster on average but can be more expensive and less flexible to schedule. Having a higher level of staffing is always better than the lower level. Otherwise, hiring too few people may result in overtime or long waits for customers, requiring hiring extra people or renting extra equipment that may result in idle time and/or excess capacity (Klassen & Rohleder, 2002). Some services, however, maintain some idle capacity in order to establish and maintain service quality and a firm's differentiation efforts (Bassett, 1992). For such services, unavailability or waiting for the service is invariably poor service, and requires setting capacity utilization low enough to provide near instant service, or at least, where the level of service is competitive and satisfactory against industry standards. In such cases, excess capacity is deliberately maintained to be employed during peak times (Bassett, 1992; Hope & Muhlemann, 1997). At the same time, insufficient capacity can result in turning down orders leading to customer dissatisfaction and lost customer loyalty.

If a firm decides to grow by adding services to its site, it should manage this in much the same manner as firms at single stage. Service firms that choose multiple sites have additional options for managing demand volatility. This may be by shifting resources between sites to cover peak demands. Despite success of a limited number of firms, those that try to expand in this way often fail because of complexity of managing a large variety of services and eventually become overwhelmed. In other cases, components of a complex service package in one location may simply not be appropriate for customers in others (Sasser, *et al*, 1982).

When a service firm enters rapid growth stage, its sales volume typically increases exponentially. Unfortunately, so does operational complexity of running the firm. This is what Sasser *et al* (1982) refer to as the "Bermuda triangle" of operational complexity, where the difficulty in running the business outstrips the manager's ability to handle it and capacity planning challenges at this stage would require that the firm incorporate fresh ideas into the existing facilities. This may mean upgrading older facilities that near the end of their useful life or remodel the existing facility or processes. Another alternative would mean expanding the existing facilities.

According to Hesting (1997), at mature stage, a service firm has tapped most of its potential market and may have lost much of its original uniqueness. Operational efficiencies become particularly important as competition becomes largely price based.

Hence due to the age of the facilities, capacity issues focus on modifying the service concept. This may be done through modelling, replacing the existing facility or process, and duplicating any changes across the entire system. However, short term strategies can be grouped into controlling, and altering demand strategies. In order to control supply, the use of part-time or seasonal employees with varying work schedules to match capacity to demand is quite common. Many service firms use variable shifts to match daily or weekly demand fluctuations. Further to this, is the need to influence consumer behaviour by offering appointments, differential pricing schemes that serve to increase demand during normally non-peak hours and developing new service packages to utilize idle capacity during off-peak times (Hesting, 1997).

2.2.3 Determining Effective Capacity

To determine effective capacity, the need is to maximize possible output, given product mix, scheduling difficulties, quality and machine maintenance among others. Therefore, relevant factors that determine effective capacity are the size and the provision for expansion for existing operating facilities, the ability of the operations system to produce similar products or services while maintaining the required quality standards. In order to do this, there would be need to separate tasks and activities to be performed by a fully motivated, trained and skilful workers with considerable experience. For efficient and satisfactory service delivery to the customer, operational factors such as appropriate scheduling and acceptable level of stock will be maintained to avoid late deliveries while ensuring satisfactory after service support, inspections and quality control procedures. It is equally important to consider the acceptance level of performance in the face of external forces which include the need to comply with regulatory standards that demand heavy paperwork (Stevenson, 2002).

In general, inadequate planning is a major limiting determinant to effective planning and Armistead & Clark (1991) see the need to balance a firm's operating capacity as one way of solving this problem. They see an operation as internally homogeneous and made up of micro operations with each micro operation being an entity on its own. Many organizations operate below maximum processing capacity, either because of an insufficient demand to completely 'fill' the capacity, or as a deliberate policy to respond quickly, to every new order.

Often, organizations have some parts of their operations below capacity while others at their capacity 'ceiling'. It is the parts at capacity 'ceiling' which are the capacity constraint are causing bottle necks for the whole operation. These parts would have to be improvement to ease bottleneck that constrain the whole operation (Armistead & Clark 1991).

In all situations, it is a good practise to be increasingly aware when the limits to matching demand and effective capacity are being reached, and to take timely action. In order to do this, a firm needs to continually manage its capacity in order to match demand. This indicates the significance of capacity management in operations management and why its success or failure to attain a competitive strategy results in a perceived added value/ price (Armistead & Clark 1991).

2.2.4   Alternative Capacity Improvement Plans

Alternative capacity improvements include increasing resources by use of overtime, adding shifts, "temporary workers" or part-time workers, hiring and sub-contracting, improving the use of resources by staggering shifts, programming appointments, accumulating stock (if feasible), queuing demand, modifying the product by varying prices, carrying out promotions, and not satisfying full demand by not supplying the entire demand (Meredith, 1992).

Gabszewicz & Michel (1991) on the other hand suggest that capacity adjusting methods may be by cross-training employees to perform different tasks. This creates flexibility required to meet peak demands. In addition, an increased customer participation in the service process would increase capacity while reducing demands. Examples of this strategy include various types of self-service and using capacity sharing. Code sharing in the Aviation industry is one such useful strategy in today's practices, however when demand is highly variable, while resource flexibility is low and customer service is important cushioning capacity is a useful strategy.

Sasser (1976) expresses the need to manage difficulties that may arise by attempting to synchronize supply and demand. Failure to synchronize would result in loss in opportunity to attend to certain customers when demand is higher and in the incurrence of losses and higher costs due to lost income when demand is insufficient arising from unused capacity.

Sasser (1976), therefore, suggests the following "pure" options for coping with such variations: -

i)   To ignore fluctuations and keep activity levels constant (level capacity plan);

ii)   To adjust capacity to match fluctuations in demand (chase demand plan); and

iii) To attempt to change demand to fit capacity availability (demand management).

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Level Strategy

Level Strategy is applicable when demand is more visible before the time of use and the firm can effectively tell customers to wait when demand cannot be satisfied, implying that the service is valued by the customers and they are willing to wait (Adenso-Díaz, *et al,*2002).

Chase Strategy

Chase Strategy applies more when customers will not wait long for the service and there is an immediate need to get the process started and taken to a reasonable stage so that customers feel satisfied. Chase demand plan is the opposite of a level capacity plan and it attempts to match capacity closely to the varying levels of forecast demand. This plan is much more difficult to achieve as different numbers of staff, different working hours, and even different amounts of equipment may be necessary in each period. A pure chase demand plan is usually adopted more by operations which cannot store their output, such as customer-processing operations or provisions of perishable products. Chase demand plan avoids wasteful provision of excess staff that occurs with a level capacity plan. Its approach requires capacity be adjusted by some means which include overtime and idle time, varying the size of the workforce, using part-time staff, and sub-contracting among others (Sasser, 1976).

Mixed Plans

These are a mixture of the three "pure" strategies. These plans may be used where each plan is applied only where the advantages strongly outweigh disadvantages. For many firms "pure" approaches do not match their required combined competitive and operational objectives to simultaneously reduce costs and inventory, minimize capital investment, and yet provide a responsive and customer-oriented approach at all times. For this reason, most firms choose to follow a mixture of the three approaches (Slack et al, 2001).

Coping Strategy

According to Armistead & Clark (1991), it is clear that in addition to the two "pure" strategies, there is still need for coping as an additional application because of the strategic short term inability to match effective capacity with demand. This strategy is appropriate for those circumstances which can be characterised by "being busy" or "being slack" while capacity is balanced with demand. Coping fine-tunes the combination of chase and level strategies by improving forecasting capabilities, setting clear service quality targets, clear resource productivity targets, understanding critical and hygiene dimensions of service quality, possible failure points and bottlenecks in the service delivery system (Armistead & Clark, 1991).

It is however worth noting that increasing operations capacity brings benefits, but it also brings greater costs and greater complications. The disadvantage of having excessive capacity in a firm may force the firm to reduce the prices of its services to stimulate demand, underutilize its work force, or seek additionally less profitable products to stay in business. Organizations should therefore integrate business growth and capacity planning for its own long-term health. While maximizing capacity, maximum output is expected to be achieved when productive resources are used to their maximum. This is because utilization of resources may be inefficient. It is therefore equally important to give considerations to operation's best operating level. The reason is because the percentage of capacity utilization minimizes the average unit cost (Slack *et al.,* 2001).

2.3   Capacity Management in the Aviation Industry

Competition, deregulation, governments' refusal to subsidize their loss-making airlines due to their financial concerns and the recognition of the benefits of privatization are forcing airlines to become more effective. This has led to a gradual transfer of ownership of airlines from state to private ownership. As a result, airlines have to appeal to their prospective shareholders by being more efficient and competitive. However, in many parts of the world, airlines continue to face limitations on where they can fly. Despite these, the airline industry has proceeded towards globalization and consolidation through the establishment of alliances and partnerships that link their networks to expand access to their customers. Hundreds of airlines have joined these alliances which range from marketing agreements and code-shares to franchises and equity transfers. Due to these, air travel is one of growing strongly and forecasts are that the number of passengers will double by 2010 and the successful airlines will be those that continue to tackle their costs to improve their products, thereby securing a strong presence in the key world aviation markets (Cameron, 1997).

The major constraint in airline capacity is that adjustment of capacity cannot be made in the short run but requires to be built into facilities to meet peak periods of demand (Voneche, 2000). It is therefore, in view of this, that Armisted & Clark (1991) stress the need to balance capacity of various micro-units of an operations system. For example, an airline may transport passengers to various destinations and also service its own aircraft. Capacity of servicing section, for example, must be capable of releasing aircraft to service for the airline to schedule its operations in its traffic network. For this network to operate efficiently, all its micro operations, including its maintenance section must have the same capacity. Depending on the nature of demand, different parts of an operation in an airline might be pushed to their capacity ceiling and constrain total operations. Unless extra resources are provided to increase capacity of this micro

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operation, it could constrain the whole capacity. Hence, capacity of the network will be limited to the capacity of its slowest link. That is why it is important to balance capacity at various stages of the process to avoid bottlenecks that may force passengers to complain about delays and waiting or being left behind. In order to avoid bottlenecks, an airline may decide to change its capacity with the concerns on the amount, timing, and form of capacity additions. This is because it is easy to add wrong kind of capacity with a big investment. For instance, to increase passenger capacity, an airline may purchase jumbo jets which may turn out to be a poor strategic decision where competitors use smaller jets to increase their frequency. While total capacity may be the same in terms of seats per day, the more frequent flight schedules may provide better customer service flexibility and gain more favour and result in an increased market share. Another strategic error that can be made is to increase only a portion of a service capacity without considering the effect on the other micro-units. An example is where an airline adds more aeroplanes without increasing capacity of its in-flight services, flight operations, ground operations, front office booking capability, to accommodate increased passengers (Voneche, 2000).

2.3.1 Approaches in Airline Capacity Adjustments

According to Smith (2001), the need for capacity planning is therefore significant as it determines the daily flight schedule that will offer the best chance of capturing maximum demand in each market serviced by the airline. This schedule will dictate the number of seats needed in each market to capture the expected demand. The optimal number of aircraft needed to supply the necessary seats in each market are represented by the fleet-type of each aircraft (Boeing 757, MD80, commuter jet) assigned to each flight and the total number of aircraft of each fleet-type. Approaches used in the airline may be through many strategies, some of which are described below.

Cushioning

Airlines often use negative capacity cushioning such as overbooking where customers' bookings exceed airline's capacity in anticipation of customers who fail to turn up last minute (Rothstein, 1971; Shlifer, 1975 and Ng, *et al*, 2001).

Globalization and Consolidation

This is usually through alliances and partnerships between airlines, linking their networks to expand access to their customers. Hundreds of airlines have entered into alliances, ranging from marketing agreements and code-shares to franchises and equity transfers (Cameron, 1997).

Exchanging Future or Alternative Capacity

This frees up existing capacity for customers who are willing to pay more. This "voluntary bumping" increases efficiency in capacity utilization and adds value to passengers (Kimes, 1989).

Capturing the Unused Capacity

This is in an expanded capacity to develop new customers, to develop new channels of distribution. An example is where an airline uses its unused capacity to give free tickets in exchange for the accumulation of miles through a frequent flier programs (Voneche, 2000).

Flexibility in Workforce

Rising costs and the need for flexibility have started changing Human Resources' mindset. Airlines such as Delta Airlines and Aer Lingus have started crew-sharing alliances. United and Lufthansa are leading in establishing overseas crew bases. These are means of shaving costs, but could only be possible with diminishing influence of unions (Cameron, 1997).

Business-to-Business Relations

In the airline business this is through code sharing (Ng, et al., 2001) as the most common type of international airline partnership. It involves one airline selling tickets for another airline's flights under its own airline code. This practice allows airlines to expand their operations, at least on paper, into parts of the world where they cannot afford to establish bases. In conformance to code sharing, a more recent development is the airline alliance, which became prevalent in the 1990s. These alliances act as virtual mergers to get around government restrictions. Groups of airlines such as Star Alliance, oneworld, and SkyTeam coordinate their passenger service programs (such as lounges and frequent flyer programs), offer special interline tickets, and often engage in extensive code sharing. The alliances integrate business combinations, sometimes including cross-equity arrangements, in which products, service standards, schedules, and airport facilities are standardized and combined for higher efficiency. One of the first airlines to start an alliance was KLM, who partnered with Northwest Airlines. Both airlines later entered the SkyTeam alliance after the fusion of KLM and Air France in 2004. Kenya Airways, among other international airlines, is part of this alliance (Doganis & Routledge, 2002).

Price Discounting

This is specifically used to fill capacity during the low periods (Stone, 1990) and methods adjusted depending on demand for particular types of service (Ng, *et al.*, 2001).

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Coping Strategy

This sets clear quality targets, resource productivity targets and understanding bottlenecks in the service delivery (Armisted & Clark).

Automation

It is usually through Smart cards, e-ticketing among others (Hesting, 1997) and is one of the most recent approaches taking over to speed up service delivery by using computers which take less time to fill orders. The reasons are that, services cannot be stored and each customer has different needs and different orders. Also, services may at times tend to have surges of passengers at peak times and this approach allows for planning capacity overload and efficiently produces and schedule required services in a relatively shorter time (Hesting, 1997). Airlines sell their product at different prices. The same seat in the same airplane can fetch different prices depending on when and where it is sold. Generally speaking, the earlier you buy a ticket, the cheaper it is. Moreover, airline seats are time-sensitive and perishable-seats that are not sold at time of departure become "spoiled'.' On the other hand, seats sold too early at discount prices may dilute revenue. In order to prevent late-coming high-yielding passengers from buying low-fare tickets, airlines impose conditions or "limits" on different low-fare tickets depending on a number of factors, including the length of stay, advance purchase (in order to get a discount ticket), Frequent Flyer Membership status (to receive certain special treatment including getting free tickets), Alliance/Code share deals (by entering "alliances" to reduce or avoid competition), Point of sale (allowing the price of an air ticket to differ depending on where it is purchased), Group price (where groups get a discount), and Booking agents' special offers (certain travel agents get special offers from the airline & sell these tickets at a lower price to the passengers) (Yang, 2001).

Bundling

Ng, *et al* (2001) defines bundling as the parcelling of two or more products, and marketing them at a discounted price. One example, in an airline, is where seats are bundled with tours. Pure bundling offers of two or more services at a package price but does not provide the option of purchasing the individual services separately, that is in their unbundled form. Switching from pure components to bundling may result in a potential loss in revenue (Guiltinan, 1987, Venkatesh & Mahajan, 1993). However, employing mixed bundling can circumvent some of these limitations. Mixed bundling provides the customer with both options of whether to purchase services in a bundle or individually (Adams & Yellen, 1976). The motivation for bundling is largely due to the strategic benefits to improve service performance, to increase

demand, to segment markets, to reduce a service firm's selling risk, to cost reduction, and to obscure discounts and to provide better service value. Using part of a firm's capacity for bundling, offers better service value and creates differentiation (Guiltinan, 1987).

Yield Management

When demand fluctuations are intermittent and too short in duration and there exist constraints to scaling capacity up and down firms, the airline, with high fixed capacity and high perishability, will have their profitability largely tied to utilization (Allen, 1988). In order to solve this problem, Belobaba (1989) and Kimes (1989), suggest using Yield Management since it allows airlines to allocate their fixed capacity (seats to various fare categories) in the most profitable manner possible. Yield Management is described by Barth (2002) as a collection of methods used to ensure an operation maximizes its potential to generate profit. It can also be used by Airlines balance the risks of over-booking during quiet times, when demand is unlikely to fill capacity or by heavily selling discounted tickets to agents, and to adjust the availability of different classes of seat to reflect their demand. The number of available seats in each class being upgraded or even reconfigured (Barth, 2002).

According to Ng, *et al.*, (2001), most airlines would be motivated by their product extensions in their quest for exchanging capacity as a means of expanding their capacity. For example, in 1995 Virgin Atlantic Airways signed a code share agreement with Malaysia Airlines, under which Malaysia Airlines increased its number of flights on a congested route from 8 to 14 fights per week and increased their expected revenues by 30 per cent to 40 per cent. In exchange for the right to operate the additional flights, Malaysia Airlines allocates a portion of its increased capacity to Virgin Airways. Although technically 11 flights were to be operated by Malaysia Airlines and three by Virgin, all 14 flights were actually operated by Malaysia Airlines with Virgin given an allocation of seats for each of the 14 flights. Flight numbers were shared and a Virgin Airways attendant was on board for each of the flights. By exchanging capacity for traffic rights, Malaysia Airlines increased its revenue and Virgin expanded its services with a new route and higher frequency at minimal costs (Aviation Week & Space Technology, 1995). Similar agreements allow for other innovative capacity strategies. One example which surfaced during the course of their study, Ng, *et al.*, (2001) revealed that by exchanging some of its capacity on a domestic route with another country's airline, the local airline was able to fly passengers from its capital into domestic points of the other country and vice versa. Thus, both airlines were able to extend their services to more destinations, even if they did not fly those routes themselves (Bradley, 1995).

An alternative to managing capacity is through Demand Management which allows stable and uniform demand to better utilize capacity and enhance profit potential with an objective of transferring customer demand from peak periods to quiet periods. One method is to change demand while more radical policies may create alternative products or services to fill capacity in quiet periods or low demand. Most Airlines, would shuttle alternative routes during low seasons in a route. The apparent benefits in this way must be weighed against risks of damaging core product/service with operations being fully capable of serving both markets (Slack *et al*, 2001).

2.3.2 Airline Personnel

According to Doganis & Routledge (2002), airline personnel are quite significant in capacity management considerations. These personnel include, among others: -

Flight Crews

These are members of staff who operate aircraft while airborne and they include Pilots (captain and first officer: with some older aircraft still requiring flight engineers and/or navigators), Flight attendants (led by a purser on larger aircraft), and In-flight security personnel on some airlines (most notably El Al);

Ground Crew

These are members of staff who are responsible for operations at airports and they include Airframe and power plant technicians, Avionics technicians, Flight dispatchers, Baggage handlers, rampers, gate agents, ticket agents, and passenger service agents (such as airline lounge employees);

Reservations Agents

These are usually (but not always) located outside the airport;

Vice president or Director

Airlines usually follow corporate structure with each broad operational area, such as maintenance, flight operations, and passenger service, is supervised by a vice president or a director; and

Station Managers

In larger airlines there are these members of staff who oversee the operations of the airline's hubs. Airlines also tend to employ considerable number of lawyers to deal with regulatory procedures and the administrative staff to deal with the administrative matters.

2.4   Control Policies and Procedures in the Airlines Business

World civil aviation structure is fashioned by many forces, amongst which is the economic logic. Almost all governments regarded air transport as an industry to be "regulated". The reasons for this have been considerations to enforce standards of air safety in the interests of the travelling public. According to IATA, the moves today toward regulatory reform around the world are limited essentially to commercial matters (fares, rates, capacity, market entry and frequency). There is therefore no question of governments relaxing their control over things like safety, airworthiness requirements, licensing of flying and maintenance staff, air traffic control and similar matters. In order to satisfy the interest of the travelling public, an airline provides aviation services to passengers and/or cargo in own or leased aircraft. The scale and scope of the airlines range from those with a single aircraft carrying mail or cargo, through full-service international airlines operating hundreds of airliners of various types. Airline services can be categorized as being intercontinental, intracontinental, regional or domestic and may be operated as scheduled services or charters (Doganis & Routledge, 2002).

According to Doganis & Routledge (2002), variations in the types of airline companies, their operating scope, and the routes they serve have caused some patterns to emerge in the last 50 years. Ownership has gone from government owned or supported to independent, for-profit public companies. This has occurred as regulators permit greater freedom. This pattern has not been completed for all airlines in all regions. As in many industries, airlines are combining, ranging from loose, limited bilateral partnerships to long-term, multi-faceted alliances of groups of companies, to equity arrangements between companies, to actual mergers or takeovers.

2.4.1 International Regulatory Considerations

According to Doganis & Routledge (2002), in 1944, governments met in Chicago to set standards, and scope for an emergent civil air industry. In addition in 1978, there was the onset of deregulation which lowered barriers to entry for new entrants. This caused aircraft, financing, hangar and maintenance services and training relatively inexpensive. Hence, the laid off staff from other companies took jobs with new companies. As a result of this, the industry has witnessed an explosive growth in demand for air travel, as millions who had never or rarely flown before became regular fliers, even joining frequent flyer loyalty programs and receiving free flights and other benefits from their flying.

The United States, Australia, and to a lesser extent Brazil, Mexico, the European Union, and Japan have deregulated their airlines. In the past, these governments dictated airfares, route

networks, and other operational requirements for each airline. Since deregulation, airlines have been largely free to negotiate their own operating arrangements with different airports, enter and exit routes easily, and to levy airfares and supply flights according to market demand. With entry barriers for new airlines being lower in a deregulated market, the industry has seen hundreds of airlines start up, producing greater competition than before. Doganis & Routledge (2002) adds that groups of countries which were contracted in the International Civil Aviation Organization (ICAO) established worldwide standards for safety and other vital concerns. This established seven ICAO regional offices (Bangkok, Cairo, Dakar, Lima, Mexico City, Nairobi and Paris serving) in nine regions and provided statutes designated as ICAO Doc 7300/8. This document requires that upon being a member, each contracting state formulates its own laws and regulations which must be consistent with the ICAO standards (annexes) to regulate its aviation industry. In addition, most international air traffic is regulated by bilateral agreements between countries. Bilateral agreements are based on the "freedoms of the air", a group of generalized traffic rights ranging from the freedom to overfly a country to the freedom to provide domestic flights within a country (a very rarely granted right known as cabotage). Most agreements permit airlines to fly from their home country on specific routes to designated airports in other countries while carrying passengers or/and cargo (Routledge, 2002). In the 1990s, "open skies" agreements emerged, and removed government regulatory powers opening up international routes to further competition (Doganis & Routledge, 2002).

2.4.2   Economic Considerations

Although many countries continue to operate state-owned or parastatal airlines, most airlines today are privately-owned and are governed by microeconomic principles in order to maximize shareholder profit. Toward the end of the century, a new style of low cost airline emerged, offering high-quality products, using new aircraft models, at well-received prices. Full-service airlines have a high level of fixed and operating costs in order to establish and maintain air services. These include labour, fuel, airplanes, engines, spares and parts, IT services and networks, airport equipment, airport handling services, sales distribution, catering, training, insurance, and other costs (Doganis & Routledge, 2002). Most of these low cost airlines use computers which allow them predict the number of passengers who will actually fly after making reservations to allow for overbooking their flights enough to fill the aircraft while accounting for "no-shows", without forcing paying passengers off the aircraft for lack of seats. Some of these airlines use yield management. Their passengers are used to airlines' different fare charges for the

same flight. This is because even though they buy similar seats, they are made aware that they are buying different products, because of the associated restrictions (Belobaba, 1989).

2.4.3 Airport Operations

Where an airline has established an engineering base at an airport, there may be considerable economic advantages in using that same airport as a preferred focus (hub) for its scheduled flights. In view of the congestion at many international airports, the ownership of slots at certain airports (the right to take-off or land at a particular time) has become a significant tradable asset in the portfolios of many airlines. A take-off slot at popular times of the day is critical in attracting more profitable business travellers to a given airline's flight and is a competitive advantage against a competing airline. If a particular city has two or more airports, market forces will tend to attract the less profitable routes, or those on which competition is weakest, to the less congested airport, where slots are likely to be more available and therefore cheaper. Other factors, such as surface transport facilities, baggage handling systems and onward connections, will also affect the relative appeal of different airports and some long distance flights may need to operate from the one with the longest runway (Chevallier, & Gamper, 1996).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

The objectives of the study were to establish capacity management strategies needed to enhance operational efficiency in Kenya Airways and challenges in capacity management in the Airline Industry. Considering that little research work had been done on capacity management in the airline industry, this study was therefore to be an icebreaker for further research in the Kenyan context. As such, this study was based on a case study approach, to understand improvement practices used by the airline. The choice of case study design proved appropriate because of the uniqueness of Kenya Airways operations, time and cost constraints. Since the focus of the study was on business operations, the targeted respondents in the study were from top managers who contributed to policy and operational decisions in their organizations. The questionnaire was designed for collection of data of nominal, ordinal and interval levels of measurement.

3.2 Population and Sample

Since the population of interest was not considered too large, no sampling was done and instead the entire population was studied. The population of interest therefore consisted of directors and top managers totalling 20. The population was drawn from Information Systems, Ground Handling, Technical, Flight Operations, Commercial, Finance and Human resource departments of the airline. The reason was that these functional areas were directly involved in the issues under study and that the respondents at this seniority level had a broader view of their operations and therefore contributed to policy and operational decisions affecting their respective departments and those of the entire airline operations.

3.3 Data Collection

The study relied exclusively on primary data that were provided by the respondents in a structured questionnaire with closed and open-ended questions. The questionnaire was addressed and administered personally to 20 respondents by a 'drop' and 'pick' method upon completion.

Although a total of 20 respondents were targeted for data collection, only 16 returned their filled questionnaires. The others who did not return their questionnaires did that out of fear of reprimand from top management due to confidential (security) reasons.

3.4 Data Analysis

Data was analyzed through descriptive statistics. The statistics was used to provide an overview of various aspects of capacity management, under study, in Kenya Airways. In this respect, therefore, measures of central tendency and dispersion were used. This included mean, frequency distribution, and content analysis. Further, appropriate graphical methods such as pie charts, and tables, amongst others were used. With respect to factors impacting on capacity requirements, content analysis was used to identify and rank critical factors impacting on strategies used to counteract demand fluctuations. Statistical Package for Social Sciences (SPSS) was utilized. However, before data analysis was made, data received from the respondents was checked for typing/writing errors and clarity.

CHAPTER 4: PRESENTATION OF RESULTS, ANALYSIS AND DISCUSSIONS

4.1 Preparation of Data for Analysis

After collection of all the required data, they were first prepared for analysis by coding and editing to transform them into a form that can be analyzed. The purpose of data coding was to change qualitative data into quantitative form for easier analysis. Since this study was of a case study type, the analysis of data that follows is through descriptive statistics with the results presented in tables and charts to illustrate various capacity management strategies used to enhance operational efficiency in Kenya Airways and show challenges experienced in capacity management in the Airline Industry.

4.2 Operational Profile of Kenya Airways

Before analyzing the collected data to see how they relate to the project objectives, it was important to look at Kenya Airways operational profile by filling the study questionnaire.

The Research Design targeted respondents from top management who were asked of their position or equivalent position in their department/airline. Data showed that, 6% of the respondents were Heads of Departments, 25% were Directors and 69% were managers. These personnel were drawn from Safety and Standards, Finance, Human Resources, Flight Operations, Security, Sales and Marketing, various departments of Aircraft Maintenance, Engineering Development, Transport, IT and Cargo, who were considered knowledgeable enough about the area of study.

When respondents were asked to specify, in general terms, the strategic roles of their departments in the Airline operations, it emerged that 81% of the departments were core to the Airline's operations while 19% had supportive role.

In further asking the respondents to specify techniques used by their departments to operationalize the above roles, the most popular techniques were Flexible workforce (43.8%) followed by Rescheduling (25%) and Business Process reengineering (18.8%). The other techniques are as depicted in Table 4-1 below.

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Table 4- 1: Specific Techniques used by Departments to Operationalize Capacity

Techniques	Percent
Flexible work force	43.8%
Scheduling	25.0%
BPR	18.8%
Remodelling	6.3%
Recruitment, Training & Development	6.3%
Total	**100.0%**

Source: Research Data

The high percentage in the flexible workforce is consistent with observations made by Cameron (1997) in the literature review as one of the approaches of shaving cost in airline operations, examples of its use are given in airlines such as Delta Airlines and Lufthansa among others. In deed Flexible work force when used with Business process reengineering can address complexities of running an aviation firm.

In trying to know how success would be made in such complex operational activities, the respondents were further asked to specify strategies used to integrate resources from all departments in their airline. Most of them ranked work teams as the highest. The other strategies are as illustrated in Chart 4-1 below.

Chart 4-1 Strategies to Integrate Kenya Airways Departmental Activities
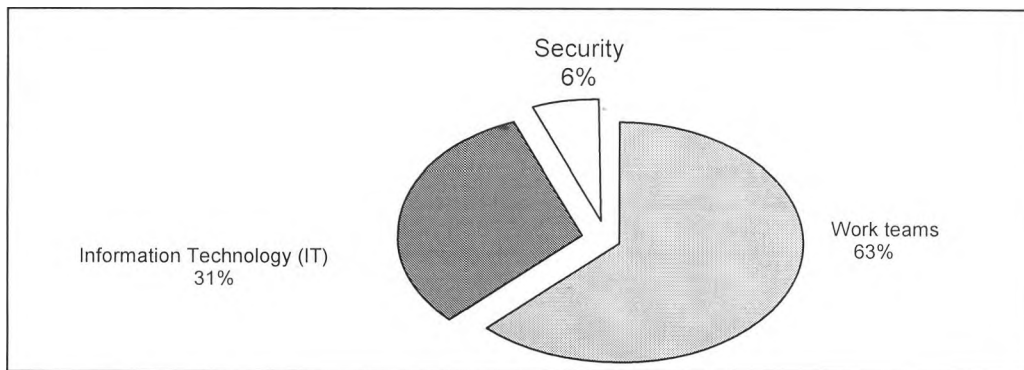
Source: Research Data

The above chart shows that work teams (63%) and IT (31%) were dominantly used to integrate work activities in the Airline. These are seen as some of the approaches used in the airline industry to speed up service delivery including E-Ticketing, which is one form of self service used to employ the services of customers to enhance capacity especially during peak times when there is serious need to plan for capacity overload. Most Airlines encourage passengers to book

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on line by offering low priced E-Tickets (Hesting, 1997). The only challenge is that since most passengers are used to the traditional tickets, E-Tickets have been slow to pick up. This explains why more staff is still needed to book in passengers.

4.3   Capacity Improvement Approaches

To investigate capacity improvement approaches used at Kenya Airways during high and low seasons, the respondents were asked to rate various improvement approaches used by their departments to achieve the Airline's expansion objectives. The approaches of concern in this case were the use of Flexible Workforce, Variable Shifts, Shared Capacity, Yield management, Contracting seasonal personnel, Flight crew, Technical staff, Training, Information Technology (IT), Levelling capacity, reducing rest periods and Chase capacity among others. A summary of responses is depicted in the following Tables.

Table 4-2: Key Capacity Improvement Approaches during High Seasons

Parameters	Percent
Variable shift	43.8%
Flexible workforce	25.0%
Sharing capacity	25.0%
Reduce rest period	6.3%
Total	100.0%

Source: Research Data

The table above shows that variable shifts (43.8%), Flexible workforce (25%) and Shared capacity (25%) are significantly used to improve capacities of various departments in the Airline during high seasons with hardly any provision of rest periods. This is quite consistent with the assertions of Sasser, *et al* (1982) in the literature review.

Table 4-3: Key Capacity Improvement Approaches during Low Seasons

Parameters	Percent
Variable shift	50.0%
Use or the same workforce	43.8%
Downsize	6.3%
Total	100.0%

Source: Research Data

The above table shows consistency with the high season where variable shift is still rated highest (50%) even during low seasons, by using the same workforce. This is to deliberately maintain excess capacity employable during peak times (Bassett, 1992; Hope & Muhlemann, 1997).

Variable shifts and Flexible workforce can be seen to be used in both cases and this is quite consistent with the literature review as techniques for improving capacity. Many service firms use variable shifts to match daily or weekly demand fluctuations and is cost effective (Hesting, 1997).

Table 4-4: Adjustments Made Since Beginning of Kenya Airways Expansion Programme

Adjustments	5	4	3	2	1	Weighted Mean
Training, Experience and Skills	87.5	6.3	6.3	0	0	**4.80**
E-Ticketing	81.3	12.5	6.3	0	0	**4.75**
Technical staff	75	25	0	0	0	**4.75**
IT	62.5	25	12.5	0	0	**4.50**
Equipment	50	31.3	18.8	0	0	**4.31**
Aircraft & parts	50	25	12.5	6.3	6.3	**4.10**
Flight crew	56.3	6.3	25	6.3	6.3	**4.01**
Frequent flier program	31.3	50	12.5	0	6.3	**4.00**
Location	37.5	25	31.3	0	6.3	**3.90**
Overbooking	37.5	43.8	0	6.3	12.5	**3.90**
Cost management	31.3	31.3	12.5	18.8	6.3	**3.60**
Chase capacity	0	56.3	25	18.8	0	**3.40**
Consultancy	31.3	6.3	25	12.5	25	**3.10**
Discounted Ticketing	0	25	56.3	18.8	0	**3.10**
Restructuring	6.3	31.3	31.3	18.8	12.5	**3.01**
Overtime & Variable shift	12.5	18.8	25	18.8	25	**2.80**
Levelling capacity	6.3	12.5	37.5	25	18.8	**2.60**
Seasonal staff	12.5	0	6.3	43.8	37.5	**2.06**
Bundling	0	6.3	18.3	43.8	31.3	**2.00**
Yield management	0	6.3	18.8	37.5	37.5	**1.90**

Source: Research Data

From the above figures it is observed that the highest adjustments based on the weighted mean are training (4.80), hiring of Technical staff (4.75) and E-ticketing (4.75). This is quite congruent with a rapidly growing firm (Doganis & Routledge, 2002). Information Technology (4.50) as an information platform is also seen to directly vary as E-ticketing (4.75) indicating a supportive role. Some of the techniques used are Increased Flight crew (4.01), overbooking (3.90) the addition of Equipment (4.31). These approaches are used fairly well to adjust capacity needs of the Airline, except for latest techniques such as Levelling capacity (2.60), Bundling of services (2.0) and Yield management (1.90).

The Airline Hub location (3.90) can be concluded to have also contributed quite well to the expansion strategy (Chevallier & Gamper, 1996). Kenya Airways can be seen to have made good

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progress on the use of the frequent flyer program (4.00). It is important to observe that the new fleet of aircraft is adequately supported by a good volume of aircraft parts (4.10).

The respondents were also asked to rank their airline expansion objectives, based on the improvement methods illustrated above. The concern in this case were, Quality, Reliability, Flexibility, Timely services, Return on Investment, Profits, processing of information, safety and Customer demands. A summary of the responses is depicted in Table 4 – 5 below.

Table 4 – 5: Capacity Improvement Objectives

Objectives	1	2	3	4	5	Weighted Mean
Perception to safety	0	0	6.3	43.8	50	**4.40**
Profits	0	0	31.3	12.5	56.3	**4.30**
Return on Investment	0	6.3	25	25	43.8	**4.10**
Timely Services	6.3	0	31.3	50	12.5	**3.60**
Processing Documents	18.8	12.5	12.5	25	31.3	**3.40**
Processing Information	18.8	12.5	18.8	18.8	31.3	**3.30**
Reliability	12.5	18.8	12.5	43.8	12.5	**3.25**
Flexibility	12.5	25	12.5	37.5	12.5	**3.10**
Quality	18.8	12.5	31.3	18.8	18.8	**3.10**
Customer Demands	12.5	18.8	50	18.8	0	**2.75**

Source: Research Data

The above weights illustrate a very positive direction on the improvement objectives. Safety which is seen to have had the highest rating (4.40). This is closely followed by profits (4.30) and Return on Investment. Three years in a row Kenya Airways recorded very high figures of profits before tax (Kenya Airways, 2005) and this is in concurrence with the findings of this study. Since the aircraft are still new and with the management of costs, the Airline is seen to be meeting its financial objectives. The biggest challenges are seen on issues of Quality and customer demands which are unfortunately at the lowest end of the table indicating the need for attention.

4.4   Managing change in Kenya Airways operations

To investigate the nature of change the operations and management went through to improve their capacity, the respondents were asked to rank the types of change their departments went through. The issues of concern here were whether the changes were radical, incremental, continuous, reactive or reactive. A summary of the responses is depicted in Chart 4-2 below.

Chart 4 – 2: Nature of Change in Kenya Airways

Continuous
19%

Incremental
25%
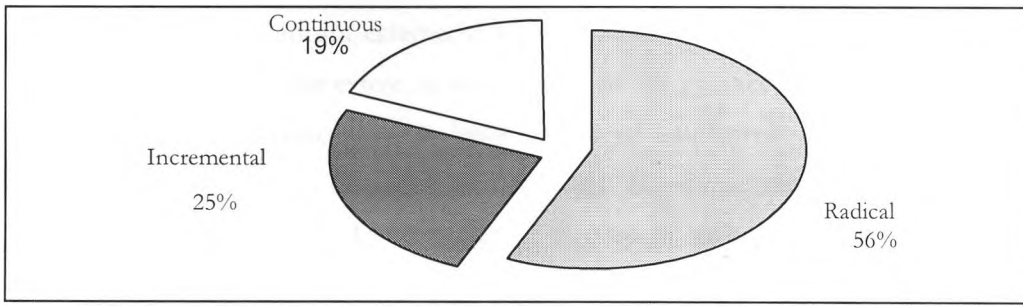
Radical
56%

Source: Research Data

The above results illustrate that most departments went through radical changes (56%) while the rest had incremental (25%) and continuous (19%) changes. What is evident here is that all these techniques can concurrently be used to improve capacity in an organization. Kenya Airways opted to use more of Radical change in many departments. One example is where it totally replaced its fleet of aircraft with the modern type forcing a transition to IT based information system which become the platform for E-Ticketing a major medium through which the Airline operations is integrated.

To test on bottlenecks to change management, the respondents were asked about their perception towards various capacity options. The areas of interest were staff being resistant, indifferent or receptive to change among others. The findings are summarized below.

Chart 4-3: Staff Perception towards Capacity Improvement Strategies

Indifferent
13%

Resistant
19%
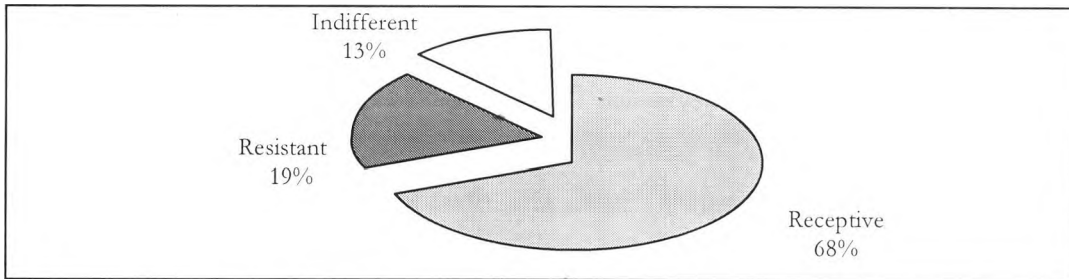
Receptive
68%

Source: Research Data

The above chart illustrates that bigger percentage of staff (68 %) were receptive to changes, while a smaller percentage (19 %) were resistant for fear of losing their jobs. The high rating on those that are perceptive indicates why Kenya Airways has managed to very quickly improve its operations. However, on order to gain even better improvement, it will the Airline to address the attitude of the indifferent and resistant to change employees.

4.5   Use of operations system and management techniques

As a result of the significant external changes affecting Kenya Airways operations, respondents were asked to indicate the extent to which some of the practices of management practices were used. The issues of concern were Involvement of employees when introducing operational changes, Decentralization of operational activities, Benchmarking of operational activities with those of best-in-class, and Involvement of customers and other stakeholders for operations improvement. The table 4-6 below provides a summary of the illustration.

Table 4-6: The Extent of Use of Operational Systems and Management Techniques

	commonly	rare	never	Total
Involve employees when introducing changes	50.0	43.8	6.3	100.0
Decentralize operational activities	62.5	25.0	12.5	100.0
Benchmark	62.5	18.8	18.8	100.0
Ignore the changes	18.8	31.3	50.0	100.0
Involve customers and other stakeholders	37.5	12.5	50.0	100.0

Source: Research Data

The above table illustrates that, half of the airline's departments, in this study, never involved customers (50 %). They commonly benchmarked (62%) their performance with the best-in-class operators as one way of improving the level of their operations while decentralising their activities (62.5%). Decentralization is quite consistent with the unique needs of various departments which may not be grouped had to work in the same location. An example is the activities and tasks in aircraft maintenance that are not clustered with those of sales and marketing department. These explain how and why Kenya Airways has managed to maintain its competitive advantage. Without Benchmarking in the Airline Industry it is very difficult to adequately improve both capacity and service delivery a situation which was never ignored change by Kenya Airways.   A decentralized operation is one good approach of improving capacity so long as it is not spread too thin to attract enormous complexities (Sasser, et al, 1982). A score of 62% is therefore good enough.

4.6   Other findings on operations improvement practices

In addition to finding out the current operations improvement practices, the respondents were asked about other strategies the airline uses to effect their expansion program. Issues of concern in this case were modification of equipment, increasing of workforce, increasing of equipment, replacement of equipment and increasing of the airline facilities. Table 4-7 below summarises these findings.

Table 4-7: Levels of Changes in Departments' Operational Capacity Strategies

Approaches	1	2	3	4	5	6	Weighted Mean
Increased facility	25	12.5	0	0	0	62.5	**4.25**
Replaced equipment	18.8	18.8	12.5	6.3	25	18.8	**3.60**
Modified equipment	25	6.3	18.8	18.8	18.8	12.5	**3.40**
Increased equipment	31.3	18.8	18.8	12.5	0	18.8	**2.90**
Increased workforce	37.5	43.8	0	6.3	0	12.5	**2.30**

Source: Research Data

The above table illustrates a high weight man on the increased facility (4.25), replacement of equipment (3.60) and modified equipment (3.40) reflecting a reality at Kenya Airways. This fact is supported by the replacement of the total fleet of the Airline aircraft and other associated ground support equipment and tooling. Once again, the above responses demonstrate the practice of capacity improvement options that is consistent with a growing firm (Hesting, 1997).

Finally, what is seen in these findings is a relationship of service capacity level and the methods of resources management which has assisted capacity increase. This has also partly been attributed by the need to satisfy the volume and certainty of anticipated demand, growth strategic objectives, competition, and the cost of expansion (vanLooy *et al.*, 1998).

There still, however exists the need to increase the workforce as shown in the above table by a very low weighted mean.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Results and Conclusions

Before summarizing the results, it is worth recording that according to the project proposal intention to target senior management in the data collection exercise, this requirement was met. Of the senior management, 69 % of them were managers, 25% were directors and 6% were Heads of departments all of whom could be said to be sufficiently knowledgeable on issues of capacity management in Kenya, the Airline under study. The rest of the results are as discussed below; with specific reference to the study objectives.

5.2 Capacity Improvement Approaches used by Kenya Airways

The improvement approaches illustrated in the findings were increased use of Information Technology (4.50), increased facility (4.25) replacement of equipment (3.60), and increased equipment (2.90). Additionally the Airline increased the workforce and used flexible workforce in various shifts to enhance operational speed and Airline processes.

The above findings also illustrate that, all the respondents had a reasonable amount of focus on all capacity improvement techniques. This is explained by the high weights on Increased Equipment, Increased facility, the replacement of equipment and the flexible workforce. These approaches resulted into very high improvements on safety (4.40), Training of staff (4.80), E-ticketing (4.75) and Technical staff (4.75). These improvements were further enhanced by Decentralized operations and Benchmarking. What is illustrated are the frequent flyer program (4.00) and overbooking (3.90) which were adequately supported by IT through low-priced E-Tickets that boosted sales and profits. The high rating of frequent flyer program showed the Airline's high level of popularity amongst its competitors and this could have been further encouraged by the location of airline Hub contributing greatly to the achievements of the Airline's expansion strategy. The above results also show that, half of the airline's departments in this study never involved customers and commonly benchmarked their performance with other operators. Most of them decentralised their activities a situation which is consistent with their unique operations. Finally it is worthy noting that majority of the departments had the right capacity to cope with demand.

5.3   Operations Systems and Activities Management

The results of the survey show that, most departments operated as decentralised units and employees were commonly involved in change management. This was shown by a high score of 62.5% to decentralized operations, and 50% to involvement of employees when introducing change. By managing capacity in this way, the Airline is ranked to have the right capacity. The above observations are somewhat consistent with responses to questions regarding achievement of performance objectives. Table 4-5 in chapter 4 shows that over 90 % of the departments tied their capacity improvement on safety, profits and return on investment.

5.4   Conclusions

Based on the results and the analysis of the study, certain conclusions have emerged. Many departments were aware of most capacity improvement techniques as a means to meeting the demand created by the airline's ambitious expansion. Most departments adopted capacity improvement techniques for competitiveness and increased owners' wealth thereby contributing towards the airline's overall long term goals.

The improvements were achieved mainly through radical change in most departments. In addition, the Airline involved employees when introducing incremental and continuous change. Other techniques used in the Airline included decentralizing of activities and benchmarking operations from the best-of-class operators. Through cost management, the departments consciously increased the returns with a level of safety and efficiency raising return on investment and profitability. Finally, the study also shows that other than periods of crisis, new operations improvement approaches can be introduced even during periods of success through research for innovative methods, to stay ahead of competition. However more improvement would be achieved if challenges tied to indifference, resistance to change and quality assurance are adequately addressed.

5.5   Recommendations from the Study

The study generally shows that many departments preferred the cautious approach with minimal risk (lowering cost) in dealing with capacity improvement issues. This is mainly caused by reluctance of staff to accept that to improve in performance, sometimes it is necessary to break with the past. Based on this, I recommend that as Airlines pursue better capacity improvement approaches through incremental methods, they should move faster towards radical changes as they learn from the past to make improvements for the future. While it does not look practical to

wholly practice the 'clean-slate' approach advocated by proponents of Business Process Reengineering, it is also not beneficial to be so enslaved to the past to the extent where trying new ways becomes a nightmare. It is by going towards the unknown through research that inventions and discoveries can be made.

5.6   Limitations of the Study

Study limitations can best be determined during data collection exercise and data analysis. During preparation of the project proposal, I had assumed that since Kenya Airways is already undertaking deliberate capacity improvement to meet its expansion strategy and in order to enhance its competitiveness, the airline was going to be open and more than willing to share its experiences by responding to the questionnaires. This was however not the case with the Chief Executive Officer citing, in writing, this as a hindrance to their work process making other managers to reluctantly avail the required information basing it on information security that would affect the airlines confidentiality. Data collection had therefore to be done discreetly and with lots of confidentiality. Although a limitation, this did not affect the outcome of the study due to the high response rate of 80 %. The study had targeted the entire management team. However, during data collection, it proved difficult to collect the expected data due to delays from the respondents and difficulties in making open follow-ups due to the confidentiality involved. Since all the departmental heads were at the airline's headquarters in Nairobi, data collection would have been faster if this study was given the importance tied to the Airline's operational capacity.

Finally, while targeting senior managers to provide data on behalf of their departments, results on critical issues appear to be somewhat consistent and predictable, that leads one to think that these managers may have been covering their backs by reporting what is expected rather than what actually occurs. In such a case, one is left wondering whether the same results would be obtained if some of the questionnaires had been responded to, by lower to middle managers.

5.7   Suggestions for Further Research

Due to the fact that it is possible for senior managers to appear to protect their positions by giving friendly responses, I recommend that further research be carried out with the same objectives, but this time, the questionnaires should be filled by two people in each department; one senior manager and one junior or middle-level manager. By doing this, it is possible that certain facts which could not be captured under this study may come to light.

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ANNEX 1: THE RESPONSE RATE OF DEPARTMENTS A KENYA AIRWAYS DURING DATA COLLECTION

DEPARTMENTS	Percent
Ground handling	6.3%
Safety & standards	6.3%
Stores	6.3%
Finance	6.3%
Human Resource	6.3%
Flight operations	6.3%
Security	6.3%
Sales and marketing	12.6%
Line manager	6.3%
Quality assurance	6.3%
Engineering	6.3%
Maintenance	6.3%
Transport	6.3%
Information Technology	6.3%
Cargo	6.3%
Total	**100.0%**

ANNEX 2: LETTER TO RESPONDENTS

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAM – LOWER KABETE CAMPUS

P.O. Box 30197
Nairobi, Kenya

DATE

TO WHOM IT MAY CONCERN

The bearer of this letter *Eng. John Patrick Ochieng Owino*

Registration No *D 61/P/7380/02*

is a Master of Business Administration (MBA) student of the University of Nairobi.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate if you assist him/her by allowing him/her to collect data in your organization for the research.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

J.T. KARIUKI
CO-ORDINATOR, MBA PROGRAM

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA OFFICE
P. O. Box 30197
NAIROBI

ANNEX 3: SURVEY QUESTIONNAIRE

This research is intended to explore the operations of Kenya Airways in order to establish strategies used for adjusting and managing capacity to match the emerging demand as the airline expands its operations. The outcome of this study is expected to inform the documentation of airline capacity improvement strategies that will, in future, benefit airline practices necessary for the enhanced competitive advantage.

Please provide answers to the following questions by ticking against the most suitable alternative or giving narrative responses in the spaces provided.

All your responses will be treated with strict confidence.

1. What is the name of your department? ---

2. What is your position or its equivalent in this department/airline?

a.	Director	[ ]
b.	Manager	[ ]
c.	Other; Specify ---	

3. In general terms, what is the strategic role of your department in the Airline's operation?

a.	Core to the Airline operations	[ ]
b.	Supportive Airline operations	[ ]
c.	Consultancy	[ ]
d.	Advisory	[ ]
e.	Others; Specify ---	

4. Kindly specify techniques your department uses to operationalize your capacity requirements.

a.	Remodelling of equipment	[ ]
b.	Scheduling of activities	[ ]
c.	Business Process reengineering	[ ]
d.	Flexible workforce	[ ]
e.	Others; Specify---	

5. Kindly rate your department's capacity to cope with its service demand.

      a.   Has excess capacity   [ ]
      b.   Has the right capacity   [ ]
      c.   Has less capacity   [ ]
      d.   Has no capacity at all   [ ]

      e.   Others; Specify---

6. What strategies do you use to integrate activities from all departments in your airline?

      a.   Cross-Functional Work Teams   [ ]
      b.   ISO 2000   [ ]
      c.   Total Quality Management   [ ]
      d.   IT based Information System   [ ]

      e.   Others; Specify---

7. What plans does your department use during high seasons to match passenger demand?

(1- Very much   2- Reasonably well   3- Moderately   4- slightly   5- Not al all.)

      a.   Flexible workforce   [ ]
      b.   Variable shifts   [ ]
      c.   Part time or seasonal employees   [ ]
      d.   Sharing capacity   [ ]

      e.   Others; Specify---

8. What plans does your department use during low seasons to match passenger demand?

(1- Very much   2- Reasonably well   3- Moderately   4- slightly   5- Not al all.)

      a.   Use the same workforce   [ ]
      b.   Variable shifts   [ ]
      c.   Downsize   [ ]
      d.   Rescheduling   [ ]

      e.   Others; Specify---

9. To what extent have the following factors contributed to improve capacity in your department?

Please rank each of the following on a scale of 1-5; (1) Being the lowest adjustment and (5) being the high adjustment

		1	2	3	4	5
a)	Information Systems					
b)	Flight operations					
c)	Maintenance of aircraft					
d)	Stores and stores procedures					
e)	Quality assurance & control programs					
f)	Machinery and equipment					
g)	Sales and marketing					
h)	Other physical facilities					
i)	Physical location					
j)	Human Resource					

10. Please indicate the level of changes in your department's operational capacity strategies resulting form your airline's operations expansion program.

Please rank each of the following on a scale of 1-5; (1) Being the lowest adjustment and (5) being the high adjustment

		1	2	3	4	5
1.	Modified the existing equipment					
2.	Increased workforce					
3.	Increased equipment					
4.	Increased facility (plants, workshops, storage facility etc)					

11. For each of the following capacity planning responses please tick the adjustments your airline has made in response to changes since the beginning of the expansion program.

Please rank each of the following on a scale of 1-5; (1) being the lowest adjustment and (5) being the high adjustment

		1	2	3	4	5
a)	E-Ticking					
b)	Discounted Ticketing					
c)	Frequent flier program (Blue)					
d)	Parcelling of services for discounted pricing (Bundling)					
e)	Yield Management					
f)	Contracting seasonal Staff					
g)	Flight Crew					
h)	Technical Staff					
i)	Training, experience and skills					
j)	Information Technology (IT)					
k)	Aircraft and associated parts					
l)	Consultancy					
m)	Overtime and variable shifts					
n)	Over-Booking					
o)	Restructuring					
p)	Cost Management					
q)	Levelling Capacity					
r)	Chase Capacity					
s)	Location					
t)	Equipment					

12. To what extent have improved methods employed by your department helped in achieving expansion objectives related to the following?

Please rank each of the following on a scale of 1-5; (1) being the lowest improvement and (5) being the highest improvement

		1	2	3	4	5
a)	Return on Investment					
b)	Profitability					
c)	Customer satisfaction (external and internal)					
d)	Market share					
e)	Service/product quality					
f)	Safety					
g)	product/service flexibility					
h)	Process time					
i)	Sales					
j)	Response time					

13. What can you say to have been the perception of staff/employees towards the operational capacity improvement strategies used by your department?

a.	Receptive	[ ]
b.	Resistant due to fear of losing their jobs	[ ]
c.	Indifferent	[ ]
d.	Not receptive	[ ]

14. How would you rate your current organization's perception on a scale of 1 to 5 on the following parameters?

(1) being the least important and (5) being the most important

		1	2	3	4	5
a)	Quality					
b)	Reliability					
c)	Flexibility					
d)	Timely (speed operations)					
e)	Return on investment					
f)	Profits					
g)	Processing documents					
h)	Processing information					
i)	Safety					
j)	Response					

15. How would you have rated your organization's perception on a scale of 1 to 5 on the following parameters in 2004?

(1) being the least important and (5) being the most important

		1	2	3	4	5
a)	Quality					
b)	Reliability					
c)	Flexibility					
d)	Timely (speed operations)					
e)	Return on investment					
f)	Profits					
g)	Processing documents					
h)	Processing information					
i)	Safety					
j)	Response					

16. How would you describe the level of safety in your department resulting from capacity improvement plans since the beginning of your airlines expansion program?

a.	High	[ ]
b.	Low	[ ]
c.	Moderate	[ ]
d.	No risk	[ ]

17. As a result of the significant external changes that have affected the operation of your department, to what extent do you do the following?

		commonly	rarely	never
a	Involve employees when introducing changes			
b	Decentralize your operational activities			
c	Benchmark			
d	Ignore the changes and maintain status quo			
e	Involve customers and other stake holders			

18. How would you describe the nature of changes your organization has introduced to improve operational performance in your department in the period you have been in service?

a	Radical	[ ]
b	Incremental/Continuous	[ ]
c	Reactive	[ ]
d	Proactive	[ ]

19. What actions does your department take to solve problems of bottlenecks in its operations?

a	Do nothing	[ ]
b	Establish the causes and make corrections	[ ]
c	Take radical measures by replacements or removal	[ ]
d	Make corrections appropriate to the problem	[ ]

20. What other information would you like to provide that your department/airline uses to effectively manage its capacity to perform as a result of the expansion program?

Thank you very much for your cooperation and for filling this questionnaire.