

Sudan University of Science and Technology

Graduate College

Application of Total Quality Management

In The Civil Aviation Authority

تطبيق إدارة الجودة الشاملة في هيئة الطيران المدني

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

إِن أُرِيدُ إِلَّا الْإِصْلَاحَ
مَا اسْتَطَعْتُ وَمَا تَوْفِيقِي إِلَّا بِاللَّهِ عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ ﴿٨٨﴾

سُورَةُ هُودٍ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(11) إِيَّاكَ اللَّهُ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّى يُغَيِّرُوا مَا بِأَنْفُسِهِمْ

سُورَةُ الرَّعْدِ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

صُنِعَ اللَّهُ الَّذِي أَنْقَنَ كُلَّ شَيْءٍ إِنَّهُ خَيْرٌ لِّمَا تَفْعَلُونَ ﴿٨٨﴾
سُورَةُ التَّنْزِيلِ

قال رسول الله صلى الله عليه وسلم

" إن الله يحب إذا عمل أحدكم عملاً أن يتقنه "

صدق رسول الله

Dedication

To my family

with love

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I ask my God to give mercy to Dr. Bakri A Rahim who established the research with me.

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Finally, I wish to express my gratitude to my staff

September 2007
Magda Mohamed Salih

Abstract

The idea of quality is not new and it has its origins in inspection systems used in manufacturing industries. When the “quality” is used, we think in terms of an excellence product or a service that fulfill or exceeds customer expectations. The move to become a TQM organization will involve change at all levels of the organization. However change will not happen effectively by it self, it needs to be managed. Managing the change means define need, idea, adoption decision, implementation strategy, and resources. Use techniques to achieve successful implementation, including obtaining top management support, implementing the change in a series of steps, assigning an idea, and overcoming resistance to change by actively communicating users and encouraging their participation.

The studies carried out either locally or internationally in the organizations shown that the main driving force that promoting TQM is top management commitment to quality was the most important drive force that promotes TQM implementation. also the research found that insufficient infrastructure, lack of training, workers’ reluctance to get involved in decision making, and inadequate knowledge base are regarded as resisting forces that inhibit the introduction of TQM strategy.

The study highlighted the current situation of the Civil Aviation Authority in a trial to diagnose the situation and identify the real problem of the CAA by using questionnaire. The questionnaire contains a number of questions which are related to the organizational objectives. The development tool used is (SWOT) analysis Strengths, Weaknesses, Opportunities, and Threats.

Evidence in the literature indicates that TQM has become a major strategy for most organizations whether in developed countries or less developed countries. because of good results that approved by TQM and the

application of the principle of TQM lead to improve the performance in the organizations. The good result provided by application of TQM due to the fact that the organizations embrace the TQM concept at all level of the organization such as involvement and empowerment of employees, Improving teams and training them to do right the first time and every time producing zero defects to satisfy the customer to whom the service is provided. Establish performance measures for the processing, reducing product and service costs, reducing development cycle time.

الخلاصة

ان فكرة الجودة ليست فكرة حديثة ولكن ترجع أصولها منذ ان كان نظام تفتيش المنتج والسلع يتبع فى المصانع بغرض تقليل نسبة الخطأ فى العملية الإنتاجية. ونسبة لتعقيد العملية الإنتاجية استبدل نظام التفتيش بنظام ضبط الجودة وبعد ذلك وضع العالم دمنج 14 نقطة لنظام الإدارة لتحسين الجودة والإنتاجية . إن تحول المنظمة او المنشأة الى نظام إدارة الجودة الشاملة يتطلب التغيير فى كل مستوياتها ولحدوث ذلك التغيير لابد من إدارته بنجاح للحصول على النتائج المرجوة وذلك بتحديد الاحتياجات ووضع الإستراتيجيات وتوفير الموارد المالية والبشرية ثم إستعمال الاساليب الناجحة لتنفيذ الإستراتيجيات.

الدراسات السابقة التى تمت فى هذا المجال سواء كانت محلية او عالمية فى منظمات مختلفة اوضحت ان هناك قوة محفزة لتطبيق إدارة الجودة الشاملة وان اكثرها اهمية هو التزام الإدارة العليا لتطبيق برامج إدارة الجودة الشاملة . كما ذكرت الدراسات ان عدم ملائمة البنية التحتية ونقص تدريب العاملين وعدم رغبة العاملين فى إتخاذ القرار وعدم كفاية المعلومات من اهم العوامل المعوقة لتطبيق إدارة الجودة الشاملة.

الدراسة القت الضوء على الوضع الحالى فى هيئة الطيران المدنى وتحليل الوضع لمعرفة المشاكل الحقيقية فى هيئة الطيران المدنى وذلك بعمل إستبيان يشمل عدد من الاسئلة لمعرفة مناطق القوة والضعف داخل الهيئة والفرص والمهددات المحيطة بالهيئة .

كل الدراسات السابقة تشير الى ان إدارة الجودة الشاملة اصبحت الإستراتيجية الاساسية لمعظم المنظمات سواء فى الدول النامية او الاقل نمواً نسبة للنتائج المحققة وتطبيق المبادئ والمفاهيم لإدارة الجودة الشاملة الذى ادى الى تحسين الاداء فى هذه المنظمات .

تقوم إدارة الجودة الشاملة على مبادئ ومفاهيم اساسية وهى التركيز على إرضاء الزبون وعمل الشئ الصحيح من المرة الاولى الإتصال الجيد والتعليم المستمر للعاملين وخفض التكاليف

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Chapter One

Introduction

1.1 General

Total Quality Management (TQM) is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in world –class competition. Only by changing the action of management will the culture and actions of an entire organization be transformed. TQM is for the most part common sense. Analyzing the three words:

Total –Made up of the whole (involves everyone and all activities)

Quality – Degree of excellence a product or service provides (meeting customer requirements)

Management – Act, art, or manner of handling, controlling, directing, etc.

Therefore, TQM is the art of managing the whole to achieve excellence.

TQM is defined as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. It is application of quantitative methods and human resources to improve all the process within an organization and exceed customer needs now and in future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.

The benefits of TQM are improved quality, employee participation, teamwork, working relationships, customer satisfaction, productivity, communication, profitability, and market share.

Research problem

The real problem of the Civil Aviation Authority (CAA) of Sudan is that it lacks an optimum organizational structure. Many trials have been made to provide such structure. These efforts focused on preparing sound jobs

and job descriptions and incorporated that in the civil aviation master plan. In addition, no coordination seems to be achieved to avoid duplication of duties and overlapping of responsibilities between the different units. This has resulted in a situation where different divisions claim responsibility for the same duties and where certain confusion exists.

The availability of suitable civil aviation airports is an essential requirement and, similarly it is necessary to have adequate air transport services. This will not occur until the most optimal organizational structure is provided.

Research objectives

The objectives of this research work can be stated as follows:

1. To get introduced to the concept of quality and total quality management as a tool to improve organizational performance.
2. To conduct a SWOT analysis for the Civil Aviation Authority of Sudan as the potential case for the application of TQM
3. To design a frame for the application of the TQM according to the results of the SWOT analysis conducted.

Chapter Two

Literature review

2.1 General

The idea of quality is not new and has its origins in inspection systems used in manufacturing industries. In order to reduce the number of faulty goods passed on to the customer, products were inspected during the manufacturing process. The products under inspection were compared with a standard and any faulty goods not reaching the standard were weeded out and either scrapped, or repaired and sold as seconds. Because products were becoming more complex, inspection systems were replaced by system of quality control based on statistic sampling. The variation was the chief cause of poor quality. In order to achieve improvement in quality through reduced variation, Deming outlined a 14-points system of management. TQM is the way of success in the business for continuous improvement. Any change followed by resistance for that reasons we should analysis change agents. Plans should be provided for change and management methodology. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.

One of the gurus of these systems was Deming (Ngowi, 2000). The main focus of Deming's work was improvement of the product by reduction in the amount of variation in design and manufacturing.

2.2 Defining Quality:

When the “quality” is used, we think in terms of an excellence product or a service that fulfill or exceeds customer expectations which are based on the intended use and the selling price. When a product or service surpasses customer expectations it is considered that quality is achieved.

Thus, it is somewhat of an intangible based on perception. Quality can be quantified as follows:

$$Q = P / E$$

Where Q =quality

P = performance

E = expectation

If Q is greater than 1.0 then customer has a good feeling about the product or service. Of course, the determination of P and E will most likely be based on perception with the organization determining performance and the customer determining expectations.

Amore definitive definition of quality is given in ISO 9000: 2000. It is defined the degree to which a set of inherent characteristic fulfills requirements. Degree means the quality can be used with adjectives such as poor, good, and excellent. Inherent is defined as existing in something, especially as a permanent characteristic. Characteristics can be quantitative or qualitative. Requirement is a need or expectation that is stated; generally implied by the organization, its customers, and other interested parties.

2.3 Basic Concepts of TQM

The basic concept of TQM can be stated as follows (Besterfield, 2003).

1. Management must participate in the quality program, develop a clear vision, set long-term goals and direct the program.
2. Employee involvement and empowerment.
3. Meeting customer requirements.
4. Continuous improvement of the business and production process.
5. Establish performance measures for the processing.
6. Reducing product and service costs
7. Reducing development cycle time.

8. Improving teams and training systems

2.4 Gurus of Total Quality Management:

According to (Besterfield, 2003) the gurus of TQM can be stated as follows.

Shewhart

Walter A. Shewhart, spend his professional career at Western Electric and Bell Telephone laboratories. He developed control chart theory with control limits, assignable and change causes of variation, and rational subgroups. In 1931, he authored Economic Control of Quality Manufactured Product, which regarded as a complete and thorough work of the basic principles of quality control, he also developed PDCA (Plan, Do, Check, Action) cycle for learning and improvement

Deming

W. Edwards Deming was a protégé of Shewhart. In 1950, he taught statistical process control. He is credited with providing the foundation for the Japanese quality revival as an economic power. Deming is the best-known quality expert in the world. His 14 points provide a theory for management to improve quality and productivity. He has authored a number of books including “Out of the Crisis” and “Quality, Productivity, and Competitive Position”.

Juran

Joseph M. Juran, worked at Western Electric from 1924 to 1941. There he was exposed to the concepts of Shewhart. Juran traveled to Japan in 1954 to teach quality management. He emphasized the necessity for management at all levels to be committed to the quality effort with hands-on improvement. He recommended projects improvements based on investment to achieve breakthrough result. The Juran Trilogy for managing quality is carried out by the three interrelated processes of

planning, control, and improvement. In 1951, the first edition of Juran's "Quality Control Handbook" was published.

Feigenbaum

Armand V. Feigenbaum, argues that total quality control is necessary to achieve productivity, market penetration, and competitive advantage

2.5 Obstacles of TQM:

The main obstacles of TQM can be stated as follows (Besterfield, 2003).

Lack of Management Commitment

In order for any organizational effort to succeed, there must be a substantial management commitment to management of time and organizational resources.

Inability to Change Organizational Culture

Changing organization's culture is difficult and will require as much as five years. Individuals resist change – they become accustomed to doing a particular process and it becomes the preferred way. Management must understand and utilize the basic concepts of change. These are:

1. People change when they want and they do that to meet their own needs.
2. Never expect anyone to engage in behavior that serves the organization's values unless adequate reason (why) has been given.
3. For change to be accepted, people must be moved from a state of fear to a state of trust.

It is difficult for individuals to change their way of doing thing; it is much more difficult for an organization to make a cultural change.

Organizations that spend more time planning for the cultural aspects of implementing a TQM program will improve their chances of success

Improper Planning

All constituents of the organization must be involved in development of the implementation planning and any modifications that occur as the plan evolve. Of particular importance is the two-way communication of ideas by all personnel during the development of the plan and its implementation. Customer satisfaction should be the goal rather than financial or sales goals.

Lack of Continuous Training and Education

Training and education is an ongoing process for everyone in the organization. Needs must be determined and a plan developed to achieve those needs. Training and education are most effective when senior management conducts the training on the principles of TQM. Informal training occurs by communicating the TQM effort to all personnel on a continual basis.

Incompatible Organizational Structure and Isolated Individuals and Department

Differences between departments and individuals can create implementation problems. The use of multifunctional teams will help to break down long-standing barriers.

Restructuring to make the organization more responsive to customer needs may be needed. Individuals who do not embrace the new philosophy can be required to leave the organization. Adherence to the basic concepts will minimize the problem over time.

Ineffective Measurement Techniques and Lack of Access to Data and Results

Key characteristics of the organization should be measured so that effective decisions can be made. In order to improve a process you need to measure the effect of improvement idea. Access to data and quick recovery is necessary for effective processes.

2.6 Deming's Fourteen Points for Management

1. Create and publish the aims of the company
2. Learn the new philosophy of the quality
3. Stop dependence on mass inspection
4. Do not award business based purely on price
5. Constantly improve the system
6. Institute training
7. Institute leadership
8. Drive out fear and create trust
9. Break down barriers between departments
10. Eliminate slogans and targets
11. Eliminate numerical quotas
12. Remove barriers to pride in workmanship
13. Institutes self-improvement and a programme of training and retraining
14. Take action to accomplish the change

2.7 TQM Tools

The tools listed below are ideally utilized in a particular methodology, which typically involves either reducing the process variability or identifying specific problems in the process. However, other methodologies may need to be developed to allow for sufficient customization to a certain specific process (Leroy Stewart, 2005). In any case, the tools should be utilized to ensure that all attempts at process improvement include:

1. Discovery
2. Analysis
3. Improvement
4. Monitoring
5. Implementation

6. Verification

Check Sheet

The function of a check sheet is to present information in an efficient, graphical format. This may be accomplished with a simple listing of items. However, the utility of the check sheet may be significantly enhanced, in some instances, by incorporate a depiction of the system under analysis into the form.

Pareto Chart

Alfredo Pareto was conducted extensive studies of the distribution of wealth in Europe. He found that there were a few people with a lot of money and many people with little money. This unequal distribution of wealth becomes an integral part of economic theory. D .Juran recognized this concept as a universal that could be applied to many fields. Pareto charts are extremely useful because they can be used to identify those factors that have the greatest cumulative effect on the system, and thus screen out the less significant factors in an analysis. Ideally, this allows the user to focus attention on a few important factors in a process. They are created by plotting the cumulative frequencies of the relative frequency data, in descending order. When this is done, the most essential factors for the analysis are graphically apparent, and in an orderly format.

Flow Chart

Flowcharts are pictorial representations of a process. By breaking the process down into its constituent steps, flowcharts can be useful in identifying where errors are likely to be found in the system.

Cause and Effect Diagram

This diagram, also called an Ishikawa diagram (or fish bone diagram), is used to associate multiple possible causes with a single effect. Thus, given a particular effect, the diagram is constructed to identify and organize possible causes for it.

The primary branch represents the effect (the quality characteristic that is intended to be improved and controlled) and is typically labeled on the right side of the diagram. Each major branch of the diagram corresponds to a major cause (or class of causes) that directly relates to the effect. Minor branches correspond to more detailed causal factors. This type of diagram is useful in any analysis, as it illustrates the relationship between cause and effect in a rational manner.

Histogram

Histograms provide a simple, graphical view of accumulated data, including its dispersion and central tendency. In addition to the ease with which they can be constructed, histograms provide the easiest way to evaluate the distribution of data.

Scatter Diagram

Scatter diagrams are graphical tools that attempt to depict the influence that one variable has on another. A common diagram of this type usually displays points representing the observed value of one variable corresponding to the value of another variable.

Control Chart

The control chart is the fundamental tool of statistical process control, as it indicates the range of variability that is built into a system (known as common cause variation). Thus, it helps determine whether or not a process is operating consistently or if a special cause has occurred to change the process mean or variance. The bounds of the control chart are marked by upper and lower control limits that are calculated by applying statistical formulas to data from the process. Data points that fall outside these bounds represent variations due to special causes, which can typically be found and eliminated. On the other hand, improvements in common cause variation require fundamental changes in the process.

Chapter Three

TQM Implementation Local & International Experience

3.1 General

In recent years, journals, conferences, and seminars across the world have been dedicated to solving the problem of total quality, and rightly so. With TQM organizations can improved continuously. The improvement is focused on customer satisfaction, process improvement and a strategic quality plan (Golomski, 1994). Research by Mann and Kehoe (1995) has concluded that there is a strong relationship between TQM implementation and number of employees, management and employees' attitudes to change, competent management, and level of education. Research conducted by Hill (1996, 1997) highlighted organizational learning (i.e. exposing organizational members to new ideas, expanding their knowledge, altering their behavior, and internalizing new insight) as one of the main driving forces for the introduction of TQM, and suggested quality circles as a useful vehicle for the early stages of the learning journey. Moreover, Hill (1996, 1997) indicated that organizations wishing to progress beyond ISO 9000 certification and towards TQM, must address the issue of organizational learning, whereas change and learning, must go hand-in-hand. Mersha (1997) concluded that the most important driving forces are managers who are aware of the quality-productivity-profitability connection, managers who appreciate the benefits of customer orientation, managers and employees who understand the mutual benefits of employee involvement, government leaders who recognize the benefits of TQM implementation for economic development, and realization by managers and workers of the benefits of accepting positive change. Also, he found that the restraining forces that

block the implementation of TQM are scarcity of local capital, lack of competent managers, and strong government involvement in economic activities, lack of competition and inadequate knowledge base. Likewise, Chase et al. (1998) indicated that the need for leadership, planning and improvement initiatives are considered as driving forces toward the implementation of TQM strategy. Yusof and Aspinwall (2000, 2001) reported in their study, about the implementation of TQM in the UK small manufacturing enterprises that lack of experience in quality management, lack of resources, lack of strategies and overall objectives, and resistance to change are the most restraining forces toward TQM implementation. Moreover, they indicated that one of the main forces to adopt TQM by manufacturing firms is to enhance business performance and in helping produce high quality products in meeting the changing demand and needs of customers. Following their review of the strategic impact and implementation of TQM literature, Leonard and McAdam (2002) indicated TQM was found to be a means of achieving strategic targets and a key driver in the implementation of organization strategy.

3.2 TQM Implementation: Sudanese Experience

National Electricity Corporation NEC is considered as the first organization in Sudan which is directed to apply TQM. The experience is more helpful for the change in all levels from top management to lower management Ishag, S.A. et al (1996).

The change came through many steps; spread the culture, leadership commitment to apply TQM, formulation of change management tool, training for continuous improvement, work internally in all directorates, application of continuous improvement tools.

The first meetings held during the period 7/12/1996 to 2/1/1997 where all leaders and managers were involved in the meetings. After many

discussions they recommended that change to TQM is inevitable. TQM culture has been more accepted from middle and young management and supported from top management.

The first workshop was held from 6/ 6/1998 to 7/7 1998 including most of the managers involved in the first meeting and it was aimed to ensure leadership commitment to TQM and determination of success factors.

In June 1998 the general directorate determined to select team for TQM. A team consisting of 11 members includes the general directorate, team leader, managers, and facilitator were selected. The main roles and responsibilities of the team were to provide and prepare the resources, eliminate problem and obstacles, follow up for continuous improvement, develop the mission and vision statements.

In July 1998 a workshop was held in Wadmdeni town to analyze and evaluate the employees' views and activities. The evaluations of the results were put in the quality plan and were developed to mission and vision statements. The committee held more than 40 meetings from 1998 to 2000 and determined the vision and mission of the NEC.

1. Vision Statement for NEC

Provide stable electricity supply for every part in Sudan, commit high efficiency and low cost, employee satisfaction, customer satisfaction, will grow to become the first electricity company in Sudan.

2. Mission statement for NEC

NEC aimed to be the best in the business and exceed customer's expectations and meet the Sudan development and social requirements through highly motivated workforce, trained for continuous improvement, waste reduction, internal supplier/customer focus and development of partnership relationship with suppliers.

In 1998 the training is started for the teams responsible for continuous improvement for critical processes .In October 1999 there were 109 trainers included the general directorate, team leader and managers were trained in quality and continuous improvement tools. From 14/7/1999 to 23/7/1999 all facilitators were trained in continuous improvement.

As cited by Ishag, S.A. et al (1996) the obstacles facing the change were lack of management commitment, insufficient time to improve the work, discontinuous training, no references, resistance to change, lack of recording, inadequate use of teamwork .

The advantages of implementing TQM in NEC could be summarized in the followings:

Employees were involved in TQM program, correction for quality concepts, and increase of training, education, workshop and seminars, 0.5% of NEC budget was allocated for TQM programs. The leadership principles are, customer satisfaction, do things right at first time, and continuous improvement, communication, education and training, use performance measurement and recording, encouraging of team work and unity, leaders trying to give employees trust and provide a secure working environment.

Because there was a new program for development and restructuring, a professional company was brought in to help NEC; namely EDF (Electrical Development of France) because of its experience in African countries and its participation in the NEC future projects.

Analysis and evaluation included all sections, administration, financial, technical, commercial, human resource and training, the result of the evaluation stated that; (1)Feed back is not effective, (2) there is lack of technical experience, (3) data is not analyzed, (4) there is no co-operation between difference levels of management.

The positions of critical improvement lie in the general directorates are general directorate of distribution, general directorate of marketing, general directorate of state electricity, general directorate of external relationship, general directorate of planning and projects and general directorate of financial and administration affairs.

Also the analysis and evaluation determined the strengths and weaknesses of the NEC investment, opportunities, external environment, political, economical, and technical.

Conclusions and Recommendations:

The following are the main conclusions and recommendations from the NEC case study:

1. The study in NEC showed that lack of top management commitment is the main obstacle, in addition to stresses of daily routine work
2. The study also indicates that resistance to change in the organizational culture is considered as barriers facing TQM programs.
3. The study found that ambiguity in methodology, lack of consultant experience, the feeling that the initiation of the work is not right, all these factors lead to discontinuation of TQM program.
4. The study has also emphasized that missing of proper planning, and discontinuous training, lead to discontinuation of the TQM program.
5. The study also showed that the existing situation is going to be stagnant but there is general directorate of external affairs in NEC continue in TQM program in spite of opposing situation of other directorate.
6. The study recommended that, Communications deliver the organization values, expectations and directions; provide

information and allow feedback from all levels. It is very important to keep information flowing back and forth between employees and various levels of management.

7. The success of TQM program depends on the commitment of top management to encourage the employees to support the program.

3.3 TQM Implementation: The Egyptian Experience

This study which was conducted by Ismael, S. (2003) aims to explore the critical resisting and driving forces that inhibit or promote the implementation of total quality management (TQM) strategy in Egypt, in an attempt to determine whether TQM can be implemented effectively in this developing country. The domain of empirical study is the public Egyptian manufacturing firms. A mail questionnaire was used to collect the required data. A field analysis was used for identifying the main factors affecting TQM implementation in Egypt. Surprisingly, the findings indicated that forces that promote or inhibit TQM implementation obtained in one developing country might be generalizable to another less developed country. The investigation identified some driving forces that promote the implementation of TQM strategy by the Egyptian manufacturing firms. On the other hand, the investigation identified some roadblocks that inhibit the implementation of TQM by manufacturing firms. Managerial implications for the successful implementation of TQM are provided, and finally opportunities for further research are recommended.

Background of the study:

In the complex world of manufacturing, the basic problems troubling many companies are relatively simple to solve. For example, some of these problems are, not making the right things at the right time, having poor product quality or having poor processes, all of which endanger

customer satisfaction. However, a review of the literature make known that production managers in manufacturing companies have seen TQM strategy as a solution, which will cure the previously mentioned ills. Therefore, there is a lot of interest in TQM implementation among manufacturers, government and customers whether in developed countries or less developed countries.

Purpose of the study:

Evidence in the literature indicates that TQM has become a major strategy for most manufacturing firms whether in developed countries or less developed countries. This study aims to presenting the findings of a field survey conducted to identify the main driving and resisting forces towards TQM implementation in Egyptian manufacturing firms. The main purpose of the study is to explore the critical resisting and driving forces related to TQM implementation through exploring two questions:

1. What are the most influential forces that promote or restrain the introduction of TQM by Egyptian manufacturing firms?
2. What are the appropriate managerial implications which could be applied for the successful implementation of TQM strategy?

The questionnaire:

The questionnaire was constructed based on Mersha study (1997), in which a theoretical investigation concerning the implementation of TQM in less development countries was conducted with special reference to Sub-Saharan Africa (i.e. Gabon, Zambia, Ethiopia, Malawi, Zimbabwe and Mozambique) and study of Mann and Kehoe, 1995. A total of 200 questionnaires` were sent by mail to manufacturing firms. The survey was limited to manufacturing firms in the Egyptian public industrial sector, because of the availability of the required data. In the current study, the basic criterion for the choice of the respondents was the capability of the

respondents to provide the necessary information (i.e. information to help to explore forces that promote or inhibit TQM implementation). Consequently, the target respondent in each company was the plant manager. After discarding four incomplete questionnaires, the survey yielded 83 usable responses. The resulting 41.5 percent response rate compares favorably with empirical research conducted in manufacturing firms in developed countries (Mersha, 1997). Although the questionnaires were addressed to the plant managers, 24 responses (28.9 percent) were from the presidents of manufacturing firms, 28 responses (33.8 percent) were from the general managers, and 31 responses (37.3 percent) were from the production managers.

The questionnaire distributed contained 22 questions in four different categories as follows:

1. Individual data on the respondent (age, education, work, experience, etc.).
2. Data on the driving forces promoting the introduction of TQM based on the Egyptian manufacturers' point of view.
3. Data on the restraining forces that inhibited TQM introduction based on the Egyptian manufacturers' point of view.
4. Data on the state of ISO 9000 quality systems in the Egyptian industrial sector.

Driving forces toward TQM implementation:

Plant managers were asked to identify how important each of listed driving forces might promote the introduction of TQM strategy in their companies. It is interesting to note that top management commitment to quality was the most important drive force that promotes TQM implementation in the Egyptian industrial sector). According to Ismael, S. (2003) comparison to this result is similar to Mann and Kehoe (1995) and

Mersha (1997), where they found that top management commitment is regarded as a pushing force toward the introduction of TQM strategy. This supposes that when top management engages in implementing new innovative managerial tools, the need and opportunity of introduction of TQM strategy is increased to improve the whole operation performance. Interestingly enough, this result concerning the expected role of TQM in promoting exports indicated that industry leaders in the Egyptian industrial sector realize the significance of exports for improving competitiveness and economic growth. Likewise, there is some consensus among respondents concerning the role of TQM implementation in attracting more foreign investments. This may stem back to the fact that foreign investors prefer to invest in corporations adopting new innovative managerial tools and acquiring high technology.

Restraining forces toward TQM implementation:

There is an agreement among Egyptian manufacturing firms that insufficient infrastructure, lack of training, workers' reluctance to get involved in decision making, and inadequate knowledge base are regarded as resisting forces that inhibit the introduction of TQM strategy. According to Ismael, S. (2003) comparison to Mersha (1997) regarding forces that hinder the implementation of TQM in Sub-Saharan Africa, the results in the current study and in Sub-Saharan Africa study, are to a large extent similar concerning the role of the above mentioned forces that inhibit the introduction of TQM into the Egyptian and in Sub-Saharan Africa companies. This finding is extremely significant for industrial policy makers, who can easily recognize which inhibiting forces can be reduced with least effort.

The state of ISO 9000 certification:

The findings indicate that 27 out of 83 manufacturing firms (32.5 per cent) have got ISO certification. The majority of ISO companies (21 out of 27) pointed out that adopting the ISO certification means implementing TQM, which is wrong, whereas the ISO certification should be regarded as a first step towards TQM (Stephens, 1994; Bradley, 1994; Williams, 1997; Yung, 1997; Samuel, 1999). Moreover, although adopting ISO certification will ensure that a company's products meet customer specifications, having a quality assurance system may not be sufficient if there is no continuous improvement.

Results and outcomes of the study:

The study indicates that most manufacturing firms involved in TQM implementation have a large number of employees. This finding is consistent with Mann and Kehoe (1995), who found similar results in their study. The effectiveness of implementation and success of TQM is that companies with a large number of employees are more likely to have implemented TQM strategy. It is interesting to note that there is a relationship between manufacturing type and the implementation of TQM strategy, where the findings indicated that 75.9 per cent of respondents involved in TQM implementation have been received from engineering, electronics, pharmaceutical, and chemical companies. This may be interpreted in the light of the fact that these sectors are exposed to severe competition on quality. Therefore, they are more willing to implement TQM in order to improve quality, and in turn to continue in the running, i.e. competition race, than the others. Also the research has found that organizational resistance to change is regarded as one of the resisting forces that inhibit TQM implementation based on the points of view of some of the respondents. That is not surprising, because some

workers still think that any change will threaten their current positions, therefore, it should be hindered. This result supports Mersha (1997) concerning the main factors that complicate the quality improvement effort in Sub-Saharan Africa companies. There is a significant difference among respondents concerning the role of the Egyptian government's control of the introduction of TQM strategy. This may be interpreted in the light of fact that the Egyptian economy is now in a transformation period i.e. transforming public into private companies. Consequently, some respondents believe that the most important influence to quality improvement efforts in Egyptian manufacturing firms would be the role of the Egyptian government. This result is similar to the findings obtained from Mersha (1997).

3.4 TQM implementation: Botswana experience

Impact of culture on the application of TQM in the construction industry in Botswana:

The purpose of the paper is (Ngowi, A.B. 2000) to discuss the outcome of implementing TQM as management program that is embedded with cultural values and assumption in places that do not share its cultural base. Quality assurance (QA) and TQM are management programs that have been formulated with the primary aim of improving productivity. QA does not, itself, ensure good quality, but does ensure realization of specification, i.e. provides confidence. There is also good evidence that the full implementation of TQM increases competitiveness, customer satisfaction, reduces waste, improves the working lives of employees. However, provision of quality requires continuous improvement grounded in culture and founded on practices conducive to such changes. The management philosophy of TQM directs all strategic and operational policies in which the company engages (Deming, 1986). TQM is,

therefore, embedded with its own set of cultural beliefs, norm, values and assumptions. Culture in organization has been described as patterns of shared assumptions, socially acquired and shared knowledge that is embodied in organizational frames of reference (Martin, 1992). Implementation of TQM requires changes to the shared assumptions, frame of reference, and understandings that most organizations have developed through interaction with their environment. These changes will impact basic beliefs and values that employees hold about work. The receptivity of TQM is influenced by both the national and industry culture. The key features of TQM as described by Oakland (1993) and Creech (1994) can be summarized as:

1. Customer satisfaction.
2. Continuous improvement.
3. Leadership (total commitment of top management to the principles of TQM).
4. Emphasis on team work (problem solving requires cross-boundary communication and cooperation).
5. Empowerment (attitudes and expectations about ways of working must change in line with the philosophy of TQM).

Methodology:

A survey that targeted both management and artisan categories was conducted in 100 construction companies in Botswana. Two sets of interviews, one for management staff and another for artisans, were conducted in companies that were randomly selected from class B, C, D and E (Table 1) the study was restricted to these classes of contractors because an earlier informal interview of contractors in classes OC and A showed that most of them have not got worried to introduce TQM in their companies. Although all the companies are registered as general

contractors, only 11 of them were involved in civil engineering works at the time of the interview. The rest of the contractors (89 of them) were involved in building projects of various types. The set of interviews that was directed to the artisans provided for additional clarifications, but was based on similar questions to the set that was directed to the management. The interviews questions were based on the key features of TQM. Question one required the views of the respondents on their companies' policy on customer satisfaction, while question two required their opinion on their companies carrying out of continuous improvement. Questions three and four sought the opinions of the respondents on how much the top management of their companies is committed to the principles of TQM and how they encourage team work respectively. Question five sought the opinions of the respondents on how their companies empower their employees

| Class | Maximum project value(million Pula) | No of companies registered | No of companies selected by the study |
|-------|--------------------------------------|----------------------------|---------------------------------------|
| OC | Up to 0.20 | 220 | - |
| A | 0.20-0.45 | 115 | - |
| B | 0.45-0.9 | 91 | 42 |
| C | 0.90-2.00 | 65 | 39 |
| D | 2.00-4.00 | 18 | 10 |
| E | unlimited | 12 | 9 |

Note: 1pula =US\$0.23

Table 3.1 Classification of construction companies in Botswana

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Result and discussion:

The main objective of the survey is to determine whether the key features of TQM were implemented in the selected companies from the point of view of management and artisan employees. Further, the survey sought to

determine the compatibility of TQM culture with both the organizational culture of the industry and the national culture in Botswana. The following section presents the results and discussion of the interviews.

Question 1 Does your company have a policy to ensure customer satisfaction?

The responses of management respondents to this question established that from management point of view all companies have policies to satisfy customers (clients) in one form or another. Responses to this question from artisan respondents established that from their point of view nothing is done to ensure that every thing possible is done to satisfy the customer.

Question 2: How does your company carry out continuous improvement?

Responses from management respondents established that only ten of the companies surveyed had measures in place to ensure defects are prevented from occurring. These measures include among others; regular seminars with all supervisors and artisans. A total of 70 percent of the respondents said that companies were at different stages of incorporating appropriate measures to improve quality. A total of 20 percent of the respondents said that their companies had not considered any measures to improve quality on project sites.

Responses from artisan respondents established that none of them was aware that their companies had measures that specifically aimed at preventing defects. Artisans from the ten companies where management respondents indicated that they have such measures in place said they understood the programs to be aimed towards improving productivity.

Question 3: How committed to the principles of TQM is the top management of your company?

Responses from management respondents established that the primary concerns of top management in all companies surveyed are cost and

profitability. A total of 40 management respondents said the top management of their companies is aware of TQM and would like to gather its benefits, but consider the effort involved in establishing it to be unattainable. 58 of the management respondents said the management of their companies has always talked about TQM but has not taken any measures to implement it. Respondents from only two companies stated that the top management of their companies has shown full commitment to TQM by taking the leading role and providing the necessary tools.

Responses from all artisan respondents established that most of them (90 %) could not distinguish QA from TQM. The 10 % of artisan respondents who could correctly distinguish QA from TQM said that, from their point of view, their management keeps talking but no action is taken on the ground.

Question 4: Does the management of your company encourage teamwork?

Responses by management stated that all companies encourage teamwork when there are tangible benefits such as early completion of projects or lowering of costs. Otherwise all respondents stated that teamwork is not encouraged in their companies.

Respondents from all artisan respondents indicated that their companies do not encourage teamwork.

Question 5: Does your company try to empower its employees?

The responses to this question established that only 20 of the surveyed companies specifically empower their employees through giving them responsibility and authority to make decision, according to management respondents. 31 of the management respondents stated that, because the employees are recruited on project basis, they do not spend enough time in the company for the management to have confidence in them and give them power to make decisions at their levels of operating.

Responses from artisan respondents from the 20 companies whose management respondents said they specifically empower their employees agreed with this response. All the remaining artisan respondents (80 percent) were of the opinion that, wherever their management feels they have enough competence, they are allowed to make decisions.

Conclusions:

The paper has attempted to highlight the influence of both the organizational and national cultures on the implementation of TQM in the construction industry. The review showed that the TQM is embedded in a culture that may or may not be consistent with the organizational and/ or national culture of the host industry. Where inconsistency is the case, conflicts arise. The study in Botswana showed that, in general the implementation of the key features of TQM often conflicts with national culture. This does not mean that the latter should change in order to be consistent with the former. What is required is the awareness of this inconsistency and the development of a tool that can specifically determine the items that should be addressed so that conflicts can be minimized. The study reported the early stages of introduction of TQM in the construction industry in Botswana. However, as TQM was introduced in the other industries at almost the same time, it will be of interest to determine whether the impacts of culture that were observed in the construction industry apply to the other industries. Also, the study needs to be extended to other countries in the region to give access to more diverse cultures and determine their impact on TQM

Chapter Four

Research Methodology

4.1 General

Research strategy can be defined as the way in which the research objectives can be questioned. Within this context, there are two types of research strategies: quantitative research and qualitative research. Deciding on which type of research to follow depends on the purpose of the study and the type of the information which is required. Quantitative research is objective in nature. It is defined as an inquiry into a social or human problem, based on testing hypotheses or a theory composed of variables, measured with numbers, and analyzed using statistical procedures. Quantitative data is therefore, not abstract, it is hard and reliable; it is measurement of tangible, countable, sensible feature of the world (Bouma and Atkinson, 1995).

Qualitative research, on the other hand is subjective in nature. It emphasizes meanings, experiences and description. The information gathered in qualitative research can be classified under two categories of research, namely, exploratory and attitudinal. Exploratory research is used when you have a limited amount of knowledge about your topic. Here, the interview technique is usually selected as a method of data collection. The purpose of exploratory research is tangled with the need for a clear and precise statement of the recognized problem. Researchers conduct exploratory research for three interrelated purposes: diagnosing a situation, screening alternatives, and to discover new ideas. The raw data provided in exploratory research will be exactly what people have said (in interviews or recorded conversations) or a description of what has been observed.

Attitudinal research is used to subjectively evaluate the opinion, view, or the perception of a person towards a particular object.

Data gathered under the qualitative research approach can later be quantified to some extent but a qualitative approach tends to value the data as qualitative (Coolican, 1993).

According to the definitions provided it has been decided that a qualitative approach will be adopted due to the lack of data, difficulty in having access to statistical data to diagnose the situation of concern to point out the problems associated with the studied organization structure. There are four types of development tools for achieving organizational objectives (Crummer, Roye, 2000).

- 1) Strengths, Weaknesses, Opportunities, and Threats, (SWOT) analysis
 - 2) Critical question analysis
 - 3) Business portfolio analysis
 - 4) Porter's Model for Industry Analysis
- 1) SWOT analysis: is a strategic development tool that matches internal organization strengths and weakness with external opportunities and threats. [(SWOT is short form of Strength and Weakness and its environmental Opportunities and Threats.)] SWOT analysis is based on the assumption that if managers carefully analyze such strengths, weaknesses, opportunities, and threats, a useful strategy for ensuring organizational success will become evident to them
 - 2) Critical question analysis: is a strategy development tool that consists of answering basic questions about the present purposes and objectives of the organization, its present direction and environment, and actions that can be taken to achieve organizational objectives in the future.
 - 3) Business Portfolio analysis: is the development of business related strategy based primarily on the market share of businesses and the growth of markets in which businesses exist.

4) Porter's Model for Industry Analysis: is developed by Michael E. Porter, an internationally acclaimed strategic management expert. Essentially, Porter's Model outlines the primary forces that determine competitiveness with an industry and illustrates how those forces are related. The model suggest that in order to develop effective organizational strategies, managers must understand and react to those forces within an industry that determine an organization's level of competitiveness within that industry.

To achieve the research objective stated earlier, a SWOT analysis will be conducted to assess the organization performance.

4.2 Overview Civil Aviation Authority (of Sudan)

CAA Development: Historical background

In **1936** Civil Aviation Authority (CAA) was first established. It used to be part of the administrative secretary's office during the colonial rule. Its main task was to discharge all transit and landing operation where British Companies used to carry out all sorts of technical services until the independence of the Sudan in 1956.

In 1956 and after the independence of Sudan the public sector had to be actively involved in the economic life of the country. So the Civil Aviation Department (C.A.D) was established under the support of the Ministry of Transport, Telecommunications and Tourism. The newly established department jointed ICAO in the same year.

In **1960** the civil aviation law was approved and its regulations were issued, in the same year, the C.A.D was engaged to the Ministry of Defense. In that period the work was accomplished by the participation of many sections according to the type of work. For construction of pavement (runways or taxiways) the Ministry of Roads and Bridges implemented the work. Building works were implemented by the Ministry of Public Works.

If the work were related to telecommunication they involved Ministry of Communication. Actually the Ministry of Finance and Planning was responsible for planning and finance of C.A.D

In **1974** Aerodrome Engineering Directorate was established to cope with the improvement in aviation and development in technology. Competent staff jointed from many departments. The departments are Public Works and Construction, Roads and Bridges, Communications, and Ministry of Finance and Planning.

In March **1985** the Ministry of Aviation and Tourism was established for only three weeks because of the revolution of 6 April at the same year. Its objectives were independent from any body and for the importance of aviation and it is vital role.

1985 witnessed the establishment of an independent body with the name of the Civil Aviation Authority under supervision of the Ministry of Defense.

In 1986 formation of central planning directorate was approved to perform the role of planning inside the CAA instead of Ministry of Finance and Planning.

In **1986** CAA issued new law (Otrakji, G. et al. ICAO Consultant 2001) which gave extensive but sometimes vague objectives to the CAA while confining the director general's authority mainly to financial and administrative areas with hardly mention of his authority in technical, operational, safety and security matters. The organization structure of the civil aviation authority has accumulated over time of function services, responsibilities, and developed from time to time in which some twenty departments in the CAA reporting directory to the Director General. The tasks, responsibilities and subdivisions have been, in most cases, prepared by their directors and approved usually by the Director General.

In **1988** and for the reasons of uncertainty and confusion and out - dated structure, CAA consulted International Civil Aviation Organization ICAO to evaluate and prepare new organization structure.

1991 there were many trials from Sudanese experience to prepare organization structure for CAA (Centre for Management Development).

In **1995** the Ministry of Aviation and Survey was established. The Survey Department was separated from the Ministry to establish the Ministry of Aviation which comprises of Civil Aviation Authority (CAA), the Department of Meteorology and the Sudan Airways company.

In **1996** the ICAO team of consultants visited Sudan and prepared the civil aviation Master Plan because of the absence of a more systematic approach and basis in the aforementioned organization structures which provided some guidance but also have caused uncertainty and confusion about the title, function and responsibility of each directorate and many of their personnel and leading to duplication and overlapping of tasks, lack of coordination and cooperation and creation of misunderstanding . A number of recommendations and proposals were made, based on an analysis of the situation, application of basic management principles and taking into account government policy options expressed at the time and for possible future privatization or incorporation of certain aviation assets and service, such as airports and air navigation services. Accordingly, the organization structure for CAA was proposed with five major divisions for airports, Air Navigation Services, Civil Aviation Affairs, Administration and Finance Affairs, Planning and Training.

In August **1998** the Council of Ministers issued an organizational structure for the Civil Aviation Authority as the result of the proposed organization structure by ICAO 1996. It includes a Board of Directors and Directors General supervising eight general directorates. These general directorates are: Khartoum Airport, Security and Regional

Airstrips, Administrative affairs, Financial, Accounting and Procurement Affairs, Aviation and Flight safety Affairs, Engineering Affairs, Air Navigation Services, Planning and Development.

The general directorates were further divided into directorates then into sections but without any explanation of their specific functions, and also no job description, mandates or duties of the senior personnel in charge of the general directorates and the subordinate directorate.

In **2003** CAA designed a new structure called department structure. That included the planning department, administration and finance department, safety and operation department, Khartoum airport department, department of airports and security. A department structure is not approved by the Council of Ministers and not achieved coordination or avoids duplication of duties and overlapping of responsibilities between different units. Although a department structure is not approved but it is partially applied in some directorate.

Civil Aviation authority plays a major role in economic, social and political status of Sudan. It provides access to remote areas and population centers that would otherwise be practically isolated from the capital and the rest of the country. It allows for the provision of food, medicine and other essentials to many areas. It permits patients to travel comfortably and safely to hospitals and for medical treatment. The same reliance on air travel affects incoming businessmen and visitors as well as the Sudanese traveling aboard.

The availability therefore of suitable civil aviation airports is an essential requirement for major population centers all around the country particularly for those at more remote and isolated locations. Similarly it is necessary to have adequate number of air transport services operated regularly to meet the transportation requirements at each location. Nearly

50 airports and landing strips are listed in Sudan Aeronautical publication. Of these, 16 are owned operated and maintained by Civil Aviation Authority (CAA). Khartoum is the major international airport in the country. Other airports include Port Sudan, Dongla, Nyala, El fasher, Geneina, El Obied. Damazin, Atbra, Juba, Malkal, Kassala, Wau, Wadi Halfa, El Debba, and Merowe. The adequacy of each of these airports on the basis of the anticipated aircraft and passenger traffic was considered and future needs of necessary improvements were noted.

The CAA main objectives are:

1. Develop all sorts of aviation services in order to provide the most up to date quality services so as to improve strategic and commercial air transport activities together with ensuring the safety of Sudanese skies, airports and aerodromes.
2. Represent the Sudan in international and regional meeting through active participation in the fields of Civil Aviation and transport.
3. Develop Civil Aviation to promote local and international Air transport and ensure its safety technically, administratively and economically to serve the national interests of the country.
4. Conduct studies, research and elaborate plans to offer a complete set of aviation services.
5. Provide high quality airports and aviation equipment to cope with International Civil Aviation Organization (ICAO) Standards.

The CAA Responsibilities are:

1. Provide air traffic services, including air inspection and telecommunication services.
2. Laying the basic infrastructures of a reliable aeronautical industry and business including issuing licenses, pricing for passenger, mail and cargo transport.

3. Air safety, air worthiness, and permit licenses to pilots, engineers, air lines, and planes.
4. Sign agreements with airline companies in order to connect the Sudan to the World and enable foreign air line companies to benefit from the air and land services in the Sudan.
5. Construct, manage, and maintain airports, navigation communication to cope with ICAO standards.

4.3 SWOT analysis for the Civil Aviation Authority

From the study conducted earlier in CAA by some department, the following results provided.

Strength:

1. Strong financial resource. .
2. Qualified and well trained staff.

Weakness:

1. Poor organization structure.
2. There is no job description.
3. Temporary staff at projects.
4. Non autonomous organization.

Opportunities:

1. Strategic location of Sudan.
2. Natural resources.
3. New technology.
4. Oil industry.

Threats:

1. Top management quick turn - over
2. Evolution of competing in air navigation centre in the regional areas

3. War.

CAA Plans and Strategies

The main plans of CAA are study of air transport economics to determine potentials for growth of air transport traffic in Sudan and prepare appropriate forecasts of passenger and aircraft movement, particularly at Khartoum Airport. Also an evaluation of existing airports and ancillary services and proposals for their development as required. Furthermore an evaluation of present and projected air navigation facilities and services including telecommunications, navigation and air traffic services and proposed development plans, taking into account the planned introduction of CNS/ATM systems (Communication Navigation Surveillance/Air traffic management). Beside that CAA assess for flight safety standards and capabilities and proposals for their upgrading and improvement. In addition CAA assess for the airport fire and rescue service and, its adequacy for each airport. CAA as well assess for training needs and facilities and appropriate recommendations for the upgrading of the Civil Aviation National Institute. Also CAA Assess for airport management capabilities and the possibility of transferring airports to regional authorities. Also CAA reviews the organizational and management structure of the Civil Aviation Authority and appropriate proposals for its improvement.

4.4 ICAO Universal Security Audit Program (USAP).

The International Civil aviation Organization (ICAO) is responsible for the development and implementation of the Universal Security Audit Program (USAP) (Annex 17 Standards). Every State has full independence over the airspace of its territory. Accordingly, ICAO fully respects an autonomous State's responsibility and authority for aviation security, including its decision-making powers with respect to

implementing corrective actions related to audit findings. USAP audits will be conducted in all Contracting States in accordance with an audit program established by ICAO and agreed upon by the States. The audit elements and process will be made available to all Contracting States. Results of the audits will be produced and submitted on a timely basis in accordance with a predetermined schedule for the preparation and submission of audit reports. ICAO USAP audits will be conducted in a consistent and objective manner. Standardization and uniformity in the scope, depth and quality of audits will be assured through training and certification of all auditors, the provision of guidance material, and the implementation of an audit quality control system within. USAP audits are to be conducted in a manner such that Contracting States are given the opportunity to monitor, comment upon and respond to the audit process, but must do so within an established time frame. USAP audits will be conducted by appropriately trained and certified auditors and in accordance with widely recognized auditing concepts. Sensitive security information collected as part of the USAP will be protected from unauthorized disclosure.

ICAO aviation security audit is typically conducted over a period of six to eight days by a team of three or four auditors following standard auditing procedures and protocols. However, the duration of the audit and the composition of the audit team are adjusted depending upon the size and complexity of operations and the number of airports involved.

The ICAO audit reports, coupled with the State corrective action plan, provide the starting point for initiating corrective actions taken by States. In recognition of the special sensitivity of information related to aviation security, the USAP has adopted the principle of confidentiality. In practice this means that the audit report and all audit-related documentation are subject to accurate physical controls by ICAO and are

strictly protected from release to any entity other than the audited State. However, ICAO encourages the exchange of information between States on a bilateral or multilateral basis in order to promote mutual confidence in the level of aviation security between States. To facilitate this exchange, ICAO regularly issues an audit activity report to member States advising of States and airports audited to date under the Program. The USAP emphasizes the importance of consistent and accurate auditor selection, training and certification in order to ensure and maintain the highest standards of competency in the conduct of the audits.

4.5 Questionnaire design and piloting

The purpose of the questionnaire is to assess the performance of the Civil Aviation Authority. The questionnaire consists of four sections each section contains a number of questions which are related to the research objectives.

Section one: General, is about the organizational structure. It consists of six questions each of which aims to assess the respondents' views about the sufficiency of the structure in delivering its purposes and facilitating the use of its resources.

Section two: relates to the strength and weakness of the CAA, whether it works as an autonomous body, what it could gain from implementing the change successfully and the possible obstacles that may face the execution of the improvement plans?

Section three: relates to the opportunities and threats. To point out how important each factor can influence the aviation industry, these factors are strategic location of Sudan, oil industry, war, technology and other factors.

Section four: about CAA plans and strategies.

(A questionnaire copy is included in appendix A). Version 1 of the questionnaire was piloted by distributing it to seven members of the

actual research sample to check its clarity and to rule out any ambiguities or misunderstanding. In this process, some questions have been changed or amended according to the pilot survey as it is shown in version two.

The following changes have been included in section two in the questionnaire.

1. Question 1&2 in version one are combined in question 1 in version two. The question is changed to: "how do you rate the financial situation of your organization?"
2. In question 4 in version one the word existence was replaced by the word improvement.
3. Question 8 in version one was divided into two questions 7&8 in version two.
4. Question 12 in version one was divided in two questions 12&13 in version two.

The following changes have been made in section four of the questionnaire.

1. A new column ' I don't know' was added In question 7 in version one because in the pilot survey it was notice that some people responded by saying don't know to some questions.

A finalized copy of the questionnaire is attached in appendix A. Copies of questionnaire were sent to all the directorates in the CAA. This included the Planning and development directorate, Aerodrome engineering directorate, General directorate of financial affairs, General directorate of administration affairs, Directorate of air transport, and Directorate of air navigation. Some of the employees that represent each of these directorates were selected to respond to the questionnaire. With a 100% rate of return, a total of 46 copies were distributed, completed and returned. All the returned questionnaire copies were used.

Chapter Five

Analysis of the result

5.1 General

The main objective of the questionnaire is to assess the CAA performance. SPSS (Statistical Package for Social Science) was used to analyze the questionnaire. The results presented in tabular format and histogram. The following sections present the results and analysis of the questionnaire.

5.2 Analysis of the result

Respondents were asked in question one to identify how many people are employed in their organization. 4 answer categories were provided as shown in the appendix A. The results shown in figure 5.1 showed that a substantial majority (89.1%) employ more than 3000 due to the fact that the organization size is an important variable that can influence structural design. 8.7% stated that between 2000 and 3000. While 2.2 % mention more than 1000

| Responses | Frequency | Percent % |
|----------------|-----------|-----------|
| Less than 1000 | 0 | 0 |
| More than 1000 | 1 | 2.2 |
| 2000-3000 | 4 | 8.7 |
| More than 3000 | 41 | 89.1 |
| Total | 46 | 100 |

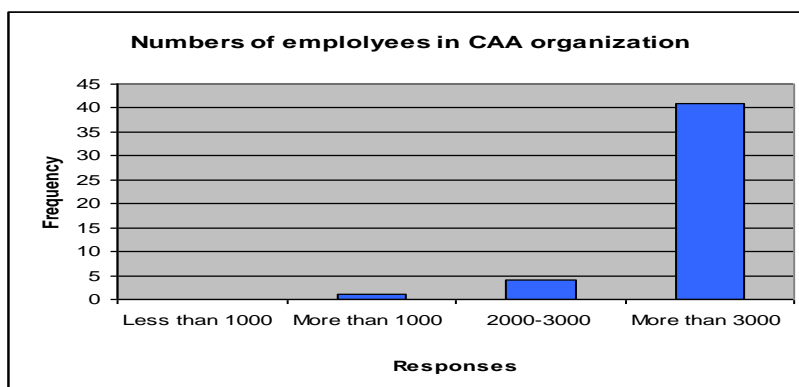


Figure 5.1: Numbers of employees in CAA

Question two about the creation of current organization structure. When asked in question two to identify who produced the current organization structure, 82.6 % responded by saying Professional government body while 6.5 % mentioned that a private sector expert, and 10.9 % of the case other.

| Responses | Frequency | Percent % |
|------------------------------|-----------|-----------|
| Professional government body | 38 | 82.6 |
| Private sector expert | 3 | 6.5 |
| Others | 5 | 10.9 |
| Total | 46 | 100 |

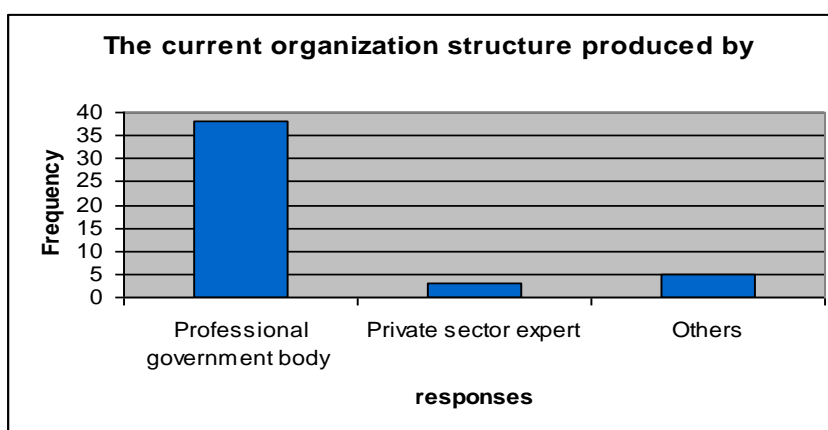


Figure 5.2: who produced the current organization structure

Respondents were asked in question three to identify if the current organization structure facilitates the use of each resource. The results shown in Figure 5.3 illustrated that 63 % responded that the current organization structure does not facilitates the use of each resource as the management system attempts to attain its objectives while 37 % mentioned it is sometimes facilitates its job

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 0 | 0 |
| Sometimes | 17 | 37 |
| No | 29 | 63 |
| Total | 46 | 100 |

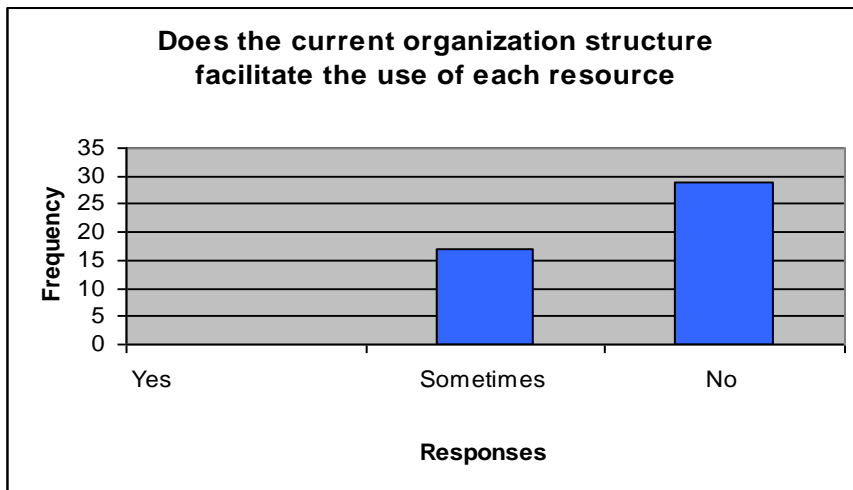


Figure 5.3: If the current organization structure facilitates the use of resource

In question four the respondents were asked if the organization structure have clear job description. The result shown in Figure 5.4 showed that a substantial majority (65.2 %) responded it does not have clear job description,34.8% stated that sometimes it has clear job description and sometimes it has not clear job description.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 0 | 0 |
| Sometimes | 16 | 34.8 |
| No | 30 | 65.2 |
| Total | 46 | 100 |

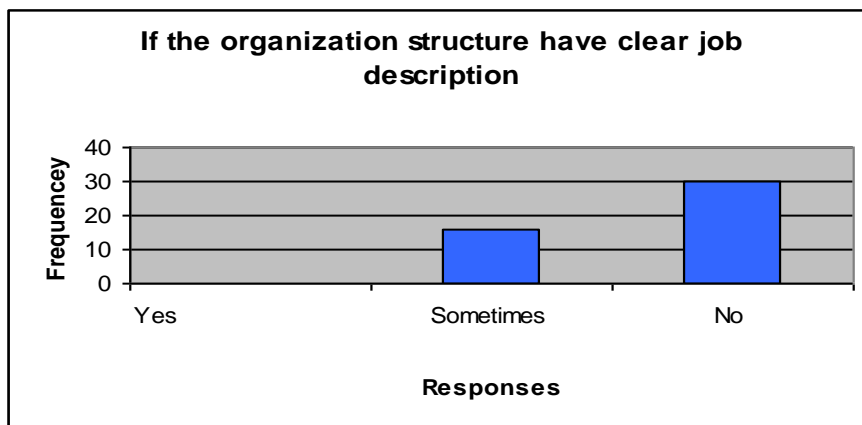


Figure 5.4: If the organization structure has a clear job description

In question five respondents were asked if there is a conflict between organization objectives and individual objectives the result shown Figure.5.5 showed that a substantial majority (73.9%) confirm that there is a conflict between organization objectives and individual objectives while 26.1 mentioned that sometimes there is conflict

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 34 | 73.9 |
| Sometimes | 12 | 26.1 |
| No | 0 | 0 |
| Total | 46 | 100 |

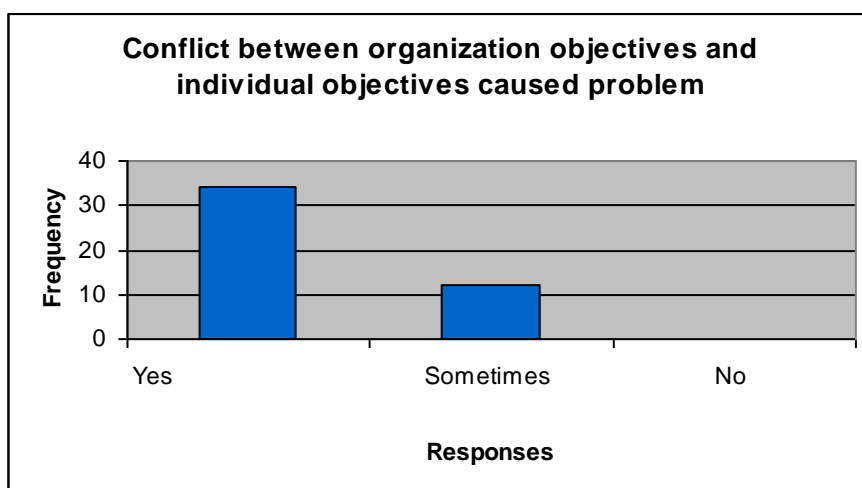


Figure 5.5: If there is a conflict between organization and individual objectives

Respondents were asked in question six to identify if the organization structure have direct link with ICAO standard. The result shown in figure 5.6 explained that 52.2% responded by saying there is link, 30.4 mentioned that sometimes there is link, while 17.4 stated there is no.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 24 | 52.2 |
| Sometimes | 14 | 30.4 |
| No | 8 | 17.4 |
| Total | 46 | 100 |

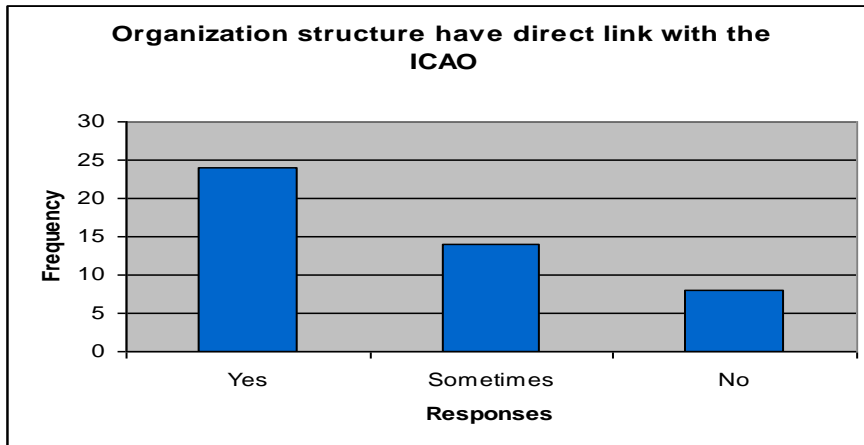


Figure 5.6: If the organization structure has a direct link with the ICAO

In question seven respondents were asked to identify the financial situation of the CAA. The result shown in Figure 5.7 showed that 6.5 % responded it is excellent, 34.8% mentioned very good, 32.7 stated good, 13 % responded weak, while 13% neutral

| Responses | Frequency | Percent% |
|--------------|-----------|----------|
| Excellent | 3 | 6.5 |
| Very good | 16 | 34.8 |
| Good | 15 | 32.7 |
| Weak | 6 | 13.0 |
| I don't know | 6 | 13.0 |
| Total | 46 | 100 |

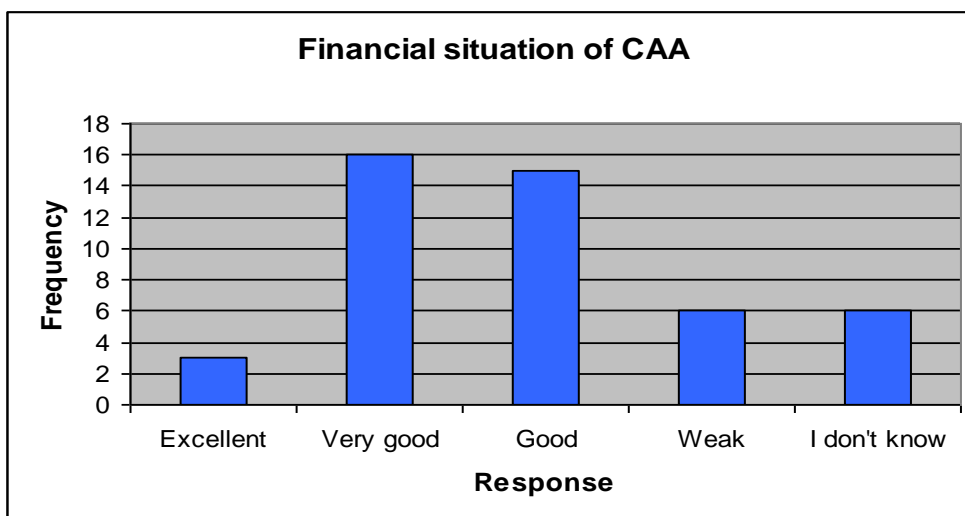


Figure 5.7: The financial situation of the CAA

In question eight respondents were asked to identify the affects of the lack of employee's motivation. The result shown in Figure 5.8% showed a substantial majority (80.4%) confirm that the lack of employee motivation affect the work significantly 15.2 % mentioned moderate, 2.2 % stated slight, while 2.2% mentioned has no effect

| Responses | Frequency | Percent% |
|---------------|-----------|----------|
| Significant | 37 | 80.4 |
| Moderate | 7 | 15.2 |
| Slight | 1 | 2.2 |
| Has no effect | 1 | 2.2 |
| Total | 46 | 100 |

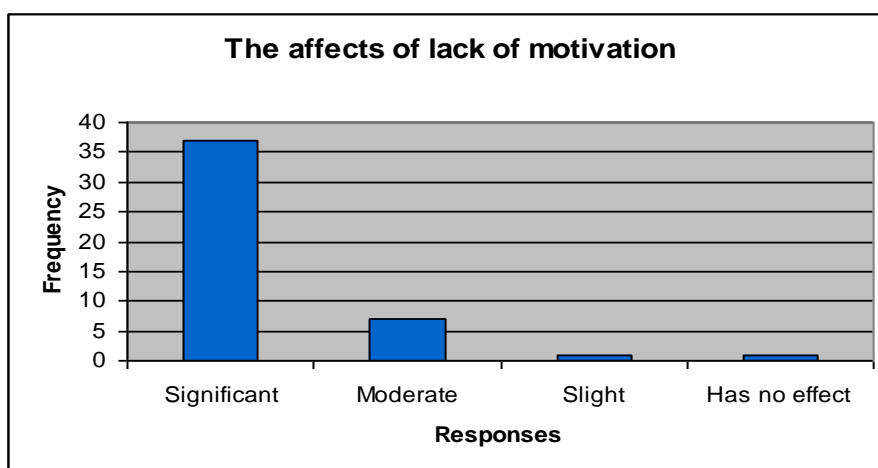


Figure 5.8: The affect of lack of motivation

In question nine the respondents were asked to identify the affects of change as the fundamental part of the organization. The result shown in Figure 5.9 showed that 87 % responded that change is fundamental part of organization, 6.5 % mentioned sometime, while 6.5% neutral.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 40 | 87 |
| Sometimes | 3 | 6.5 |
| No | 3 | 6.5 |
| Total | 46 | 100 |

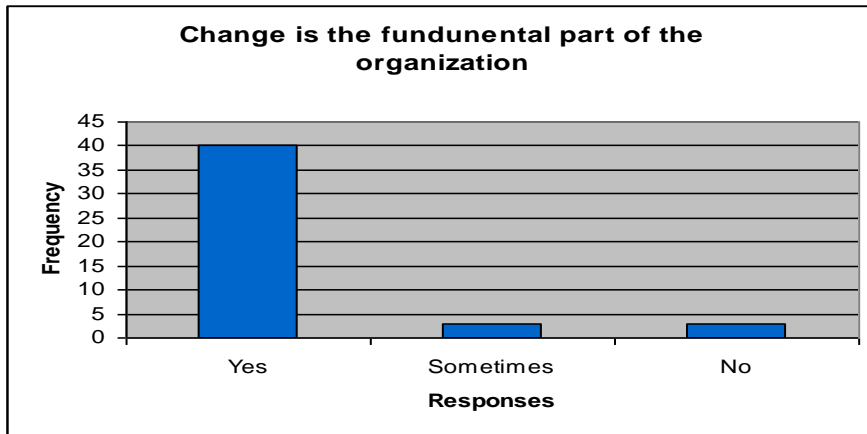


Figure 5.9: Change is the fundamental part of the organization

When asked In question ten to identify the area of change 45.7 % responded by saying customer needs, technological breakthrough, and new government regulations as shown in Figure 5.10 while 30.5% mentioned that new government regulations, 4.3 % responded customer need and 13 % technological breakthrough.

| Responses | Frequency | Percent% |
|----------------------------|-----------|----------|
| Customer needs | 2 | 4.3 |
| Technological breakthrough | 6 | 13 |
| New government regulations | 14 | 30.5 |
| All above | 21 | 45.7 |
| Other | 3 | 6.5 |
| Total | 46 | 100 |

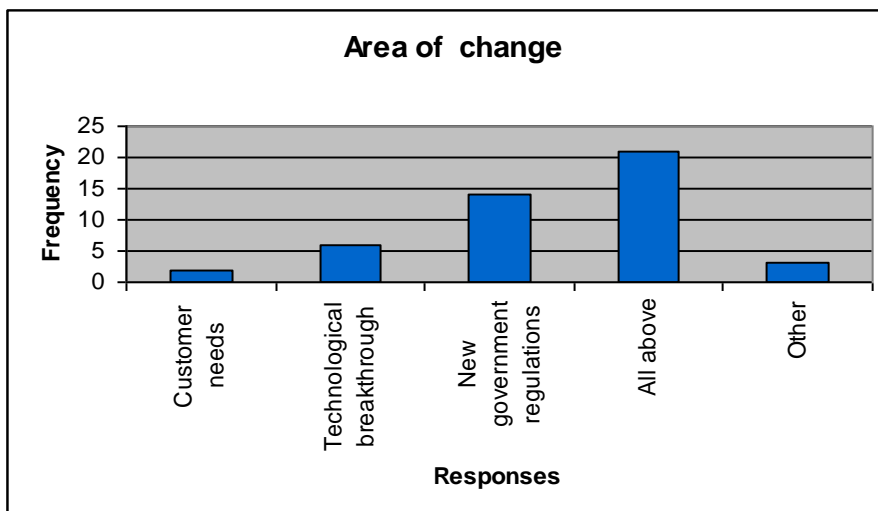


Figure 5.10: The area of change

In question eleven the respondent were asked to identify the outcome from implementing changes successfully in the organization. The result shown in Figure 5.11 showed that 45.7 responded that more flexibility and innovation, 32.6 % responded that more flexibility, 15% innovation, while 6.5 % responded others.

| Responses | Frequency | Percent % |
|------------------|-----------|-----------|
| More flexibility | 15 | 32.6 |
| Innovation | 7 | 15.2 |
| Both above | 21 | 45.7 |
| Others | 3 | 6.5 |
| Total | 46 | 100 |

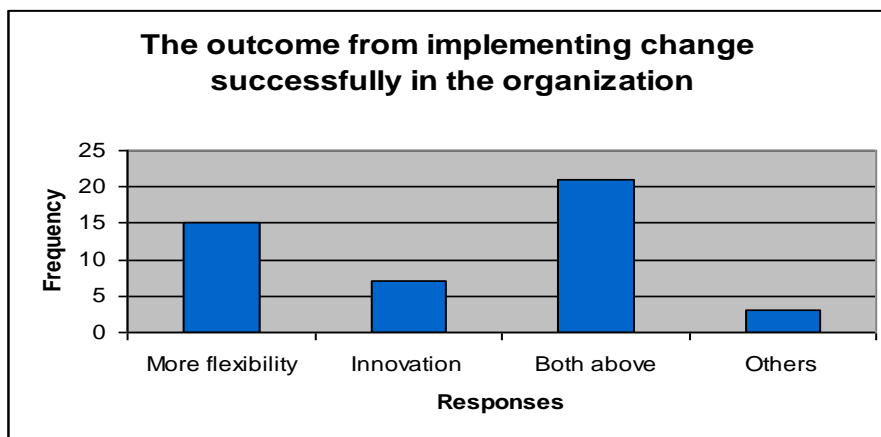


Figure 5.11: The out come from implementing change successfully

In question twelve the respondents were asked to identify if the organization encourage employees to continually search. The result shown in Figure 5.12 showed that 45.7 % responded by saying no, 43.5 % stated sometime while 10.8 % mentioned it encourage employees.

| Responses | Frequency | Percent % |
|-----------|-----------|-----------|
| Yes | 5 | 10.8 |
| Sometimes | 20 | 43.5 |
| No | 21 | 45.7 |
| Total | 46 | 100 |

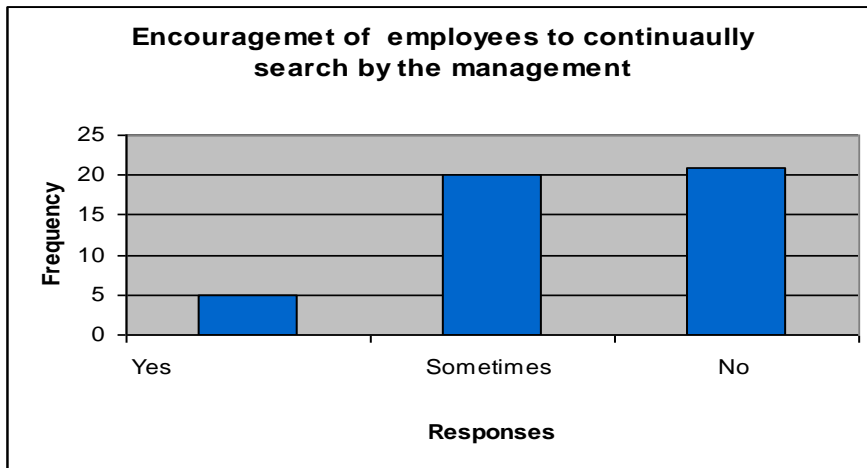


Figure 5.12: Encourage of employees to continually research

13) The respondents were asked in question thirteen to identify if the CAA autonomous body. The result shown in Figure 5.13 showed that a substantial majority (76.1 %) confirm it is not autonomous, 13 % mentioned yes, while 10.9 % said sometimes.

| Responses | Frequency | Percent % |
|--------------|-----------|-----------|
| Yes | 6 | 13 |
| Sometimes | 5 | 10.9 |
| No | 35 | 76.1 |
| I don't know | 0 | 0 |
| Total | 46 | 100 |

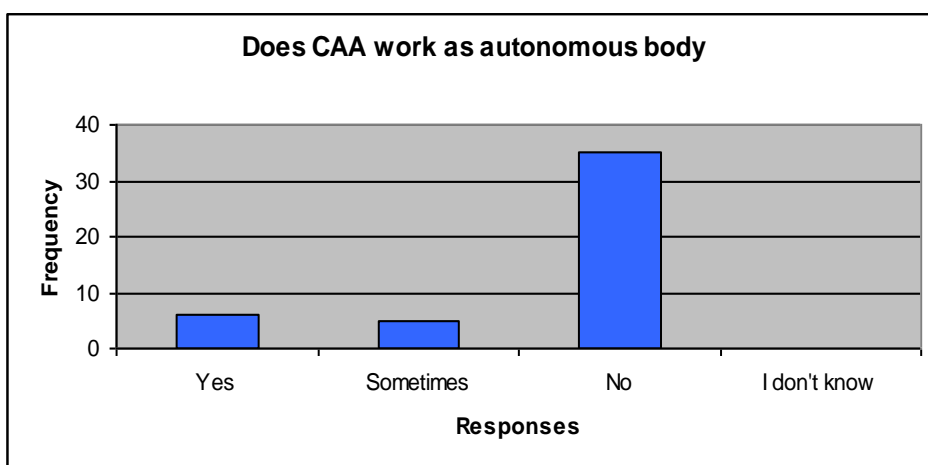


Figure 5.13: If CAA works as autonomous body

In question fourteen the respondents were asked to identify to what extent CAA follow regulations and procedures of the ministry of finance. The result shown in Figure 5.14 showed that 78.2 % confirm all time, 10.9 % most time, 10.9 % sometime.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| All time | 36 | 78.2 |
| Most time | 5 | 10.9 |
| Sometime | 5 | 10.9 |
| Total | 46 | 100 |

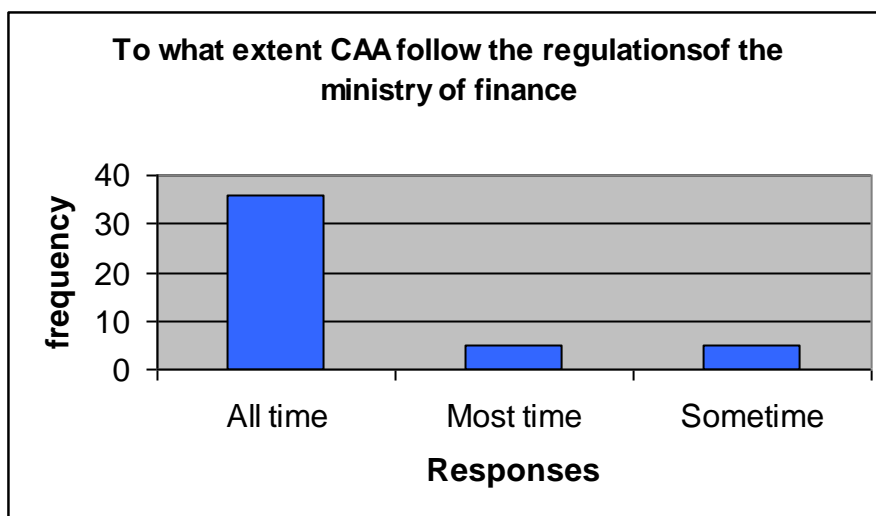


Figure 5.14: CAA follows the regulations of the ministry of finance

In question fifteen respondents were asked to identify if the previous plans and policies implemented. The result shown in Figure 5.15 showed that 56.6 % responded no, 30.4 % mentioned sometimes, 13 % stated yes.

| Responses | Frequency | Percent % |
|-----------|-----------|-----------|
| Yes | 6 | 13 |
| Sometimes | 14 | 30.4 |
| No | 26 | 56.6 |
| Total | 46 | 100 |

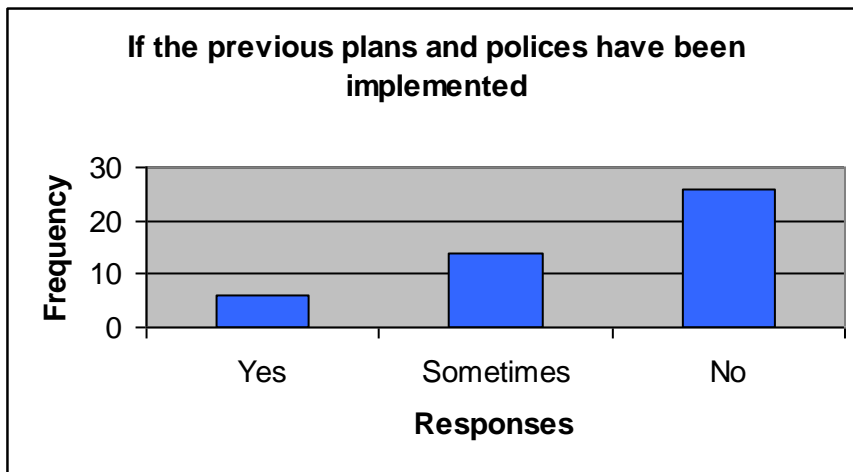


Figure 5.15: If the previous plans and polices implemented

When asked in question sixteen to identify if there are any obstacles or difficulties facing the execution of plans. The result shown in Figure 5.16 showed that a substantial majority (73.9 %) confirm there are obstacles, 19.6 % sometime, while 6.5 % mentioned no.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 34 | 73.9 |
| Sometimes | 9 | 19.6 |
| No | 3 | 6.5 |
| Total | 46 | 100 |

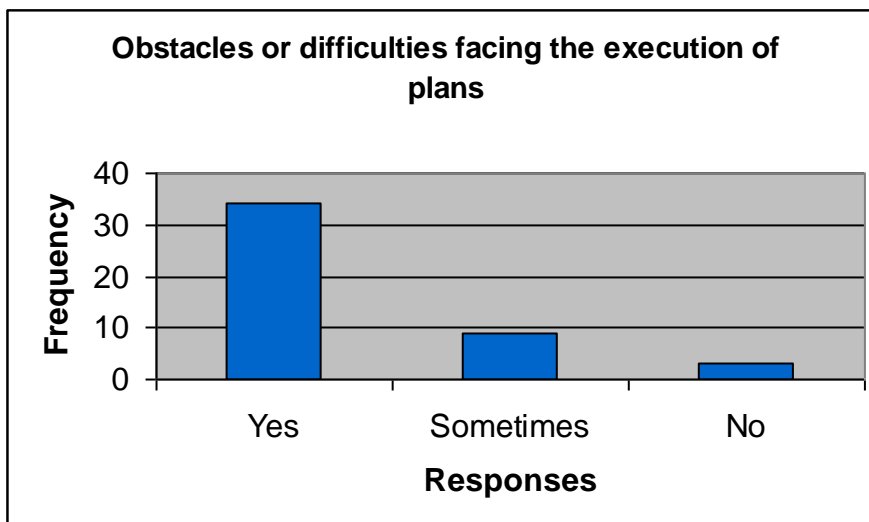


Figure 5.16: Obstacles and difficulties facing the execution of plans

In question seventeen the respondents were asked to identify if obstacles are internal or external. The result shown in Figure 5.17 showed that 67.4 % responded internal and external, 19.6 % stated external, 10.8 % mentioned internal, 2.2 % stated others.

| Responses | Frequency | Percent % |
|------------|-----------|-----------|
| Internal | 5 | 10.8 |
| External | 9 | 19.6 |
| Both above | 31 | 67.4 |
| Others | 1 | 2.2 |
| Total | 46 | 100 |

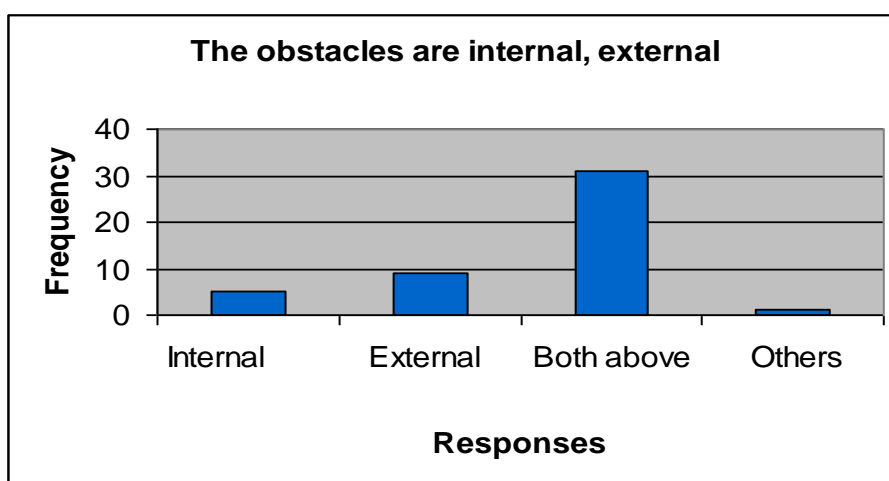


Figure 5.17: The obstacles in CAA are internal or external

Respondents were asked in question eighteen to identify if CAA recruits employees. The result shown in Figure 5.18 showed that 54.4 % responded it does not, 32.6 % sometimes, 13 % it does.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 6 | 13 |
| Sometimes | 15 | 32.6 |
| No | 25 | 54.4 |
| Total | 46 | 100 |

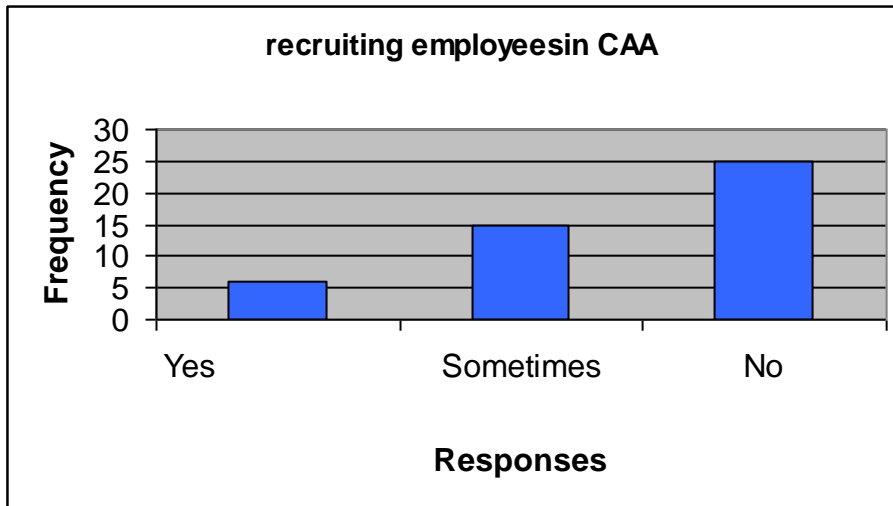


Figure 5.18: Recruiting employees in CAA

The respondents were asked in question nineteen to identify if CAA set salary scale. The result shown in Figure 5.19 showed that 65.2 % responded it does not, 26.1 % stated sometime, while 8.7 % mentioned it does.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 4 | 8.7 |
| Sometimes | 12 | 26.1 |
| No | 30 | 65.2 |
| Total | 46 | 100 |

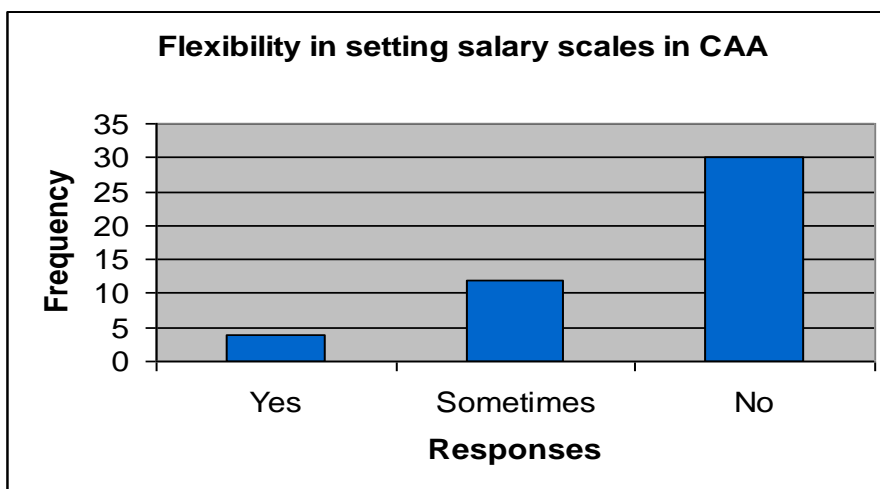


Figure 5.19: If CAA set salary scale

In question twenty the respondents were asked to identify if CAA considered as stable organization. The result shown in Figure 5.20 showed that 50 % responded no, 34.8 % stated to some extent, 15.2 % mentioned yes.

| Responses | Frequency | Percent% |
|----------------|-----------|----------|
| Yes | 7 | 15.2 |
| To some extent | 16 | 34.8 |
| No | 23 | 50 |
| Total | 46 | 100 |

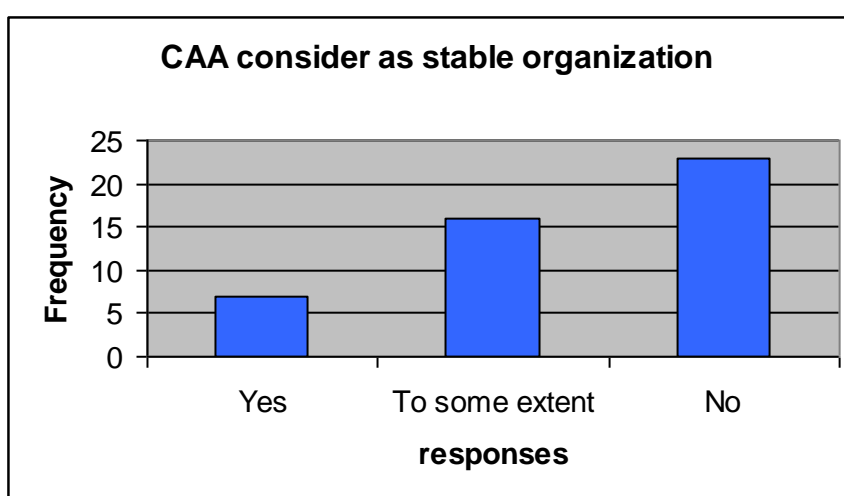


Figure 5.20: If CAA consider as stable organization

In question twenty one the respondents were asked to identify the influence of strategic location of Sudan to aviation industry. The result shown in Figure 5.21

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 41 | 89.2 |
| Of some importance | 2 | 4.3 |
| Of no importance | 3 | 6.5 |
| Total | 46 | 100 |

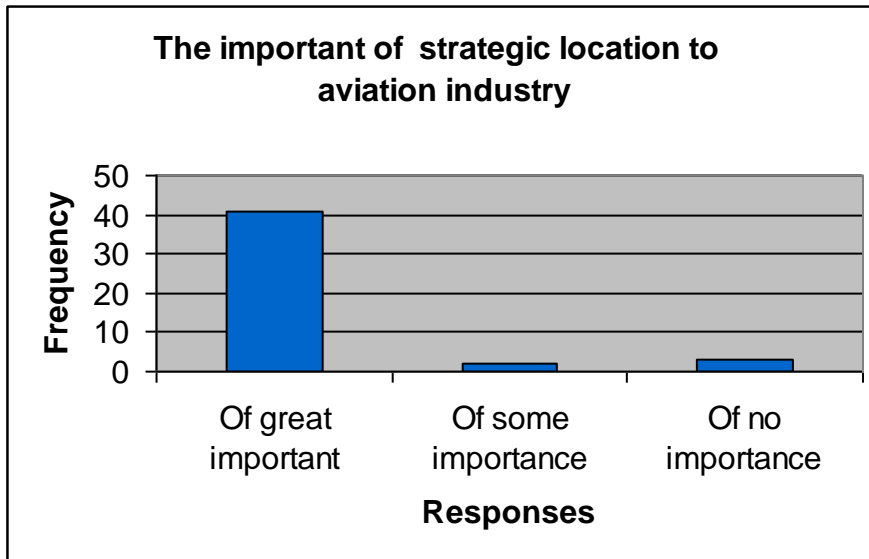


Figure 5.21: The importance of strategic location to aviation industry

In question twenty two the respondents were asked to identify the influence of oil industry of Sudan to aviation industry. The result shown in Figure 5.22

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 32 | 69.6 |
| Of some importance | 12 | 26.1 |
| Of no importance | 2 | 4.3 |
| Total | 46 | 100 |

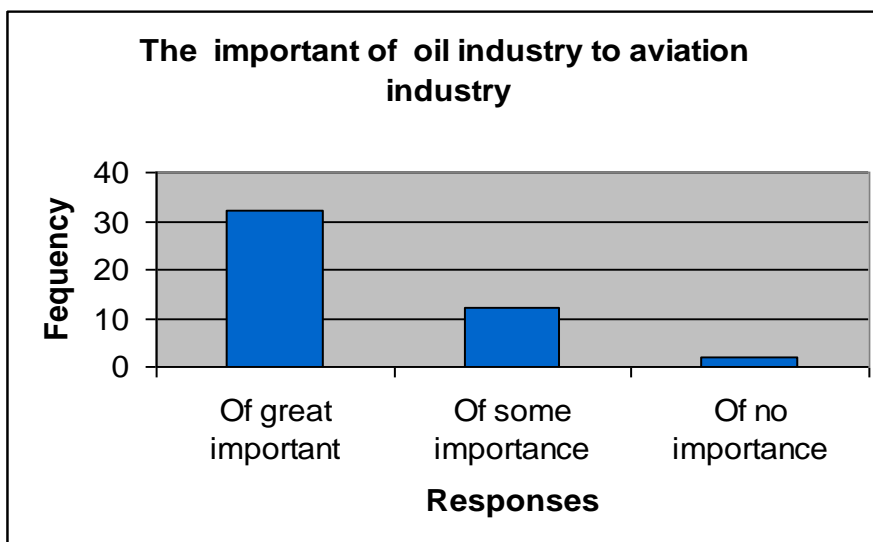


Figure 5.22: The importance of oil industry to aviation industry

In question twenty three the respondents were asked to identify the influence of tourism to aviation industry. The result shown in Figure 5.23

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 25 | 54.3 |
| Of some importance | 16 | 34.8 |
| Of no importance | 5 | 10.9 |
| Total | 46 | 100 |

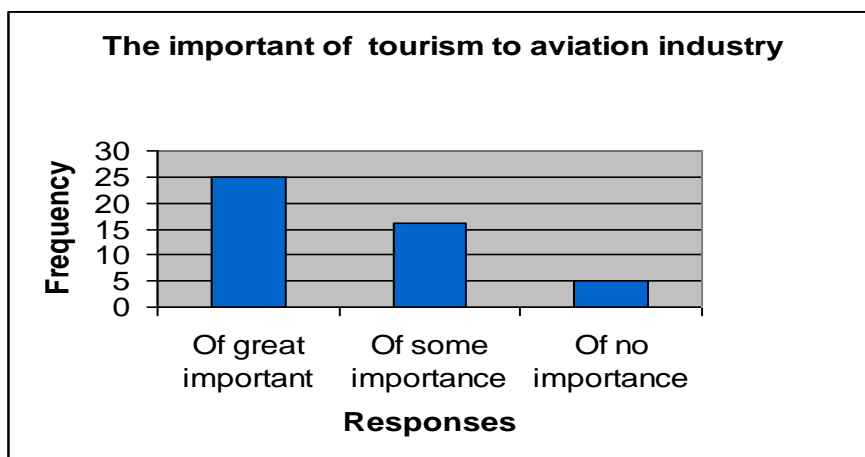


Figure 5.23: The importance of tourism to aviation industry

In question twenty four the respondents were asked to identify the influence of new technology to aviation industry. The result shown in Figure 5.24

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 31 | 67.4 |
| Of some importance | 13 | 28.3 |
| Of no importance | 2 | 4.3 |
| Total | 46 | 100 |

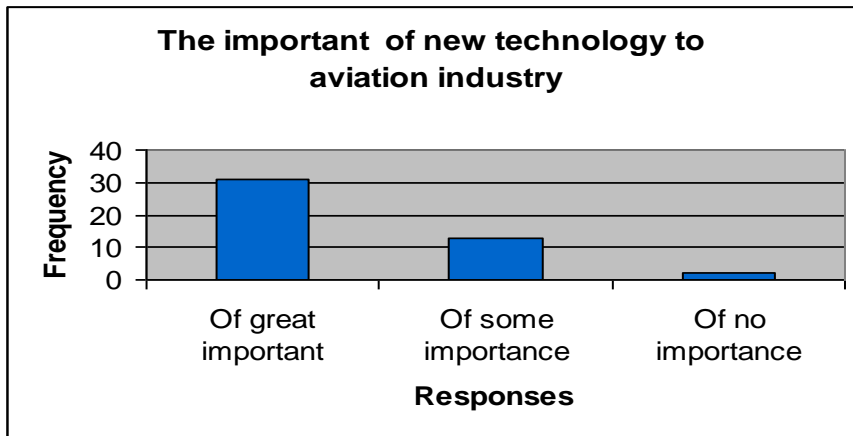


Figure 5.24: The importance of new technology to aviation industry

In question twenty five the respondents were asked to identify the influence of experience of employees to aviation industry. The result shown in Figure 5.25

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 35 | 76.1 |
| Of some importance | 9 | 19.6 |
| Of no importance | 2 | 4.3 |
| Total | 46 | 100 |

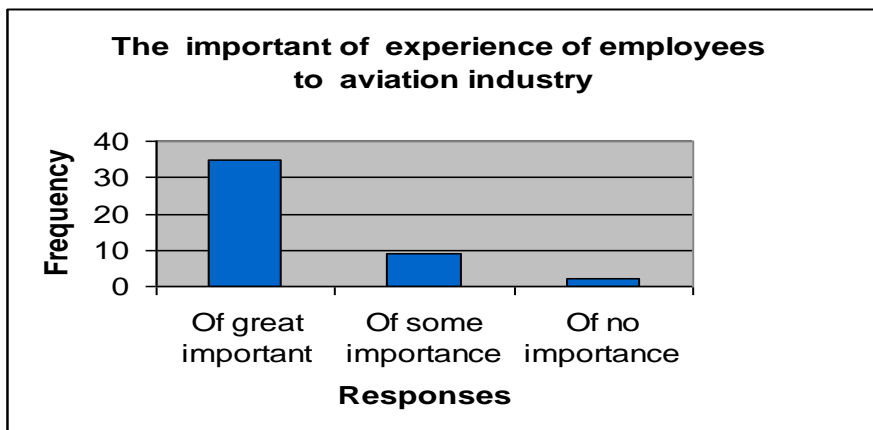


Figure 5.25: The importance of experience of employees to aviation industry

In question twenty six the respondents were asked to identify the influence of training on new technology to aviation industry. The result shown in Figure 5.26

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 37 | 80.4 |
| Of some importance | 7 | 15.2 |
| Of no importance | 2 | 4.4 |
| Total | 46 | 100 |

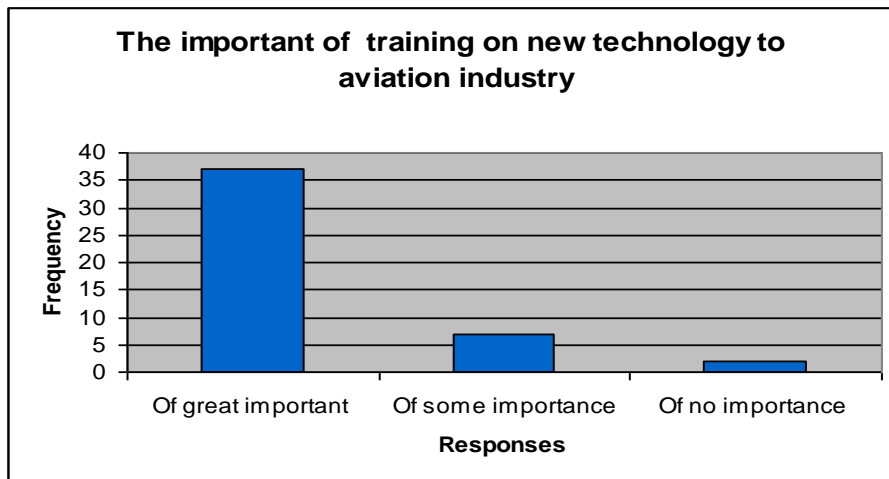


Figure 5.26: The importance training on new technology to aviation industry

In question twenty seven the respondents were asked to identify the influence of war to aviation industry. The result shown in Figure 5.27

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 36 | 78.3 |
| Of some importance | 6 | 13 |
| Of no importance | 4 | 8.7 |
| Total | 46 | 100 |

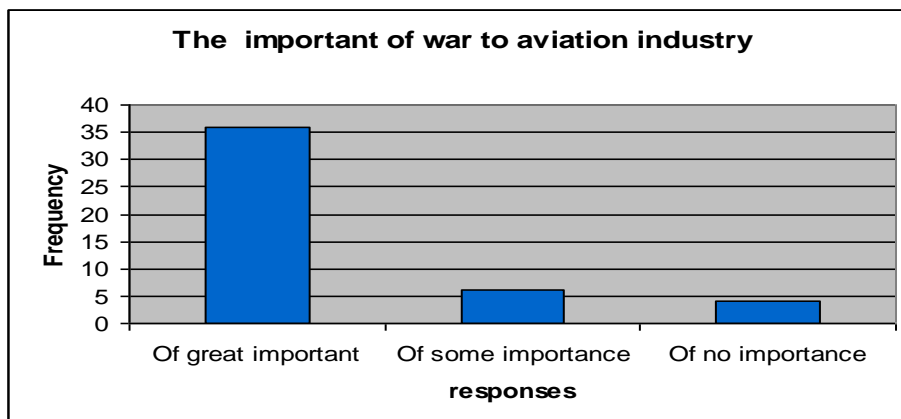


Figure 5.27: The importance of war to aviation industry

In question twenty eight the respondents were asked to identify the influence of national income to aviation industry. The result shown in figure 5.28

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 35 | 76.1 |
| Of some importance | 11 | 23.9 |
| Of no importance | 0 | 0 |
| Total | 46 | 100 |

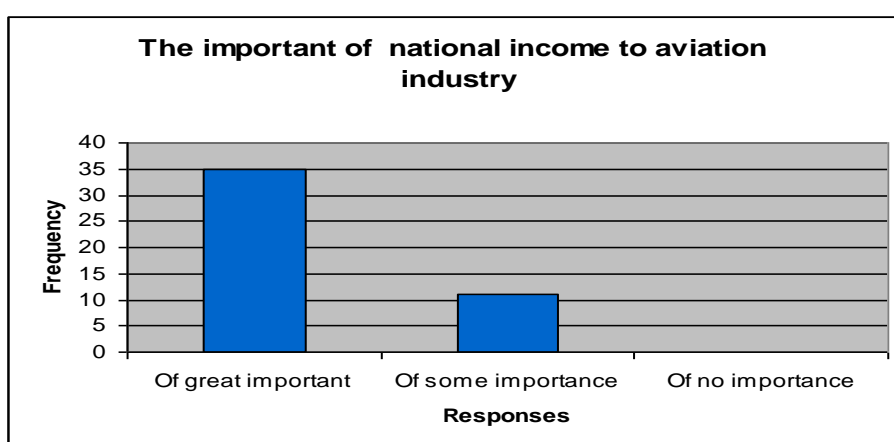


Figure 5.28: The importance national income to aviation industry

In question twenty nine the respondents were asked to identify the influence of developing of competing centre to aviation industry. The result shown in Figure 5.29

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Of great important | 35 | 76 |
| Of some importance | 10 | 21.7 |
| Of no importance | 1 | 2.3 |
| Total | 46 | 100 |

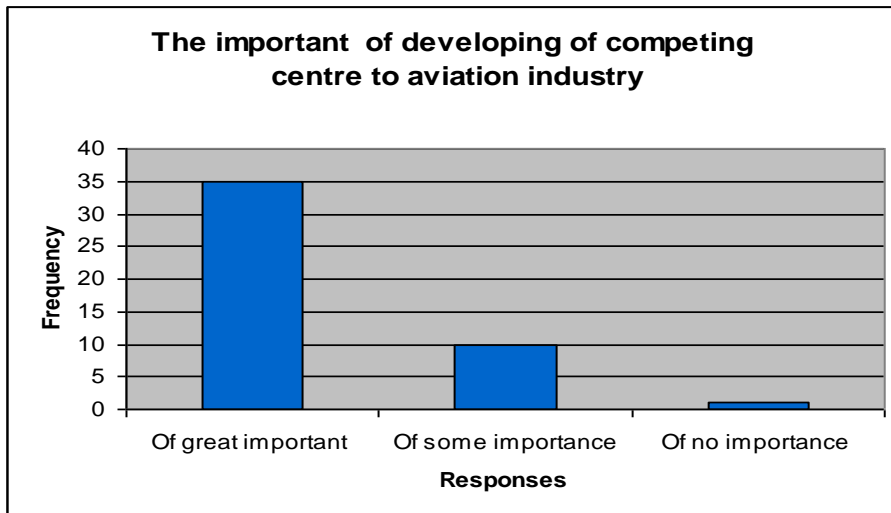


Figure 5.29: The importance of developing competing centre to aviation industry

Questions 21 to 29 related to the factors affect aviation industry. Figures 21 to 29 showed that a substantial majority (74.2 %) confirm that all the factors strategic location of Sudan, oil industry, tourism, new technology, experience of employees, training, war, national income and developing of competing centre are of great importance to aviation industry, 20.2 % mentioned that of some importance, while 5.6 % stated of no importance.

In question thirty the respondents were asked to identify if the management develop different plans for CAA. The result shown in Figure 5.30 showed that a substantial majority (65.2 %) confirm it does not, 26.1 % mentioned sometimes, 8.7 % responded it does.

| Responses | Frequency | Percent % |
|-----------|-----------|-----------|
| Yes | 4 | 8.7 |
| Sometimes | 12 | 26.1 |
| No | 30 | 65.2 |
| Total | 46 | 100 |

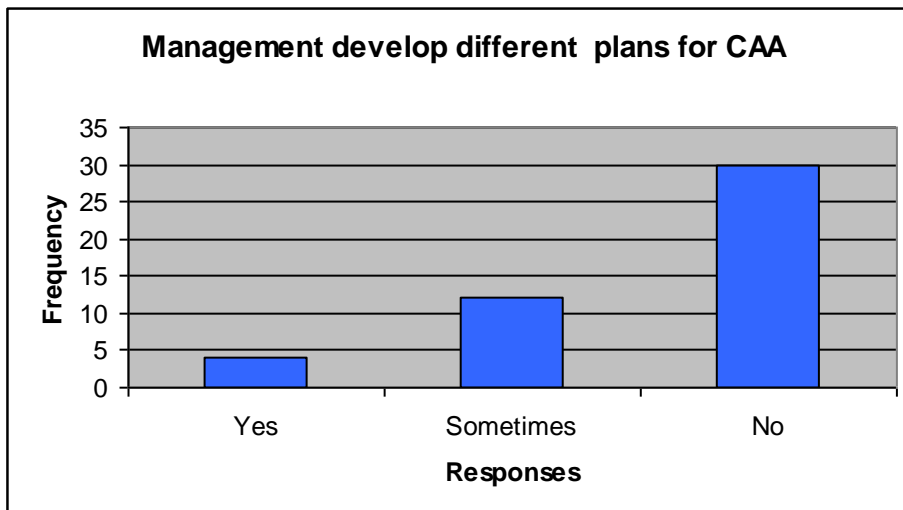


Figure 5.30: Management develop different plans for CAA

In question thirty one the respondents were asked to identify if they in favor of changing CAA plans and strategies. The result shown in Figure 5.31 showed that 71.7 % responded yes, 26.1 % mentioned sometime, 10.9 % responded no.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 33 | 71.7 |
| Sometimes | 8 | 17.4 |
| No | 5 | 10.9 |
| Total | 46 | 100 |

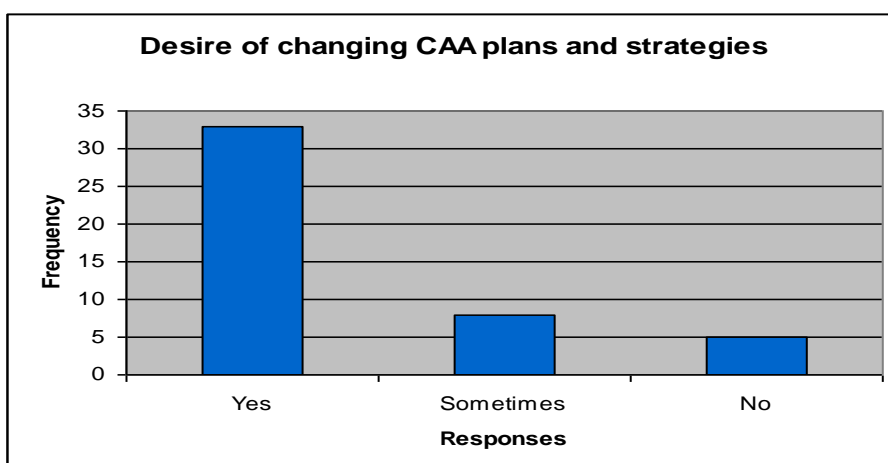


Figure 5.31: Changing CAA plans and strategies

In question thirty two respondents were asked to identify the areas that they want the management to focus on. The result shown in Figure 5.32 showed that 73.9 % responded organization objectives, employees' satisfaction and working conditions, 8.7 % mention working conditions, 8.7 % stated employee's satisfaction, while 2.2 % mentioned others.

| Responses | Frequency | Percent% |
|-------------------------|-----------|----------|
| Organization objectives | 3 | 6.5 |
| Employees satisfaction | 4 | 8.7 |
| Working conditions | 4 | 8.7 |
| All above | 34 | 73.9 |
| Others | 1 | 2.2 |
| Total | 46 | 100 |

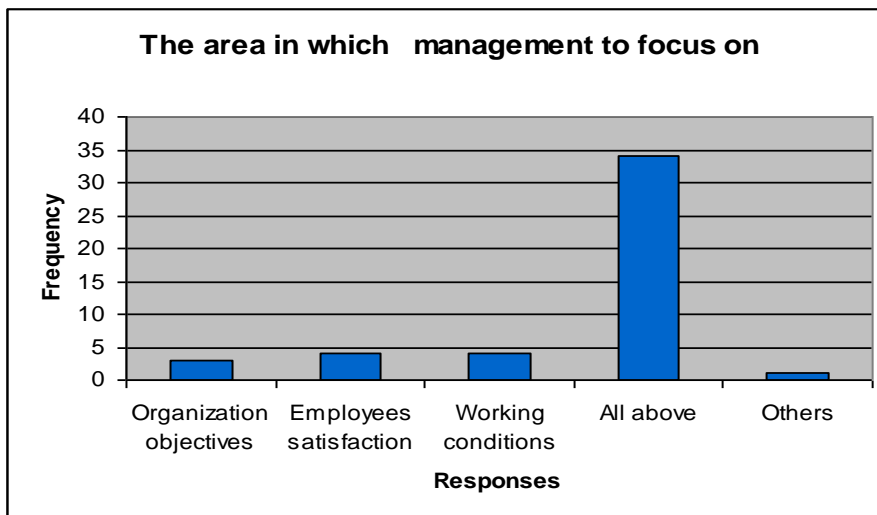


Figure 5.32: The area in which management to focus on

Question thirty three the respondents were asked to identify if they believe in wage discrimination. The result shown in Figure 5.33 showed that 80.4 % responded yes, 17.4 % mentioned sometime, 2.2 % stated no.

| Responses | Frequency | Percent% |
|-----------|-----------|----------|
| Yes | 37 | 80.4 |
| Sometimes | 8 | 17.4 |
| No | 1 | 2.2 |
| Total | 46 | 100 |

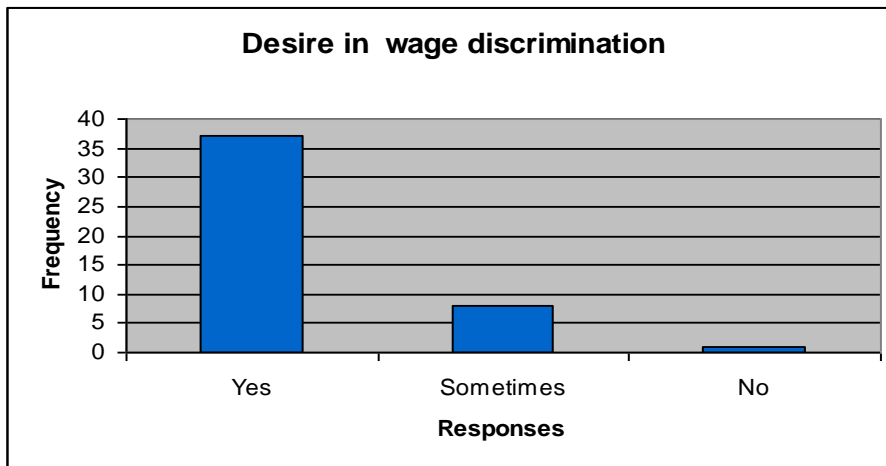


Figure 5.33: Believe in wage discrimination

In question thirty four the respondents were asked to identify the criterion for discrimination. The result shown in Figure 5.34 showed that 73.9 % responded efforts, experience and quality of work, 17.4 % stated quality of work, and 6.5 % mentioned experience, while 2.2 % responded effort.

| Responses | Frequency | Percent% |
|-----------------|-----------|----------|
| Efforts | 1 | 2.2 |
| Experience | 3 | 6.5 |
| Quality of work | 8 | 17.4 |
| All above | 34 | 73.9 |
| Others | 0 | 0 |
| Total | 46 | 100 |

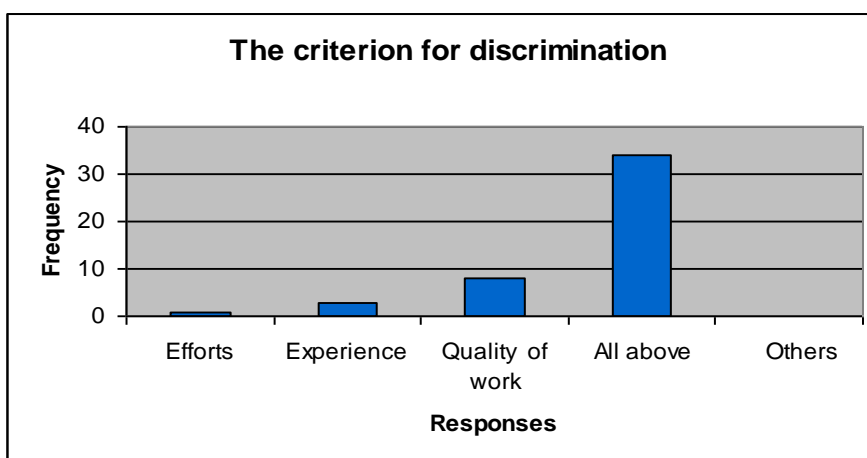


Figure 5.34: The criterion for discrimination

Question thirty five the respondents were asked to identify if they satisfied with the current CAA development plans and strategies. The result shown in Figure 5.35 showed that 69.6 % responded no, 23.9 % mentioned sometime, 6.5 % stated no.

| Responses | Frequency | Percent % |
|-----------|-----------|-----------|
| Yes | 3 | 6.5 |
| Sometimes | 11 | 23.9 |
| No | 32 | 69.6 |
| Total | 46 | 100 |

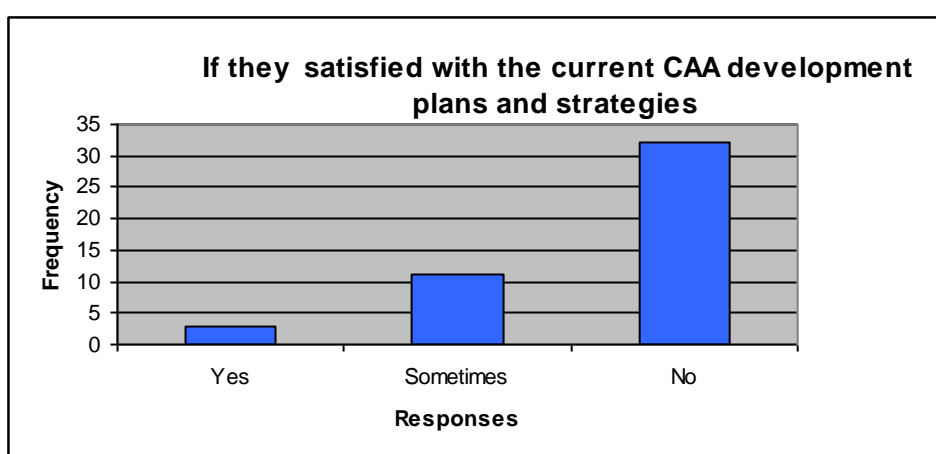


Figure 5.35: If respondent satisfied with the development plans

In question thirty six the respondents were asked to identify to what extent they satisfied with the study of air transport economics. The result shown in Figure 5.36

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 11 | 23.9 |
| Slightly satisfied | 20 | 43.5 |
| Satisfied | 8 | 17.4 |
| Fully satisfied | 3 | 6.5 |
| I don't know | 4 | 8.7 |
| Total | 46 | 100 |

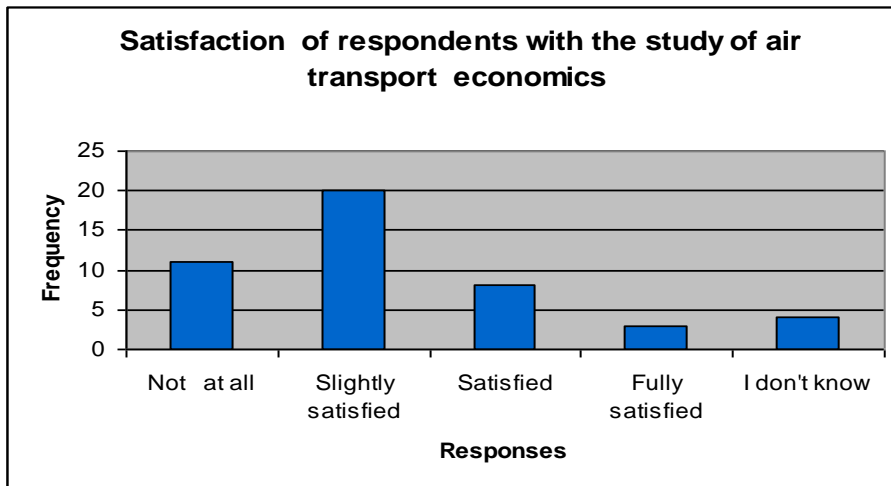


Figure 5.36: The extent which the study of air transport satisfied

In question thirty seven the respondents were asked to identify to what extent they satisfied with evaluation of existing airports and ancillary services and proposals for their development as required. The result shown in Figure 5.37

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 17 | 37 |
| Slightly satisfied | 17 | 37 |
| Satisfied | 6 | 13 |
| Fully satisfied | 3 | 6.5 |
| I don't know | 3 | 6.5 |
| Total | 46 | 100 |

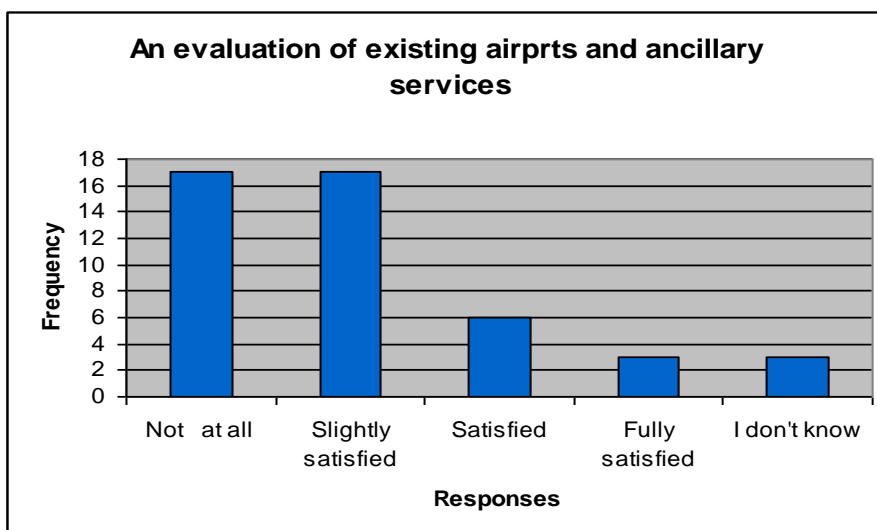


Figure 5.37: The extent which the evaluation of airports satisfied

In question thirty eight the respondents were asked to identify to what extent they satisfied with the evaluation of present and projected air navigation facilities and services. The result shown in Figure 5.38

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 5 | 10.9 |
| Slightly satisfied | 16 | 34.8 |
| Satisfied | 16 | 34.8 |
| Fully satisfied | 3 | 6.5 |
| I don't know | 6 | 13 |
| Total | 46 | 100 |

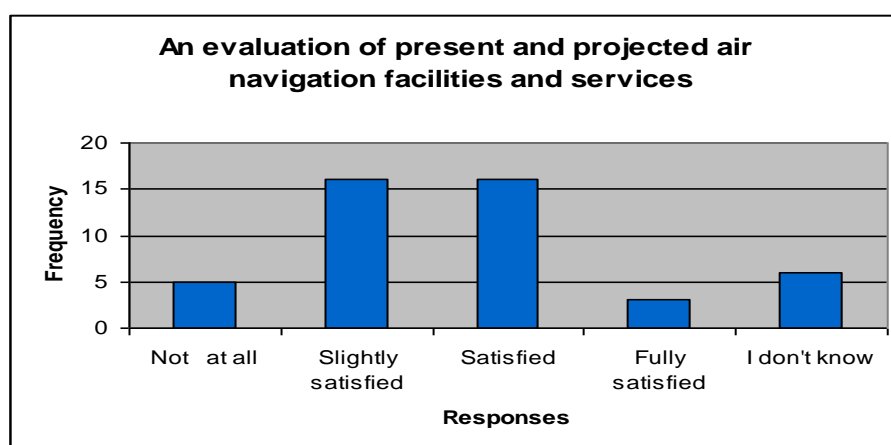


Figure 5.38: The extent which an evaluation of air navigation satisfied

In question thirty nine the respondents were asked to identify to what extent they satisfied with assessment of flight safety standards and capabilities and proposals for their upgrading and improvement. The result shown in Figure 5.39

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 10 | 21.7 |
| Slightly satisfied | 17 | 37 |
| Satisfied | 11 | 23.9 |
| Fully satisfied | 4 | 8.7 |
| I don't know | 4 | 8.7 |
| Total | 46 | 100 |

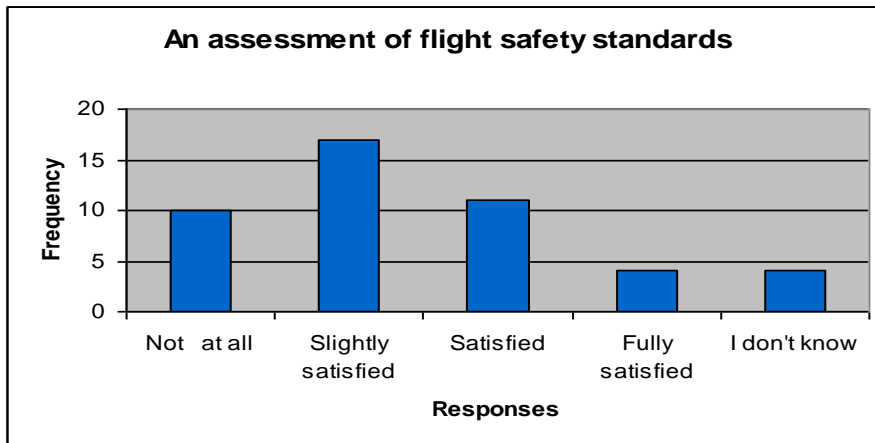


Figure 5.39: The extent which the assessment of flight and safety satisfied

In question forty the respondents were asked to identify to what extent they satisfied with assessment of airport fire and rescue service and its adequacy for each airport. The result shown in figure 5.40

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 6 | 13 |
| Slightly satisfied | 15 | 32.6 |
| Satisfied | 17 | 37 |
| Fully satisfied | 3 | 6.5 |
| I don't know | 5 | 10.9 |
| Total | 46 | 100 |

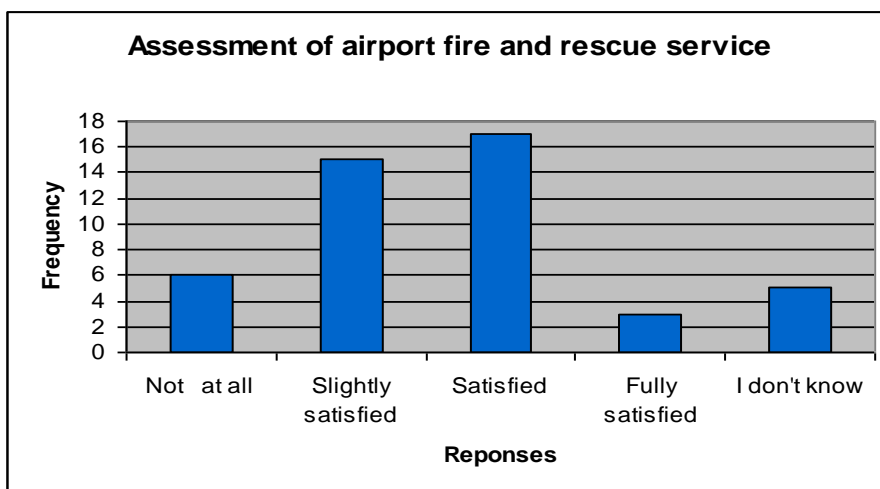


Figure 5.40: The extent which the study of air transport satisfied

In question forty one the respondents were asked to identify to what extent they satisfied with assessment of training needs. The result shown in Figure 5.41

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 15 | 32.6 |
| Slightly satisfied | 20 | 43.4 |
| Satisfied | 9 | 19.6 |
| Fully satisfied | 1 | 2.2 |
| I don't know | 1 | 2.2 |
| Total | 46 | 100 |

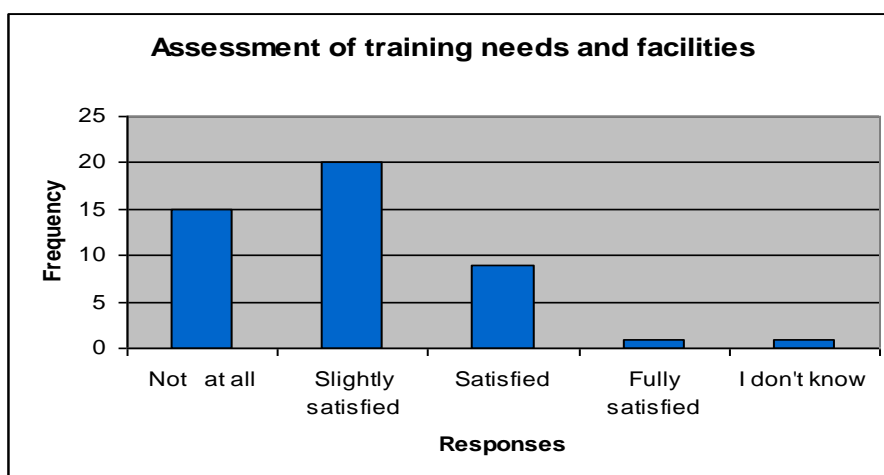


Figure 5.41: The extent which the assessment of training needs satisfied

Question forty two the respondents were asked to identify to what extent they satisfied with assessment of airport management capabilities and the possibility of transferring airports to regional authorities. The result shown in Figure 5.42

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 20 | 43.5 |
| Slightly satisfied | 14 | 30.4 |
| Satisfied | 6 | 13 |
| Fully satisfied | 1 | 2.2 |
| I don't know | 5 | 10.9 |
| Total | 46 | 100 |

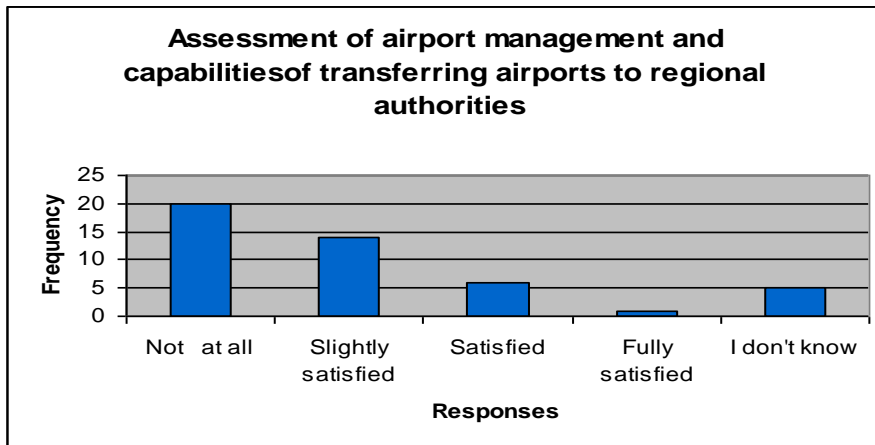


Figure 5.42: The extent which the assessment of airport management and transferring of airports to regional authorities satisfied

Question forty three the respondents were asked to identify to what extent they satisfied with review of the organizational and management structure of the Civil Aviation Authority and appropriate proposals for its improvement. The result shown in figure 5.43

| Responses | Frequency | Percent% |
|--------------------|-----------|----------|
| Not at all | 18 | 39.1 |
| Slightly satisfied | 14 | 30.5 |
| Satisfied | 7 | 15.2 |
| Fully satisfied | 5 | 10.9 |
| I don't know | 2 | 4.3 |
| Total | 46 | 100 |

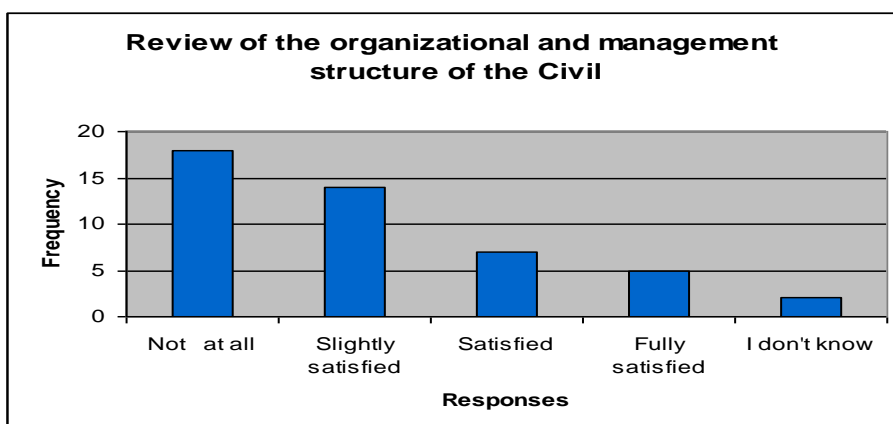


Figure 5.43: The extent which the review of organizational and management structure satisfied

Questions 36 to 43 focused On asking the respondents to identify the extent to which they are satisfied with CAA plans and strategies. The results shown in Figures 5.36 to 5.43 showed that 36.2 % are slightly satisfied, 27.8 % are not at all satisfied, 21.7 % are satisfied, 8 % are neutral while 6.3 % are fully satisfied

Conclusions, Recommendations, and Suggestions for Further Studies

6.1 Conclusions:

From the results of SWOT analysis there are many weaknesses which affected the performance of CAA.

1. It has been found that the lack of an optimal organizational structure in the CAA is the main weaknesses. In addition, no coordination seems to be achieved to avoid duplication of duties and overlapping of responsibilities between different units. This has resulted in a situation where different divisions claim responsibility for the same duties and where certain confusion exists.
2. The research has also emphasized the fact that the CAA is functioning as a dependent body on the financial directorate and it is following all the regulations and procedures of the Ministry of Finance. As such the CAA does not have the flexibility in recruiting its employees or set their salary scales.
3. The analysis also showed that there are internal and external obstacles facing the execution of CAA plans.
4. The study also confirmed that there are external opportunities for CAA to be developed and threats to be avoided.
5. Respondents have also confirmed that they are not at all satisfied with the current CAA plans and strategies.
6. The research has highlighted the influence of the employee's motivation to the work and required the management to focus on organization objectives and employees objectives.

Finally, now CAA has more than 5000 employees at headquarter and the various airports. About 3/4 of these are based in Khartoum, mainly at its airport, where many headquarter directorates and staffs are also situated. The numbers of personnel employed is often too large for the needs, particularly in the non professional fields while shortages exist in professional personnel in the areas such as flight safety inspectors and professional engineers. Until now there is no optimum organization structure to occupy the large number of employees, management returned to structure **1998** although there is no coordination seems and there is duplication of duties and overlapping of responsibilities between different units.

6.2 Recommendations:

1. The managers concentrate on TQM as a concept of development and continuous improvement in Civil Aviation Authority. Internal audit will be implemented in each directorate as external audit is already implemented by ICAO. Management use TQM strategy as the solution of all problems because TQM included improved quality, employee participation, teamwork, working relationships, customer satisfaction, communication, profitability, and market share. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.
2. Managers make sure that the move to become a TQM company will involve change at all levels of the organization. However change will not happen effectively by itself, it needs to be managed. Managing change means definite need, idea, adoption decision, implementation strategy, and resources. Use techniques to achieve successful implementation, including obtaining top management

support, implementing the change in a series of steps, assigning an idea, and overcoming resistance to change by actively communicating users and encouraging their participation.

3. Managers must evaluate internal strengths and weakness as well as environmental threats and opportunities. Combine these factors to define goals and to select strategy that takes advantage of the fit between organization and environment. Use this information to formulate and implement the strategy best suitable to the organization.
4. Develop organization charts that describe task responsibilities, vertical reporting relationships, and the grouping of individuals into departments, provide sufficient documentation so that all people within the organization know to whom they report and how they fit into the total organization picture.
5. Managers must act as the leaders for the internal culture and the values that are important to the organization. Influence the values system of the organization through the use of observances, representation, and stories. Communicate important values to employees to enhance organization effectiveness
6. As an organization managers, keep the following guides in mind do not leave lower organization levels powerless. If the power of top levels is too heavy, increase the power of lower levels by reducing rules, providing rewards for innovation, increasing visibility and outside contract, and encouraging participation in important problem. Increase power of employees in order to increase performance.
7. Finally an organization chart is only so many lines and boxes on a piece of paper. The organization charts simply reflect what people should do and what their responsibilities are. The purpose of the organization chart is to encourage and direct employees into activities and

coordination processes that enable the organization to achieve its goals. The organization chart provides the structure, but employees provide the behavior (performance, actions, deeds, activities). The chart is a guideline to encourage people to work together, but management must implement the structure and carry it out. And finally opportunities for further research are recommended.

6.3 Suggestions for Further Studies:

CAA is currently undertaking search and study in

1. Consideration being given to possible privatization of aerodrome engineering directorate.
2. Established organization structure to fulfill its main responsibilities for aviation (safety, Engineering, Air Navigation Services, and Planning).
3. Peace agreement recognizes that the state shall have the right to construct and manage air strips.

Above three areas are encouraged.

References

- 1) Besterfield, Dale H. 2003. "Total Quality Management", 3rd ed, Upper Saddle River, New Jersey. Prentice Hall
- 2) Crummer, Roye. 2000 "Modern Management" 8th ed, Upper Saddle River, Prentice Hall
- 3) Daft, Richard L, 1988. "Organization theory and design", West Publishing Company, New York.
- 4) Deming, W. Edwards. 1982, Quality, Productivity, and Competitive Positions. MA: Massachusetts Institutes of Technology.
- 5) Ngowi, A.B, 2000, Impact of culture on the application of TQM in the construction industry in Botswana. International Journal of Quality & Reliability Management, Vol. 17 No. 4/5
- 6) Norman, Ashford, 1992, "Airport Engineering" 3rd ed, A wiley – Interscience publication New York
- 7) Ismael, S , 2003 "The implementation of TQM strategy in Egypt", the TQM Magazine, Vol. 15 No. 4
- 8) Salih, A.K, 2007. "Total Quality Management & Quality performance". Training program. Sudanese German Center for Quality Assurance.
- 9) Salih, A.K, 2007. "Risk Management". Training program. Sudanese German Center for Quality Assurance.
- 10) Stewart, Leroy. 2005 "Quality Control Tools" 4th ed quality press, Milwaukee, United State of America

Title: A questionnaire to assess the performance of CAA

- Confidential
- Company name will not be revealed
- Academic purpose
- CAA : Civil Aviation Authority
- ICAO: International Civil Aviation Organization
- CNS/ATM: Communication Navigation Surveillance /Air Traffic Management

Please respond to the following questions by ticking the appropriate box (√).

Section –A: Organization structure

- 1) How many people are employed in your organization?
 - a) less than 1000
 - b) more than 1000
 - c) 2000-3000
 - d) more than 3000 (please state)
- 2) Who produced the current organization structure?
 - a) professional government body
 - b) Private sector expert
 - c) Others
- 3) Does the present organization structure facilitate the use of each resource, individually and collectively, as the management system attempts to attain its objectives?
 - a) Yes
 - b) Sometimes
 - c) No
- 4) Does the present organization structure have clear job descriptions?
 - a) Yes
 - b) Sometimes
 - c) No
- 5) Is it a problem when there is a conflict between organization objectives and individual objectives?
 - a) Yes
 - b) Sometimes
 - c) No
- 6) Does the organization structure have direct link with the ICAO standard?
 - a) Yes
 - b) Sometimes
 - c) No

Section – B: Strength & weakness

- 1) Are you aware of the financial situation of your organization?
 - a) Yes
 - b) sometimes
 - c) No
- 2) If the answer is yes, how do you rate it?
 - a) Excellent
 - b) Very good
 - c) Good
 - d) Weak
- 3) Do you think that the lack of employee's motivation is a factor that can significantly affect the work?
 - a) Yes
 - b) Sometimes
 - c) No
- 4) Do you believe that 'change' is a fundamental part of your organization existence?
 - a) Yes
 - b) Sometimes
 - c) No
- 5) If the answer is yes in what areas do you plan your 'change'?
 - a) Customer needs
 - b) Technological breakthrough
 - c) New government regulations
 - d) Other (please specify)
- 6) What do you expect from implementing changes successfully in your organization?
 - a) more flexibility
 - b) innovation
 - c) Others (please specify)
- 7) Does your organization encourage employees to continually search for areas in which beneficial change can be made?
 - a) Yes
 - b) Sometimes
 - c) No
- 8) Does the financial administration directorate follow the regulations and procedures of the ministry of finance?
 - a) Yes
 - b) Sometimes
 - c) No

- 9) Did the previous plans and polices have been implemented?
- a) Yes
- b) Sometimes
- c) No
- 10) Are there any obstacles or difficulties facing the execution of these plans?
- a) Yes
- b) Sometimes
- c) No
- 11) If the answer is yes is it
- a) Internal
- b) External
- c) Others
- 12) Does Civil Aviation Authority have the flexibility in recruiting employees and setting salary scales?
- a) Yes
- b) Sometimes
- c) No
- 13) From your point of view do you think Civil Aviation Organization considered as stable organization?
- a) Yes
- b) to some extent
- c) No

Section –C: Opportunities & threats

From your experience, please express your opinion on how important each factor can be influencing aviation system. (Please tick the appropriate box).

| Factors influencing aviation system | Of great importance | Of some importance | Of no importance |
|---|---------------------|--------------------|------------------|
| 1.Strategic location of Sudan | | | |
| 2. Oil industry | | | |
| 3. Tourism | | | |
| 4. New technology | | | |
| 5.Experience of employees | | | |
| 6. training on new technology | | | |
| 7. War | | | |
| 8. National income | | | |
| 9. Development of competing supported modern regional centre(open skies-hub & spoke system) | | | |

Section –D: CAA plans & strategies

- 1) Does management develop different plans for CAA?
 - a) Yes
 - b) Sometimes
 - c) No
- 2) Do you in favor of changing CAA plans and strategies?
 - a) Yes
 - b) Sometimes
 - c) No
- 3) What are the areas do you want management to focus on?
 - a) Organization objectives
 - b) Employees satisfaction
 - c) Working conditions
 - d) others (please specify).....
- 4) Do you believe in wage discrimination?
 - a) Yes
 - b) Sometimes
 - c) No
- 5) If the answer is yes what is the criterion for this discrimination?
 - a) efforts
 - b) experience
 - c) Quality of work
 - d) Others (please specify).....
- 6) Are you satisfied with the current CAA development plans and strategies?
 - a) Yes
 - b) Some of them
 - c) No
- 7) How do you rate your satisfaction with the following?

| CAA plans & strategies | not at all | Slightly satisfied | Satisfied | Fully satisfied |
|--|------------|--------------------|-----------|-----------------|
| 1) Study of air transport economics to determine potentials for growth & forecasts of passenger and aircraft movement. | | | | |
| 2) An evaluation of existing airports and ancillary services and proposals for their development as required. | | | | |
| 3) An evaluation of present and projected air navigation facilities and services including telecommunications, navaids and air traffic services and proposed development plans, taking into account the planned introduction of CNS/ATM systems. | | | | |

| CAA plans & strategies | not at all | Slightly satisfied | Satisfied | Fully satisfied |
|--|------------|--------------------|-----------|-----------------|
| 4) An assessment of flight safety standards and capabilities and proposals for their upgrading and improvement. | | | | |
| 5) Assessment of airport fire and rescue service and its adequacy for each airport. | | | | |
| 6) Assessment of training needs and facilities and appropriate recommendations for the upgrading of the Civil Aviation National Institute. | | | | |
| 7) Assessment of airport management capabilities and the possibility of transferring airports to regional authorities. | | | | |
| 8) Review of the organizational and management structure of the Civil Aviation Authority and appropriate proposals for its improvement | | | | |

- **Comment:**

Any additional comments

.....
.....
.....

- **Thank you** for your participation, please send the completed questionnaires in the self addressed envelop provided.

Title: A questionnaire to assess the performance of CAA

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- Academic purpose
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- 1) How many people are employed in your organization?
 - a) Less than 1000
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 - c) Others
- 3) Does the present organization structure facilitate the use of each resource, individually and collectively, as the management system attempts to attain its objectives?
 - a) Yes
 - b) Sometimes
 - c) No
- 4) Does the present organization structure have clear job descriptions?
 - a) Yes
 - b) Sometimes
 - c) No
- 5) Is it a problem when there is a conflict between organization objectives and individual objectives?
 - a) Yes
 - b) Sometimes
 - c) No
- 6) Does the organization structure have direct link with the ICAO standard?
 - a) Yes
 - b) Sometimes
 - c) No

Section – B: Strength & weakness

- 1) How do you rate the financial situation of your organization?
- a) Excellent
- b) Very good
- c) Good
- d) Weak
- e) I don't know
- 2) To what extent do you think that the lack of employee's motivation affect the work?
- a) Significant
- b) Moderate
- c) Slight
- d) Has no effect
- 3) Do you believe that 'change' is a fundamental part of your organization improvement?
- a) Yes
- b) Sometimes
- c) No
- 4) If the answer is yes in what areas do you plan your 'change'?
- a) Customer needs
- b) Technological breakthrough
- c) New government regulations
- d) All above
- e) Other (please specify)
- 5) What do you expect from implementing changes successfully in your organization?
- a) More flexibility
- b) Innovation
- c) Both above
- d) Others (please specify)
- 6) Does your organization encourage employees to continually search for areas in which beneficial change can be made?
- a) Yes
- b) Sometimes
- c) No
- 7) Does the CAA work as autonomous body?
- a) Yes
- b) Sometimes
- c) No
- d) I don't know

- 8) If No to what extent CAA follow the regulations and procedures of the ministry of finance?
- a) All time
- b) Most time
- c) Sometime
- 9) Did the previous plans and polices have been implemented?
- a) Yes
- b) Sometimes
- c) No
- 10) Are there any obstacles or difficulties facing the execution of these plans?
- a) Yes
- b) Sometimes
- c) No
- 11) If the answer is yes is it
- a) Internal
- b) External
- c) Both above
- d) Others
- 12) Does Civil Aviation Authority have the flexibility in recruiting employees?
- a) Yes
- b) Sometimes
- c) No
- 13) Does Civil Aviation Authority have the flexibility in setting salary scales?
- a) Yes
- b) Sometimes
- c) No
- 14) From your point of view do you think Civil Aviation Organization considered as stable organization?
- a) Yes
- b) To some extent
- c) No

Section –C: Opportunities & threats

From your experience, please express your opinion on how important each factor can be influencing aviation industry. (Please tick the appropriate box).

| Factors influencing aviation industry | Of great importance | Of some importance | Of no importance |
|---------------------------------------|---------------------|--------------------|------------------|
| 1.Strategic location of Sudan | | | |
| 2. Oil industry | | | |

| Factors influencing aviation industry | Of great importance | Of some importance | Of no importance |
|---|---------------------|--------------------|------------------|
| 3. Tourism | | | |
| 4. New technology | | | |
| 5. Experience of employees | | | |
| 6. training on new technology | | | |
| 7. War | | | |
| 8. National income | | | |
| 9. Development of competing supported modern regional centre. | | | |

Section –D: CAA plans & strategies

- 1) Does management develop different plans for CAA?
 - a) Yes
 - b) Sometimes
 - c) No
- 2) Do you in favor of changing CAA plans and strategies?
 - a) Yes
 - b) Sometimes
 - c) No
- 3) What are the areas that you want the management to focus on?
 - a) Organization objectives
 - b) Employees satisfaction
 - c) Working conditions
 - d) All above
 - e) Others (please specify).....
- 4) Do you believe in wage discrimination?
 - a) Yes
 - b) Sometimes
 - c) No
- 5) If the answer is yes what is the criterion for this discrimination?
 - a) Efforts
 - b) Experience
 - c) Quality of work
 - d) All above
 - e) Others (please specify).....
- 6) Are you satisfied with the current CAA development plans and strategies?
 - a) Yes
 - b) Some of them
 - c) No

7) How do you rate your satisfaction with the following?

| CAA plans & strategies | Not at all | Slightly satisfied | Satisfied | Fully satisfied | I don't know |
|--|------------|--------------------|-----------|-----------------|--------------|
| 1) Study of air transport economics to determine potentials for growth & forecasts of passenger and aircraft movement. | | | | | |
| 2) An evaluation of existing airports and ancillary services and proposals for their development as required. | | | | | |
| 3) An evaluation of present and projected air navigation facilities and services including telecommunications, navaids and air traffic services and proposed development plans, taking into account the planned introduction of CNS/ATM systems. | | | | | |
| 4) An assessment of flight safety standards and capabilities and proposals for their upgrading and improvement. | | | | | |
| 5) Assessment of airport fire and rescue service and its adequacy for each airport. | | | | | |
| 6) Assessment of training needs and facilities and appropriate recommendations for the upgrading of the Civil Aviation National Institute. | | | | | |
| 7) Assessment of airport management capabilities and the possibility of transferring airports to regional authorities. | | | | | |
| 8) Review of the organizational and management structure of the Civil Aviation Authority and appropriate proposals for its improvement | | | | | |

• **Comment:**

Any additional comments

.....

• **Thank you for your participation.**