# The Impact of Organizational Aspects on Successful Adoption of Decision Support System in Developing Countries: The Context of Libyan Higher Education Ministry

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**Abstract**
Decision Support Systems are the information application programs that analyze data and present it in a way that makes it easier to make acumen decisions dependent on the prevailing circumstance. This paper provides research grounds for implementing and designing the decision support systems. The paper generally talks about the adoption of decision support systems in developing countries. Most of the firms in the developing countries reveal an advanced use of computerized services. Most developing countries employ the use of DSS in the organizations not because of being competitive but because of the business requirements which are always immediate (Power 124). The organizations that have successfully employed the use of DSS have been seen to be successful. The researcher begins with a brief introduction and background of the study topic, continue with a section of data analyzing, exploration, reduction, factor analysis and discussion, provide numerous recommendations based on the information obtained and conclude the paper.
**Keywords:** Decision Support Systems, Adoption of Decision Support Systems, Developing Countries, Factors Influencing the Decision Support Systems

## 1.0 Introduction
A Decision support system could be defined as a computer "information application" program that helps to analyze and present data in a way that makes it easier to make business decisions (Rouse 2010).It is used to collect information during the normal transactions and stores them for later use such as that involving sales figures between weeks of the year, outcomes of different decision alternatives based on history, and the extrapolated revenue streams from various new and old products. These systems may present their analysis graphically with or without the assistance of artificial intelligence.

A decision support systems (DSS) are a class of information that has been computerized that mainly supports business and some of the organizational activities (MacEachren et al. 97). A well designed DSS should be able to help the people or an organization to compile information from documentations or even raw data and use the information to come up with decisions that will later help to solve the problems within the organization or firm (Goodwin et al. 132). The DSS help the organizations or the individuals to quickly solve the problems that they may be having in their firms by using the past data or raw data.

The data helps in the designing of the system by use of computerized information. Employers at the small businesses usually ignore employees who possess good communication skills and they rather employ based on the credentials of the job seekers (Van and Voorde 67). These small businesses would perform well if the employers employ those with good communication skills. This may also help the organizations to effectively adapt and implement the decision support system. There are also ways in which the communication skills of the already employed employees can be improved to make the company or the organization more productive. Training exercises and modeling skills may be done to the employees as these will improve their skills of communication and also greatly influence the productivity of an organization and the organization may also have the freedom to successfully adapt the DSS.

## 2.0 Background
There have been rapid changes in the organizations especially those in the developing countries. This has brought about the need for information technology in these organizations. Various information systems are being used by the organizations and they have accepted this (Hafkin and Taggart, 2001). These information systems support the decisions made by the organizations and also this makes the organizations to be more strategic and to be more competitive (Power 129). Information technology is a computer based facilitator of the decisions made by the decision makes in an organization. The computer based information technology has been observed to be man and they mainly help the decision makers in implementing their decisions in order to solve problems that may be in an organization. One of the information systems that help in decision making includes the decision support system (DSS).

DSS can be referred to as a computer based information system that helps the decision makers to face problems that may be strategic through directly interacting with both raw, documented data and also the analysis

models (Power 102). The design of DSS is mainly to increase an organization's productivity, to reduce the costs of the product in the organization or company, to save time and also to increase the quality of decisions and services offered at the give organization (Power 132). It also helps the organizations to achieve the goals on competition and also increases the efficiency of the organization. Therefore, the main purpose of this research paper is to investigate how the organizational aspects influence the successful adoption of DSS in developing countries.

Most initiatives in an organization do not fail because of factors that are external but they mostly fail because of the external factors that come from the organization itself. These soft issues include human aspects, organizational aspects, political aspects and the culture aspect (Power 138). The culture of a given organization may make the firm not to adapt to some changes. The employees may find it hard to adapt to such changes and even to employ the DSS due to the effects that may be brought about by the employment of the information technology.

*2.1 Organizational aspects:*
Research shows that a number of organizational factors can greatly influence DSS adoption. Some of the organizational aspects that influence the successful adoption of DSS in the developing countries include:
2.1.1 Top management support:
This is also abbreviated as TMS. It is the main predictor in the implementation and the DSS adoption. It leads more companies or organizational firms to successful adoption of the DSS. For the successful implementation and adoption of the DSS, the organization needs support from the top management. If this support is not available, then the IT sector will face resistance from most of the employees. The support of the top management is therefore very important in the adoption and implementation of the DSS. It is therefore observed that, the higher the support from the top management, the more successful the organization will implement and adapt to the decision support system. They should adapt to an attitude which is friendly to the organizations in the developing countries. The workers of the company should always attempt to have cheery attitude toward the public but this can still fail the company depending on how the top management view some of the options that involve change within the company. The implementation and adoption of the decision support systems will help most organizations in the developing countries to be more popular and to be the best in the world.
2.1.2 Management style:
It is a requirement for the implementation of any information system within an organization. MS majorly deals with the way the management tends to deal with the company, the manner in which it solves the company's problems, how the employees within the company are handled by the management and how they influence or direct the people's activities within the company.
2.1.3 Organizational structure:
The interaction between members of an organization is important. The way the staff communicates with the employees defines how the company has been structured. An organizational structure is basically the way and manner in which the organization is built up. It can also be the culture of a given organization since it is how the organization operates and some of the policies that govern the given organization. The OS can affect the DSS adoption and implementation. If the company's structure does not favor the adoption of the new information system, it should be restructured as this may help in the adoption.

**3.0 Problem of the study**
The problem of the study reflects the rapid development in technology and information systems, and weather the developing countries are able to take advantage of this. The investigation is based on the organizational Aspects: change control system (CCS), & organizational structure (OS). For better understanding of the research problem; the following questions can be derived: Is Organizations Structure in Libya facilitating utilization of decision support systems?

**4.0 Objectives and research methodology**
The main objective of this research identifies and examines the substantial reasons for failures of decision support systems in Libya organizations as a developing country.

**5.0 Type and nature of study**
Choosing an appropriate research method can be very challenging. Research methods are broadly categorized into qualitative and quantitative. This study is explanatory in purpose as it seeks to know the impact of organizational aspects on successful adoption of Decision Support System in developing countries: The Context of Libyan higher education ministry including the higher educational organizations. To achieve this, a questionnaire was designed and distributed to a sample of respondents (mostly LHEM top & middle management managers). The survey aimed at rating the successful adoption and implementation of the decision support system in the Libyan Higher Education Ministry (LHEM). The rating strategy adopted the scale: 1 for Strongly Disagree; 2 for Disagree; 3 for

Neutral: 4 for Agree and 5 for Strongly Agree. The data gathered was then analyzed using the Statistical Package for Social Software (SPSS)

## 6.0 Analysis and discussions

The adoption of the DSS can bring a great positive effect to the organizations within the developing countries. Most of these organizations are therefore advised to adopt and implement this information system. The workers and the communities associated with these developing organizations have the same voice of saying enough is enough? It is time for a change to be recorded at these organizations and business firms (Hillestad et al. 1107). For the first time in the history of the developing countries, most of them have seen the need to adapt to this information system and the benefits are already being seen and noticed by these organizations and their employees.

The implications that may be caused by not responding to changes in these organizations and business firms can have a greater impact on the organizations than even the previous problems. The business firms may be forced to lose most of its stakeholders and investors. There may also be some loss in the productivity of the organizations and companies. The public will continue tarnishing the developing countries' names due to failure of implementing the new information technology system (Power 242). The countries may not have the reputation after their names have been tarnished by the public. The countries may also lose international trade partners from developed countries due to slow development. The employees of these organizations will not receive any form of respect from the public too due to their failure to assist the company in the implementation and adoption of DSS.

The research adopted a quantitative research method in order to measure and evaluate the relationship between influencing factors and successful adoption of DSS thus allowing testing the research hypothesis and generalizing the research findings to the population (Zikmund, 2003). This research technique tend to be descriptive since the researcher tend to identify and explain the factors of research hence being able to describe how these factors influence successful adoption of DSS thus providing a complete picture of the system in academic environment (Churchill & Iacobucci, 2002).        Tables 1 – 7 illustrate the age, gender, education level, specialization, managerial level, experience and the courses in the area of DSS distribution of respondents respectively.

Table 1: Age distribution of respondents

|  |  | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | 25 - 30 yrs | 28 | 17,1 | 17,1 | 17,1 |
|  | 31 - 40 yrs | 92 | 56,1 | 56,1 | 73,2 |
|  | 41 - 50 yrs | 44 | 26,8 | 26,8 | 100,0 |
|  | Total | 164 | 100,0 | 100,0 |  |

Table 2: Gender distribution of respondents

|  |  | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | Female | 26 | 15,9 | 15,9 | 15,9 |
|  | Male | 138 | 84,1 | 84,1 | 100,0 |
|  | Total | 164 | 100,0 | 100,0 |  |

Table 3: Education Level distribution of respondents

|  |  | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | UniversityDegree | 77 | 47,0 | 47,0 | 47,0 |
|  | MastersDegree | 43 | 26,2 | 26,2 | 73,2 |
|  | PhD | 44 | 26,8 | 26,8 | 100,0 |
|  | Total | 164 | 100,0 | 100,0 |  |

Table 4: Specialization distribution of respondents

|  |  | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | BusinessAdministration | 17 | 10,4 | 10,4 | 10,4 |
|  | Finance&Accounting | 12 | 7,3 | 7,3 | 17,7 |
|  | Engineering | 60 | 36,6 | 36,6 | 54,3 |
|  | IT | 46 | 28,0 | 28,0 | 82,3 |
|  | Others | 29 | 17,7 | 17,7 | 100,0 |
|  | Total | 164 | 100,0 | 100,0 |  |

Table 5: Managerial Level distribution of respondents

| | | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | HeadofDepartment | 53 | 32,3 | 32,3 | 32,3 |
| | ManagerDeputy | 10 | 6,1 | 6,1 | 38,4 |
| | Manger | 44 | 26,8 | 26,8 | 65,2 |
| | DirectorDeputy | 55 | 33,5 | 33,5 | 98,8 |
| | GeneralDirector/Above | 2 | 1,2 | 1,2 | 100,0 |
| | Total | 164 | 100,0 | 100,0 | |

Table 6: Experience distribution of respondents

| | | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | 5 – 10 years | 26 | 15,9 | 15,9 | 15,9 |
| | 11 – 15 years | 54 | 32,9 | 32,9 | 48,8 |
| | 16 – 20 years | 12 | 7,3 | 7,3 | 56,1 |
| | Morethan 20 years | 72 | 43,9 | 43,9 | 100,0 |
| | Total | 164 | 100,0 | 100,0 | |

Table 7: Courses in the area of DSS distribution of respondents

| | | Frequency | Percent | ValidPercent | CumulativePercent |
|---|---|---|---|---|---|
| Valid | None | 94 | 57,3 | 57,3 | 57,3 |
| | OneCourse | 41 | 25,0 | 25,0 | 82,3 |
| | TwoCourses | 29 | 17,7 | 17,7 | 100,0 |
| | Total | 164 | 100,0 | 100,0 | |

The following tables display mean for each estimated variables such as Organization Structure characteristics and Change Control System characteristics. These indicators allow us assess how following organization structure components facilitate utilization of DSS.

Table 8: Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| OrganizationStructure Q1 | 164 | 3,00 | 5,00 | 4,1524 | ,62263 |
| OrganizationStructure Q2 | 164 | 3,00 | 5,00 | 4,2073 | ,60139 |
| OrganizationStructure Q3 | 164 | 3,00 | 5,00 | 4,0549 | ,54551 |
| OrganizationStructure Q4 | 164 | 3,00 | 5,00 | 4,2927 | ,58588 |
| OrganizationStructure Q5 | 164 | 3,00 | 5,00 | 4,0488 | ,74145 |
| OrganizationStructure Q6 | 164 | 3,00 | 5,00 | 4,0427 | ,64921 |
| OrganizationStructure Q7 | 164 | 3,00 | 5,00 | 4,1707 | ,58204 |
| OrganizationStructure Q8 | 164 | 1,00 | 3,00 | 2,2378 | ,51793 |
| ChangeControlSystem Q1 | 164 | 3,00 | 5,00 | 4,0549 | ,57827 |
| ChangeControlSystem Q2 | 164 | 3,00 | 5,00 | 4,3720 | ,57723 |
| ChangeControlSystem Q3 | 164 | 3,00 | 5,00 | 4,0427 | ,62022 |
| ChangeControlSystem Q4 | 164 | 3,00 | 5,00 | 4,2256 | ,62979 |
| ChangeControlSystem Q5 | 164 | 1,00 | 3,00 | 1,8171 | ,65772 |
| Valid N (listwise) | 164 | | | | |

Table 8 and Figure 1; show that all organizational characteristics have approximately the same high mean:
- OS is facilitating the decision – making process within the ministry(4,15)
- OS is facilitating discipline and control over the business process activities(4,20)
- Business process activities are fully related to organization structure(4,05)
- Clear and precise responsibilities assigned to organization structure(4,29)
- OS is providing flexibility and responsiveness to the changing organizational environment(4,04)
- OS is allowing information flow enormously(4,04(
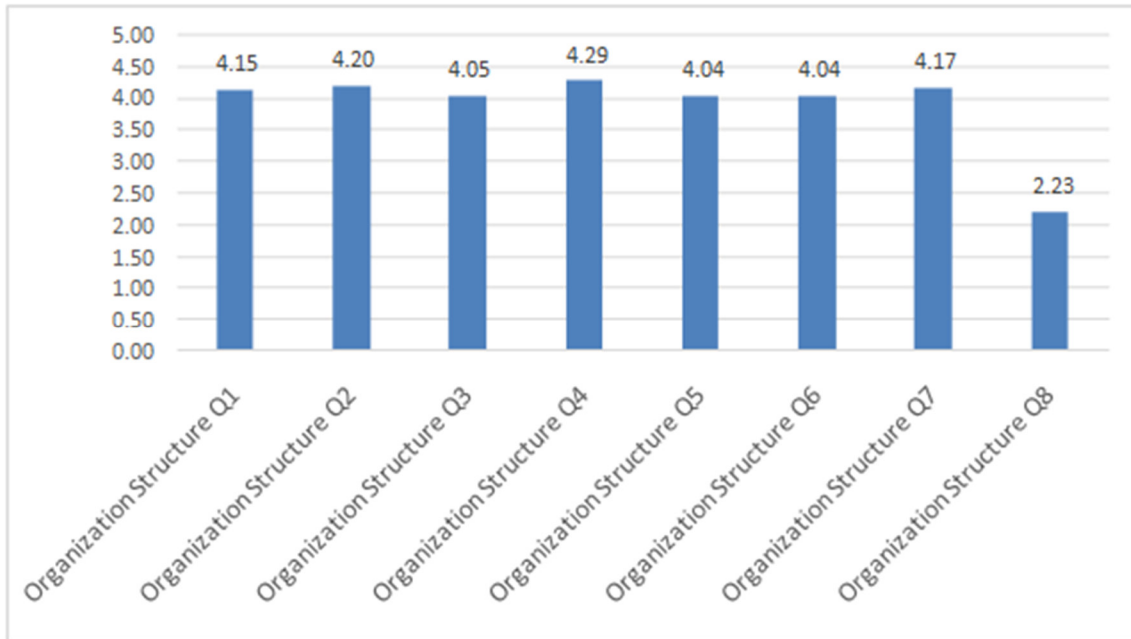- OS is providing easy communications among specialists(4,17)

Figure 1, The mean of organizational characteristics

Question 8: "Organization structure is facilitating performance evaluation for supervisor" has the lowest mean(2,23). This characteristic of organizational structure was estimated as the least facilitative for DSS implementing.

Table 9: Descriptive statistics

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Change Control System Q1 | 164 | 3.00 | 5.00 | 4.0549 | .57827 |
| Change Control System Q2 | 164 | 3.00 | 5.00 | 4.3720 | .57723 |
| Change Control System Q3 | 164 | 3.00 | 5.00 | 4.0427 | .62022 |
| Change Control System Q4 | 164 | 3.00 | 5.00 | 4.2256 | .62979 |
| Change Control System Q5 | 164 | 1.00 | 3.00 | 1.8171 | .65772 |
| Valid N (listwise) | 164 |  |  |  |  |

Table 9 and Figure 2, illustrate that all change control system requirements were highly rated too:
- change is integrated by DSS(4,05);
- pre-defined communication plan is applicable to manage resistance to change(4,37);
- change usually accelerate workflow by use of Critical Path Analysis (CPA) techniques(4,04);
- change is positively affecting the usability, reliability or safety problems(4,22)
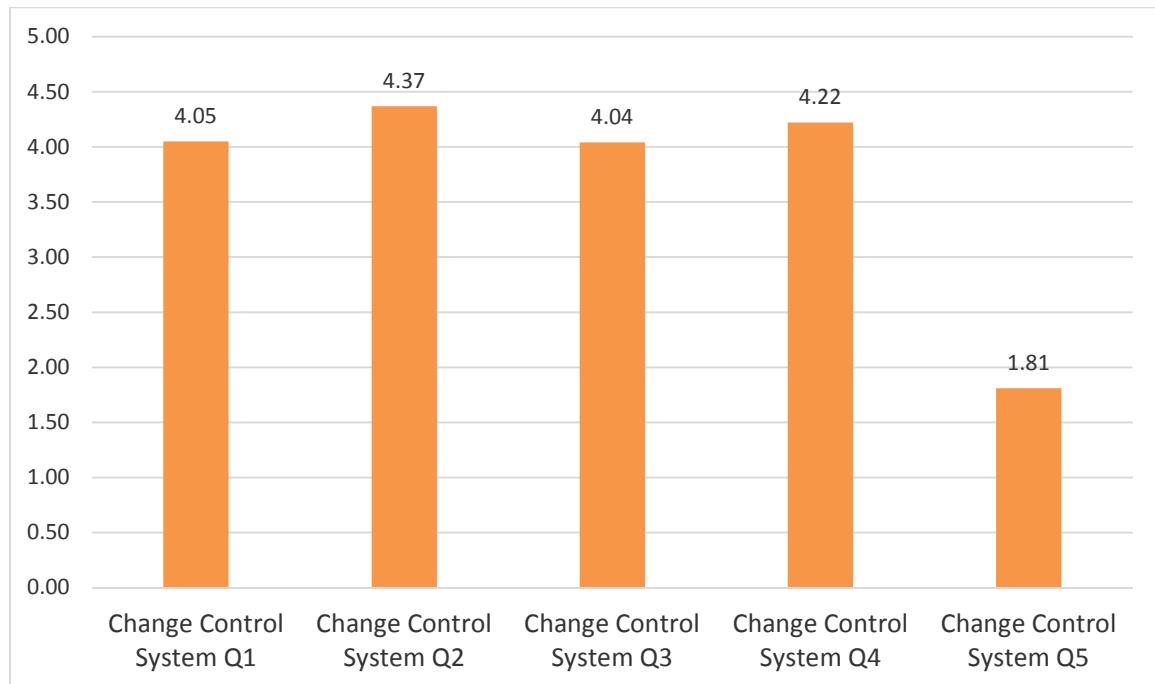
Figure 2, The mean of change control system characteristics

The following requirement has very different mean: "Change always fixes a bug or procedure defect of the daily activities." It was rated low and it has mean 1,81. We can say it is not effective for utilization of DSS.

For data reduction and getting factors which influence on utilization of DSS in organizations we conducted factor analysis. Discovered factors can be defined as generalized criteria for evaluating of organizational structure and control change system impact to the implementing of DSS.

The following table shows correlations between variables and discovered factors.

Table 10: Rotated Component Matrix[a]

|  | Component | | | | | | |
|---|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Age | ,939 | | | | | | |
| Experience | ,886 | | | | | | |
| Courses in the area of DSS | ,855 | | | | | | |
| EducationLevel | ,777 | | ,383 | | | | |
| Gender | ,743 | | -,361 | | | | |
| ManagerialLevel | ,611 | | -,454 | | | | |
| OrganizationStructure Q5 | | ,820 | | | | | |
| ChangeControlSystem Q1 | | ,724 | | | | | |
| OrganizationStructure Q6 | | ,654 | | | | | -,397 |
| ChangeControlSystem Q2 | | -,453 | | ,362 | | | |
| OrganizationStructure Q2 | | | ,819 | | | | |
| OrganizationStructure Q4 | | | ,641 | | | | |
| OrganizationStructure Q3 | | | | ,698 | | | |
| ChangeControlSystem Q4 | | | | ,618 | | | |
| ChangeControlSystem Q3 | | | | ,522 | | -,363 | |
| OrganizationStructure Q1 | | | | | -,756 | | |
| OrganizationStructure Q8 | | | | | ,733 | | |
| OrganizationStructure Q7 | | | | | | ,863 | |
| ChangeControlSystem Q5 | | | | | | | ,876 |
| Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations. | | | | | | | |

Factor 1 includes following variables:

• Age
• Gender

- Experience
- Courses in the area of DSS
- Education Level
- Managerial Level

This factor is connected with personal characteristics of respondents. It is not informative for us itself, but some other variables which are included have other important correlations.

Factor 2:
- OS is providing flexibility and responsiveness to the changing organizational environment.
- OS is facilitating the decision – making process within the ministry.
- OS is allowing information flow enormously.
- Negative correlation with requirement "Pre-defined communication plan is applicable to manage resistance to change".

This factor can be named as flexibility and self-organization of the organizational structure.

Factor 3:
- Positive correlation with Education Level.
- OS is facilitating discipline and control over the business process activities.
- Clear and precise responsibilities assigned to organization structure.
- Negative correlation with Gender and Managerial Level.

Factor can be defined as discipline, control and clarity of job responsibilities. Also it means that more educated female with lower managerial level defined these characteristics as more facilitative factors for DSS utilizing.

Factor 4:
- Pre-defined communication plan is applicable to manage resistance to change.
- Business process activities are fully related to organization structure.
- Change is positively affecting the usability, reliability or safety problems.
- Changes usually accelerate workflow by use of Critical Path Analysis (CPA) techniques.

Factor 5:
- Organization structure is facilitating performance evaluation for supervisor.
- Strong negative correlation with requirement "OS is facilitating the decision – making process within the ministry".

This factor we can define as centralized monitoring and control, focus on external control.

Factor 6:
- Negative connection with requirement "Change usually accelerate workflow by use of Critical Path Analysis (CPA) techniques".
- OS is providing easy communications among specialists.

Factor 7:
- Negative correlation with requirement "OS is allowing information flow enormously".
- Change always fixes a bug or procedure defect of the daily activities.

Interpreting these factors is carried out with using of discovered correlations with variables.

**7.0 Conclusion**
The practices above have shown how adoption and implementation of the DSS can mean a great change to most of the organizations in the developing countries. When DSS is employed in the organizations, the workers and the public will also change their initial view of the company. Most of the developing countries have big companies whose journeys towards adoption of decision support system are a bit long and expensive. These organizations should not therefore give up on the way before meeting their intended goals and targets. The organizations should work hard to make sure that the message of the adoption of the new information system is taken in by the workers and that it will bring a great change to these organizations I the developing countries and to the entire public.

The company's employees may also be participating in the efforts to change the company. The people who are important to these organizations such as the suppliers should also be engaged while the policy of adoption of decision support system is being implemented (Van Gosliga et al. 91). This is because these stakeholders are the most affected when the adoption process of DSS is not successful. Therefore, the shareholders should also come up with decisions and perceptions on whether the organizations should adapt the information system. This

will also change the view of the company to the public (Bencsik and Bacsardi 34). By adhering to all these, the organizations will win the public and most of the suppliers of the organizations will also benefit from the adoption process. The number of consumers in these organizations will increase and the profit made by the companies will also increase. This will also enable the developing countries to develop more mainly if most of the organizations and business firms within these countries adopt and implement the information system. Therefore, the organization managers within the developing countries should try and implement the adoption policy for a better future and a good reputation to the public.

## 8.0 Further work
Certainly, many organizations have not yet adopted technological aspects in their operations. For the prosperity of many firms, there should be incorporation of technological aspects in operations of the companies. Because of the limitations that are inherent in this research, there is need for further studies on the influence of Organizational Aspects on successful adoption of Decision Support System in developing countries. Future research on this topic should consider gathering data from all stakeholders who interact and utilize the DSS system within the LHEM and not to focus on only top and senior management support.

## 9. 0 Research limitations
Researcher exerted efforts to get benefit of the research results, but there were a number of certain constraints that limit the research results. These limitations should be taken in consideration for any future work.
• The study was conducted on government institutions only and did not cover non-government institutions. The impact of organizational aspects on the adoption of decision support systems could be different in non-government institutions.
• Data collected from one country on despite that the impact of user awareness on the adoption of decision support system could different in other developing countries.

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