

**IMPACT OF OPERATIONAL LEVEL INFORMATION SYSTEMS  
ON OPERATIONAL PERFORMANCE: A CASE STUDY OF AN  
ORGANIZATION IN THE ENERGY SECTOR IN KENYA**

**ODUOR MICHELLE ATIENO**

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## DECLARATION

This research project is my original work and has not been submitted for another degree of this or any other university or institution of learning.

Signed: \_\_\_\_\_

Oduor Michelle Atieno

D61/73685/2012

Date: \_\_\_\_\_

The research project has been submitted for examination with my approval as University supervisor.

Signed: \_\_\_\_\_

Dr. Owino Agaya Okwiri  
Lecturer, School of Business,  
Department of Management Science,  
University of Nairobi

Date: \_\_\_\_\_

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## **DEDICATION**

This work is dedicated to my family, whose encouragement and understanding enabled me to complete the programme.

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## **ABSTRACT**

The increase in the use of information systems has resulted in a larger business environment and increase in competition. Organizations are now forced to implement different types of information systems to automate their business processes so as to enhance their productivity, reduce costs and increase the speed of delivery to enhance customer satisfaction. The main purpose of this study was to determine the impact of the type of information system on operational performance. The study focused on an organization in the energy industry in Kenya. The findings indicate that different categories of information systems and the different management styles do not impact operational effectiveness differently. The study also found that both the management style and the type of information system interact and have an effect on operational effectiveness and operational effectiveness has an impact on operational performance. Data was collected through self-administered questionnaires focusing on the operations department of the organization. Organizations that implement information systems should take into account the management style and expect an increase in the operational effectiveness and in turn an increase in their operational performance.

# **CHAPTER ONE: INTRODUCTION**

## **1.1 Background of the Study**

Organizations are composed of different functions such as marketing, operations and finance which all work together to achieve the overall goals of an organization. Operation activities combine and transform various resources used in the operations function of the organization into value added products or services in a controlled manner as per the policies of the organization (Slack, Chambers, & Johnston, 2010). Operations management is the business function that manages the part of the business that transforms raw materials and human inputs into goods and services of higher value.

Objectives of the operations function are built around four core objectives. These are quality, cost, flexibility and speed (Slack et al, 2010). The functions of an operations manager are to design the operation system, planning and controlling and the improvement of the system over time. Successful implementation of these functions requires understanding the performance strategy of the organization so that all the goals can be focused towards meeting the objective chosen.

An Operations Management System transforms inputs into outputs. The inputs are raw materials while the outputs are goods or services. The transformation process should be efficient and must also result in goods and services of value to the customer. The control of the system depends on feedback and empowerment of the members of the system. By making information available where it is needed for action, an employee's work output is enhanced in terms of reduced activity time and hence reduced cost (Okwiri, 2012).

### **1.1.1 Operational Level Information System**

Information is the foundation of conducting business in any organization. The ability to make decisions or formulate business goals is difficult without the use of technology (Laudon & Laudon, 2012). Information systems enhance the operations function in that many activities can be performed at the same time such as keeping track of inventory, organizing and scheduling, sourcing and distribution. Organizations can also create and distribute products and services without the limitations of physical boundaries or physical location. Information systems also enable the exchange of business information between organizations thus enhancing the organizational efficiency and enhances the relationship between the customer service staff and the customers as they are more responsive to the needs of the customers (Rahim & Kurnia, 2006). Hence information can be described as an enabling factor. Information systems can also be described as an empowerment agent.

Employee empowerment can be described as giving the employees the authority to change to their jobs, as well as how it is performed (Slack et al, 2010). The benefits of empowering the staff are faster decision making and better customer service as some decisions do not have to be made by the supervisors. Having readily available information in the operations system empowers the lower-level employees to make decisions without supervision. Bacon & Fitzgerald (2001) in their paper on A Systemic Framework for the Field of Information Systems state that people are the stakeholders and it is the people that determine, specify, develop, exploit, support are empowered by and rely upon information, information systems and information technology.

The levels of decision-making and the information required to support it can be analysed into three levels: strategic, tactical and operational (Laudon & Laudon,

2012). The information in an organization must be organized in such a way that it meets the needs of these levels of management. The information available in the strategic level is from both internal and external sources. It is also both qualitative and quantitative in order to enable planning of the long term strategies of the organization. The tactical level is where systems combine data from the strategic and operational levels of management. The data is supplied in a summarized form but detailed enough to allow tactical planning of resources and manpower and the operational level where the information used in this level is obtained from internal sources and the day-to-day performance of tasks.

### **1.1.2 Information Systems, Operational Effectiveness and Operational Performance**

Operational performance is one of the constructs that contributes to the overall performance of the organization. It deals with the process and evaluates the internal operation of the company in terms of cost, customer services, delivery, quality, flexibility and product/services process quality (Brah & Lim, 2006). Business processes refer to the way in which work is organized to produce a particular product or service.

Operational effectiveness refers to the degree to which an operation's service delivery operation furnishes the right service to the right customer at the right time (Taylor, 2008). It involves improving process performance by leading and controlling the processes within the firm as well as measuring and improving the processes (Santa, Ferrer, Bretherton, & Hyland, 2010). Information Systems enable the improvement of the business processes enhancing the operational effectiveness and the operational

performance. Information Systems anchored on operations results in a business system that integrates employee empowerment and enhanced capability.

There are different types of information systems supporting the different management levels of the organization. Examples of these systems are Transaction Processing Systems (TPS) which perform and record the daily routine transactions such as purchase requisitions, material reservations, and employee record keeping. They are mostly used by operational managers to answer routine questions and to track the flow of transactions through the organization. Decision Support Systems (DSS) is also another type of system which supports more non-routine decision making. They focus on problems that are unique and rapidly changing, for which the procedure for arriving at a solution may not be fully predefined in advance. Decision Support Systems use information from Management Information Systems, Transaction Processing Systems and external sources such as current stock prices or product prices of competitors.

Executive Support Systems enable the senior management address non-routine decisions requiring judgment, evaluation and insight because there is no agreed on procedure for arriving at a solution. It presents graphs and data from many sources through an interface that is easy for senior managers to use. It uses external data and internal data from Management Information Systems and Decision Support Systems. Operating Support Mixed Systems are composed of Transaction Processing Systems and Executive Support Systems. They generate data processed by business operations, automate office procedures and enhance office communications and productivity. They handle routine yet critical tasks and perform simple calculations. They also convert the data collected into useful summarized reports enhancing decision making. Planning Support Mixed Systems are composed of Decision Support

Systems and Executive Support Systems. They assist the operations staff in planning, analysing alternatives and trial and error search for a solution. They focus on problems that are unique and rapidly changing.

### **1.1.3The Energy Industry in Kenya**

The study was undertaken in an organization in the energy sector. The name of the organization is not disclosed for confidentiality. The energy sector in Kenya comprises four sub-sectors namely: Biomass, fossil fuels, electricity and other renewable energy sources(Onyango, Njeru, & Omori, 2009). Major source of energy used in Kenya is oil through the consumption of petroleum products, or in the generation of electricity(Institute of Economic Affairs, 2014). The aim of the energy industry is to facilitate provision of clean, sustainable, affordable, reliable, and secure energy services for national development while protecting the environment(Ministry of Energy and Petroleum, 2014).

This is a liberalized sector in which public and independent energy firms must vie for the same market. In this sector, the number of competitors is increasing as the government is inviting bids from private firms to participate in the power generation activities. This is so as to meet the target of generating 5000MW of power by 2016 reducing the cost of electricity by 40%(Standard Group, 2014). The buyer of electricity from the generating firms is only one giving the customer market power as they impose their requirements, price and quality.

For organizations to have a higher percentage of the market share they must have a product that is competitively priced, of high quality and readily available. To meet this goal they must also reduce their operational and overhead costs, improve their

operational processes and structure and they must be able to predict any future changes that may occur in future.

The organizations in this sector have implemented different types of information systems to automate their prime business processes and thereby enhance their organizational productivity with lower costs and prompt service delivery to fulfil consumer demands(Amondi, 2014). The main issues faced in installing information systems in this sector include the high cost of installation, the availability of technical support when needed, the ability of the information system to be customized to meet the needs of the organization and the acceptability of the system by the employees of the organization. Another issue is the ability of the new information system to integrate with the other systems already installed(Borura, 2009).

## **1.2 Statement of the Problem**

Information Systems have an effect on operational performance. Information in operations management is used as an operations enabling factor and as an empowering agent and to enhance faster decision making management. Types of information systems have an effect on different factors in organizations. The outcome is also influenced by organization structure, business processes, politics, culture and the surrounding environment.

There is competition in the country's energy sector. For the organization to be successful in this sector it needs to gain a competitive advantage by improving its operational performance. The organization can improve its operational performance by reducing its operational and overhead costs, improving its operational processes and structure and it must be able to predict any future changes that may occur in

future. This can be achieved by implementing an information system that will easily support all these functions.

Studies of information systems in organizations have covered such areas as alignment to operations processes, Implementation issues and efficiencies of the system (Slack, et al 2010). Other studies have also shown that the levels of integration and communication functionalities of the system are equally important. Operational network members have to communicate with each other and with actors outside the operational network. And the amount of information being processed is very high (Wijngaard, Vries, & Nauta, 2006). While the concept of strategic alignment of Information Systems has been looked at in the past, Fewer studies have examined the performance implications of alignment to the operational context of the organization has not been adequately considered (Bendoly & Jacobs, 2004). This study found that the alignment of ERP solutions with operational needs is crucial to perceived ability to deliver orders on time and to general satisfaction with the ERP solution.

The main dilemma is, are there different types of Information Systems that impact operational performance differently? The choice between different types of information systems may have a significant effect on the long term strategy, effectiveness and operational performance of the organization. Different technologies may be appropriate for different types of operations depending on the needs of the organization.

### **1.3 Research Objectives**

To answer the research question the following specific objectives have to be achieved.

- i. To determine the impact of the type of information system on operational effectiveness



- ii. Determine the impact of the type of information system on operational performance

#### **1.4 Value of the research**

The research will be valuable to senior management who will appreciate the benefit of having information systems as an operational tool and give a better understanding on understand how information systems can improve operational performance by enabling them to smoothen operations, empower the staff to make proper decisions, predict future trends and changes and make more informed decisions. The research will also be valuable to the ICT department as they will have information on the type of information system that will best meet the needs of the operations function and how they can best support the function to meet its goals.

The research will also be valuable to scholars and researchers who may use this study as a reference and guide for future studies on different types of information systems and the impact they have on operational or organizational performance.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter focuses on the review of relevant literature along the following three themes; Information based system taxonomy, operational effectiveness, management style and operational performance.

### **2.2 Information based Systems Taxonomy**

This theme reviews two conceptual papers. These papers provide for a way of classifying the types of information systems and the benefits of having these classifications.

Mentzaz (1994) in his conceptual paper on the taxonomy of computer based information systems, sought to provide a basic framework for classifying Computer Based Information Systems on three basic distinctions. These are information support, decision support and communication support. The researcher identified that with the three distinctions mentioned above, more control can be introduced in the development of Computer Based Information System. He also found that there is a relative lack of systems that can cover all the different processes in an organization.

The findings in this study support the paper by Farbey, Land, and Targett (1995) who sought to classify applications in the form of an eight rung ladder. Farbey et al. (1995) appear to support the issues in terms of the deployment of the systems. In their study on taxonomy of information systems applications, they also stated that each rung of the ladder increases the complexity of evaluation and the return on investment of the application. They also found that very few applications, especially those in the higher rungs, are pure. This is because the applications may have components which belong

properly to the lower rungs. The categorization of the applications would need to be evaluated in the Kenyan context.

### **2.3 Operational Effectiveness**

This theme reviews three research papers. The reviewed papers have identified categories of effectiveness and have also set out the dimensions for measuring effectiveness.

Okwiri (2012), in his participatory action-based study, sought to examine how information-based practices, can improve operational performance. To determine the elements of operational performance that are influenced by information-based practices; the data on cycle time, cost and process audits was obtained using participant-observation methods. The findings suggest that information-based practices have a positive impact on operational performance in that by the reduction of mistakes the cost element of operational performance is reduced and by the consistency of work activities the speed of delivery is improved. A study on the energy industry needs to be done as this study focused on the IT industry.

The finding by Okwiri (2012) supports the finding by Zelbst, Green, Sower, and Reyes (2012). In an empirical study, Zelbst et al.(2012)examine the Impact of Radio Frequency Identification (RFID) utilization on manufacturing effectiveness and efficiency. The dimensions used by the researchers to measure effectiveness are the speed of delivery, accuracy and availability of information, level of customer service, delivery performance, fill rate and order fulfilment. This study focused on the manufacturing industry in the United States of America. As a statistical study these findings are considered to be widely generalizable.The effectiveness measures mentioned would need to be evaluated in the context of the energy industry in Kenya.

The findings support those of Santa, Ferrer, Bretherton, and Hyland (2010). In which their research paper explored the role of cross-functional teams in the alignment between system effectiveness and operational effectiveness was explored. The argument is that there is a strong relationship between system effectiveness, operational effectiveness and operational performance. They used a combination of qualitative and quantitative methods for data collection. The dimensions used by the researchers to measure operational effectiveness are cost, quality, reliability, flexibility and speed. These measures differ from those used by (Zelbst et al., 2012) .

Santa et al. (2010) also found that the measures stemming from operational effectiveness can be used to measure the impact of the implementation of system effectiveness on operational effectiveness. The dimensions used to measure system effectiveness are system quality, information quality, service quality and user satisfaction (Santa et al., 2010). They also state that special attention should be given to the measures quality and speed as these two factors are the most important in achieving operational effectiveness. However this study also questions the extent to which innovation helps organizations in the delivery of better services and in reducing operational cost. The focus of the study under review was on the contribution of cross-functional teams to the improvement in operational performance, this study will seek to find the outcome in the context of the impact of type of information system installed on operational performance.

## **2.4. Management Style**

Hussen, Mohamed, Karim, and Ahlan (2007) in a research paper sought to determine the influence of organizational factors on Information Systems Success in E-Government agencies in Malaysia. They state that management style is one of the six organizational factors that influence the success of information systems. They also

brought out the fact that two types of management-types can exist in an organization. These are: people-oriented management style where the managers are concerned with inter-personal relationships and the task-oriented style where the manager focuses more on the task aspect of jobs.

Hussenet al.(2007) find that, management style has a significant impact on system success. The study further established that the people-oriented management style supports system success more than the task-oriented management style. The researchers used perceptual measures to capture data on the success of information systems and organizational factors. The dimensions used to measure the success of information systems are systems quality, information quality, perceived usefulness and user satisfaction. The problem with the methodology used is that the respondents may have been bias, as what they perceive might not be the true picture of the organizational setting.

The findings by Hussenet al.(2007) are consistent with the study by Chen, Wu, and Guo (2007). This study suggests that management style is the main issue in the management of information systems. This is mainly because the decision-making mechanism is centralized as the economy in China is transforming from a central-planned economy to an open-market economy (Chenet al.,2007).

In a statistical study, Chenet al.(2007) sought to analyse the key challenges facing managers on the management of Information Systems. They also found that top executives play a critical role for innovations to successfully penetrate the organization. The study would have had more conclusive results if it focused on only one issue at a time. A study on the Energy industry in Kenya also needs to be done to fill this gap.

## **2.5 Operational Performance**

In this theme, the dimensions of performance and perception of performance are discussed. The issues constituting the gap are also set out.

Richard, Devinney, Yip and Gerry (2009) in a conceptual paper on Measuring Organizational Performance defines two types of measures of performance: objective measures and subjective measures. The objective measures are accounting, financial, mixed accounting/financial market measures and survival measures. The subjective measures of organizational performance are fully subjective and quasi objective measures (Richard et al., 2009). According to Richard et al. (2009), the fully subjective measures address latent performance constructs directly and may ask the respondent to compare the performance of the company to that of a rival. The quasi objective measures elicit specific objective performance information through self-report techniques and may ask a salesperson the level of sales or the CEO to estimate the market value of the firm (Richard et al., 2009). These subjective measures are said to have biases as the respondents will always view themselves positively, however the biases can be reduced with a sound research design (Richard et al., 2009). The study goes on to suggest that researchers should not view the choice of subjective measures as a second best alternative as the objective and subjective measures correlate (Richard et al., 2009).

Okwiri (2013) in his statistical paper on the relationship between a successful pre-ISO 9001 certification audit and the effectiveness of an organization used subjective measures to measure the effectiveness of the organization. This study focused on the customer-focused performance dimensions of reputation and relevance as perceived by the staff of the organization as ISO 9001:2008 standard focuses narrowly to customer and regulatory requirements (Okwiri, 2013). The findings

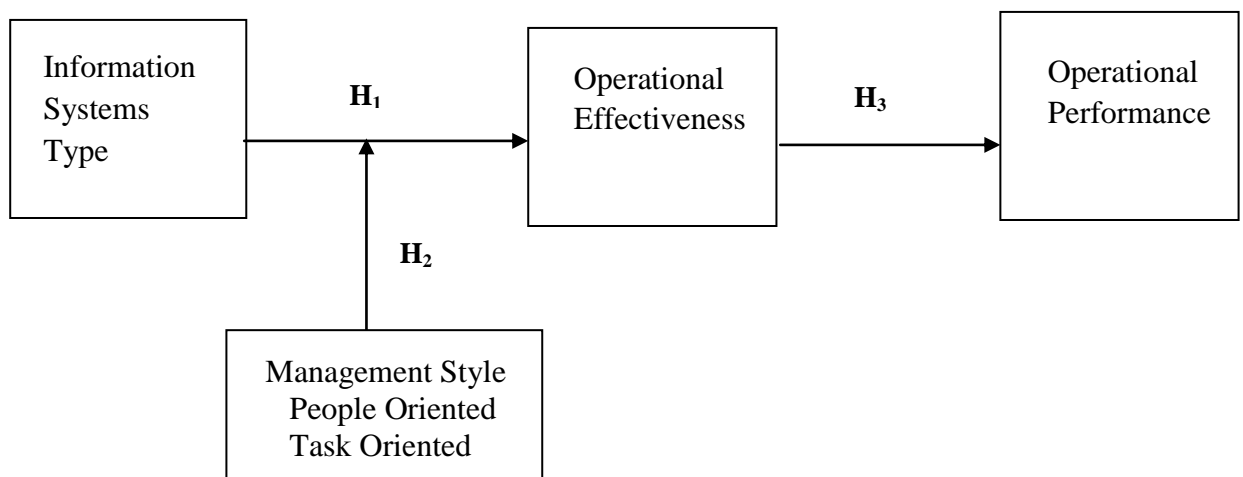
suggest that employees in an organization perceive their performance as high if the organization is ISO9001 certified relative to the organizations not certified.

## 2.6 Summary

The literature reviewed is summarized as Table 1 below.

## 2.7 Conceptual Model

A conceptual model emphasizes how the different variables in the study interact under different conditions. The themes discussed above can be modelled as below.



**Figure 1: Conceptual Model**

These links can be examined by testing the following hypotheses.

H<sub>1</sub>: The type of information system deployed has an impact on operational effectiveness.

H<sub>2</sub>: The management style of the organization has an impact on operational effectiveness.

H<sub>3</sub>: Operational effectiveness has an impact on operational performance

**Table 1: Summary of Literature Review**

<b>Study and Type</b>	<b>Finding</b>	<b>Gap</b>	<b>Issues to be examined in the proposed study</b>
(Mentzaz,1994), Conceptual Paper; (Farbeyet al.,1995), Conceptual Paper	Develops a taxonomy of Information Systems	An empirical study is needed.	An empirical study in a specific context.
(Okwiri, 2012), Empirical Paper , Participatory Action Case Study; (Zelbst et al.,2012),Empirical Paper	Information-based practices have a positive impact on operational performance	The industry	The context in the energy industry.
(Santa et al.,2010), Empirical Paper	There is a correlation between system effectiveness and operational effectiveness.	Restricted to specific operational performance dimensions.	Wider dimensions of operational performance in the Energy Sector.



(Hussenet al.,2007), Empirical Paper	Management style has a significant impact on system success	Geographical context and Industry	The context in a specific industry
(Chenet al.,2007), Empirical Paper	Management style is the main issue in the management of information systems	Geographical context	The context in Kenya
Okwiri (2013), Empirical Paper	Perception can be influenced by other factors.	The Industry	The context in the energy industry
(Richard at al.,2009), Empirical Paper	Perceptual measures can be used to represent operational performance	The Industry	The context in the energy industry

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter seeks to define the research design and explain how the data was collected.

### **3.2 Research Design**

The study was conducted to determine if different types of information systems impact operational performance differently. To meet the stated objective, the study was empirical as the data was collected first-hand at the source (Mugenda, 2011). The research was also cross-sectional in nature as the information was recorded based on a single point in time. It was also case-study so that the researcher could have an in depth understanding of the outcomes of the research. Although case studies are said to have the limitation of generalizability, it has been argued that the limitation depends on the adequacy of the underlying theory (Okwiri, 2012).

### **3.3 Data Collection**

This study focused the Operations Department in all the different areas of generation because the employees in this department are concerned with the day-to-day operations in the organization. Only the employees who use the information system installed in the organization were asked to provide information. Each of the informants understands operational performance goals so was able to understand the questionnaire items. According to the central limit theorem, if random samples of observations are selected from any population at different points in time or other the sampling distribution of the means will be approximately normal (Lucey, 2002).

Hence for this study,20% of the respondents from each of the 28 sections in the operations department was selected at random.

The measures on the different variables, questionnaire sections and the questions selected was be obtained from the reviewed literature. For the operational effectiveness variable, the indicators; cost,quality, reliability,flexibility and speed and were derived from (Zelbst et al.,2012). Perceptual measures were used to capture data on the management style based on (Hussenet al.,2007). For operational performance, perceptual data on cost efficiency, timeliness and quality of service was used based on (Okwiri,2013).

A questionnaire with items as indicated was administered through e-mail. To avoid influencing informants, the questions were set in such a way that there was no correct or wrong answer and the informants did not know what was sought. Because questionnaire items are derived from past studies, it was considered that the variables are measurable.

### **3.4 Data Analysis**

The data obtained was presented in terms of descriptive statistics. The mean and standard deviation were used to represent the variables and represented in form of tables. Discriminant analysis was used to test the mediating effect of the management style on the relationship between the type of information system and operational effectiveness. Regression analysis was used to test the impact of the type of information system and operational performance. The significance of coefficients for each independent variable was indicated by the P-Value. The extent and nature of the relationship was indicated by the coefficient and its direction.

## **CHAPTER FOUR: RESULTS AND DATA ANALYSIS**

### **4.1. Introduction**

In this chapter the results are received and analysed. The multi-item variables were aggregated and variable values were determined. These variables are: operational effectiveness, management style and operational performance.

### **4.2 Results**

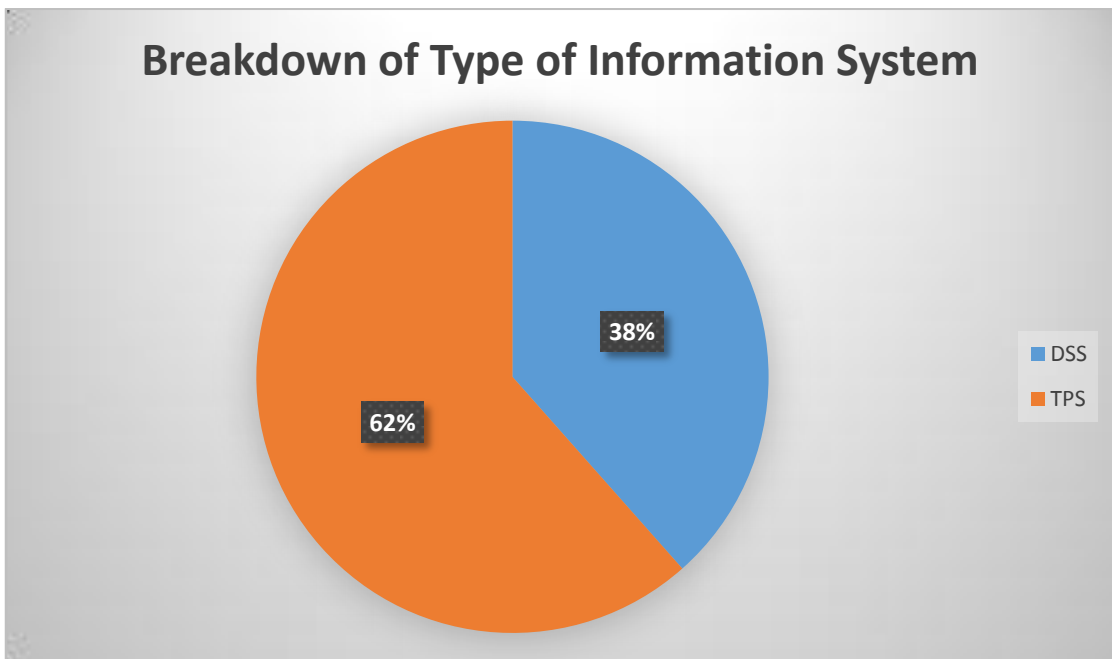
#### **4.2.1 Respondents Received**

Out of the sixty (60) questionnaires distributed, 52 were returned giving a response rate of 86.7%. The questionnaires were distributed to two categories of staff; resource coordinating staff and the coordinated staff. Of the 60 questionnaires distributed, Forty eight (48) were distributed to the coordinated staff. Forty six (46) were returned giving a response rate of 95%. For the resource coordinating staff, Twelve (12) questionnaires were distributed and Six(6) were returned giving a response rate of 50%. Both response rates are acceptable to use because they are both greater than the generally accepted response rate of 30% (Lucey, 2002). There was a low response rate from the resource coordinating staff because they may have been engaged in other work-related activities and did not have time to fill in the questionnaire.

#### **4.2.2 Breakdown of Information Systems**

Figure 2 below shows that 62% of the respondents use Transaction Processing Systems while 38% of the respondents use Decision Support Systems.

**Figure 2: Breakdown of type of Information System**

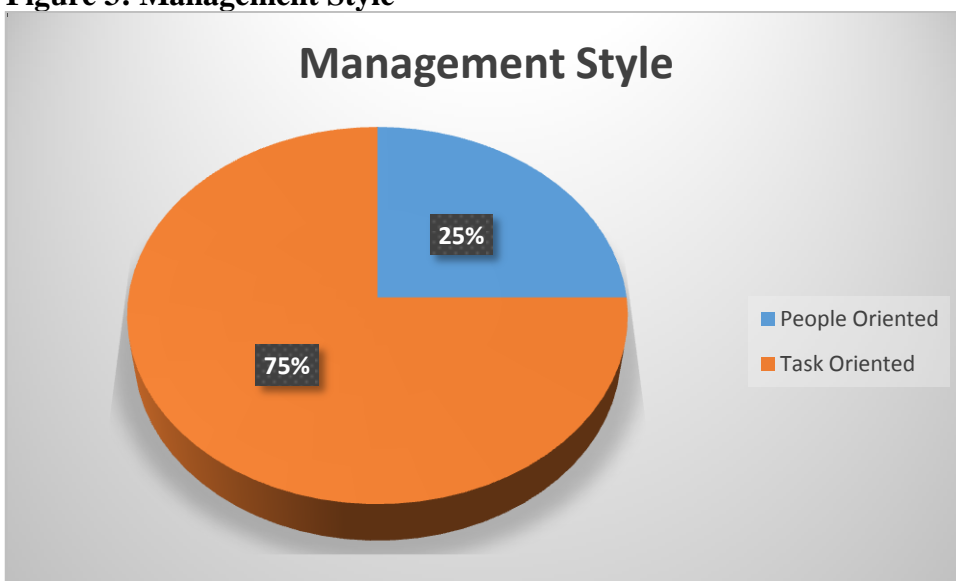


**Source: Survey Data**

### **4.2.3 Breakdown of Management Style**

75% of the respondents perceive that the managers have a task-oriented management style while 38% of the respondents perceive that their managers are people-oriented in terms of management style.

**Figure 3: Management Style**



**Source: Survey Data**

The multi-item variables used to represent the variables of management style, operational effectiveness and operational performance were aggregated and means and standard deviations determined. The data representing the variables is presented in Table 2 below

**Table 2: Variable Representation**

Questionnaire #	Type of Information System	Management Style	Operational Effectiveness		Operational Performance	
			Mean	S.D	Mean	S.D
1	DSS	People Oriented	5	0.53	4	1.15
2	DSS	People Oriented	4	0.53	4	0.58
3	DSS	People Oriented	4	0.35	3	0.58
4	DSS	People Oriented	4	0.53	4	0.58
5	DSS	Task Oriented	3	1.04	3	0.58
6	DSS	Task Oriented	5	0.53	4	1
7	DSS	Task Oriented	4	0.53	4	0.58
8	DSS	Task Oriented	4	1.16	4	0.58
9	DSS	Task Oriented	3	0.89	3	0.58
10	DSS	Task Oriented	4	1.16	4	0.58
11	DSS	Task Oriented	4	1.16	4	0.58
12	DSS	Task Oriented	4	1.16	4	0.58
13	DSS	Task Oriented	4	0.46	4	0.58
14	DSS	Task Oriented	4	0.35	3	1
15	DSS	Task Oriented	4	0.46	4	0.58
16	DSS	Task Oriented	4	0.93	4	0.58
17	DSS	Task Oriented	4	0.99	4	0.58
18	DSS	Task Oriented	3	0.99	2	1
19	DSS	Task Oriented	4	0.46	4	0
20	DSS	Task Oriented	4	0.46	4	0.58
21	TPS	People Oriented	4	0.52	5	0.58
22	TPS	People Oriented	4	0.52	5	0.58
23	TPS	People Oriented	3	0.74	4	0.58
24	TPS	People Oriented	4	0.53	4	0.58

Questionnaire #	Type of Information System	Management Style	Operational Effectiveness		Operational Performance	
25	TPS	People Oriented	4	0.35	5	0.58
26	TPS	People Oriented	4	0.74	4	0.58
27	TPS	People Oriented	4	0.52	5	0.58
28	TPS	People Oriented	3	1.3	3	0
29	TPS	People Oriented	3	0.89	3	0.58
30	TPS	Task Oriented	4	0.35	3	0
31	TPS	Task Oriented	4	0.35	3	0.58
32	TPS	Task Oriented	4	0.35	3	0.58
33	TPS	Task Oriented	4	0.89	4	1
34	TPS	Task Oriented	4	0.71	4	1
35	TPS	Task Oriented	4	0.92	3	1
36	TPS	Task Oriented	4	0.53	4	0.58
37	TPS	Task Oriented	4	0.46	3	1
38	TPS	Task Oriented	4	0.46	3	1
39	TPS	Task Oriented	4	0.35	3	0.58
40	TPS	Task Oriented	4	0.52	5	0.58
41	TPS	Task Oriented	4	0.93	4	0.58
42	TPS	Task Oriented	4	0.52	5	0.58
43	TPS	Task Oriented	3	0.99	4	0.58
44	TPS	Task Oriented	5	0.53	4	1
45	TPS	Task Oriented	5	0.53	4	1
46	TPS	Task Oriented	4	0.53	3	0.58
47	TPS	Task Oriented	3	0.76	3	0.58
48	TPS	Task Oriented	4	0.74	4	1
49	TPS	Task Oriented	4	0.46	4	0.58
50	TPS	Task Oriented	4	0.71	5	0.58
51	TPS	Task Oriented	3	1.36	4	0.58
52	TPS	Task Oriented	4	0.46	3	0

Source: Survey Data

#### 4.2.2 Correlation Matrix

A correlation matrix of the data in table 3 is presented as a matrix in table 3.

**Table 3: Correlation Matrix**

			1	2	3	4
			Type of Information System	Management Style	Operational Effectiveness	Operational Performance
1	Type of Information System	Pearson Correlation	1	-.091	-0.074	0.102
		Sig. (2-tailed)		0.520	0.600	0.474
2	Management Style	Pearson Correlation	-0.091	1	0.068	-0.242
		Sig. (2-tailed)	0.520		0.633	0.084
3	Operational Effectiveness	Pearson Correlation	-0.074	0.068	1	0.338*
		Sig. (2-tailed)	0.600	0.633		0.014
4	Operational Performance	Pearson Correlation	0.102	-0.242	0.338*	1
		Sig. (2-tailed)	0.474	0.084	0.014	

\*.Correlation is significant at the 0.05 level (2-tailed).

**Source: Survey Data**

Table 3 above presents the correlation between the type of information system and operational effectiveness as -0.074. Management style and the type of information system also have a negative correlation of -0.091. Operational performance and operational effectiveness have a positive correlation of 0.338. The table shows that there is a positive relationship between the type of information system and operational performance as the correlation is 0.102 and a positive correlation of 0.068 between the variables operational effectiveness and management style.



The data presented in Table 4 is information system focused and shows that for operational performance, the mean of the DSS type of system is 3.95 while that of the TPS is 3.875. For the operational performance, the mean of the DSS is 3.7 while that of the TPS is 3.84

**Table 4: Information Systems Mean**

	Operational Effectiveness		Operational Performance	
	DSS	TPS	DSS	TPS
	Mean	Mean	Mean	Mean
	5	4	4	5
	4	4	4	5
	4	3	3	4
	4	4	4	4
	3	4	3	5
	5	4	4	4
	4	4	4	5
	4	3	4	3
	3	3	3	3
	4	4	4	3
	4	4	4	3
	4	4	4	3
	4	4	4	4
	4	4	3	4
	4	4	4	3
	4	4	4	4
	4	4	4	3
	3	4	2	3
	4	4	4	3
	4	4	4	5
		4		4
		4		5
		3		4
		5		4
		5		4
		4		3

	Operational Effectiveness		Operational Performance	
	DSS	TPS	DSS	TPS
		3		3
		4		4
		4		4
		4		5
		3		4
		4		3
$\bar{x}$	3.95	3.875	3.7	3.84375
	0.51	0.49	0.57	0.77

**Source: Survey Data**

The data presented in Table 5 is focused on the management style and shows that for operational performance, the mean of the people-oriented is 3.84 while that of the task-oriented is 3.92. For the operational effectiveness, the mean of the people-oriented is 4.08 while that of the task-oriented is 3.69.

**Table 5: Management Style Mean**

	Operational Effectiveness		Operational Performance	
	People-Oriented	Task-Oriented	People-Oriented	Task-Oriented
	Mean	Mean	Mean	Mean
	5	3	4	3
	4	5	4	4
	4	4	3	4
	4	4	4	4
	4	3	5	3
	4	4	5	4
	3	4	4	4
	4	4	4	4
	4	4	5	4
	4	4	4	3
	4	4	5	4
	3	4	3	4
	3	4	3	4
		3		2

	Operational Effectiveness		Operational Performance	
	People-Oriented	Task-Oriented	People-Oriented	Task-Oriented
	Mean	Mean	Mean	Mean
		4		4
		4		4
		4		3
		4		3
		4		3
		4		4
		4		4
		4		3
		4		4
		4		3
		4		3
		4		3
		4		3
		4		5
		4		4
		4		5
		3		4
		5		4
		5		4
		4		3
		3		3
		4		4
		4		4
		4		5
		3		4
		4		3
$\bar{x}$	3.84	3.92	4.08	3.69
S.D	0.5547	0.480384	0.759555	0.759555

Source: Survey Data

## **CHAPTER FIVE: FINDINGS, DISCUSSION AND CONCLUSIONS**

### **5.1 Introduction**

This chapter presents statistical tests of results presented in chapter 4 so as to determine statistical significance. Hypotheses are tested and conclusions are drawn.

### **5.2 Type of Information System and Operational Effectiveness**

The first objective of this study was to determine if the type of information system has an impact on operational effectiveness. To test the null hypothesis that the means for operational effectiveness from perception of users on the different types of Information System are not significantly different, a t-statistic of the difference between the two information system means was calculated and was found to be -0.527 with 50 degrees of freedom and a confidence interval of 95%. The t-value of 2.00 is critical. As the t-statistic value is less than the table value the null hypothesis that the means for effectiveness from the perception of users of the different types of information systems are not significantly different is accepted (Pardoe, 2012).

### **5.3 Management Style and Operational Effectiveness**

Another objective of this study was to find out if the management style has an impact on operational effectiveness. To test the null hypothesis that the means for operational effectiveness from perception of users on the different management styles in the organization are not significantly different, a t-statistic of the difference between the two means was calculated and was found to be 0.481 with 50 degrees of freedom and a confidence interval of 95%. The t-value of 2.00 is critical. As the t-statistic value is less than the table value the null hypothesis that the means for operational effectiveness from the perception of users on the different management styles are not significantly different is accepted.

## **5.4 Interaction between the Type of Information System and Management Style**

This study sought to determine if the management style and the type of information system can interact and cause a difference in the operational effectiveness of the organization. A variable that is the product of the type of information system and management style was created and used to test the null hypothesis; the coefficient of the product variable is not significantly greater than zero. Discriminant analysis was used and the results show that the coefficient of the product was 0.240. As the coefficient of the product is greater than zero, the null hypothesis is rejected (Thiertart, 2001). The alternate hypothesis that the co-efficient of the product variable is significantly greater than zero is accepted. The conclusion made is that the type of information system and the management style interact and the interaction positively influences operational effectiveness.

## **5.4 Operational Effectiveness and Operational Performance**

The last objective of the study was to determine the impact of operational effectiveness on operational performance. The study measured three elements of operational performance. These are cost, timeliness of output and customer satisfaction. A regression analysis was carried out to test the null hypothesis that operational effectiveness has no impact on operational performance. The regression analysis results gave a p-value of 0.00 and a beta value of 0.786. The null hypothesis that there is no impact of the type of information systems on operational performance is rejected and the alternative hypothesis that there is an impact of the type of information system on operational performance is accepted because the p-value < 0.05 and the beta value is greater than zero.

## **5.5 Discussion**

The study determined that the different categories of information systems and the different management styles do not impact operational effectiveness differently. The study also found that both the management style and the type of information system interact and have an effect on operational effectiveness and operational effectiveness has an impact on operational performance.

On the impact of the type of Information System on operational effectiveness, the study revealed that the different types of information systems do not impact operational effectiveness in different ways. The findings also state that the different management styles affect operational effectiveness in the same way. This study contradicts the findings by Hussein et al. (2007) who found that the people-oriented management style was more prevalent than a task-oriented style. This inconsistency may be due to the individual level of analysis where the users may have been indifferent to the management style of the organization.

As observed in the literature, Chen et al. (2007) find that the top management play a critical role for the information systems to successfully penetrate the organization which in turn leads to operational effectiveness. The results are consistent with the findings of this study which indicates that the type of information systems and the management style interact and together they have an effect on the operational effectiveness of the organization.

The study measured the operational performance based on the elements of cost, timeliness of output and customer satisfaction. It was found that operational effectiveness has an impact on operational performance. This finding supports those of

Zelbst et al. (2012) who found that the effectiveness outcomes directly support supply chain performance.

## **5.6 Conclusion**

The main focus of this study was to determine the impact of the type of information system on operational performance. In view of the findings, it can be determined that the information systems deployed in an organization will affect the operational effectiveness in the same way regardless of the categorization of the system. Organizations that implement information systems should expect an increase in the operational effectiveness and in turn an increase in their operational performance. The type of management style in the organization should also be taken into account as the managers in the organization can influence the use of the information systems. The study's conclusion is that the type of information system has an impact on operational performance through an influence on operational effectiveness.

## **5.7 Recommendations**

Information systems with the influence of the management style affect the operational effectiveness of the organization and in turn the operational performance. This study may provide direction to operations managers considering the adoption of information systems to enhance their operational effectiveness to also take into account the management style in the organization as this will have a greater impact on operational effectiveness.

Future studies should consider measuring the effectiveness of the systems and the relationship between the management styles and the effectiveness of the systems. They should also consider determining the impact of information systems on a wider range of departments to establish if the same results will hold.

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## APPENDIX I: QUESTIONNAIRE

You have experience and knowledge that would be useful in investigating aspects of system and operation effectiveness derived from information and analysis practices. Kindly spare a few minutes of your busy schedule to fill in the questionnaire below. The information provided is confidential and will be used for academic purposes only. Your assistance and cooperation will be highly appreciated.

**Please indicate by ticking against the information processing system that you use most for your work.**

**Transaction Processing System**

**Decision Support System**

**Please indicate the extent to which you agree or disagree with the following statements by ticking the appropriate answer.**

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Our organization provides quick response to the needs of customers.					
	The use of information systems has increased the productivity of the employees					
	Our organization has the ability to deliver the product in the precise specifications to the customer.					

	Our organization operates with low overall operating cost as a percentage of sales					
	Overall, our organization is performing well in comparison to our competitors.					
	Our organization has the ability to meet the expectations of the customer.					
	In our organization, we use resources effectively and efficiently.					
	Our organization meets its contract obligations with the customers					

**Please indicate by placing a mark in the appropriate area to reflect the relative extent your perception is closest to the phrase as it describes the object.**

**0=Neutral, 1= Slightly, 2= Quite, 3= Extremely**

**Management of our organization**

— — — — — — — —

Focuses on people    3    2    1    0    1    2    3    Focuses on tasks  
and relationships

**Please indicate by placing a mark in the appropriate area to reflect the relative extent your perception is closest to the phrase as it describes the object.**

**0=Neutral, 1= Slightly, 2= Quite, 3= Extremely**

**Management of our organization**

— — — — — — — —  
Shows warmth when 3 2 1 0 1 2 3 Organized when  
dealing with us setting task goals

**Please indicate by placing a mark in the appropriate area to reflect the relative extent your perception is closest to the phrase as it describes the object.**

**0=Neutral, 1= Slightly, 2= Quite, 3= Extremely**

**Management of our organization**

— — — — — — — —  
Facilitates 3 2 1 0 1 2 3 Emphasizes on how  
communication tasks are performed  
between us and task schedules

Please indicate how you feel about your section's performance relative to other sections in your organization in terms of the outputs that go directly to your section's output users.

		Much worse than others	Somewhat worse than others	Just about the same as others	Somewhat better than others	Much better than others
1.	Cost efficiency per unit of output					
2.	Timeliness of output					
3.	Satisfaction for users of output					

**Thank you very much for your cooperation.**