

# **A Study of Value Addition by Information Systems to a Service Providing Business at the Meteorological Services Department in Zimbabwe**

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**Abstract** - Many companies are using only a portion of what is needed in terms of Information Technologies (IT) and this has caused the researcher to study how best Meteorological Services Department (MSD) can effectively utilize Management Information Systems (MIS). The objective that directed the study was to investigate value addition by information systems to a service providing business with specific reference to the weather station in Zimbabwe (Meteorological Services Department). Knowing the value added by MIS to one's business and working environment is key to cope with the ever increasing challenges such as the volume of information resources, nature and quality of information, user needs and expectations, information and communication technology competencies and infrastructure, inflated cost of information resources and staffing needs. The researcher studied how information systems add value to the daily business of the (MSD) in the following areas of the organisation processes: products, quality, management, problem solving and decision of the organisation. The study on value addition by management information systems will assist in the improvement of the MSD in Zimbabwe. The study used a multistage sampling process for drawing sample from the target population. Secondary and primary data collection methods were used for data collection purposes. The source for primary data was questionnaire. Five different types of Management Information Systems that add value to the MSD were identified; Management Information Systems, Office Automation Systems, Executive Support Systems, Expert Systems, Decision Support System and Transaction Processing System. From the findings it was concluded that management information systems add value by allowing valid decisions which provide accurate and up-to-date information and analytic functions. This study demonstrated the importance of information systems in an organisation and outlined the fundamental roles of Information Systems (IS) which are to support business processes and operation, support decision making by employees and managers and support strategies for competitive advantage.

**Keywords-** Management information systems; Meteorological Service Department; transaction processing systems; office automation systems; executive support systems; expert system; decision support systems; service providing business.

## **1. INTRODUCTION**

The Meteorological Services Department (MSD) is a department in the Ministry of Environment, Water and Climate in the Government of Zimbabwe responsible for providing weather, climate and seismic data to a diversity of stakeholders including the farming community, aviation industry, academic fraternity, and the mining sector, among others.

MSD is one of the most highly computerized Government Departments in Zimbabwe. Different sections use different software. For data purposes the Department uses Climate Software (CLIMSOFT) a Data Management System which was developed in Zimbabwe and is used for data entry, archiving, analysis and retrieval. The database uses a server which can house more than 80 stations at once (MSD QMS Policy Manual, 2011:11)[23].

The vision of the MSD is to offer world class meteorological, climatological and seismological products

and services are timely, affordable, easily accessible and understood by all anytime and anywhere within and outside Zimbabwe. Its mission is to contribute to the protection of life and property and sciences based informed socio-economic decision-making by providing customer and stakeholder driven quality meteorological, climatological and seismological products and services. The Department is guided by the Service Charter and its functions are laid down in the Meteorological Act Chapter 13:21.

## **2. LITERATURE REVIEW**

Information systems are a series of formal processes by which the potential usefulness of a specific message being processed is enhanced that is value is added (Taylor, 1982: 341)[26]. To accommodate and implement increasing complexity of products, services and distribution methods, organizations are frequently redesigning their organization structures and business processes, also in order to increase effectiveness and

efficiency. The varying possible coincidence of these phenomena has characterized the business situation with complex dynamism. The degree to which organizations can be successful in competition depends on the speed at which they can adapt to changing circumstances. This largely depends on the ability of their management information systems to support changing user information needs. Meteorologists use scientific principles to observe, explain, and forecast weather. They often focus on atmospheric research or operational weather forecasting. Meteorologists cover several sub disciplines of meteorology that include: climate modeling, remote sensing, air quality, atmospheric physics, and climate change. Weather and the study of it take place in multiple, interconnected-ways.

(<http://education.nationalgeographic.com>).

Information technologies, including Internet-based information systems, are playing a vital and expanding role in business. Information Systems (IS) are also valuable organizational resources that must be properly managed for an organization to succeed (Wolf, 2005:25)[31]. Organizations are faced with continual changes in the size, complexity and scope of their operations. Information that is reasonably accurate, timely, and tailored to the needs of managers and end users assist organisations gain strategic advantages over their competitors (O'Brien, 1998:11)[21]. Therefore information systems play a vital role in the success of modern organizations. Information systems that do not properly support an organization's strategic objectives, corporate culture, or employee needs can seriously damage that organization's prospects for survival and success. The proper management of information systems is therefore a major organizational challenge (Wolf, 2005:25-26)[31].

According to O'Brien (1998:11)[21] the information systems function represents a major functional area of business that is as important to business success as the functions of accounting, finance, operations management, marketing, and human resource management, an important contributor to operational efficiency, employee productivity and morale, and customer service and satisfaction, a major source of information and support needed to promote effective decision making by managers, an important ingredient in developing competitive products and services that give an organization a strategic advantage in the global marketplace and a major part of the resources of an enterprise and its cost of doing business. Nikoloski et al (2014:83)[19] goes on to say that information systems and organizations influence one another. Information systems are built by managers to serve the interests of the business firm. At the same time, the organization must be aware of and open to the influences of information systems to benefit from new technologies. The interaction between information technology and organizations is complex and is influenced by many mediating factors, including the organization's structure, business processes, politics,

culture, surrounding environment, and management decisions.

### **3. IMPACT OF INFORMATION SYSTEMS ON ORGANISATIONS AND BUSINESS FIRMS**

Information systems have become integral, online, interactive tools deeply involved in the minute-to-minute operations and decision making of large organizations. Over the last decade, information systems have fundamentally altered the economics of organizations and greatly increased the possibilities for organizing work. Theories and concepts from economics and sociology help us understand the changes brought about by IT (Laudon and Laudon, 2002:120)[13].

The unprecedented expansion and consequent physical and commercial growth of organisations open up crevices in the organisation's business processes. Nicholls-Nixon (2005: 77- 89)[18] found in his study that rapid growth in business generates dramatic changes in the scale and scope of a firm's activities. According to her, entrepreneurs in rapidly growing business enterprises experience more difficulties in comparison to small growth companies when deciding or establishing the type of changes or evolution required to support their level of growth. This is because they face greater managerial complexity than slow growth firms. One of the solutions she recommended to solve this complex issue was that high growth organisations should develop new skills and capabilities which will allow them to cope with the complexity. This can be attained by appointing new personnel or acquiring new resources such as new information systems targeted at improving organisational efficiency and effectiveness (Mojisola et al, 2008:35-40)[17].

According to Laudon (1990), information technology changes both the relative costs of capital and the costs of information. Information systems technology can be viewed as a factor of production that can be substituted for traditional capital and labor. As the cost of information technology decreases, it is substituted for labor, which historically has been a rising cost. Hence, information technology should result in a decline in the number of middle managers and clerical workers as information technology substitutes for their labor (Laudon, 1990).

Previous research has attempted to establish causal relations between prerequisites for use (roles), such as technical quality, information quality, and use, user satisfaction and impact (DeLone and McLean, 1992)[3] cited by Sarker et al (2006:51-86). Studies view computerized information system as an object; a technical construction that is to be used by people to play its role in business settings DeLone (1988: 5056)[2]. In organisations, people talk of the information systems as if they were intentional beings. Based on that observation, we explore the ways information systems are perceived

by their direct and indirect users. In actor network theory, information systems are also considered to be actors interacting with other technological and social elements of the network, and descriptions of how the information system acts as change agent or enemy to those who want change in the organisation have been provided (Hanseth and Braa, 1998:188-196)[6].

The way an information system is used is influenced by the perceived fit between the structure in the company and the IS functionality on the one hand, and the user's perception of how the system is trying to influence the user's work on the other hand (Askenäs and Westelius, 2003:210).

#### **4. ADDED VALUE IN INFORMATION SYSTEMS AND SERVICES**

The value of information can be addressed from different perspectives. Top managers see the value in decision making and operational management (Hayes, 1997:116-129)[7]. Some researchers emphasize the monetary value of information and argue that the cost of a professional user's time and effort to obtain information elsewhere far exceeds the cost of providing a library or an information system (Griffiths and King, 1993[5]; Keyes, 1995:172 - 187)[11]. The value of information in time saved, productivity and improved work quality is highlighted in a research carried out by Volpe National Transportation Systems Center (1998). Similarly, Koenig (1992:199-210) stresses the correlation between the costs of information services and corporate productivity.

To McGee and Prusak (1993)[16], the value of information lies in its use for competitive corporate strategy. The ability to acquire, manipulates, interpret, and use information makes it possible for organizations not only to survive but also to be ahead of their rivals. Reports on the added value of information released in some countries or economic sectors indicate the strategic attention paid to this matter. For example, the Georgia Technical Institute installed a campus-wide online library system in 1986 and reduced the costs of its literature searches by \$1.2 million a year. Another case study was the library at the Houston division of Texas Instruments. In a survey conducted by the library, users' responses indicated that the library saved the company \$268,800 a year and increased users' job proficiency by a value of \$523,000 a year. From an annual investment in the library of \$186,000 a year, Texas Instruments netted \$959,000 in benefits--a 515 percent rate of return (Matarazzo, et al., 1987:102 - 110)[15].

From an Asian perspective, the added value of the information market has gained much attention. The Government of Shanghai's official website (2004) states that the information industry in that state generated 35.04 million Yuan in the year 2000. That figure shows a 28.8% growth compared to the previous year. The added value gained from the production of information was 1.25 billion Yuan, and that figure for information services has

been 12.09 billion --a 13% growth compared to the previous year. Information in electronic form is capable of generating even more value. Matarazzo et al (1987)[15] points to some properties of electronic information among the most important factors for its added value. For example, at present, by synthesizing text, voice, and images an increasing number of multimedia resources are generated; hundreds of thousands of job opportunities are created, even in developing countries. This has created a considerable added value.

Overall, one could conclude that added value depends on factors such as the quality of the product itself, the method and quality of innovation, the type of utilization, conditions of use, the individual user (or the customer), the time of use, and even the place of investment and use. Such factors, as will be discussed later in this paper, are applicable to information and information systems. Also, the notion of added value in relation to information services is not limited to economics. Such services spread knowledge in the society. To elaborate this, we first carry out an analysis of the capabilities and values of information. Then we elaborate on the capabilities of information systems for generating added value.

#### **5. METHODOLOGY**

Kerlinger (1986:279)[10] defines research design as the plan and structure of investigation so conceived as to obtain answers to the research questions. Research design provides and holds the research project together. The main function of the research design is to ensure that the evidence collected enables the researcher to answer the research questions as unambiguously as possible.

The researcher used the case study approach which is both exploratory and descriptive in nature. Descriptive research is a type of decisive research, which has its major objective as descriptive of something usually market characteristics or function. According to Sekaran and Bougi (2012:31)[24], descriptive research design is used in the study that has major objective the description of something. According to Yin (1994:67)[32] a case study is an enquiry that investigates a contemporary phenomenon within its real life context especially when the boundaries between phenomenon and context are not clearly evident. A case may be an individual of some event or entity that is well defined.

Advantages that were noted by the researcher through the use of the case study approach were that the case study approach is rich in details and well defined as it gives the parameters for the study. It therefore becomes immediately useful in gathering detail. It also provided a chronological chain of events and lessons that are learnt from these case studies. Case study is also an effective way of explaining a situation like that of using the Meteorological Services Department to show the relationship between two variables; information systems and value addition in a service providing business.



Disadvantages of case studies were that it was time consuming since it entailed the study of one situation. The researcher also noted that it involves generalizing a topic from just one single case. This limits the applicability of the research findings since cases tend to differ in a lot of aspects. Case studies are often labeled as being too long, difficult to conduct and producing a massive amount of documentation (Yin, 1984).

The study was carried out at the MSD headquarters in order to attain a representative sample. The total population of the study was 100 staff members that are serving in all the sections of the Department. The Department is categorized into the following sections; Directorate, Engineering and ICT, Public Weather Forecasting, Numerical weather predictions, Administration, Aviation, External Relations and Marketing, Human resources, Seismology, Accounts, Agro meteorology and Training school. The researcher only considered the rank from supervisors to support staff since they are the ones who are directly in use of the information systems. The employees were defined as both managerial and non-managerial and those on contracts. The total number of the target population was 100 employees.

The current study used a multistage sampling process for drawing sample from the target population of 100. Stratified sampling was then used which is a method of sampling that involves the division of a population into smaller groups known as strata. In stratified random sampling, the strata are formed based on members' shared attributes or characteristics. Meteorological Services Department employees were stratified into homogeneous groups according to educational qualifications and sections. A random sample from each stratum was taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata were then pooled to form a random sample. Every element was selected independently of every other element and the sample was drawn by a random procedure from a sampling frame. Based on the population and sample of this study, proportional stratified random sampling or proportionate stratification was used for determining the sample size. Later on simple random sampling technique was applied to draw 21 elements from the targeted population of 100. With proportionate stratification, the sample size of each stratum is proportionate to the population size of the stratum. Strata sample size is determined by the following equation:

$$n_h = \left( \frac{N_h}{N} \right) \times n$$

Where  $n_h$  is the sample size for stratum  $h$ ,  $N_h$  is the population size for stratum  $h$ ,  $N$  is total population size, and  $n$  is total sample size.

This research employed a semi structured questionnaire method which is a research instrument consisting of a series of questions and other prompts for the purpose of collecting the information required from respondents. In

order to ensure a high response rate, the participants were assured that their answers will be kept in confidential way Pilot study acted as a tool to determine the suitability of the research questionnaires as well as the suitability of the research structure. It was also conducted in order to determine response rates and learn of any discrepancies within the questions, which included determining the suitability of the questionnaires and the questions as well. 2% were involved in the pilot study chosen at random at the sections in MSD. Testing the meaning of questions is probably the most important pretesting purpose. Kinnear and Taylor (1991) advised that it is important to make sure that the words used in survey questions have the same meaning to the respondent as the researcher intended them to have and to determine the time will be taken to complete the survey considered as a benefit of pre-test.

## 6. RELIABILITY AND VALIDITY

Joppe (2000)[8] defines reliability as: the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. Embodied in this citation is the idea of replicability or repeatability of results or observations. In the study, reliability was assured by having comprehensible research questions congruent with the research design. Ambiguity, which was discovered in the pilot study in certain questions, was avoided in the main study. In the data gathering process, the researcher's role was clearly defined. Coding and data checks were done.

The traditional criteria for validity find their roots in a positivist tradition, and to an extent, positivism has been defined by a systematic theory of validity. Within the positivist terminology, validity resided amongst, and was the result and culmination of other empirical conceptions: universal laws, evidence, objectivity, truth, actuality, deduction, reason, fact and mathematical data to name just a few (Winter, 2000[30]; Joppe (2000)[8] provides the following explanation of what validity is in research: Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are.

Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others. Validity plays vital role in the study it determines whether the validity of the study will measure according to the research objective set. Studies on the "content validity" are a method that depends on the consideration of the validity for observers and experts, researchers always keen to get encouragement and guidance of experts like supervisors, co-supervisors and other people who are good in the research may provide the researchers study adequate advices and suggestions that will be appreciated at the end.

Validity is the degree to which the test, or instrument, measures what it is supposed to measure. The researcher formulated data collection instruments after considering objectives of the study and initially formulated research questions in chapter one. The researcher improved the validity in the questionnaire during the pilot study. The information collected from responses can easily tell the validity of instrument's further performance in the study. Thus, the researcher employed the pilot study to check on each completed questionnaire to ensure that the respondents had no problems in understanding or answering questions and could follow instructions correctly. In order to remove the possibility of bias, the researcher sent the questionnaire to the project supervisor for some adjustments.

Data gathered from the questionnaires were analyzed with "Statistical Package for Social Science" (SPSS) version 16.0. The Descriptive statistic, mean and standard deviation and percentage was used to transform of raw data into a form that made it easy to understand and interpret, rearrange, ordering, manipulating data to provide descriptive information. The data analysis done on the data collected includes: Inferential Statics (Pearson Correlation Analysis and Multiple Regressions), descriptive analysis: mean scores, frequency and standard deviations. Inferential statics were used to test the hypothesis through the use of Pearson correlation and Multiple Regression Analysis. Pearson correlation analysis was used to examine whether there is a relationship between value addition and service provision where Multiple Regression Analysis was used to test the relationship between extrinsic and intrinsic motivational factors and performance.

Testing of assumptions usually involves obtaining descriptive statistics on variables. These descriptive statistics include the mean, standard deviation, range of scores, skewness and kurtosis. Descriptive statistics can be obtained a number of different ways, providing a variety of information (Pallant, 2010). Descriptive and inferential analysis was used. Descriptive statistics is the term given to the analysis of data that helps describe, show or summarize data in a meaningful way such that, for example, patterns might emerge from the data. Descriptive analysis was used to describe the distribution of respondents on question related to the study.

## **7. RESULTS AND DISCUSSION**

28.6% of the respondents said they use information systems for communication purposes and the examples given are of Office Automation Systems (OAS). Respondents who have administration responsibilities said they use cell phones to communicate with suppliers and they also use the Internet to look up for suppliers and to send and receive, external and internal emails. The human resource uses information systems for record keeping as well as internal communication with staff members. The External Relations and Marketing Officer

said they use the internet for communication and for keeping electronic schedules for meetings and travels. The value addition of OAS are that there is reduction of cost due to improving productivity by using less labour force for the same amount of work and Office Automation Systems improves the value of output for example better presentation, adding communication methods

9.5% of the respondents were technicians who said they use information systems for data capturing and they gave an example of software they use to capture data from hard copy to softcopy, the system is called Climatic Software (CLIMSOFT).

The accountant uses the Transaction Processing Systems (TPS). The specific TPS used was the Public Finance Management System (PFMS) for creditors. The other TPS that are used in this section were the public finance accounting package known as Systems Application Package (SAP) as well as Persistent Application Systems, Technologies, Environments and Languages (PASTEL) used for preparing reports. The TPS adds value to the MSD by capturing, entering, storing, retrieving, and processing the relevant details of business events, and generating the information/ documents necessary for running the organization and interfacing with external entities, such as customers as indicated by Escalle (1999:8)[4].

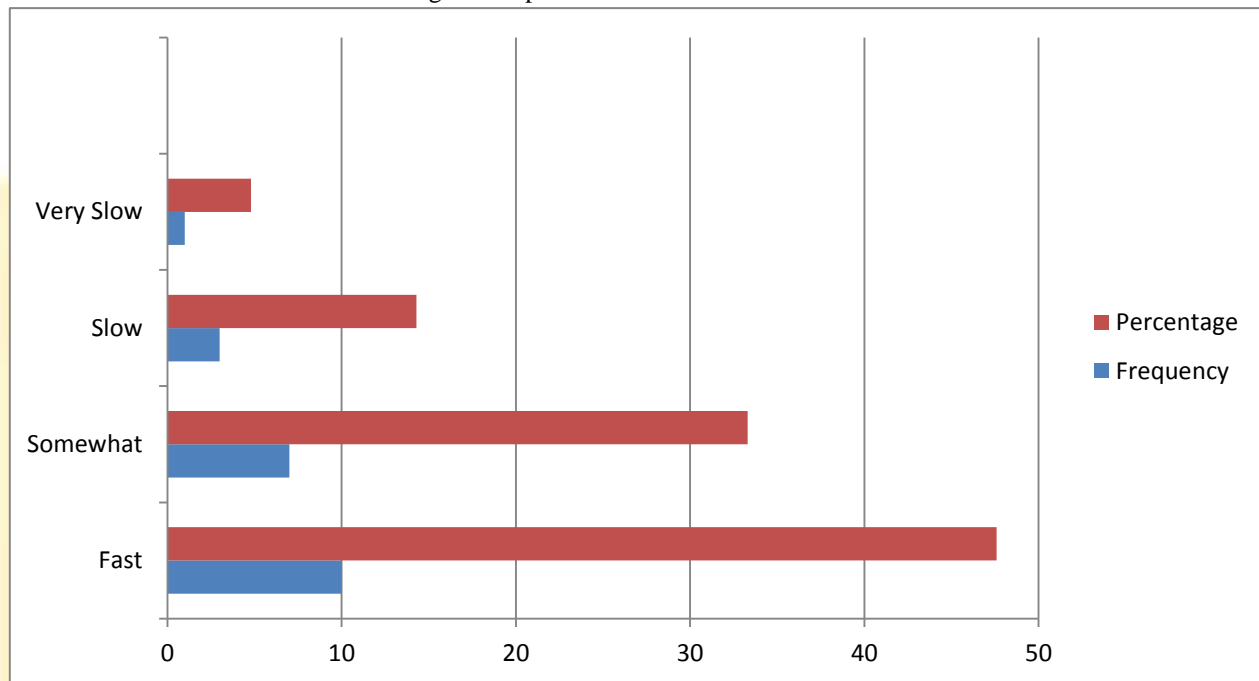
42.9% of the respondents were Meteorologists, Engineers, Forecaster and Meteorological Technician of which two have Master's degrees, and others have Bachelor's Degrees, Diplomas and the Technician has a certificate. This set of respondents was from Public Weather Forecasting (PWF), Numerical Weather Predictions (NWP) and Agro-meteorology sections. Results indicate that they use the Decision Support Systems and the Expert Systems (ES) which help them in making decisions. Todd, (1992:90)[28] said ES can be used to calculate a numerical measure of support (for example the conditional probability) for a particular hypothesis, a statement which supports the responsibilities of the respondents in their usage of IS. The systems they include Surfer which is used in surface modeling, analysis and mapping, GeoWRSI which helps in coming up with rainfall bulletins as it runs programs on crop-specific water balance models for a selected regions of the country, using raster data inputs, MESSIR SAT to receive synoptic reports and real time satellite pictures used in forecasting and Models from the Internet to show global weather parameters.

### **7.1 Added Value Created through the Use of Management Information Systems in MSD**

From the research project findings, value is added by; an increase in the speed of internal communication, increasing the working speed of staff members, providing easy access to information for the customers and

provision of updated information to customers in a quick interval.

Figure 1: Speed of Internal Communication



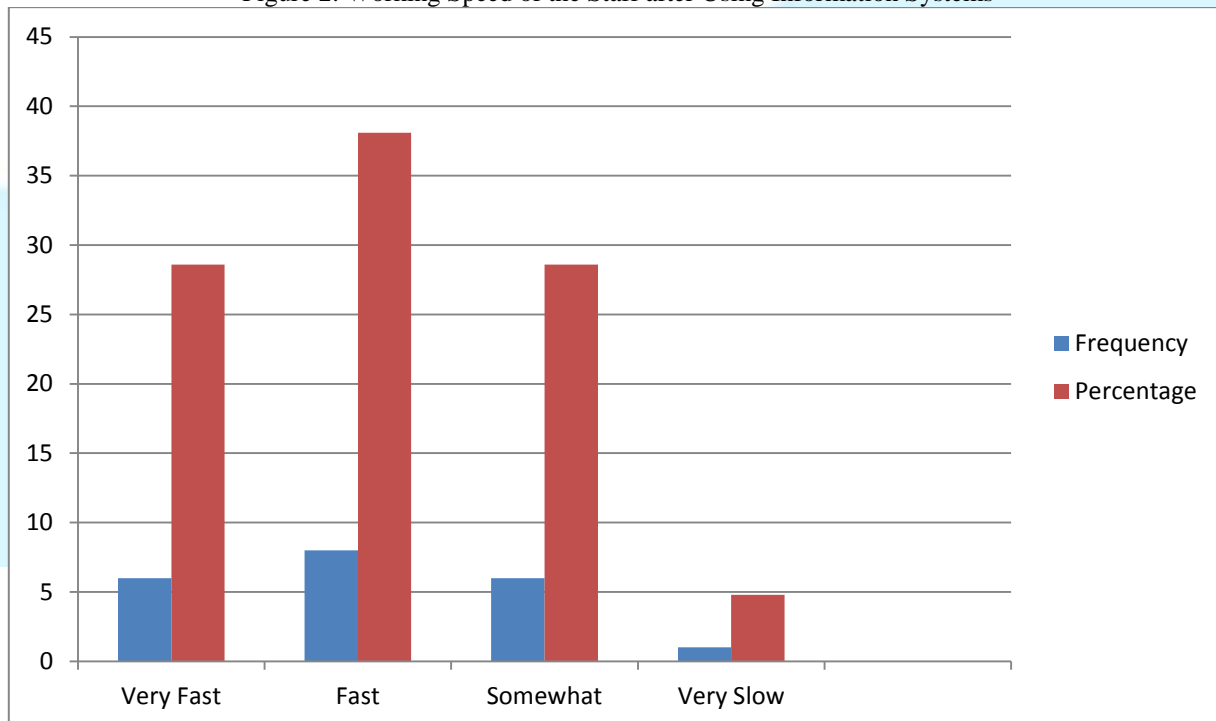
47.6% rated that the speed of internal communication is fast through the use of internal information systems. 33.3% said it was satisfactory. 14.3% said internal communication was slow and 4.8% said it was very slow. It is clear from the above that quite a considerable number of the respondents, 47.6 % rated that the speed of internal

communication was fast through the use of internal information systems.

## 7.2 Working Speed of Staff

The results below show the extent to which the use of information enhanced staff performance in relation to speed of executing their duties.

Figure 2: Working Speed of the Staff after Using Information Systems





Results showed that a large number of respondents, 28.6% and 38.1% said the speed of staff become very fast and fast respectively. 28.6 said it is satisfactory while 4.8% said the speed become very slow after the use of information systems.

### **7.3 Provision of Easy Access to Information for the Customers**

There is also value addition as information systems provide easy access to information for the customers. The majority of the respondents, 61.9% said it is true that information systems provide easy access to information for the customers. 33.3% of the respondents said it is somewhat true and 4.8% said it was not true that IS provided easy access.

### **7.4 Provision of Updated Information to Customers in Quick Intervals**

Results show that the rate at which updated information is provided to customers in a quick interval using Information Systems was fast. 19% and 47.6% of the respondents said it was very quick and quick respectively. 28.6% of the respondents rated the provision of updated information to customers to be a moderate interval and 4.8% said it was slow.

### **7.5 Processes and Functions that Create Added Value out of Information System**

#### **7.5.1 Value Addition to Processes**

9.5% respondents said IS like MESSIR SAT helps them in forecasting because it provides quick access and display of satellite images. The high definition satellite images are an essential tool for the forecaster, for weather analysis, monitoring and now casting. It allows to locate the main cloud masses (storm systems and tropical cyclones) and to identify the type of clouds. The animation of these images also provides a clear insight of the evolution and the movement of the cloud masses. Satellite imagery helps detect and forecast high impact weather, such as thunderstorms or fog.

19% of the respondents said using a system like Surfer adds value because it helps in surface modeling, analysis and mapping. This is in line with functions of the Surfer system which is a full-function 3D visualization, contouring and surface modeling package that runs under Microsoft Windows. Surfer is used extensively for terrain modeling, bathymetric modeling, landscape visualization, surface analysis, contour mapping, watershed and 3D surface mapping.

Meteorologists which made up 9.5% of the respondents said Expert Systems like the GeoWRSI helps in coming up with rainfall bulletins as it runs programs on crop-specific water balance models for a selected regions of the country, using raster data inputs. 28.6 % percent of the respondents had administration, human resources, external relations and marketing responsibilities said IS added value through easy communication and record keeping. One respondent who is an accountant said the

TPS used in her section helps in the paying of creditors and PASTEL helps in report writing.

#### **7.5.2 Online Services**

It clearly shows that MSD offers online services to its customers shown by the 85.7% respondents who said yes while 14.3% said no. The provision of online services is a process and function that create added value to customers. The online service mentioned by the respondents is Online Weather.

### **7.6 Added Value of Information Systems to the Business**

#### **7.6.1 Product Quality**

The results show that there is improvement of product quality by using IS. 28.6% of the respondents rated that the use of IS greatly improved product quality and 66.7% of the respondents said IS improved product quality. This shows that IS add value to product quality, only 4.8% respondent said that there is no change in product quality by using IS.

#### **7.6.2 Decision Making**

From the data gathered it was clear that IS impacts decision making with 81% of the respondents agreeing that information systems impact on decision making while only 19 % of the respondents did not agree.

The results show that IS improves communication both internally and externally. IS integrates the whole organization. One respondent in External Relations and marketing said that IS helps to keep records which are evidence of business transactions and it support decision making. This was in agreement with the statement by Elbeltagi et al (2008:15) who said, "... reports produced by the business system make information for decision making readily available to managers".

A respondent in public weather forecasting said his line of work depends on information systems for efficiency and effectiveness in forecasting disasters and disseminating early warnings in disaster response situation. In human resources the respondent elaborated that IS helps in analyzing employees who are needed as well as keeping databases of employees. One of the respondents said there is a gap between technology and decision making, "...you can have IS and fail to make decisions".

### **7.7 Employee Motivation**

Motivation is a key component of Humana Resource function of the organization because it is greatly related to work outputs and meeting the objectives of the organization.

### **7.8 Value Addition to Staff Members**

33.3% of the respondents said staff members were very motivated through the use of IS, 47.6% are motivated by use of IS while 9.5% said it was satisfactory. 9.5% of the respondents rated the use of IS as demotivating to staff members. Results showed various sections that benefitted from IS. The processes and management of the Engineering and ICT section were mainly rated to have benefitted well by using IS. The ratings were very good

and good, these two ratings constituting 90.5% of the respondents. The Public Weather Forecasting section uses Expert Systems in coming up with weather forecasts and warnings.

A bigger number of the respondents (47.6%) said the benefits of IS to this section were very good and 33.3% said the benefits were good while 14.3% of the respondents said the benefits were moderate. None of the respondents rated the benefits of IS to Public Weather Forecasting as poor. In the Numerical Weather Predictions who use mainly the Expert Systems, 23.8% of the respondents rated the benefits of IS to this section as very good and 28.6% respondents said the benefits are good. In the accounts section the benefits of IS was rated to be very good and good with 33.3% and 47.6% respondents respectively. 14.3% of the respondents said the benefits were moderate while 4.8% said they were poor. In the Agro-meteorology section who use Expert Systems in coming up with agricultural weather, results indicate that 33.3% of the respondents rated the benefits of IS to Agro-meteorology as very good, 28.6% as good, 33.3% as moderate while 4.8% said the contribution of IS to Agro-meteorology is poor. None of the respondents rated it as very poor. More than half of the respondents rated that the contributions of IS to the Administration section are good; 28.6% say it is very good, 33.3% said it is good, 14.3% say it is moderate and the other 14.3% said it is poor. Only 9.5% said the contribution is very poor. More than half of the respondents rated that the contributions of IS to the External Relations and Marketing Section are good; 38.1% said it's very good and 42.9% said it is very good. 9.5% of the respondents said the contributions of IS to this section is moderate. The ratings of poor and very poor were 4.8%. 57.1% of the respondents from the human resources section said the benefit was good and 19.0% said it is very good, 14.3% respondents rated the benefit as moderate and 2.8% said it is poor. None of the respondents rated the benefit as very poor.

From Quality assurance(QA) section 47.6% of the respondents rated the benefit to be good and five (23.8%) of the respondents rated the benefits to be very good. 19.0% of the respondents said the contributions of IS to this section is moderate. One respondent rated the benefit as poor and one respondent did not give an answer on how he/she rates this section. 33.3% of the respondents from the training school rated the benefit as moderate, 28.6% gave a rating of poor and 9.5% very poor. 14.3% respondents said it was very good and good. The results reveal that 23.8% respondents said it is very suitable, 38.1% said information systems is suitable, 28.6% said it is moderate while 9.5% said it was unsuitable. It is clear that MSD's IS keeping pace with the dynamic business environment.

## **7.9 Information Systems Collaborate with Corporate Responsibilities**

Results from interviews indicate that 19.0% of the respondents said that IS collaborate with their corporate responsibilities because it assists then in data collection, analysis reporting and record keeping. Respondents from PWF and NWP sections said information systems collaborate with their corporate responsibilities because they use it in information dissemination. In this organic business environment where technology is fast evolving for these sections the IS they use helps them keep pace with the dynamic business environment. 9.5% respondents from the External Relations and Administration said IS helps them automate their duties hence helps them keep pace with the dynamic business environment while 19% said information systems helps them collaborate with both internal and stakeholders.

## **8. CONCLUSION**

Information systems are vital and have capacity to provide added value which is of strategic importance to service businesses. IS makes communication and data management efficient within an organisation. Also through the use of TPS value is added when transaction processing systems record and process data resulting from business transactions.

Working speed of staff is enhanced and provision of information to customers in quick intervals is made possible. Information systems add value through the production and provision of quality goods and services. From the analysis we can also conclude that management information systems can help you make valid decisions by providing accurate and up-to-date information and performing analytic functions. In addition, the more an information system is used, the higher becomes its value.

### **8.1 MSD Information Systems**

Information technology can help all kinds of businesses improve the efficiency and effectiveness of their business processes, managerial decision making, and workgroup collaboration, thus strengthening their competitive positions in a rapidly changing marketplace. MSD is a good case example of a service business which uses IS.

### **8.2 Types of Information Systems**

There are five different types of MIS with specific uses in business. The different type of IS include the TPS, which records and processes data resulting from business transactions. The second type of IS is MIS which provide managerial end users with information products that support much of their day-to-day decision-making needs. There is also DSS which is mainly used for analysing complex business situations and making interactive decisions. There is also the OAS which aids knowledge workers and ESS which is tailored to the strategic information needs of top management.



### 8.3 Network and Speed

An organisation which uses an IS has different connections on different networks for example intranet, extranet and internet. These networks help in both the internal and external communication of the business.

Value addition by information systems to a service providing business can be created through the increase of speed of internal communication and working speed of staff.

Among other things this research revealed that value is created through the provision of easy access to information for the customers and provision of updated information to customers in quick intervals. These provisions give the business competitive advantage over its competitors.

### 8.4 Processes and Functions that Create Value Addition out of Information Systems

There are processes and functions which create value addition out of the above mentioned five different types of MIS. For example in the MSD an ES like MESSIR SAT helps in forecasting because it provides quick access and display of satellite images. Service businesses use IS to create and ultimately provide online services. The provision of online services is a process and function that create added value to customers. The online service mentioned by respondents at the MSD is Online Weather.

### 8.5 Impact of Information Systems

IS impact businesses' product quality that is quality is improved by using information systems. Furthermore IS does not only impact product quality only but it has other economic impacts like lowering operational costs and opens up the possibility of revenue increase.

### 8.6 Decision Making and Employee Motivation

To some extent IS impact decision making in an organisation. Managers and employees depend on IS for efficient and effective decisions. Reports produced by the business system make information decision making readily available to managers. On the other hand there is a gap between decision making and technology and if the existing IS is poorly established this will not impact decision making.

IS impact employee motivation. Motivation is a key component of Humana Resource function of the organization because it is greatly related to work outputs and meeting the objectives of the organization.

### 8.7 Benefits of IS to Different Sections

Information systems benefits different functions of a business. From the findings results show that the benefits vary from section to section, with extremes that the benefits can be very good or very poor.

### 8.8 Keeping Pace with Dynamic Business Environment

Competitive advantages are typically temporary as competitors often seek ways to duplicate the efforts of competitors. In order to stay ahead of competition, organisations have to continually develop new competitive advantages. Empirical findings showed that IS is suitable to keep pace with dynamic business environment.

### 8.9 Collaboration with Corporate Responsibilities

Information systems collaborate with a business's corporate responsibilities as it assists in data collection, analysis reporting and record keeping. Respondents from PWF and NWP sections said information systems collaborate with their corporate responsibilities because they use it in information dissemination. Information systems also facilitate the collaboration of businesses with both internal and external stakeholders.

### 8.10 Competitive Strategies

Information systems could be a critical enabler of the five competitive strategies, which were identified by Micahel Porter. (Baltzan and Phillips, 2010:17).

Rivalry of competitors within its industry

- Threat of new entrants into an industry and its markets
- Threat posed by substitute products which might capture market share
- Bargaining power of customers
- Bargaining power of suppliers

By creating/adding value and thus creating competitive advantages, information systems could contribute to each part of an organization's value chain and extended value chain (including interactions/ties with external partners and strategic alliances). By leveraging on the Internet technologies, organizations could also create a value web (Laudon and Laudon 2012: 137) or a hub structure, both of them look at improving the efficiency and the effectiveness of value chain and supply chain by digitally connecting customers, suppliers, partners; by reducing the information gaps/errors along the chain (especially demand and supply); and by bettering communication, cooperation and collaboration.

The current types of IS as used by service businesses add considerable value, but also if under-utilized the benefits may not be realized. There is therefore need to review the business processes and procedures taking into considerations some of the changes that are taking place in the ICT world which have effect on businesses.

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