A Review of the Principles, Components and Applications of Management Information System

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Abstract
Management Information System (MIS) is a system by which information is collected, processed and provided to management to facilitate decision making in an organization. It is a formal mechanism for gathering, and supplying necessary information to managers to help them in performing their functions effectively. The main objective of management information system is to assist managers in making timely and informed decisions. The principles of management information system include: recognition and management of complexities within an organization; adoption of management information system practice by all staff of the organization; and effective/ extensive communication within an organization. The basic components of management information system include: inputs (collection of data from various sources); processing (conversion of data into information); analyzing (evaluation of information for various uses); and output (supplying the processed information to managers at the right time and place). Management information system is generally applied in assembling, processing, evaluating, storing, retrieval, and disseminating manner to managers in various levels or areas of management such as financial management, manufacturing management, marketing management and human resource management (or personnel management). With the vast information emanating from both in and outside the organisation, computers have become the main tool of management information system. They have revolution management planning and control as they have provided up-to-date and timely reports to management.

Key words: Management Information System, Principles, Components, Applications, Decision Making.

1.0 Introduction
Organisations are in the race for enhancing their capability in order to survive in the competition of the global curious market .Organisations therefore attempt to advance their performance level by continuously using the principles and components of management information, as well as applying the overall management information system in the managerial process (Carl, 1973). Many authors, including Gupta (1992), Onuegbu and Obiah (2015), have observed that the survival of any organization depends mainly on the application of management information system in the management process.

Therefore, Management information system is any reporting technique, manual or automated which provides the key members of an organization with data for their managerial

operations. It is formalised procedures for providing managers at all levels, with appropriate information from all relevant sources, to enable them make timely and effective decisions for planning, directing and controlling the activities for which they are responsible (Madu, 2004 and Adebayo, 2007). Information normally move along channels from point to point through the interrelated network of the operating elements of the organisation (Uhegbu, 2007). In a business organisation, this flow of information would include production, sales, personnel data and the total information emanating from both internal and external environment of the organization. The information or data may flow in form of memos, reports, forms, face-to-face encounters, electronic signals or any other medium that moves intelligible symbols from one place to another in the organisation (Heidarkhnani et al 2013)

Owing to the vast information emanating from both inside and outside of an organization, there is need to view management information system in the light of computer system. According to Asemi et al (2011), management information system is one of the major computer-based information systems; its purpose is to meet the general information needs of all the managers in the organization, or in some organizational subunit of the firm. Nowduril and Al-Dossary (2012) see it as a computer based information system that provides for management oriented reporting based on transactions, processing and business operations of the organization.

Laudon and Traver (2010) see management information system as a computerized established information system that is particularly designed to assist with management tasks, activities and decision making. They went further stating that its objective is to design and complement techniques, processing and procedures that provide proper detailed reports in an accurate, consistent and appropriate timely manner. Laudon and Laudon (2012) have the view that management information system is a computerized database of financial information organized and programmed in such a way that it produces regular reports on operations for every level of management in a company. The levels of management according to Carthivel (2004) and Eze (2014) include top level managers, middle level managers and junior level managers. Whatever be the case, the main purpose of the management information system is to give managers feedback about their own performance.

In this paper, the principles, components and applications of management information system are reviewed.

2.0 Principles Of Management Information System
According to Robertson (2005), the principles of management information system may include:
   i.   Recognition and management of complexities within an organization: Organisations are very complex environments having many challenges that need to be overcome when planning and implementing information management projects. The complex nature of the organisational environment according to Wade (2013) could be traced from diverse political views, competitive changes or threat of substitutes. When confronted with these complexities, Robertson (2005) suggests that project managers should fall back upon approaches such as focusing on deploying just one technology, purchasing a very large suite of applications from a single vendor, rolling out rigid, standardized or fully decentralising information management activities to ensure that every activity is tightly controlled. In proffering this solution, Robertson (2005) has in mind that these complex set of needs and problems could be limited or avoided using a single solution. In practice however, there is no way of avoiding the inherent

complexities within the organisations; therefore new approaches to information management must be found that will recognize these complexities.

ii. Adoption of management information system practice by all staff of the organisation: Management information systems are only successful if they are actually used by staff. It is not sufficient enough to install a software that will manage data, active participation of employees throughout the organization is needed (Reddin, 1992). In buttressing this view Robertson emphasized that staff must save all key files into the records management system, front-line staff must capture all details in the customer relationship management system. This may include communicating clearly to all staff the purpose and benefits of the project and ensuring that the systems that are deployed are useful and usable for staff (Bliss,1979; Snivascava,1985)

iii. Effective/extensive communication within an organization: Communication ensures that the staff of the organisations has clear understanding of the projects and the benefits it will deliver (Smith, 1990). This is a pre-requisite for achieving the required level of adoption. It is not possible to enforce a strict command and control approach to management. Instead, the vision must be clear and created for the management information project and communicated widely. This allows each project team to align themselves to the decisions about the best approaches.

3.0 Components of Management Information System

According to Bulgars (2013) and Kronke (2015), the five components that must co-exist and function harmoniously in order to enhance effective management information system practice include:

i. Computers: Computers are electronic machines which can accept data, perform desired operations on the data, and report or store the results of these operations at an extremely high speed (Gupta, 1992). Computers have the capability of treating a vast mass of data within minutes and to produce summarized results (Kronke, 2015). Computers can improve the effectiveness of management information system. They help in providing up-to-date and timely reports to management for planning and control. Computerised management information systems have revolutionalised management planning and control (Ligon, 1976). These systems can provide altogether new dimensions to the practice of management and help in processing a vast amount of data (Kronke,2015)

ii. Data: Data are facts that are used by programs to produce useful information. The necessary data called input are fed into the computer in a coded form. They are stored in machine readable forms on disk or tape until the computer needs them. Vladimir (2016) is of the view that these data are later processed according to a prepared programme and the result known as output is supplied in the designed format for use in an organization. In the words of Gupta (1992), these data are received from both internal and external sources as it concerns the organization. Then relevant information is deduced from the data and supplied to managers for decision making. Effects of decisions on both the external and internal environment are compared against established standards.

iii. Procedures: Jessup and Joseph (2008) assert that procedures are the policies that govern the operation of a computer system. They are manuals or set of instructions that direct people to function in ways that produce useful information from data.

iv. People: Human element must be duly considered before management information system is installed. People should be educated in the nature and utility of the system to overcome their resistance. The system should not be forced upon the people. Social and behavioral aspects must be taken into account in the design and implementation

of the system (Reddin, 1992). This human element of management information system according to Vladimir (2016) refers to the users of the information, those who operate and service the computers and those who support the network of computers.

v. Feedback: It is another component of management information system that defines that management must be supplied with information concerning the operations of the organization to enhance their decision makings (Kronke,2015)

4.0 Applications of Management Information System

Many organisations are structured along functional lines which include financial management, marketing management, manufacturing management and human resource management. In marketing management aspect, Jobber (2007) views the application of management information system as marketing information system and defines it as a system in which marketing data is formally gathered, stored, analysed and distributed to managers in accordance with their informational needs on a regular basis. In addition the online business dictionary defines it as a system that analyses and assesses marketing information gathered continuously from sources inside and outside an organization.

This marketing information system according to Shajahan and Prijadharshini (2004) can be applied in three crucial developments. Firstly, when an organization or company expands and diversifies into new market, both the company and the customers' point of views are needed to be handled by the marketing managers. Therefore there would be greater need for marketing information concerning the new products and the reactions of customers. Secondly, when consumers obtain an increment in the level of their income, it causes a tendency for them to be more discriminating during the purchasing procedure. A full awareness of the points that distinguished his brand from that of the rivals should be obtained by the marketers. This awareness brought about by marketing information system could be used by managers to take decisions on how to meet up with their rival firms or on how to have competitive edge over them so as to drag back their customers. Thirdly, the development of the markets and the movement from price to non-price grounds of competition lead to an increase in the application of competitive strategies. For example in event of rivalry, a firm can either lower or raises price to gain competitive advantage over others. Such decision is taken after analyzing the marketing information available to the company or firm.

The application of marketing information system aspect of management information system are numerous, it is also used to produce sales report. Such reports allow managers to see which aspects of sales are doing well and which aspects of sales need attention. The company can learn about the types of products the customers purchase including sale items, a profile can be developed that reflects the purchasing habits and powers of their customers. In Birn (2004) contribution, marketing information system could help in having competitors' information, reviewing competitors' promotion and communications to see if the company is doing it better or worse than competitors. This information however enables the marketing managers to make decisions toward having an edge over their rival firms.

Another functional area in an organization where management information system has made impact or could be applied is in financial management. Siddiqui (2015) asserts that financial management information system involves collecting and analyzing financial data which are used in running a business in a way as wanted as making good financial decisions. In analyzing financial data, the amount of resources the company should maintain, how the

company will receive the money (loan, revenue) and how that money should be disbursed and allocated throughout the organization are also determined.

Financial management information system also provides financial information to all financial managers within an organization which they use in analyzing historical and current financial needs, monitors and controls the use of funds over time. Kurfi (2003) in his own contribution asserts that analyzing financial data results in making financial decisions like investment or long-term-asset mix decision, financial or capital mix decision, dividend or profit allocation decision and liquidity or short-term-asset-mix decision.

The use of management information system in manufacturing management is seen as manufacturing management information system. A typical manufacturing information system is use to monitor the flow of materials and it is targeted anywhere production is taking place throughout the organization.

In product designing and engineering practice, new products to be sold by an organization to its customers are created essentially by efficient and effective generation and development of ideas through a process that leads to a new product (Morris, 2009). Information for designing are culled out from databases such as Computer Aided Design (CAD) and Computer Aided Engineering (CAE) systems. Norma (2002) summarised the kind of information that the product designer can cull out from these databases as it concerns different stakeholders to include:

a. The manufacturer is concerned with production cost, he wants an economically produced product
b. The purchaser looks at price, appearance and prestige value from the product
c. The end user is concerned with usability and functionality of the final product
d. The maintenance and repair department focuses on how well the final product can be maintained, whether the product is easily reassembled, dissembled, diagnosed and serviced. It is the product designer's job to incorporate these information needs into his design. He should also acquit himself with the information concerning the opinion of people about the product, faculty products, errors made in the design process and the desirable market sales.

The last functional line as mentioned earlier where management information system is applicable in an organization is human resource management. It is a function within an organization that focuses on recruitment of management and providing direction for the people who work in the organization. It is the organization function that deals with issues related to people such as work force analysis and planning, compensation, hiring, performance management, benefits, motivation, communication, training and job assignments.

Armstrong (2006) is of the view that these human resource management functions could not be realized without the use of human resource information system and therefore asserts that it is the use of human resource information system that determines the flow of this information as relates to people in an organization. Thus the use of information system of the human resource management helps in information gathering, documentation, retrieval and use when needed.

Smriti (2016) stated that the main purpose of maintaining human resource information system is to gather, classify, process, record and disseminate the information required for efficient

and effective management of human resources in the organization. He further stipulated the various uses of human resource information system as -----------

Personnel administration: which encompasses personal information of the employee, which may include name, address, date of birth, marital status and the date of joining the organization. The information describes the employee in a unique format and enables the organization to have a comprehensive or background knowledge of the employee in question.

Salary administration: this provides a report containing information like present salary, benefits, last pay increase and proposed increase in future. An organization can use the information available here to determine the total amount payable to workers as against profit made or against individual contributions in an organization which often lead to decisions taken toward retention of workers.

Leave or absence increase: human resource information system is also useful in controlling leave or absence of employees by maintaining a leave history of each worker. A worker can be issued with an identification booklet indicating every worker's name and unique number on it, columns for entry and exit which must be filled when occurred. This to a great extent reduces chances for malpractice or oversight in calculating wages for each employee. It can also be useful in identifying those to be laid out in times of economic recession in an organization.

Performance appraisal: human resource information system is useful in maintaining performance appraisal data such as due date of the appraisal, potential for promotion, scores of each performance. The textual information can be combined with the factual data obtained from the human resource information system and the combination of this information can be used for imparting training and affecting employee mobility in the form of transfer and promotion.

Manpower training: human resource information system is applicable in manpower planning also, by keeping information of organizational requirements in terms of positions. Having documented the information need for positions, it proceeds to connecting employees to the required positions in the organization. Through this system, vacancies are identified for recruitment.

Recruitment: recruitment forms the most essential function of human resource management information system. This function it performs by recording the details of activities involved in employee recruitment. The recorded information is made available by human resource information system for reference purposes or for use in subsequent recruitments

5.0 Conclusions

Management information system is of paramount importance in effective management of any organization. It is a key factor in the management of any organization. The principles of management information system include involvement of all staff of the organization in the practice and communicating effectively and extensively in the organization. The components/procedures include collection of data from various sources, conversion of data into information, processing of information for various uses and dissemination of processed information to managers in various areas and levels of management. As an integrated user-machine system that provides information to support management planning and control, computer is the main tool of management information system. Management information

system has wide applications in several areas of management including financial management, marketing management and personnel management.

References

Adebayo, G.; (2007). Management Information System in 21st century. Awmark, Ibadan Nigeria

Armstrong, M.; (2006). A Handbook of human resource management practice 10th.ed Kogan Page Limited, Lodon.

Asemi, A.; Safari, A.; and Zavareh, A.A.; (2011). The Role of management information System (MIS) and Decision Support System (DSS) for manger's decision making process.International Journal of Business and Management. 6(7)164-173

Birn, R.; (2004). The Effective use of market research: how to drive and focus better business decision 4thed. Kogan Page Limited, London

Bliss, E. C.;(1979). Getting things done. Elem Tree, London

Bulgars, S.; (2013). The First phase of creating a standardized international technological implementation framework/ software application. Int.J Business and Systems Research. 7(3)250-254

Cakthivel, R. S.;(2004). Role impact and importance of management information system://www.Linkedin.com

Eze, I.F.;(2014).Management Information System. Divine Favour Publishing Ventures, Owerri

Gupta, C. B.; (1992). Contemporary management. Ashishi Publishing House.New Delhi, India

Heidarkhani, A; Khomani, A. A.; Jahanbazi, Q. and Alipoor, A.; (2013). The role of management information systems in decision making and problems of its implementation. Universal Journal of Management and Social Sciences. 3(3),78-89

Jessup, L.M. and Joseph, S. V.;(2008). Information systems today. 3rd.ed. Pearson Publishing, Boston.

Jobber, D.; (2007). Principles and practice of marketing. 5th.ed. Mcgraw-Hill Education, New York

Kronke, D.; (2015). Essentials of management.4th.ed. Pearson Publishers, Boston.

Kurfi, A. K.; (2003). Principles of financial management. Benchmark Publishers Limited, Kano

Laudon, K. C.; and Laudon J. P.; (2012). Management information systems: managing the digital firms. 12thed. Pearson Publication Limited

Laudon, K.C.; and Traver, C. G. (2010). Ecommerce 2010-Business technology-society. 6th.ed. Pearson Education Incorporation. Prentice Hall

Ligon, H. H.; (1976). Successful management information system. Umi Research Press, Ann Arbor Michingan

Madu,E. C.;(ed)(2004). Technology for Information Management and Services. Evi-Coleman Publications, Ibadan Nigeria

Morris, R.; (2009). The Fundamentals of Product design. Ava Publishing

Norma, D.; (2002). The Design of everyday things. Basic Books, New York

Nowduril, S.; and Al-Dossary, S.; (2012). Management information systems and its support to sustainable small and medium enterprises. International Journal of Business and Management. 7(19)125

Onuegbu, R. C. and Obiah, M.E.;(2015). Human capital development and human resources management in Nigeria. Mega Atlas Projects Limited, Owerri

Reddin, W. J.; (1972). Effective management . Tata Megraw-Hill, New Delhi, India.

Robertson, J.; (2005). Information management: 10 principles of effective

management.www.steptwo.au

Shajahan, S. and Priyadharshini, R.;(2004). Management information systems. New Page International Ltd, India

Siddiqui, F.; (2015). Benefits of financial management system. https.//www.linkedin.com/pulse/

Smriti, C.; (2016).Advantages and uses of Human Resource Information System (HRIS)www.yourarticlelibrary.com/hum.

mith, P. M.; (1990). Taking charge. Sterling Publishers, New Delhi, India

Snivastava, P. K.; (1985). New Horizons in management. Print Well. Jasper, India

Uhegbu, A.N.(2007). The Information user: issues and themes. 2nd.ed. Whytem Publishers, Nigeria.

Vladimir, Z.;(2016). Information system. Retrieved from www.Britannica.com.

Wade, M.(2013). Organisational complexity: the hidden killer. Retrieved from www.imd.org/research/challenges/Tco.