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Management Information System: Tools for Achieving Administrative Effectiveness in Private Universities

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ABSTRACTS

The major goal of this study was to demonstrate the role of management information systems (MIS) at private universities, as well as the challenges they face. The study discovered four major MIS issues: poor communication networks, insufficient finance for MIS units, insufficient MIS facilities, and insufficient computer literacy among important university executives. To implement the university's management information system more effectively and successfully, as well as to improve the organization's and employees' performance. It was recommended that the government contribute a significant amount of money to MIS units in universities yearly, that more network services be made available in all universities, and that all institutions be connected to the internet.

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1. INTRODUCTION

Schools employ management information systems (MIS) to help with a variety of administrative tasks such as attendance tracking, assessment records, reporting, financial management, and resource and staff allocation (Shah, 2014). Managers can use MIS to get the information they need to run their businesses more efficiently and effectively. MIS is a system that uses formalized procedures to provide appropriate information to management at all levels and in all functions, based on data from both internal and external sources, so that they can make timely and effective decisions for planning, directing, and controlling the activities for which they are responsible. The National Universities Commission (NUC) established the National Universities Management Information Systems (NUMIS), which concentrated only on three primary areas: student records, staff records, and financial records. Data entry, data update, query, reports, and file maintenance are the five (5) phases of the NUMIS main structure (Nwankwo *et al.*, 2020). Staff and student entities, finance, reference tables, students and staff list, and student and staff information are all linked to these phases. Although NUMIS has been implemented in Nigerian colleges, it has not been fully exploited in the decision-making process.

Its fundamental goal is to create and implement procedures, processes, and routines that provide appropriately detailed reports in a consistent, timely, and accurate manner. In Nigeria, poor management information systems have been recognized as a stumbling barrier to effective university administration. The importance of information technology in improving the efficacy and efficiency of work processes in an organization has required an assessment of Information System functionality, leading to a rapid increase in demand for Information System resource performance.

2. METHODS

This is a literature review. This study collected data from articles in international journals. Then, the obtained data were analyzed and summarized.

3. RESULTS AND DISCUSSION

3.1. Concept of management information system

An integrated user-machine system for providing information to assist the operations, management, analysis, and decision-making functions of an organization is known as a management information system. According to Telem (1999), MIS is a management information system that is tailored to the school's structure, management tasks, instructional processes, and specific needs. MIS is a field that focuses on the integration of computer systems with an organization's goals and objectives. MIS refers to a system that employs the information necessary by the organization's management at every level in making operational, tactical, and strategic choices, based on the definitions above. Management information systems (MIS) give managers the data they need to run their businesses efficiently and effectively. These systems differ from conventional information systems in that they are intended to be used to analyze and facilitate the organization's strategic and operational actions. The primary goal of MIS was to increase the efficiency of school office functions. It was used to keep track of student and employee information. The most significant source of worry was an emphasis on data entry and collation rather than data transfer and analysis. During the integration stages, the usefulness of management data was realized.

3.2. Types of management information system

Management information systems are used to extract data, prepare reports, and assist operational and middle-level managers in making decisions. The types of the management information system are the following:

- (i) **Process Control.** The process control system collects data in real-time and then generates a report on the system's performance. The report aids the manager in evaluating the process's performance and provides information on the incidence of a specific event over time. This type of data aids in the evaluation of efficiency as well as the protection of people and machinery.
- (ii) **Management Reporting System.** This system generates reports on a company's activities and finances for all levels of management. The management report system assists the company's manager in comparing current performance to the previous year's performance as well as predicted performance. In this method, the management can assess their performance and seek to improve the company's overall performance. Upper management uses this report to evaluate the financial output and operational efficiency of the company's defined goals.
- (iii) **Inventory management.** Spoilage, sales, theft, and goods on hand are included in a company's inventory. All of this is tracked by the inventory control system, which keeps management informed. In this approach, management can see when individual items are running short and when restocking is necessary. In any organization that deals with the stocking and storage of commodities, it is one of the most significant types of Management information systems.
- (iv) **The office automation information system** includes electronic devices used by managers to interact with managers in other departments and their staff, as well as electronic devices used by employees to communicate with each other. This system keeps track of financial items such as payroll, benefits, and retirement, all of which are part of the accounting and financial system. It takes care of everything, including tracking work attendance and employee timekeeping, keeping track of available and spent vacation days, and allowing employees to take sick or vacation days without involving the manager physically. Furthermore, by collecting and assessing resumes as well as finding and assembling qualified prospects, this type of Management information system automates the recruiting function.
- (v) **Accounting and finance.** A company's investments and assets are tracked by an accounting and finance system. These reports' data is utilized to produce financial reports required by law for functions like federal, payroll, local taxes, state, and pension funds. Regularly, this system generates reports for financial audits, as well as annual reports for top management. All monthly and yearly statements, such as profit and loss statements and balance sheets, are generated via this system. These statements are necessary for middle and upper management to understand the company's performance, as well as to track and compare the current financial status to the prior financial situation and pre-determined growth plans.
- (vi) **Decision Support System.** When a circumstance develops, this support system is designed to assist the manager in planning. It collects information from both external and internal sources. External sources of information include population trends, interest rates, and the cost of new home construction, whereas internal sources include manufacturing, sales, inventory, and financial data.
- (vii) **Expert system.** An expert system captures and maintains the information of a human expert on a subject and then uses that knowledge to help others with less expertise make

decisions. An expert system's artificial intelligence is a critical component. The expert system detects your activities and makes a judgment based on logical assumptions based on previous actions made in comparable scenarios.

- (viii) Executive information system. An organizational information system is meant to help executive management manage other executives. This system presents data in the form of tables and charts, making it simple for a manager to analyze data and make key decisions.
- (ix) The transaction process system collects and processes data generated during an organization's everyday actions. Orders, payments, deposits, and reservations are examples of activities.
- (x) School information management system. It allows a school to efficiently manage its day-to-day activities. Updating and managing student attendance records has become easier thanks to the school information system.

3.3. History of management information system

Any computer system that collects and stores data, as well as tools for evaluating that data so you may monitor operations and make informed business decisions, is referred to as a management information system. The origins of information management can be traced back to the 1801 Paris Industrial Exhibition. There, Joseph Marie Charles Jacquard was the first to present punch cards to the world. These cards, which were comparable to the computer punch cards that were popular for much of the twentieth century, were used in weaving looms to create detailed patterns in cloth. In the following decades, the use of punch cards grew, and by the 1880s, punch cards were being used to compile data. Punch card machines "programmed" information into cards, which were processed, tallied, and printed out by other machines. IBM was founded in 1911 and was originally known as the Computing-Tabulating-Recording Company. By this time, punch cards were being used to collect and store a wide range of data, including time tracking and weighing on scales. Even the United States Census used punch cards to keep track of data. Management information systems have a long history, dating back to when corporations used ledgers to keep track of bookkeeping.

The current history of MIS can be divided into five eras, as recognized by Filip (2007). Punch cards were still a key part of information systems when computers first appeared in the 1940s and 1950s. They remained in use until the 1970s when magnetic storage medium such as tapes and disks took their place. As a result of these storage devices, the speed with which data could be calculated grew dramatically, and MIS for accounting began to emerge. Calculating data and combining it into reports can now be completed in a fraction of the time it previously took. As computers became smaller, quicker, and more inexpensive from the 1970s through the early 1990s, MIS expanded beyond accounting to include inventory systems, sales, marketing, manufacturing processes, and engineering. Small enterprises lacked the means to complete such an undertaking and were forced to manually produce various reports, frequently on paper. Even in the 1990s, when computers could be joined through networks, different software systems were frequently incompatible. Companies began modernizing their systems as a result, allowing separate department systems to connect.

By the late 1990s, even small businesses could afford integrated information systems and even use the internet to connect disparate office systems. It's helpful to break down the history of management information systems into four or five eras to make sense of it. Information systems of the first Era (the mid-1960s to mid-1970s) were centralized and focused mainly on governance and management concerns. Accounting departments were in

charge of the majority of information systems and reports. Third-generation mainframe computers, such as the IBM 360, were part of the technology. MIS was still primarily concerned with governance and management concerns in the second Era (the mid-1970s to mid-1980s), but more departments were beginning to benefit from technology. The early personal computers (PCs), minicomputers, and mid-range computers were all part of the technology. The third Era (the mid-1980s to late 1990s) saw the rise of centralized information systems and the decentralization of information. Each department was equipped with its computer system. Herding cats were a common metaphor for information management. During this time, several companies created new jobs to oversee the acquisition and management of different information systems. Internetworking and the birth of the internet were among the technological advances of this era.

Information systems are still firmly related to governance and management in the Fourth Era (the late 1990s to today), but they are extensively distributed, and accessible to practically every employee who requires it across multiple platforms. Many different organizations' information systems are linked together so that a client company can easily obtain supplier information and their consumers can access that information as well. Social networking, search engines, and ubiquitous computing are now available through a range of platforms such as laptops, tablets, and smartphones. The rise in internet bandwidth in recent years has led to a significant reliance on cloud computing in the fifth Era (today and onward). As a result, some argue that this is the start of a new era in workers' ascendancy, and that management information system is now in their fifth period. Using technologies that are readily available across numerous platforms, nearly every employee can now make educated judgments. Furthermore, the distinction between those who create and those who receive MIS data is becoming increasingly blurred.

3.4. Role of management information system

The MIS's position in an organization is comparable to that of the heart in the human body. The system guarantees that the correct data is acquired from diverse sources, processed, and provided to all of the destinations that require it. The system should be able to meet the information needs of a single person, a group of people, and management functionaries such as managers and top management. MIS plays several essential roles, including the following:

- (i) Through a variety of systems like query systems, analytical systems, modeling systems, and decision support systems, the MIS meets a wide range of needs.
- (ii) Strategic planning, managerial control, operational control, and transaction processing are all aided by the MIS.
- (iii) The MIS assists junior management staff by providing operational data for planning, scheduling, and control, as well as assisting them in operational decision-making to fix an out-of-control scenario.
- (iv) The MIS aids middle management in short-term planning, goal-setting, and business function control.
- (v) The MIS aids top-level management in goal-setting, strategic planning, and the evolution and implementation of business plans.
- (vi) The MIS is responsible for information generation, communication, and problem identification, as well as assisting in the decision-making process.

3.5. Concept of administrative effectiveness

MIS can give administrators and instructors the data they need to make informed decisions about planning, policy, and evaluation. MIS is important in decision-making because it can

monitor system disturbances, establish a course of action, and act to bring the system back under control. It is also relevant in non-programmed decisions since it supports the decision-making process by providing information for the search, analysis, evaluation, and decision-making choice and implementation (Karim, 2011). These systems can give users processed data, analytical models, real-time updates, and hypothetical situations to help them make decisions. According to Rashford and Cogan's research, university administration effectiveness can be maintained by utilizing four levels of organizational behavior in a university (individual, team, group division, policy, and strategy), as these levels are significant and critical for effective administration. In the context of organizational behavior, effectiveness is defined as the optimal link between productivity, quality, effectiveness, adaptability, satisfaction, competitiveness, and development.

3.6. Limitations for measuring administrative effectiveness

The effectiveness of information systems (IS) is a complex variable. According to the research on organizational effectiveness, there may not be an exact measure of IS effectiveness, and the criteria for effectiveness may differ from one organization to the next. A review of IS effectiveness literature examines a prominent perceptual construct, user pleasure. The following are the measures for determining administrative effectiveness:

- (i) Ensuring purposeful leadership of the staff by the head
- (ii) Involvement of the heads of departments
- (iii) Maximum communication between staff
- (iv) Efficient and accurate record-keeping
- (v) Positive school climate
- (vi) Productive division of labor among staff
- (vii) Employee satisfaction.

3.7. Tools for enhancing administrative effectiveness in universities through management information system

These methods can aid the school manager in identifying the school's goals, developing strategic plans, allocating resources, and assessing staff and organizational success (Telem, 1999). According to Bober (2001), the increased interest in MISs and the tendency toward thoughtful, long-range planning for MIS adoption originates from a sense among educators that such systems allow for the improved site and district management as well as empowering employees at all levels. Leadership, decision-making, workload, human resource management, communication, responsibility, and planning have all changed as a result of MIS. These methods can aid the school manager in identifying the school's goals, developing strategic plans, allocating resources, and assessing staff and organizational success. In the late 1970s, the first school administrative computer applications were developed. Several loose, non-integrated clerical and administrative programs were developed in the early 1980s, but these systems limited managerial support since data relationships could not be examined (Visscher, 1994). The primary goal of software development and use in the early phases was to increase the efficiency of school office functions. In educational institutions, computers and technology were primarily used to store student and personnel data. During the integration stages, the importance of managing data was realized.

As a result, various initiatives were launched by governments in many industrialized countries, providing the impetus for them to go to the next stage of development. These projects aimed to improve educational information systems, resulting in enhanced efficiency

and effectiveness in the classroom. The goal was to create a standard system that could be used by as many schools as possible while maintaining maximum flexibility.

3.8. Challenges related to management information system in Nigeria universities

The rise of information systems services in Nigerian universities began around 1990 when the World Bank intervened to help Nigerian universities improve their institutional capacities. The intervention focused on Management Information Systems (MIS), which are specifically intended to suit the information demands of management employees as they make a variety of decisions for effective university administration. MIS is designed to achieve the following goals in Nigerian universities: act as a central point for collecting data on students and staff from individual Nigerian universities, building a comprehensive statistical database, and having that data used by the Nigerian Universities Commission and Federal Ministry of Education for infrastructure planning and development; and for the production of statistics such as student registrations, staff & students' ratios, and so on. In Nigerian institutions, NUMIS has not been fully exploited in decision-making. According to [Nwankwo et al. \(2020\)](#), due to shortcomings in the NUMIS data management component, no MIS unit in NUMIS-using universities has been able to finish the compilation of staff and student records and provide required reports. The investigation discovered four major MIS issues: a poor communication network, insufficient money for MIS units, insufficient MIS facilities, and insufficient computer literacy among senior university executives.

4. CONCLUSION

In areas such as planning lecture and examination timetables electronically to avoid clashes, providing needed information about students, staff, and university activities, managing university equipment and resources, staff recruitment and promotion, and the appointment of Vice-Chancellors, Deputy Vice-Chancellors, Deans, and other principal officers of universities, MIS could be used to improve decisions and thus enhance effective administration. We believe that MIS can offer administrators and teachers the data they need to make well-informed decisions about planning, policy, and evaluation.

Recommendations are in the following:

- (i) To provide relevant data for MIS activities in universities, MIS professionals should follow the established data gathering methods.
- (ii) The MIS workers should process the recorded data and transform it into information using the data processing and analysis methodologies provided. In universities, this data should be used to make administrative decisions.
- (iii) It is suggested that the specified publication methods be employed in the publication of MIS activities so that the information reaches all those who require it for decision-making.
- (iv) MIS professionals should disseminate MIS information to the target consumers of MIS outcomes using the defined electronic and manual data distribution techniques.
- (v) In the specified areas, administrators should use MIS outputs to make decisions.
- (vi) Administration and MIS employees should use feedback systems to review and monitor MIS actions in universities, allowing for the update of data and information.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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