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Optimizing Resource Utilization in the Nigerian Tertiary Institutions: A Case for Enterprise Resource Planning

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ABSTRACT

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This study examines resource utilization in Nigerian tertiary institutions, uncovering inefficiencies despite available resources. A case-based approach, combining semi-structured interviews and questionnaires across four institutions, revealed significant waste and stakeholder disconnects. The research confirms the presence of untapped resources within these institutions. To optimize resource allocation, minimize waste, and boost performance, this study proposes an integrated Enterprise Resource Planning (ERP) system. By streamlining resource management, institutions can enhance operational efficiency, reduce organizational resource waste, and achieve objectives effectively, fostering sustainable growth.

1.0 INTRODUCTION

Higher educational institutions play a vital role in individual and societal development, with their ratings influenced by factors like research orientation, faculty quality, and resource utilization [7-8]. Effective management of resources is crucial for their success and sustainability. Higher education institutions still rely on the traditional systems in their administrative roles leading to redundancy, waste, and underutilization of resources [6]. The disconnection between personnel, as noted in [3], hinders optimal resource allocation and utilization, resulting in reduced productivity, diminished institutional performance and other inefficiencies [2], [5]. This study proposes an Enterprise Resource Planning (ERP) system to optimize resource utilization in higher educational institutions (HEI) to improve institutional efficiency and effectiveness.

2.0 Resources in Higher Educational Institutions

Higher educational institutions are complex organizations with diverse functions and processes. HEIs utilize varied resources influenced by factors such as funding, size, and academic focus. Despite similarities in basic resources, significant differences exist in specific resources and quality between institutions. Nigeria's tertiary institutions face challenges in achieving global recognition, with concerns raised about inefficiency and low productivity [3]. The human resource (HR) is the most active resource in HEIs and utilizes other resources to achieve the institutional goals. It has

however been observed that misalignment between employee skills and job requirements hinders productivity and leads to resource waste [4]. Traditional administrative systems, adopted by most HEIs [6] isolate such institutions from modern technological benefits, which emphasizes the need for a management support system that ensures resource availability, accessibility, authenticity, and integrity.

3.0 METHODOLOGY

This study employed a mixed methods research design, combining quantitative and qualitative approaches, to provide a comprehensive understanding of resource management in higher educational institutions. Initially, a questionnaire was designed to assess the alignment of employee skills with job roles using the University of Benin as a case study. An online questionnaire, administered via Google Forms was sent to non-teaching staff using their institutional email address. Non-teaching staff were selected because most university resources are held by them. Additionally, an exploratory case study method was used to gather data to identify institutional resources, their custodians and how resources are utilized to minimize waste. A convenient sample consisting of four HEIs (University of Benin, Bayero University, Federal College of Education, and Delta State Polytechnic) was used for the study. Interview protocol designed with ten resource custodians identified in [1]. The respondents consisted of Heads of Units, Directors, Deputy Registrars, Principal Librarian, Chief Accounting, systems Analysts and Academic staff in the institutions studied. This study aligns with [10], which advocates for mixed methods

research to provide a comprehensive understanding, enhance validity and reliability, and explore complex research questions. The first data set was analysed using percentage analysis. Three hundred and one (301) responses were obtained from google to determine the alignment of job roles with employee skills. The findings are presented in Table 1.

Table 1: Job roles and alignment of Skills

S/N	QUESTION	PERCENTAGE NUMBER OF RESPONDENT	
		Yes	No
1.	Do you think your present office merits your job role?	81.5%	18.5%
2.	Without the use of computers are you effectively be able to deliver in your daily role?	22.2%	77.8%
3.	Are there computers for you to do your work?	7.5%	92.5%
4.	Do you often attend staff training or workshops?	7.5%	92.5%
5.	Do you know and understand your job role/ description perfectly?	94.4%	5.6%
6.	Do you prefer using the computer systems for your daily work?	100%	0%
7.	Were you trained on the job before you were given a schedule?	17.4%	82.6%
8.	Have you acquired additional qualifications/ roles since your employment?	82.6%	17.4%
9.	Has any training which you have attended affected your job role?	26.1%	73.9%
10.	Has any additional qualification which you have acquired since your employment been documented?	18.2%	81.8%
11.	Have you ever taken a study that is not related to your current role?	73.9%	26.1%

4.0 FINDINGS/DISCUSSION

The responses in Table 1 show that most of the respondents (81.5%) perform roles that align with their skills and they understand their job roles (94.4%). This is contrary to the findings in [4] that identified misalignment between job roles and employee skills as a course of resource waste in HEIs. A major finding from the study show that employees still rely on traditional administrative procedures. They lack computers to work with (92.5%), which may have resulted in the disconnect among employees resulting in resource waste observed in [3]. To further understand the methods of resource utilization in HEIs, the second data set was collected and analysed.

Thematic analysis was used to identify entities that define the various resource custodians, types resources held, method of processing and communication with other custodians. Eighteen (18) additional custodians were obtained. The custodians, type of resource(s) controlled and methods of communication with other custodians are shown in Table 2.

Table 2: Custodians, Relationships and Communication Patterns

Custodians	Resources Controlled	Methods of Data Processing	Methods of Information Communication with Other Custodians
Academic Planning	Human, information, intellectual	Manual	Manual
Alumni Relations and Endowment	Information, Reputation, Finance	Manual	Manual
Bursary	Financial, Information	Manual, automated	Manual
Equipment and Maintenance	Capital, intellectual	Manual	Manual
Estate	Capital, Information, intellectual	Manual	Manual
Faculties/ Departments	Human, Intellectual	Manual	Manual
Fire Services	Human, capital, Intellectual, Information	Manual	Manual
Guidance and Counselling	Human, Information, Intellectual	Manual	Manual
Health Services	Human, Intellectual, Information	Manual	Manual
Information Communication Technology Unit (ICTU)	Intellectual, capital, Information	Automated	Online, Manual
Intellectual Property Technology and Transfer Office	Intellectual, Human	Manual	Online, Manual
Internal Audit	Information, Human	Manual	Manual
Liaison Offices	Human, Information	manual	Online/manual
Parks and Gardens	Equipment, human, Information	manual	Manual
Physical Planning	Intellectual, Capital	Manual	Manual
Procurement	Capital, Human, Information	Manual	Manual
Public Relations and Protocol	Intellectual, Information, Human	Manual	Manual
Publication and Documentation Unit	Human, intellectual, Capital	Manual	Manual
Quality Assurance	Intellectual, Information	Manual	Manual
Registry	Human, Intellectual, Information	Manual	Manual
Research Centres	Intellectual, Capital, Human, Information	Manual	Manual
Security Division	Human, Equipment, Intellectual, Information	Manual	Manual
Sports	Intellectual, Human, Information	Manual	Manual
Staff School	Intellectual, human, Information, Capital	Manual	Manual
Student Affairs	Human, Information, Intellectual	Manual automated	automated
Sustainable Development Desk Office	Intellectual, Information	Manual	Manual
Vice Chancellor's Office	Human, Intellectual, Finance, Capital, Information	Manual, Automated	Manual, Automated
Works	Capital, Human, Information, Intellectual	Manual	Manual

The categorization of custodians in Table 2 reveals a complex network of interdependencies within the university. However, the predominance of manual communication among most custodians hinders optimal resource utilization in Nigerian tertiary institutions. Most of the custodians work with computers but information is communicated to other units using manual methods (hardcopies, flash drives and CD-ROMs), though occasionally, emails are sent. All the institutions studied have student management portals, Information and Communication Technology (ICT) have not been adopted as a campus-wide communication tool, resulting in ineffective and inefficient utilization of institutional resources. Understanding custodian relationships and communication patterns is vital for optimizing resource management and achieving strategic objectives. By acknowledging these dynamics, the institution can cultivate a more collaborative environment to enhance its performance and reputation.

To ensure a balanced approach, combining electronic and manual communication methods to ensure effective utilization of resources will require an Enterprise Resource Planning (ERP) system which is proposed in this study.

The proposed ERP system aims to address these challenges by integrating resource management processes, enhancing collaboration, and streamlining resource allocation to minimize waste and optimize institutional performance. By automating communication and data sharing, the ERP system facilitates collaboration, optimizes resource allocation, and enhances institutional performance. The block diagram for proposed system is shown in Figure 1 with each custodian running as an independent module which communicates with other custodians via the ERP system

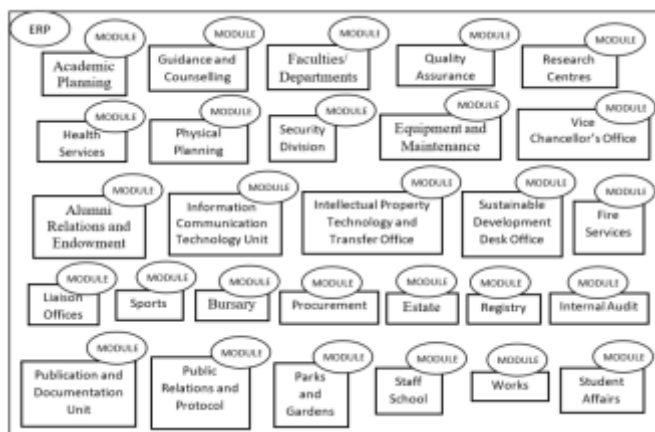


Figure 1: A cross section of the resource custodians in a typical tertiary institution

Figure 1 illustrates the diverse range of resource custodians in a typical tertiary institution, and their potential linkage to an Enterprise Resource Planning (ERP) system through its various modules. This diagram highlights the complexity of resource management in higher educational institutions and an integrated system to optimize resource allocation and utilization.

The proposed ERP model facilitates seamless information sharing and communication among various departments and functions within an organization, leading to enhanced decision-making and improved business performance. Unlike other centralized applications, ERP systems are distinguished by their integrated nature, leveraging a centralized database to provide real-time data and analytics that enable organizations to manage their operations more effectively. Beyond administrative functions, ERP systems can also significantly benefit academic functions in tertiary institutions. For instance, they can track students' progress, offer real-time insights into course availability and scheduling, and facilitate communication between faculty and students, as noted in [9]. Furthermore, the system can optimize the utilization of institutional facilities, equipment, and personnel.

Figure 2 illustrates the architecture of the proposed system showing the interconnectedness of the various entities and their relationships. It also highlights the comprehensive and integrated nature of the proposed ERP system.

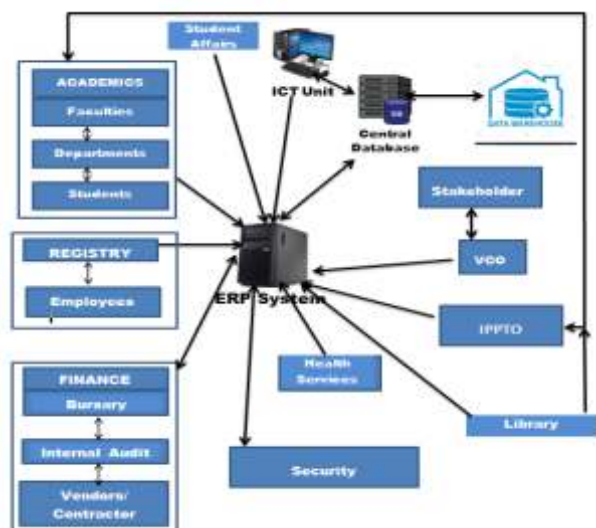


Figure 2: Architecture of Proposed ERP System

The central database serves as the backbone of the system, ensuring that all departments have access to identical, up-to-date information in real-time. This architecture minimizes errors, eliminates data silos, and enhances efficiency institution-wide.

By adopting this ERP system, tertiary institutions can achieve a harmonized and efficient operational framework, enabling them to make informed decisions, optimize resources, and improve overall performance.

5.0 CONCLUSION

This study highlighted the significance of effective resource management in tertiary institutions, emphasizing the need for an integrated Enterprise Resource Planning (ERP) system to optimize resource allocation and utilization. Through a comprehensive analysis of the current resource management landscape, this research has identified key challenges and weaknesses, including data silos, manual communication, and inefficient resource sharing in HEIs. By harnessing the power of ERP, tertiary

institutions can implement the proposed model to streamline their operations, enhance collaboration, and improve overall performance through efficient resource utilisation.

Qualitative, quantitative, and mixed methods approaches. Sage Publications.

6.0 RECOMMENDATION

To further complete this research, a future study should focus on developing a comprehensive model of the proposed ERP system. This can be achieved by:

- a. Designing a detailed Object-Oriented Programming (OPM) model of the system, incorporating all the modules and functionalities identified in this study.
- b. Refining the model and validating with real-world data from individual institutions.

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