LEVERAGING ON ENTERPRISE RESOURCE PLANNING AS A DETERMINANT OF ADMINISTRATIVE EFFICIENCY OF INDIGENOUS OIL AND GAS COMPANIES IN RIVERS STATE, NIGERIA.

TIMOTHY DAGOGO MINIMA[1] and DR. (MRS.) CHIZI. E. OBARA[1]
[1]Department of Office and Information Management, Faculty of Management Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

ABSTRACT

The study explored the relationship between enterprise resource planning and administrative efficiency of indigenous oil and gas producing companies in Rivers State. The research provided answers to four questions and tested ten hypotheses in order to establish the hypotheses formulation that there is no significant relationship between enterprise resource planning and administrative efficiency. The study population comprised of the twenty-four Indigenous oil and gas producing companies in Rivers State. The research selected three managerial staff members from each of the firms under study making it a total seventy-two study elements. Data were generated from the respondents by the use of a well-structured copies of questionnaire. Pearson's product moment correlation, partial correlation and multiple regressions were used to test the hypotheses with the aid of statistical packages for social science (SPSS) version 23.0. The P-values were calculated to determine the significance of the hypothesized relationship. Analytical outcomes revealed statistically positive and significant relationships between the dimensions of our predictor variable-enterprise resource planning and the measures of the criterion variable-administrative efficiency. Based on the findings, the study concluded that enterprise resource planning has a positive significant relationship with administrative efficiency of Indigenous oil and gas producing companies in Rivers State. The study further recommended amongst others, that Managers of indigenous oil and gas producing companies should apply objectivity in their Hybrid ERP processes as this has the potency to either ruin or enhance their Administrative Efficiency.

KEYWORDS: ERP, AE, Resource Planning, Oil and Gas, Efficiency

INTRODUCTION

Our organizations today are subject to technological innovation. These innovations have the dynamism needed to keep up with the trends of the times while creating efficiencies in all areas of operations. Enterprise resource planning is part of the technical skills tree that provides organizations with the means to stand the test of time and operate as efficiently as possible. An enterprise resource planning (ERP) system is a business management system that includes a comprehensive and integrated set of software that, when implemented well, can be used to manage and integrate all business functions within an organization. These sets typically include a set of mature business applications and tools for financial and cost accounting, sales and distribution, materials management, human resources, production planning and computer-integrated manufacturing, supply chain, and customer information (Boykin, 2001; Chen, 2001; Yen, Chou, & Chang, 2002). These packages have the ability to facilitate the flow of information between all supply chain processes (internal and external) within an organization (Al-Mashari & Zairi, 2000a). Additionally, ERP systems can be used as tools to improve performance levels in supply chain networks by helping reduce cycle times (Gardiner, Hanna & LaTour, 2002). However, it has traditionally been used in capital-intensive industries such as manufacturing, construction, aerospace, and defense. Recent literature has extended ERP systems beyond manufacturing to include finance, healthcare, hotel chains, education, insurance, retail, and telecommunications. ERP is now considered an entry-level price for running a business, and at

least for now, an entry-level price for connecting other businesses in a network economy to enable business-to-business e-commerce (Boykin, 2001). Additionally, many multinationals limit their business to companies that use the same ERP software as the multinational. The fact of the matter is that ERP was designed for large enterprises, and small businesses must adapt their business models and approaches to the practices and software of large enterprises. Small and medium-sized enterprises (SMEs) face significant challenges in opening up the economy. Lacking the robustness of large corporations, small businesses must harness the power of IT and integrated information systems to remain competitive and customer-centric. ERP is often seen as the answer to survival (Rao, 2000). As a result, the ERP software market is now one of the largest IT investments in the world.

Suffice it to say that the ERP package affects many aspects of a company's internal and external operations. Successful implementation and use of ERP systems is therefore critical to an organization's performance and survival (Markus, Axline, Petrie & Tanis, 2000b). Potential benefits include dramatic reductions in inventory, breakthrough reductions in working capital, comprehensive information on customer wants and needs, and an extended enterprise of suppliers, partnerships and customers; including features that can be viewed and managed as a whole (Chen, 2001). In the manufacturing industry, ERP implementations have reduced inventories by 15-35 percent (Gupta, 2000). ERP allows companies, especially domestic oil and gas producers, to consolidate departmental information. It has evolved from a human resources application to a tool that encompasses IT management. For many users, an ERP is a "do it all" system that handles everything from sales order entry to customer service. Seek to integrate suppliers and customers into the organization's manufacturing environment. For example, when a purchase is entered in the Ordering module, the order is routed to the manufacturing application, which in turn sends a material request to the Supply Chain module, which receives the required parts from the supplier, and uses the Logistics module and transports them to the factory. At the same time, purchase transactions typically show the ledger module as sales. Traditional application systems commonly used by enterprises process each transaction individually. They are based on strong restrictions on specific functions that specific applications are intended to perform. ERP no longer treats these transactions as discrete activities, but as part of the interrelated processes that make up the enterprise (Gupta, 2000). The imports of ERP implementation at indigenous oil and gas exploration companies in Rivers State, Nigeria, spans through its ability to help run the business while supporting automation and processes in manufacturing, finance, human resources, and other aspects of the organization, spanning different generations and developments. In light of the foregoing, this study explores how ERP can provide an organization (indigenous oil and gas producing companies in Rivers State, Nigeria) with the means necessary to run its business and the support for full automation of processes and practices. Over the years, Rivers State's Indigenous Oil and Gas sector has faced significant challenges of resource inefficiency and mismanagement, particularly in terms of standardizing and automating its processes and operations. This long-standing issue has been the focus of government research. As overtime intensifies, these challenges tend to affect the growth and sustainability of these businesses, which in turn tends to lead to their downfall. Therefore, this study attempts to address this identified issue through enterprise resource planning. Subjects related to enterprise resource planning are seriously debated by various scholars. Sometimes, some of these academics argue that most organizations suffer from conflicts of interest—poor automation of cross-departmental processes. This leads to significant penalties that can affect organizational processes and thereby affect productivity levels. Therefore, for an organization, in

this case, indigenous oil and gas exploration companies in Rivers State, Nigeria, to understand the need to carefully manage diverse but "ultimately important" organizational stakeholders has become essential. This is because it helps organizations achieve business efficiency and enables a structure that is able to stand the test of time. Based on this backdrop, this study sought to investigate the relationship between enterprise resource planning and administrative efficiency of Indigenous oil and gas producing companies in Rivers State, Nigeria.

REVIEW OF RELATED LITERATURE

Enterprise Resource Planning (ERP)

Enterprise resource planning is a business management system with integrated software that, when fully implemented, can be used to manage and coordinate all business activities within an organization. These collections often include business processes and financial and costing tools, sales and distribution, materials management, human resources, production planning and computerized manufacturing, supply chain, and customer information (Boykin, 2001; Chen, 2001; Yan et al., 2002).). These packages facilitate the flow of information between all channels (internal and external) within an organization (Al-Mashari & Zairi, 2000a). Engineering information management (data on materials, planning processes and office information) between different types of ERP; sales, acquisitions and inventory (sales and distribution, inventory and acquisitions); material requirements planning (MRP); program management (production, financial management and human resources); working documents (work orders, store orders, release documents, and documentation for products and assemblies); floor management and management and other aspects such as cost management, transportation, maintenance and managing information systems. In addition, the ERP model includes areas such as finance (financial accounting, financial management, enterprise management, asset management), logistics (production planning, materials management, plant maintenance, quality control, project systems, sales), and human resources (personnel management). It is included in training and development, (inventory of competencies) and workflow (organization-wide integration with flexible assignment of tasks and responsibilities to locations, titles, jobs, groups or individuals) (Siriginidi, 2000).

Administrative Efficiency

The word "efficiency" is different from the word "effectiveness"; however, both are used to describe the work of a place (Chinyere & Ikoromasoma, 2021). However, according to Jouadi and Zorgui (2014), efficiency generalizes the concept of design well; this means that efficiency focuses on using the least amount of ideas to create the best output, in other words optimizing the use of resources and produce the best products at the lowest prices. Irsova (2010) states that efficiency leads to growth, economic development and human well-being by supporting the results of macroeconomic policies; this is the same as McKnley and Banaian (2000) who argue that efficiency includes costs and benefits since Base Maximization and profit maximization to define Efficiency. The use of the term "administration" has become so widespread that its meaning and concept have been overlooked. This is because the word is now used in many ways and its meaning seems to be related to the context in which it is used (Bestman, 2020). According to the Oxford English Dictionary (2010), administration refers to a business, organization, etc. executive process or function. In this study, researchers define administration as the process or activity of running a business, especially with the help of resource planning.

Just as everyone in business does this or that management. Thus, administration is governed by rules; these policies can be formal or informal (Bider, 2008). Organizational efficiency refers to the success of an organization in producing maximum output using the least amount of input. Efficiency refers to the highest level of efficiency that produces the most output with the least input. Efficiency is a term that has come to the forefront of the scientific community recently. Efforts to increase efficiency have become important as the world struggles to adapt to population growth and manage resource allocation (Chinyere & Ikoromasoma, 2021). Qayyum and Khan (2007) define efficiency as the ratio of output to input units. A firm may be more efficient than other firms if it can produce more output than other firms using inputs. According to Marudas (2004), administrative efficiency is viewed as budgeting, that is, the ratio of management expenditures to total expenditure. Thus, it is clear that a profit-oriented public sector is a means of managing efficiency in the delivery of public services and increasing the value of public money. Identifying and evaluating (i.e. measuring efficiency) public goods and services is often a difficult task. This is mainly due to the inability to define the effect (output) because they are direct, but also indirect due to the external materials they create, and also due to the authenticity and clarity of the goals (Mihaiu, et al., 2015).

Dimensions of Enterprise Resource Planning

Cloud-based ERP

Responding to business challenges, Information Technology has taken a new form. Cloud computing as a new form of IT deployment; is an innovative way to provide various on-demand IT resources to different clients using Internet technologies in a pay-per-use way (Plummer, 2008). Cloud computing is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort, or service-provider interaction" (Mell & Grance, 2011). Cloud-based solutions give businesses and users easy access to massive computing power at negligible costs (Wu, Lan, & Lee, 2011). By moving IT functions such as storage, business applications, and services to the cloud, organizations can potentially reduce the overall cost of IT (Goscinski & Brock, 2010; Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011; Stanoevska-Slabeva, Wozniak, & Ristol, 2009). As such, cloud computing brings financial benefits to businesses that can no longer be ignored. The on-demand and pay-as-you-go requirements of cloud computing mean that no payment is made if the service is not used (Loebbecke, Thomas & Ullrich, 2012). The service dimension of cloud computing indicates the range of services provided through cloud computing. Infrastructure as a Service (IaaS) refers to the need-based provision of computing power and storage resources provided by a highly standardized, mostly virtualized infrastructure with automated systems management (Wang et al., 2010). Second, Platform-as-a-Service (PaaS) describes a common development and runtime platform, programming, testing, and management environment delivered as an integrated or optional service. Third: Data-as-a-Service (DaaS): Users in your network can access data from different resources in different formats through services. For example, a user can remotely modify her data as if she were working locally on her hard drive, or access the data in a semantic way over the Internet (Wang, et al., 2010). Storage-as-a-Service (StaaS) is also called DaaS for many resources (Wu, Ping, Ge, Wang & Fu, 2010). And finally, Software-as-a-Service (SaaS) is a presentation of shared software services covering all critical IT resources (infrastructure, system administration,

application management, maintenance), and Internet and network connectivity. It is available via and is provided in 'units'. "Base units" are used (Loebbecke, et al., 2012).

On-premise ERP

An on-premise ERP can provide most of the functionality an enterprise can engage with. On-premise ERP systems have greatly contributed to building competitiveness, improving product quality, improving service levels, and reducing operating costs (Huang & Wang, 2017). The biggest benefit is saving administrative resources, especially losses due to manual mistakes. It allows users to analyze their financial situation, and dynamic analysis allows the company to know whether its capital structure is reasonable and its operations are orderly. Stored data also provides information for predictions and decisions. The main functionality it provides is the allocation of resources in production, finance, inventory, etc. This helps administrators suggest appropriate solutions to specific problems. On-premises ERP can play the role of resource planning driver well. As mentioned earlier, an on-premises ERP is a standalone system that requires the enterprise to prepare the database, provision the system, and install the system itself, and there are limitations on the enterprise's operating system to go through the complex system preparation phase (Xu & Zen, 2018). In the early stages, preparation and commissioning are more complicated. If a company decides to purchase on-premises ERP as all-in-one software, the cost will have to be paid once, further straining the capital. On-premise ERP has a fixed structure to some extent, so it is difficult for companies to update the system at any time, and the cost is higher than updating cloud ERP. Additionally, data stored in on-premises ERPs is relatively isolated, making it difficult for companies to integrate all information and data from various modules into one operational process. Processing speed and processing volume are limited because processing volume and performance are maximized. The preparation phase is tough, but you can trust the security of the information managed by your on-premises ERP. Data is always used by the local system, so data flows without interference from other users. The system's database is also located on each computer, making data storage more secure. Using an on-premise system makes it easier to build a more customized ERP system. By linking different tables in the database together, an on-premise ERP can also integrate different modules with their respective tables. Maintenance costs are not always high because there are very little iteration after the product is sold. Management patterns are standardized, so once users become familiar with the system, they are less likely to make mistakes and save time performing management operations (Lin, 2022).

Hybrid ERP

A hybrid ERP system uses a cloud-based ERP system and an on-premises ERP system simultaneously while achieving unity between these systems. In this hybrid model, the entire lifecycle becomes a waterfall divided into his four phases. The first two phases are an iterative agile process, while the last two phases are performed using a waterfall-based approach. Requirements engineering is the most complex part of this model. The nature of ERP systems requires project teams to collect and analyze requirements from all entities within the organization. However, the requirements of various stakeholders are complex and conflicts are inevitable. Moreover, it is impossible for a small business project team to implement his ERP system with minimal value and go back to the request phase, which takes a lot of time and resources. The idea is to repeat this work until the final Software Requirements Specification (SRS) is complete and all feature managers are required to sign it. This allows teams to limit the number of changes in subsequent phases. Therefore, this process should be separated from the

development phase. In the second phase, design, development, and testing are continuously iteratively performed according to an agile approach. Modules can be developed independently in many sprints, allowing the development team to focus instead of working on all the pieces at once. All modules are then integrated and system tests are performed. Each module is tested independently, limiting the risk of rework. The development team primarily focuses on system performance and deals with conflicts between modules at this stage. Finally, the project cycle ended with the release phase delivering and implementing the final ERP software system. From a team structure perspective, the Scrum framework is highly recommended (Thang, 2021). According to Sutherland and Jeff (2020), Scrum is a lightweight framework that helps people, teams, and organizations create value through adaptive solutions to complex problems.

Measures of Administrative Efficiency

Cost Minimization

According to Drury (2004), the emphasis is not on cost containment, but on cost reduction and continuous improvement and change. The term cost reduction can also be used instead of cost optimization. While traditional cost management systems are applied on a daily and continuous basis, cost optimization tends to be applied ad hoc when opportunities for cost reduction are identified. Cost minimization is an action taken by an administrator to reduce costs. Some of these actions are prioritized based on information from accounting systems. Cost optimization aims to reduce costs, but not at the expense of customer satisfaction. Ideally, take action to reduce costs and improve customer satisfaction. Minimizing costs is a key focus in today's competitive business environment. The purpose of this study was to define cost optimization and discuss the underlying philosophy of optimization. Over the past 25 years, there have been clear changes in cost accounting and operational accounting (Maher & Deakin, 1994; Günther, 1997; Götze, 2004). This change is the result of an intensifying competitive environment due to the introduction of new manufacturing and information technologies, customer focus, the growth of global markets, and the introduction of new forms of management organization (Blocher et al., 1999). Regarding cost minimization, our concern is the monetary expenditure incurred as a measure of a company's productivity efficiency. Cost is the cost of production factors and production activities. There is no doubt that any organization strives to minimize expenses as much as possible in order to maximize profits. This is achieved through concepts such as economy and cost savings. Several cost concepts emerge from Baumback's (1983) discussion of profit planning and management, but here he confines himself to three. These are quality, labor and strategic costs. Businesses that want to survive and feed their customers must strive to improve their products. Organizations should therefore ensure maximum efficiency in their activities so as not to exceed budgets, incur losses, or compromise product quality (Chinyere & Ikoromasoma, 2021). Domestic oil and gas exploration companies face low margins and highly compliant investments that require constant vigilance and cost control. Domestic oil and gas producers in Nigeria's Rivers state are now in dire need of finding ways to be more efficient. Cost savings in this industry can only be achieved if operational activities and processes become more efficient (Nwinyokpugi & Alikornwo, 2022). In this study, the essence of enterprise resource planning revolves around promoting efficiency, reduce costs and maximize company profits. Thus, domestic oil and gas exploration companies can achieve organizational efficiency through the implementation of enterprise resource planning. Therefore, in order to maintain high profitability in an ever-competitive global economy, domestic oil and gas exploration companies

need to adopt appropriate techniques and measures to keep up with the times (Nwinyokpugi & Alikornwo, 2022).

Improved Decision-making

Reason (1990) argues that any decision-making process leads to a final choice, which may or may not lead to action. Decisions depend on the structure that provides those decisions. Modern information technology offers new solutions for companies, companies or other scientific institutions building new working environments based on computer communication between people. This different environment represents the working environment of working people, enabling greater flexibility, easier business problem solving, greater creativity, and better interpersonal collaboration (well-presented solutions that affect people's destinies, not only in their physical work, but also in their mental work performance). According to Schacter (2011) and Doya and Michael (2012), most decisions involve some form of cost-benefit analysis, and it is assumed that people are trying to maximize benefits while minimizing costs. According to Muhamet (1995), management information systems provide decision support based on methodologies and systematic analysis. Based on this, tried and tested alternatives are created using the software in the preliminary stages of the decision-making process. These systems are called Decision Support Systems (DSS). A decision support system (DSS) is a computer program application that analyzes and displays business her data to help users make business decisions more easily. This is an "information application" (to distinguish it from an "operational application" that collects data as part of normal business operations). According to Searchcio, common information that decision support applications collect and display include: Comparison of sales from one week to the next. Projected sales based on new product sales assumptions; the outcome of different decision-making alternatives given previous experience in the described context. Decision support systems (DSS), on the other hand, are characterized by flexible implementations in databases with different output formats and a flexible collection of deployment models. As part of this study, an ERP system will help managers in the domestic oil and gas production sector by enabling them to automate and monitor the processes and progress of all aspects of their work in real-time while leveraging sufficient information; improve their decision-making skills. Information required for quality determination is requested for each landmark recorded by the organization.

Real-time optimization

Real-time optimization is the actual time that a process or event occurs at the expected time. It is also the act of achieving a set goal or result within an expected period of time. Operational activities and process efficiencies in the domestic oil and gas sector improve speed, on-time delivery and many other process metrics. True organizational efficiency minimizes wasted resources, including man-hours, while achieving desired results. Real-time services can only be achieved in efficiently managed organizations (Chinyere & Ikoromasoma, 2021). The real-time service is made possible by maximizing the company's resource planning by keeping employees of Rivers State's domestic oil and gas exploration companies up-to-date on what's happening inside and outside the organization. Organizational stakeholders oversee the company's operations. A real-time service allows monitoring of recorded successes at any critical point. This helps managers and decision makers track the successes and failures of their subordinates. This means key stakeholders don't have to carry paperwork to get the knowledge they need to perform their tasks, and they have free access to the information they need, like her ERP at their fingertips. The business of indigenous oil and gas companies is very diverse and multifaceted.

Many of their services are provided jointly or independently. By improving the efficiency of the domestic oil and gas sector, meeting customer needs will become a key strategy to achieve superior customer retention and achieve organizational and organizational efficiency. With so many choices available to customers, they may be more demanding than ever before, and businesses must be able to track and anticipate changes in customer preferences and respond in a timely manner. It must therefore be said that real-time services know the efficiency level of domestic oil and gas exploration company employees engaged in providing value-added services (Nwinyokpugi & Alikornwo, 2022).

Theoretical Framework

The theoretical foundation of this work is hinged on the General Systems Theory.

General Systems Theory

General Systems Theory is the backbone of science in the sense that it aims to provide a framework or structure for systems that can bring together the flesh and blood of a particular discipline or subject area into an ordered and coherent body of knowledge (Boulding, 1956). Systems theory, originally derived from biology, was developed in the 1950s against the backdrop of the need for a set of systematic theoretical building blocks for discussing the empirical world (Boulding, 1956; von Bertalanffy, 1951). Another origin of system theory is in cybernetic system theory in mechanical engineering (Ashby, 1954; Wiener, 1948). Organizations and systems have evolved many times over the years and inevitably become more complex. Recent studies have found that systems approaches are becoming more and more popular in the study of tissues. With the advent of globalization and the information age, researchers have found that a systems approach can help them understand organizations in the context relevant to these new and changing environments. Revolutionary advances in communications technology have enabled businesses to outsource at lower cost and better respond to changing environments (Lai & Lin, 2017). With the increasing adoption of information and communication technologies within and outside the organizational environment, the realm of interaction has become fluid and ambiguous, adding complexity to both the organization and the environment in which it is embedded (Yoon & Kuchinke, 2005). Many researchers have applied system theory to the study of complex networks and organizations (how to interact with a large number of stakeholders). Manage large amounts of data, information and knowledge, improve organization through digital feedback and control mechanisms (Lai & Lin, 2017). Given the above, it is sufficient to assume that technology is the foundation of innovation. Therefore, it has brought benefits to enterprise resource planning and management efficiency.

This study conceptualized the following framework as a guide through the study.

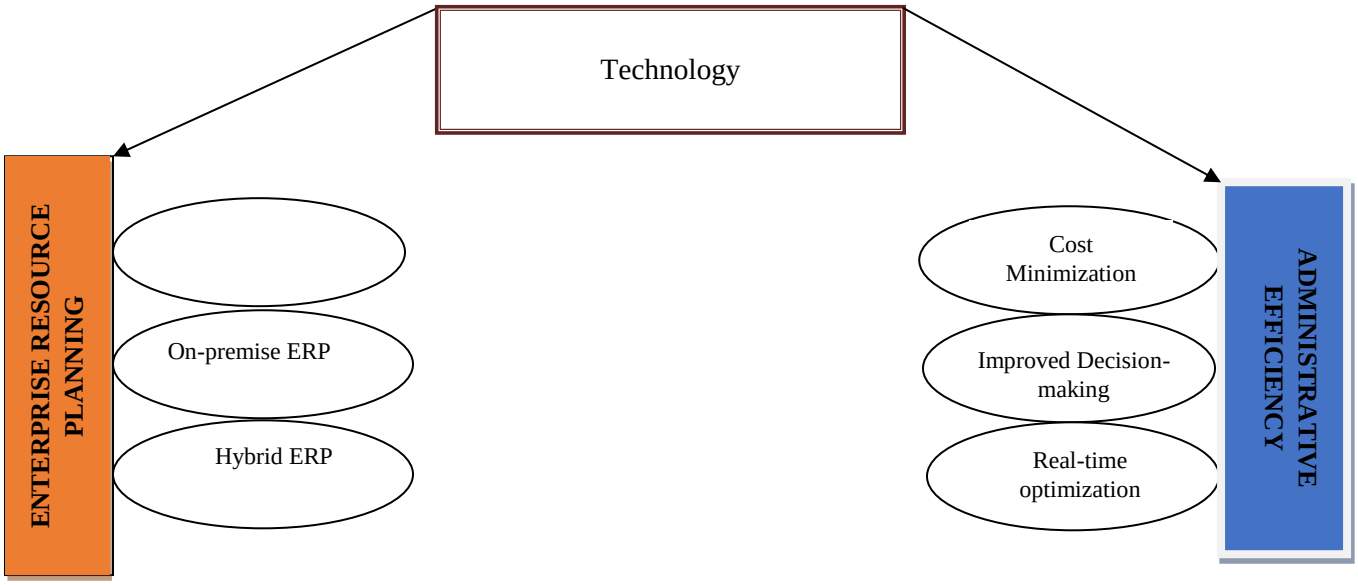

Fig. 1.1: Framework of enterprise resource planning and administrative efficiency of oil and gas producing companies in Rivers State, Nigeria.

Source: Researchers' Conceptualization, 2023

METHODOLOGY

This study is a descriptive study assuch adopted a cross-sectional survey design suitable for this study. The study population comprised of the twenty four indigenous oil and gas producing companies operating in Rivers State as enlisted in the Nigerian Directory and Search Engine (2023). The researchers considered three (3) managers of each of the Indigenous oil and gas companies in Rivers State as the target population. The respondents/elements of this study were limited to the top, senior, and junior managers of each of the indigenous oil and gas companies in Rivers State. Thus, 72 copies of the structured close ended 4point lykert scale questionnaire were administered on the categories of employees that formed the respondents mainly Top and Senior Managerial Cadres. The reliability test of the structured questionnaires was ascertained through Test-re-test in which a pilot administration of the questionnaire was made on a portion of the chosen sample and administered after two months and relationship between the two results determined by correlation coefficient, through SPSS version 20. Our reliability test was also anchored on the Cronbach Alpha at 0.7. At the primary level of our analysis, this study adopted the use univariate descriptive statistical tool such as mean, standard deviation, frequency tables, simple percentages, bar charts and histograms to present the data that was generated while for bivariate inferential statistics, the Pearson's Product Moment Correlation was employed at the secondary level of analysis, to test the hypothesized statements. At the tertiary level of analysis, the study employed Partial Correlation to test the impact of the moderating variable (level of influence) on the relationship between enterprise content collaboration management and administrative efficiency. Also, the study adopted the Multiple Regression Analysis in testing the combined influence of all the dimensions of the study on each of the measures. All the statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) version 23.0..

DATA ANALYSIS AND RESULTS

Decision rule

Reject Ho if PV< 0.05

Accept Ho if PV > 0.05

Table 1 Showing Strength and Direction of Relationship between Variables

Range of values	Degree of relationship
$\pm 0.00 - \pm 0.19$	Very weak
$\pm 0.20 - \pm 0.39$	Weak
$\pm 0.40 - \pm 0.59$	Moderate
$\pm 0.60 - \pm 0.79$	Strong
$\pm 0.80 - \pm 1.00$	Very strong

Test of Hypotheses

H_{01}: There is no significant relationship between cloud-based ERP and cost minimization in indigenous oil and gas producing companies in Rivers State

Table 2 Relationship between Cloud-based ERP and Cost minimization

		Cloud-based ERP	Cost minimization
Cloud-based ERP	Pearson Correlation	1	.692**
	Sig. (2-tailed)		.000
	N	53	53
Cost minimization	Pearson Correlation	.692**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 2, it can be observed that there is a correlation coefficient of 0.692** between Cloud-based ERP and cost minimization, indicating a strong and positive relationship between Cloud-based ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Cloud-based ERP and cost minimization. This further implies that most of the changes in cost minimization among indigenous oil and gas producing companies in Rivers State are caused by their Cloud-based ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Cloud-based ERP and cost minimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a strong, significant relationship between cloud-based ERP and cost minimization of indigenous oil and gas producing companies.

H_{02}: There is no significant relationship between cloud-based ERP and improved decision-making in indigenous oil and gas producing companies in Rivers State

Table 3 Relationship between Cloud-based ERP and Improved decision-making

		Cloud-based ERP	Improved decision-making
Cloud-based ERP	Pearson Correlation	1	.821**
	Sig. (2-tailed)		.000
	N	53	53
Improved decision-making	Pearson Correlation	.821**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 3, it can be observed that there is a correlation coefficient of 0.821** between Cloud-based ERP and improved decision-making, indicating a very strong and positive relationship between Cloud-based ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between Cloud-based ERP and improved decision-making. This further implies that most of the improved decision-making experienced among indigenous oil and gas producing companies in Rivers State are caused by their Cloud-based ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Cloud-based ERP and improved decision-making of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a very strong, significant relationship between cloud-based ERP and improved decision-making of indigenous oil and gas producing companies.

H_{03}: There is no significant relationship between cloud-based ERP and real-time optimization in indigenous oil and gas producing companies in Rivers State

Table 4 Relationship between Cloud-based ERP and Real-time optimization

		Cloud-based ERP	Real-time optimization
Cloud-based ERP	Pearson Correlation	1	.679**
	Sig. (2-tailed)		.000
	N	53	53
Real-time optimization	Pearson Correlation	.679**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 4, it can be observed that there is a correlation coefficient of 0.679** between Cloud-based ERP and real-time optimization, indicating a strong and positive relationship between Cloud-based ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Cloud-based ERP and real-time optimization. This further implies that most of the real-time optimization experienced among indigenous oil and gas producing companies in Rivers State are caused by their Cloud-based ERP while others are caused by

externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Cloud-based ERP and real-time optimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a strong, significant relationship between cloud-based ERP and real-time optimization of indigenous oil and gas producing companies.

H_{04}: There is no significant relationship between on-premise ERP and cost minimization in indigenous oil and gas producing companies in Rivers State

Table 5 Relationship between On-premise ERP and Cost minimization

		On-premise ERP	Cost minimization
On-premise ERP	Pearson Correlation	1	.799**
	Sig. (2-tailed)		.000
	N	53	53
Cost minimization	Pearson Correlation	.799**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 5, it can be observed that there is a correlation coefficient of 0.799** between on-premise ERP and cost minimization, indicating a strong and positive relationship between on-premise ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between on-premise ERP and cost minimization. This further implies that most of the changes in cost minimization among indigenous oil and gas producing companies in Rivers State are caused by their on-premise ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between on-premise ERP and cost minimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is strong, significant relationship between on-premise ERP and cost minimization of indigenous oil and gas producing companies.

H_{05}: There is no significant relationship between on-premise ERP and improved decision-making in indigenous oil and gas producing companies in Rivers State

Table 6 Relationship between On-premise ERP and Improved decision-making

		On-premise ERP	Improved decision-making
On-premise ERP	Pearson Correlation	1	.766**
	Sig. (2-tailed)		.000
	N	53	53
Improved decision-making	Pearson Correlation	.766**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 6, it can be observed that there is a correlation coefficient of 0.766** between on-premise ERP and improved decision-making, indicating a strong and

positive relationship between on-premise ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between on-premise ERP and improved decision-making. This further implies that most of the improved decision-making experienced among indigenous oil and gas producing companies in Rivers State are caused by their on-premise ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between on-premise ERP and improved decision-making of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a strong, significant relationship between on-premise ERP and improved decision-making of indigenous oil and gas producing companies.

H_{06}: There is no significant relationship between on-premise ERP and real-time optimization in indigenous oil and gas producing companies in Rivers State

Table 7 Relationship between On-premise ERP and Real-time optimization

		On-premise ERP	Real-time optimization
On-premise ERP	Pearson Correlation	1	.820**
	Sig. (2-tailed)		.000
	N	53	53
Real-time optimization	Pearson Correlation	.820**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 7, it can be observed that there is a correlation coefficient of 0.820** between on-premise ERP and real-time optimization, indicating a very strong and positive relationship between on-premise ERP and real-time optimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between on-premise ERP and real-time optimization. This further implies that most of the real-time optimization experienced among indigenous oil and gas producing companies in Rivers State are caused by their on-premise ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between on-premise ERP and real-time optimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a very strong, significant relationship between on-premise ERP and real-time optimization of indigenous oil and gas producing companies.

H_{07}: There is no significant relationship between Hybrid ERP and cost minimization in indigenous oil and gas producing companies in Rivers State.

Table 8 Relationship between Hybrid ERP and Cost minimization

		Hybrid ERP	Cost minimization
Hybrid ERP	Pearson Correlation	1	.718**
	Sig. (2-tailed)		.000
	N	53	53
Cost minimization	Pearson Correlation	.718**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 8, it can be observed that there is a correlation coefficient of 0.718** between Hybrid ERP and cost minimization, indicating a strong and positive relationship Hybrid ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Hybrid ERP and cost minimization. This further implies that most of the cost minimization experienced among indigenous oil and gas producing companies in Rivers State are caused by their Hybrid ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Hybrid ERP and cost minimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a strong, significant relationship between Hybrid ERP and cost minimization of indigenous oil and gas producing companies.

H_{08}: There is no significant relationship between Hybrid ERP and improved decision-making in indigenous oil and gas producing companies in Rivers State

Table 9 Relationship between Hybrid ERP and Improved decision-making

		Hybrid ERP	Improved decision-making
Hybrid ERP	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.000
	N	53	53
Improved decision-making	Pearson Correlation	.548**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 9, it can be observed that there is a correlation coefficient of 0.548** between Hybrid ERP and improved decision-making, indicating a moderate and positive relationship Hybrid ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a moderate significant relationship between Hybrid ERP and improved decision-making. This further implies that most of the improved decision-making experienced among indigenous oil and gas producing companies in Rivers State are caused by their Hybrid ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Hybrid ERP and improved decision-making of indigenous oil and gas producing companies and incline to the

alternate hypothesis that there is a moderate, significant relationship between Hybrid ERP and improved decision-making of indigenous oil and gas producing companies.

H_{09}: There is no significant relationship between Hybrid ERP and real-time optimization in indigenous oil and gas producing companies in Rivers State

Table 10 Relationship between and Hybrid ERP and Real-time optimization

		Hybrid ERP	Real-time optimization
Hybrid ERP	Pearson Correlation	1	.738**
	Sig. (2-tailed)		.000
	N	53	53
Real-time optimization	Pearson Correlation	.738**	1
	Sig. (2-tailed)	.000	
	N	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

From the SPSS output on Table 10, it can be observed that there is a correlation coefficient of 0.738** between Hybrid ERP and real-time optimization, indicating a strong and positive relationship Hybrid ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Hybrid ERP and real-time optimization. This further implies that most of the real-time optimization achieved among indigenous oil and gas producing companies in Rivers State are caused by their Hybrid ERP while others are caused by externalities. Based on this, we reject the null hypothesis that there is no significant relationship between Hybrid ERP and real-time optimization of indigenous oil and gas producing companies and incline to the alternate hypothesis that there is a strong, significant relationship between Hybrid ERP and real-time optimization of indigenous oil and gas producing companies

Multivariate Statistics

H_{10}: Technology does not significantly moderate the relationship between enterprise resource planning and Administrative Efficiency of indigenous oil and gas producing companies in Rivers State

Table 11 Moderating influence of Technology on the Relationship between Enterprise resource planning and Administrative Efficiency

Control Variables			Enterprise resource planning	Administrative Efficiency	Technology
-none-[a]	Enterprise resource planning	Correlation	1.000	.902	.665
		Significance (2-tailed)	.	.000	.000
		Df	0	51	51
	Administrative Efficiency	Correlation	.902	1.000	.746
		Significance (2-tailed)	.000	.	.000
		Df	51	0	51
	Technology	Correlation	.665	.746	1.000
		Significance (2-tailed)	.000	.000	.
		Df	51	51	0
Technology	Enterprise resource planning	Correlation	1.000	.839	
		Significance (2-tailed)	.	.000	
		df	0	50	
	Administrative Efficiency	Correlation	.839	1.000	
		Significance (2-tailed)	.000	.	
		df	50	0	

a. Cells contain zero-order (Pearson) correlations.

From the results of the analysis on Table 11, it can be observed that there is a correlation coefficient is 0.902 which indicate that enterprise resource planning has a very strong and positive relationship with Administrative Efficiency. More so, the probability value is less than the critical value (1.e, p=0.000<0.05) this implies that the result of the analysis is statistically significant. Also, the result indicates that there is a correlation coefficient of 0.839 indicating that technology has a very strong significant moderation of the relationship between enterprise resource planning and Administrative Efficiency. More so, the probability value is less than the critical value (1.e, p=0.000<0.05) this implies that the result of the analysis is statistically significant.

DISCUSSION OF FINDINGS

The analysis of the study revealed a correlation coefficient of 0.692^{**} between cloud-based ERP and cost minimization, indicating a strong and positive relationship between cloud-based ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between cloud-based ERP and cost minimization. The analysis results also revealed a correlation coefficient of 0.821^{**} between cloud-based ERP and improved decision-making, indicating a very strong and positive relationship between cloud-based ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between cloud-based ERP and improved decision-making. Further, the study result

showed a correlation coefficient of 0.679** between cloud-based ERP and real-time optimization, indicating a strong and positive relationship between cloud-based ERP and real-time optimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between cloud-based ERP and real-time optimization. The findings are attuned with the findings of authors in the area of cloud-based ERP. Specifically, Nizar (2021) investigated the transformation process from using regular enterprise resource planning (ERP) system into implementing Cloud ERP system in the UAE public sector by means of a qualitative case study and in-depth interviews The findings established that the transformation process to Cloud ERP could result in diverse practical advantages in an organization's controlling system, cost reduction and profitability. Equally, outcomes disclosed that the effectiveness of putting into practice cloud ERP is reliable on the provider's professionalism; therefore resulting in issues connected to curtailed organizational independence. Furthermore, the study found supplied confirmed clarifications concerning the contentious misapprehension of Cloud ERP's privacy issues.

The analysis of the study revealed a correlation coefficient of 0.799** between on-premise ERP and cost minimization, indicating a strong and positive relationship between on-premise ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between on-premise ERP and cost minimization. The analysis results also revealed a correlation coefficient of 0.766** between on-premise ERP and improved decision-making, indicating a strong and positive relationship between on-premise ERP and improved decision-making. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between on-premise ERP and improved decision-making. Further, the study result showed a correlation coefficient of 0.820** between on-premise ERP and real-time optimization, indicating a very strong and positive relationship between on-premise ERP and real-time optimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a very strong significant relationship between on-premise ERP and real-time optimization. The findings of the study are in consonance with the finding of authors in the area of on-premise ERP. Specifically, AlMuhayfith and Shaiti (2020) examined the influence of ERPs usage on the financial and non-financial performance of the Saudi SMEs using an exploratory study has been used to identify the factors contributing to the effective and successful use of an ERP system and the findings designate seven contingency factors. Based on the exploratory study outcomes, three hypotheses have been developed and tested by means of a quantitative investigation. A survey was put up and administered to 200 Saudi SMEs that assumed the ERP systems, and data analysis and hypothesis testing was executed with a structural equation modeling (SEM) apparatus has been adopted. The results portray that management support, user satisfaction, and training significantly influence the ERPs procedure. Further, significant finding displayed that ERP systems improve SMEs' performance.

The analysis of the study revealed a correlation coefficient of 0.718** between Hybrid ERP and cost minimization, indicating a strong and positive relationship between Hybrid ERP and cost minimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Hybrid ERP and cost minimization. The analysis results also revealed a correlation coefficient of 0.548** between Hybrid ERP and improved decision-making, indicating a moderate and positive relationship between Hybrid ERP and improved decision-making. More so, the probability value (0.000) is less than the critical

value (0.05), this shows that there is a moderate significant relationship between Hybrid ERP and improved decision-making. Further, the study result showed a correlation coefficient of 0.738** between Hybrid ERP and real-time optimization, indicating a strong and positive relationship between Hybrid ERP and real-time optimization. More so, the probability value (0.000) is less than the critical value (0.05), this shows that there is a strong significant relationship between Hybrid ERP and real-time optimization. The findings of the study are in consonance with the finding of authors in the area of Hybrid ERP. Specifically, Othman, *et al.* (2018) studied the impact of enterprise resource planning (ERP) quality dimensions on organizational performance under the theoretical lens of dynamic capability theory by adopting business process change capability as a mediator in the association of ERP system quality dimensions and Organizational Performance. The analysis was executed by means of variance based partial least square (PLS) technique., and the results disclosed the business process change capability mediates the relationship between ERP quality dimensions and organizational performance.

The analysis of the study revealed a regression coefficient of 0.902** on the moderating influence of technology on the relationship between enterprise resource planning and Administrative Efficiency, indicating that technology has a very strong and positive influence on the relationship between enterprise resource planning and Administrative Efficiency. More so, the probability value (0.000) is less than the critical value (0.05), this shows that technology has a very strong significant influence on the relationship between enterprise resource planning and Administrative Efficiency. The findings of this study are in consonance with the finding of authors in the area of technology. Specifically, Özçelik, Aybas & Uyargil (2016) whose study on "High performance work systems and technology: Resource-based view considerations" employed the descriptive survey research design and questionnaire method of data collection. Spearman Rank Order Correlation statistical tool was used to measure the study hypotheses and their findings revealed that technology permeate the ways in which organizations use them to operationalize their organizational culture. More-so, the findings of this study aligns with the findings of Tamayo & Borges (2006), whose empirical study employed the descriptive survey research design and questionnaire method of data collection. Spearman Rank Order Correlation statistical tool was also used to measure the study hypotheses and their findings revealed that technology contribute to internal integration, motivate the achievement of goals and objectives and are imperative for organizational effectiveness. Finally, the findings of this study are in tandem with the findings of Tamayo (1998) whose empirical study revealed that these technologies being talked about are a major determinant of organizational productivity. Thus, makes it a critical player in the attainment of organizational productivity and sustainability.

CONCLUSION

In line with the findings of this study and to the extent of its consistency with results of similar previous studies, we conclude that enterprise resource planning has a positive significant relationship with Administrative Efficiency of indigenous oil and gas producing companies in Rivers State. Thus, enterprise resource planning is a key imperative for cost minimization and improvement in Administrative Efficiency within the Rivers State oil and gas production sector given its cloud-based ERP, on-premise ERP and Hybrid ERP which in turn impacts cost minimization of the business, improved decision-making among administrators as well as real-time optimization of the firm.

RECOMMENDATIONS

Based on the findings of the study and to the extent of its consistency with the result of similar studies we make the following recommendations.

1. Managers of indigenous oil and gas producing companies should capitalize on the pivot role of cloud-based ERP in their operations to ensure their Administrative Efficiency.
2. Managers of indigenous oil and gas producing companies should seek to build strong on-premise ERPs in line with their company policies and practices aimed at achieving Administrative Efficiency.
3. Managers of indigenous oil and gas producing companies should apply objectivity in their Hybrid ERP processes as this has the potency to either ruin or enhance their Administrative Efficiency.

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