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VIRTUAL COLLABORATION TOOLS BACKUP AND WORK OUTPUT OF ADMINISTRATIVE STAFF IN OIL AND GAS COMPANIES IN RIVERS STATE, NIGERIA.

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ABSTRACT

The administrative performance has gained more and more relevance in the contemporary organizations as digital technologies and collaboration applications influence the organization of work and its implementation. This paper has explored the linkage between the virtual collaboration tools backup and the work output of the administrative staff working in the oil and gas companies in Rivers state in Nigeria and the technological infrastructure as a moderating factor. The study based its conceptualization on the Technology-Organization-Environment (TOE) framework and viewed virtual collaboration tools backup as a necessary technological capability manifested in backup automation, system redundancy, and data recovery capability, and work output in terms of task productivity, work quality and timeliness. The research design adopted was a cross-sectional survey research. A sample of 120 administrative personnel who were selected in the oil and gas firms located in Rivers State were used to gather data, 110 of which were validated and returned to the researcher constituting a response rate of 92%. The tool showed a good level of reliability with a Cronbachs Alpha coefficient of 0.82. Pearson Product Moment Correlation (PPMC) at the 0.05 level of significance was used to analyse the data. The results indicated that there was a moderate positive correlation between backup automation and task productivity ($r = 0.590$, $p = 0.002$), moderate positive correlation between system redundancy and work quality ($r = 0.552$, $p = 0.000$), and strong positive correlation between data recovery capability and timeliness ($r = 0.651$, $p = 0.000$ Besides, the research study established a good positive moderating effect between technological infrastructure and the connection between virtual collaboration tools backup and work output ($r = 0.643$, $p = 0.000$). This implies that backup systems are more effective in improving the performance of administrative employees with the presence of sound technological infrastructure. The findings demonstrate that efficient backup systems pay off in improving efficiency, accuracy and timeliness of administrative processes in oil and gas organizations. The research finds that backup systems of reliable virtual collaboration tools, backed by sufficient technological infrastructure, come out as essential organizational resources that enhance the output of administrative work and continuity of operations. Some of the recommendations the study offers include the fact that oil and gas companies ought to upgrade automated backup systems to boost the work output of administrative personnel.

Keywords: Virtual Collaboration Tools Backup; Administrative Staff Work Output; Backup Automation; Technological Infrastructure; Oil and Gas Companies.

Background to the Study

The performance of administrative personnel has also gained a lot of significance in contemporary organizations where digital technologies and virtual system have played a role in determining the way tasks are coordinated and accomplished. Administrative personnel in oil and gas companies are crucial in the administration of documentation, communication procedures, scheduling and

information coordination that facilitate operations. With the introduction of digital work environments to organizations, administrative staff work can be evaluated in terms of the quantity, quality, and timeliness of the work being produced. Researchers have highlighted that the output of work by the employees within the technology-driven setting is influenced by the capacity to perform the required tasks correctly, efficiently, and on time (Tarafdar et al., 2019; Waizenegger et al., 2020). Task productivity is one of the major indicators of the output of the work, as it is the degree of efficiency of the performance of the employees in the tasks given to them and high performance in working in the same manner. Some of the measures used to assess task productivity are the number of tasks done, the time taken to do the tasks and volume of output produced in the course of a period. When working in digital offices where administrators are required to handle multiple tasks at the same time, the efficient use of technological systems will allow the employees to complete their tasks more quickly and sustain the workflow performance (Bharadwaj et al., 2013; Vial, 2019). Enhanced efficiency in a company and continuation in operations are the benefits of increased productivity in tasks.

Work quality is another significant indicator of work output, which indicates the level of accuracy, reliability, and compliance related to the performance of employees in terms of their tasks. The quality of work can be measured by indicators of error rate, accuracy level, and adherence to an established procedure. In oil and gas companies where the accuracy of documentation and adherence to regulations is of paramount importance, the high quality of work is used to avoid the mistakes in the operations and assure the proper coordination of the administrative processes. Research shows that work systems that are supported by technology may improve the precision and dependability of employee work through the minimization of manual errors and aiding standardized processes (Verhoef et al., 2021).

Timeliness is another important output measure of administrative work along with productivity and quality. Timeliness is the capability of the employees to accomplish tasks in due time and in a timely manner to meet the operational requirements. The timeliness in administrative processes are usually assessed in terms of actions like the rate of deadline adherence, speed of response, and frequency of delays. Studies on digital collaboration indicate that systems that are facilitated by technology enhance the speed of response and minimize delays in case information and communication systems are effectively integrated into the organizational workflows (Kane et al., 2019; Nambisan et al., 2017).

Although they are the important elements of organizational performance, as far as the work output is concerned, these aspects are becoming dependent on the trustworthiness of digital collaboration systems implemented in the organizations. Virtual collaboration tools have become very crucial in modern organizations to aid communication, sharing of documents and coordination between employees in various departments and locations. The success of these tools, however, is greatly determined by the accessibility of credible virtual collaboration tools backup systems that safeguard online data, and ensure system continuity in case of technical failures.

The conceptualization of virtual collaboration tools backup in this study is based on three dimensions: backup automation, system redundancy, and data recovery capability. Backup automation refers to automatic mechanisms that save digital data in an automated fashion via methods like automatic cloud backup, scheduled backup cycles and real time syncing. These procedures will make sure that data is always secure and available within the organization. System redundancy can be defined as having an alternate technological system like server replication, failure systems, and network redundancy that keeps the system operational in the event of technical failures. Likewise, data recovery capability is that of the organizations to restore lost or damaged data effectively in terms of speed of recovery, accuracy of restoration, and recovery procedure in the event of a disaster. These tools assist companies to ensure business continuity and minimize interruptions in online operations (Alshaikh, 2020; Zyoud&Lutfi, 2024).

The success of virtual collaboration tools backup systems, however, is usually determined by the quality of technological infrastructure that is in place in the organization. Technological infrastructure

is the underlying technological resources, which underlie digital systems, such as network stability, server capacity, and hardware sufficiency. Good technological infrastructure means that online systems can run smoothly and that backup systems are efficient in safeguarding organizational information. On the other hand, poor infrastructure can hamper the effectiveness of backup systems and decrease the dependability of electronic collaboration instruments (Vial, 2019; Bharadwaj et al., 2013).

On the whole, with the growing reliance of administrative practices on digital collaboration platforms, it becomes necessary to have the backup mechanisms in place and a well-developed technological infrastructure that will help to maintain the productivity in the workplace, quality of work, and timeliness of the work process among employees. Although there is an increasing focus on digital collaboration technologies, there is a lack of empirical studies that focus on the topic of how the virtual collaboration tools backup affects the work output of administrative employees in oil and gas firms in Rivers State, Nigeria. This gap is the foundation of the current research, as it examines the connection between virtual collaboration tools backup and work output of administrative personnel, with the moderating effect of technological infrastructure.

Statement of the Problem

Virtual collaboration tools are becoming increasingly important to oil and gas companies in Rivers State as a means of organizing administrative processes, working with electronic records and ensuring communication between employees in various departments and locations. These systems allow administrative personnel to exchange documents, update operational information, and work together on activities in real time. Nevertheless, irrespective of the increased use of virtual collaboration technologies, organizations still face issues like loss of data, system downtime, sluggish access to shared files, and disruption of collaborative work processes. These issues create some questions concerning whether the quality of virtual collaboration systems and especially the quality of backup systems can be trusted to serve the productivity, quality of work, and timeliness of administrative personnel.

Despite the introduction of the backup systems in the organizations in the form of automated cloud storage, server replication, and disaster recovery procedures to safeguard the digital information, the efficiency of these programs to aid the work output of the employees is still unclear. Poor automation of backups, poor system backup, and ineffective data recovery in most instances can cause disruption of access to collaborative documents and administrative records thus impacting the capacity of the staff to execute tasks effectively and efficiently. The growing reliance of administrative work on digital collaboration platforms can result in the disruption of workflow, slow execution of tasks, and low performance in case of unreliable backup systems.

Although earlier research has determined that digital collaboration technologies and information systems have the potential to affect employee productivity and organizational performance (Vial, 2019; Verhoef et al., 2021; Kane et al., 2019), there is little empirical focus on virtual collaboration tools backup as a multidimensional capability that involves backup automation, system redundancy, and data recovery capability. To be more precise, the linkage between these dimensions as a whole on the work output of administrative personnel, especially the task productivity, the quality of work, and timeliness in the oil and gas organizations is under-evidenced.

Moreover, virtual collaboration tools backup systems can be effective, provided that there is a sufficient technological infrastructure, such as stable network connection, adequate server capacity, and a stable hardware base. Nonetheless, the aspect of technological infrastructure that influences the relationship between backup systems and work output of employees has not been well studied in the literature, especially in the oil and gas industry in Rivers State.Thus, the research issue of the present study is that the empirical clarity concerning the degree to which the virtual collaboration tools backup affect the work performance of the administrative personnel in the oil and gas companies within Rivers State, Nigeria, and the degree to which technological infrastructure mediates this association, therefore, offers a plausible basis to the current research.

Conceptual Framework

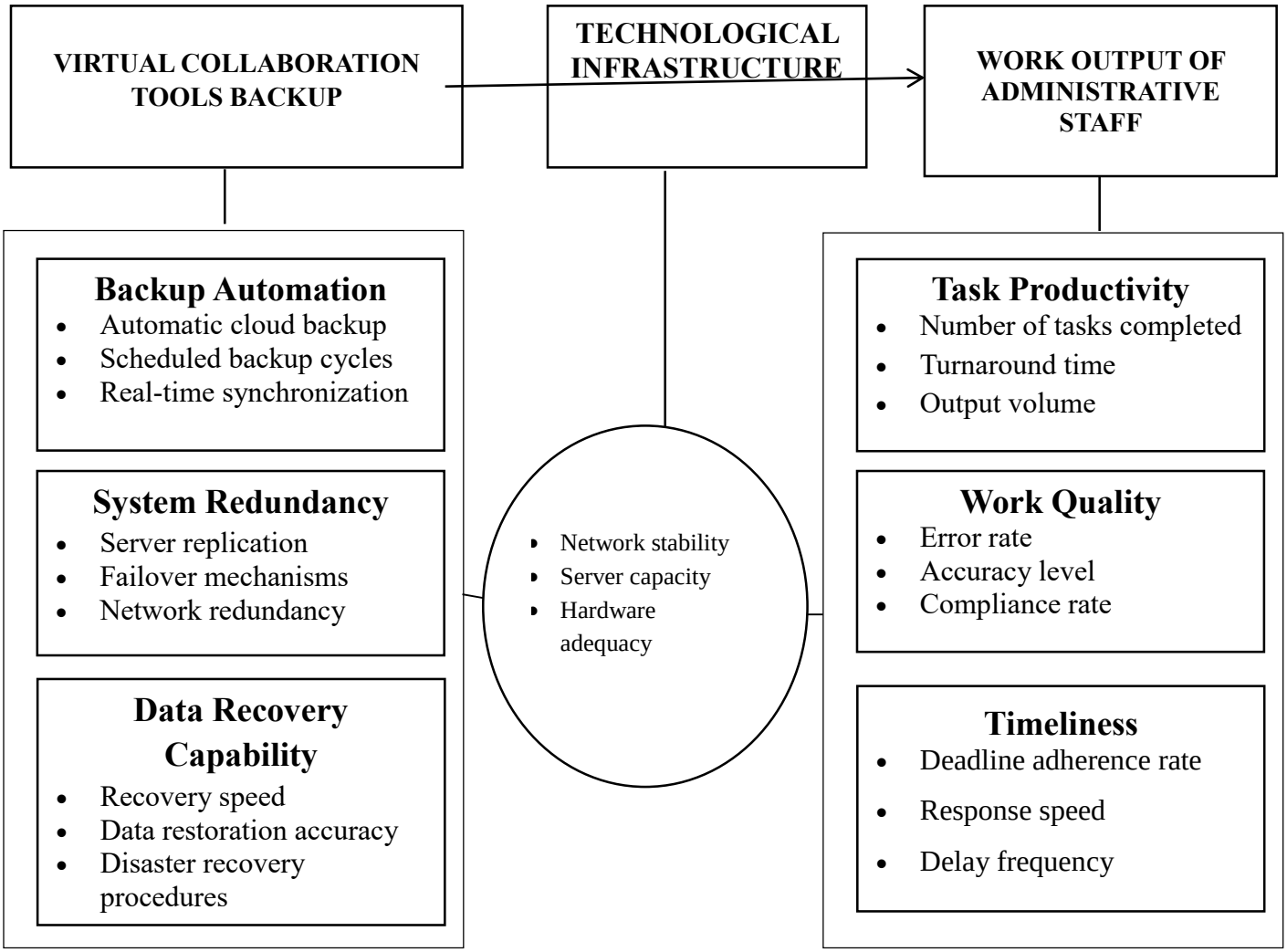

Fig 1.1: Conceptual framework showing the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State, Nigeria.
Source: Avolio et al. (2014)

Aim and Objectives of the Study

The aim of this study is to examine the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State, Nigeria. Specifically the study sought to:

1. determine the relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.
2. investigate the relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria.
3. examine the relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria.
4. examine the moderating roleof technological infrastructure on the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State.

Research Questions

In line with the stated objectives, the following research questions guided the study:

i. What is the relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria?
ii. What is the relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria?
iii. What is the relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria?
iv. What is moderating role of technological infrastructure on the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State.

Research Hypotheses

The following hypotheses were tested in the course of the study at a 0.05 level of significance:

H_{o1}: There is no significant relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.

H_{o2}: There is no significant relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria.

H_{o3}: There is no significant relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria.

Ho_4: There is no significant relationship on the moderating role of technological infrastructure on virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State.

Theoretical Framework

The current work is based on the Technology-Organization-Environment (TOE) framework created by Tornatzky and Fleischer (1990) that helps to identify how technological, organizational, and environmental conditions affect the adoption and successful use of innovations. The framework rests on the principle that the adoption of technology does not just depend on the nature of the technology itself but also on the organizational capability of supporting the technology and the overall environment in which the organization functions. It presumes that performance in organizations is enhanced when technological systems are stable, are well supported by the internal infrastructures and are well matched with the operational requirements.

In the technological environment, the efficiency of digital systems are based on their reliability, functionality, and resilience. Virtual collaboration tools backup mechanismssystem redundancy, data recovery ability, and backup automation are essential technological aspects in this study because they guarantee the preservation, continuity and fast recovery of the data. The mechanisms mitigate system disruptions, and facilitate continuous administrative processes.The context of the organization focuses on the importance of internal resources, in this case, technological infrastructure, such as robust networks, clouds, and data management systems. The resources allow the efficient implementation and use of backup systems and collaboration tools.

Using the TOE model, the research presumes that with well-developed backup technologies and backed by a good infrastructure, the administrative personnel will be in a better position to improve productivity, quality, and timeliness of their work. In this way, the TOE framework can serve as an appropriate framework to explain how the impact of virtual collaboration tools backup affects the output of work in oil and gas companies.

Conceptual Review

Concept of Virtual Collaboration Tools Backup

Virtual collaboration tools backupis the systematic procedures and the technological systems to save, duplicate, and recover the digital information created in collaboration platforms like Microsoft Teams,

Slack, Google Workspace, and Zoom. Such sites enable communication, sharing of documents and real time working of employees in various locations. Nevertheless, due to the fact that organizational functions are more and more relying on digital communication systems, data storage and recovery mechanisms reliability becomes critical to the continuation of operations.

The studies emphasize the importance of digital infrastructure in showing that organizations deploying automated backup systems and resilient data storage infrastructure are in a better position to maintain the continuity of workflows and minimize operational failures (Nelson, 2025). These backup mechanisms will guarantee the safety of communication records, common files, and team outputs and their availability when needed, such as in case of system failure, cyber attacks, and disruption.

Data loss can be a huge factor to productivity and decision making in certain industries like oil and gas where the administrative processes deal with huge amounts of operational documentation, project records and compliance reports. Thus, companies have become more concerned with how well collaboration tools maintain reliability, particularly regarding their backup mechanisms and redundancy, as well as their recovery properties in addition to their communication abilities.

Dimensions of Virtual Collaboration Tools Backup

Backup Automation

Backup automation is a feature of digital systems that enable them to automatically save copies of organizational data without human intervention. Automated backup systems run automatically at pre-determined times or on-demand, and this ensures that data created using collaboration platforms is always saved.

Research on digital workflow systems reveals that automation greatly minimises the possibility of human error linked with manual data management and enhances system reliability and efficiency of an operational system (Adepoju, Austin-Gabriel, Eweje, and Collins, 2022). Automated backups can be used in administrative settings so that records of meetings, reports, and communication logs can be available even following the interruption of the system. This will allow the administration personnel to proceed with their job without having to endure long delays in restoring data manually.

System Redundancy

System redundancy is a concept that implies that technological systems in the digital infrastructure of an organization have duplicate components acting as backup systems in the event of malfunctioning of the other systems. Redundant systems can be mirrored servers, backup databases, alternate communication systems or distributed storage systems.

Redundancy is comprehensively understood as an important design concept in digital infrastructures as it provides persistence of the system in case of technical failures or other disruptions (Samylovskaya, Makhovikov, andLutonin, 2022). Redundant digitals in oil and gas companies, where business operations are usually constituted by the timely information flow, obstruct workflow disruption by ensuring that collaborative platforms remain accessible to users in case of network interruption or hardware failures.

Organizations can keep the administrative practices like documentation control, time-management, and inner communication going by having parallel systems that can replace a failed part instantly.

Data Recovery Capability

Data recovery capability can be referred to as the capacity of digital systems to recover lost, corrupted or inaccessible data in a relatively short time after system failures. Categorical modalities of recovery usually entail the structured recovery measures, cloud-based data archival, and disaster recovery systems. Recent studies have shown that contemporary digital architectures are becoming more dependent on smart recovery mechanisms that have the capacity to restore organizational data in a short time and with minimal downtime (Nelson, 2025). Successful data recovery will make sure that administrative employees will be able to access past-stored documents, communication

records and collaborative files without loss of continuity of work.Of great importance to oil and gas organizations, with regulatory documentation and operation reports being highly sensitive, good data recovery systems ensure that the administrative staff is able to still access the past data needed to comply, plan and make decisions.

Work output of Administrative Staff Concept.

Work output of administrative staff is a measurement of the tangible outcomes of employees who handle organization coordination, documentation, scheduling and facilitation of communication. Administrative personnel are the instrumental coordinators of all the operations that are involved in keeping records and arranging workflow processes and facilitating effective inter-departmental communication. Administrative staffs play a major role in organization performance in technologically intensive sectors like oil and gas, where they guarantee timeliness, reliability, and accuracy of operational information (Ogbu, Ozowe, &Ikevuje, 2024). The efficiency of administrative personnel is bound to the stability of technological systems that underpin their activities as organizations start to use digital collaboration tools in growing numbers.The measure of work output in this research is gauged by quantifiable measures that reflect productive outcomes of administrative work, quality, and time efficiency.

Measures of Work Output of Administrative Staff

Task Productivity

Task productivity is a measure of the number of administrative tasks done in a period against resources. Administrative productivity can include the handling of documents, facilitating of meetings, handling of communications and arranging the records of operations.Digital collaboration systems with effective backup systems will allow administrative professionals to gain information fast and ensure the continuity of the workflow, enhancing the level of productivity (Wanasinghe et al., 2021). In cases whereby digital systems have minimum disruptions, the administrative staff will be able to accomplish their work more effectively.

Work Quality

Work quality is defined as the accuracy, consistency, and reliability of administrative products like records, schedules, documentation, and reports. Proper work quality will be portrayed by the absence of errors in documentation, systematic information systems, and monitoring of records. Dependable digital backup and recovery systems help in enhancing the quality of work by avoiding the loss of data and also by making sure that the administrative staff get full and precise data with which he or she works (Chux-Nyeche&Obele, 2026).

Timeliness

Timeliness is the capacity of the administrative personnel to fulfill tasks in a given time frame. Administrative tasks tend to include organizing meetings, sharing information and composing reports in rigid time frames.

Effective digital systems with automatic backup and redundancy systems minimize the downtime and enable the staff to sustain the operational schedules even during technical problems. In turn, administrative staff can more easily meet deadlines and continue work in the organization.

Technological Infrastructure Concept.

Technological infrastructure entails the underpinning digital systems, hardware, and network designs that aid in the functionality of the information technologies in organizations. Examples of infrastructure include data storage, servers, cloud computing systems, network connectivity, and cybersecurity systems.

Research on the digital transformation in oil and gas implies that well-developed technological infrastructure is a key to sustain digital operations and to uphold the latest collaboration technologies

(Saputelli, Duran, Rivas, & Casas, 2024). The reliability of infrastructure defines the effectiveness of digital tools like collaboration tools, automated backup tools, and redundancy systems.
Technological infrastructure in this research will be taking the form of a moderating variable in the determination between virtual collaboration tools backup and work output. Companies that possess robust digital infrastructure can better harness the power of backup automation, redundancy, and recovery processes to maintain the productivity of their administration, the quality of work, and the timeliness of work.

Empirical Review
Adepoju et al. (2022) designed a quantitative research that investigated the effect of workflow automation systems on operational efficiency in digitally integrated organizations. Based on the results of a survey given to the employees working in the technology-oriented companies, the researchers discovered that automated digitalizing processes resulted in a high level of workflow throughput, whereas the number of redundant administrative activities decreased as well. The findings showed that companies with automated backup systems had less disruption and administration had increased productivity. The current research builds on this study, showing that backup automation increases the productivity among the administrative personnel.
Nelson (2025) empirically conducted a study on the application of automation and artificial intelligence in the process of disaster recovery in multi-cloud environments. The study used system performance data and organizational case studies and concluded that automated recovery mechanisms considerably decreased the system downtime and enhanced operational continuity. Those organizations that had well-developed recovery frameworks could recover the lost data very quickly and ensure no delays in the workflow. The results help prove the current research by indicating the fact that the process of data recovery makes the administrative operations timely and reliable.
The study of Samylovskaya et al. (2022) focused on digital technologies adoption within the oil and gas production systems and the focus on the redundancy architecture. The study employed a technological systems analysis approach, and discovered that redundant infrastructure was helpful in giving the system additional reliability and operational continuity. Companies that adopted parallel communication systems and transition servers had a lesser number of disruptions in the operations. This conclusion correlates with the current research in showing that system redundancy enhances the continuity in workflow and administration productivity.
Chux-Nyeche&Obele (2026) used the survey-based research to examine the strategies of cloud-based recovery and the efficiency of the administration in the organization, which functions within Rivers State. The researcher used regression analysis to test the hypothesis of the relationship between recovery infrastructure and administrative performance indicators. Results have shown that organizations that have a successful backup and recovery strategy have greater documentation accuracy and efficiency. This paper contributes to the existing research by demonstrating that recovery systems enhance the quality of administrative outputs.
Ogbu et al. (2024) discussed the role of digitalization and remote collaboration technologies in the oil and gas industry administrative performance. Based on survey data collected on the employees who work in digitally integrated organizations, the study revealed that digital collaboration tools enhanced efficiency in communication and coordination of administration to a great extent. Nonetheless, the research also found that the lack of proper technological infrastructure may negatively affect the usefulness of digital systems. The current study is backed by this discovery as it reveals the significance of technological infrastructure to promote online collaboration and efficiency in administration.
The authors of the study by Wanasinghe et al. (2021) aimed to examine how technologies of digital transformation impact the productivity of operations in the oil and gas sector. The mixed-methods research revealed that integrated digital systems have a major impact on operational efficiency and the performance of administration tasks. The study underscored the importance of digital

infrastructure reliability as an important factor towards successful technology implementation. The results provide evidence to the current research by indicating that the digital collaboration tools can be more effective when accompanied by technological infrastructure.

Onukwulu&Dienagha (2024) trained a research on automation and redundancy in supply chain coordination in oil and gas projects. The study established that coordination efficiency and less disruption of the operation were realized in organizations that had redundant digital systems. The researchers concluded that redundancy architecture improves the resilience and continuity of organizations. This result confirms the current study in that system redundancy enhances the stability of the administrative workflow.

Lawan (2022) studied the use of cloud computing technologies in the Nigerian upstream oil and gas industry in both survey and case study designs. The results indicated that cloud computing infrastructures greatly enhanced the availability of data, the efficiency of collaboration, and administrative coordination. Companies that had well developed cloud infrastructures had more capacity to smoothen operations within the company in the event of a system failure. The current study complements the current research by endorsing that excellent digital collaboration and work output of administration are improved by a strong technological infrastructure.

Methodology

The present study used a cross-section survey research design to test the connection between virtual collaboration tools backup and work output of administrative personnel working in oil and gas firms in Rivers State, Nigeria. The study sample was 120 administrative employees who were selected among the oil and gas companies functioning in Rivers State. Census sampling method was selected since the number of people was small enough to enable the researcher survey the whole population. A structured questionnaire based on the five-point Likert scale of Strongly Agree to Strongly Disagree was used to gather the data. The instrument was tested and proved by two professionals in the field of digital systems management and industrial administration and then the instrument reliability was found using Cronbach Alpha which gave a reliability coefficient of 0.82 indicating that the instrument was reliable. One hundred and twenty questionnaires were sent, and 110 of them were retrieved with a response rate of 92 percent. Pearson Product Moment Correlation Coefficient (PPMC) was used to analyze data collected with the help of Statistical Package for Social Sciences (SPSS) version 26.0. The test of all hypotheses was done at 0.05 level of significance where the null hypothesis was rejected when the p-value was lower than 0.05.

Table 3.1: Names of Oil and Gas Companies in Rivers State and Respondent Categories

S/N	Company Name	ICT/Systems Staff	Records/Data Management Staff	Operations Support Staff	Total
1	Shell Petroleum Development Company (SPDC)	2	2	1	5
2	TotalEnergies Nigeria	2	2	1	5
3	Chevron Nigeria Limited	2	2	1	5
4	ExxonMobil Nigeria	2	2	1	5
5	Nigeria Agip Oil Company (NAOC)	2	2	1	5
6	Seplat Energy Plc	2	2	1	5
7	Oando Energy Resources	2	2	1	5
8	Aiteo Eastern E&P	2	2	1	5
9	Sahara Energy Resources	2	2	1	5

10	Nigeria LNG (NLNG)	2	2	1	5
11	WaltersmithPetroman Oil Ltd	2	2	1	5
12	Belema Oil Producing Ltd	2	2	1	5
13	Niger Delta Petroleum Resources	2	2	1	5
14	Shoreline Natural Resources	2	2	1	5
15	Pillar Oil Limited	2	2	1	5
16	Amni International Petroleum	2	2	1	5
17	Lekoil Nigeria Limited	2	2	1	5
18	Energia Limited	2	2	1	5
19	First Exploration & Petroleum Development	2	2	1	5
20	Green Energy International Ltd	2	2	1	5
21	Dubri Oil Company Limited	2	2	1	5
22	Platform Petroleum Limited	2	2	1	5
23	Frontier Oil Limited	2	2	1	5
24	Midwestern Oil & Gas Company	2	2	1	5
	TOTAL	**48**	**48**	**24**	**120**

Source: Researchers' Fieldwork (2026)

Result/Finding

Hypothesis One: There is no significant relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.

		Backup automation	Task productivity
Backup automation	Pearson Correlation	1	.590**
	Sig. (2-tailed)		.002
	N	110	110
Task productivity	Pearson Correlation	.590**	1
	Sig. (2-tailed)	.002	
	N	110	110

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

Source: SPSS version 25

H_{O1}: There is no significant relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.The result reveals a significant positive relationship (r = .590, p = 0.002). We reject the null hypothesis and accept the alternative hypothesis: there is a significant relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.

Hypothesis Two: There is no significant relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria.

		System redundancy	Work quality
System redundancy	Pearson Correlation	1	.552**
	Sig. (2-tailed)		.000
	N	110	110
Work quality	Pearson Correlation	.552**	1
	Sig. (2-tailed)	.000	
	N	110	110

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

Source: SPSS version 25

H_{O2}: There is no significant relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria. The result reveals a significant relationship (r = .552, p = 0.000). We reject the null hypothesis and accept the alternative hypothesis: there is a significant relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria.

Hypothesis Three: There is no significant relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria.

		Data recovery capability	Timeliness
Data recovery capability	Pearson Correlation	1	.651**
	Sig. (2-tailed)		.000
	N	110	110
Timeliness	Pearson Correlation	.651**	1
	Sig. (2-tailed)	.000	
	N	110	110

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

Source: SPSS version 25

H_{O3}: There is no significant relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria. The result reveals a significant relationship (r = .651, p = 0.000). We reject the null hypothesis and accept the alternative hypothesis: there is a significant relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria.

Hypothesis Four: There is no significant relationship on the moderating role of technological infrastructure on virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State.

Control variables			Virtual collaboration tools backup	Work output
Technological infrastructure	Virtual collaboration tools backup	Correlation	1.000	.643
		Significance (2-tailed)	.	.000
		Df	0	108
	Work Output	Correlation	. 643	1.000

	Significance (2-tailed)	.000	.
	Df	108	0

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

Source: SPSS version 23

Decision: The positive correlation value which is 0.643 shows there is a strong relationship in technological infrastructure moderating the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State. Furthermore, the null hypothesis five is rejected and the alternative accepted.

Summary of Findings

S/N	Hypotheses	Outcome	Extent of Relationship	Decision
H01	There is no significant relationship between backup automation and task productivity in oil and gas companies in Rivers State, Nigeria.	(r = .590, p = 0.002)	Moderate Positive Relationship	Reject Null Hypothesis
H02	There is no significant relationship between system redundancy and work quality in oil and gas companies in Rivers State, Nigeria.	(r = .552, p = 0.000)	Moderate Positive Relationship	Reject Null Hypothesis
H03	There is no significant relationship between data recovery capability and timeliness in oil and gas companies in Rivers State, Nigeria.	(r = .651, p = 0.000)	Strong Positive Relationship	Reject Null Hypothesis
H04	There is no significant moderating role of technological infrastructure on the relationship between virtual collaboration tools backup and work output of administrative staff in oil and gas companies in Rivers State.	(r = .643, p = 0.000)	Strong Positive Relationship (Moderating Effect)	Reject Null Hypothesis

Source: SPSS Output from Field Data (2026)

Discussion of Findings

The study reveals a significant positive relationship between backup automation and task productivity in oil and gas companies in Rivers State (r = 0.590, p = 0.002), indicating a moderate relationship. This finding suggests that the implementation of automated backup systems enhances the efficiency with which administrative staff complete their tasks. Automated backup processes ensure that organizational data such as documents, communication logs, and operational records are consistently preserved without manual intervention. Consequently, administrative staff can access required information promptly and maintain workflow continuity without disruptions caused by data loss. This improved system reliability supports faster task execution and sustained performance. This finding supports Adepoju et al. (2022), who reported that automated digital systems improve workflow efficiency and reduce operational disruptions. It also aligns with Wanasinghe et al. (2021), who found that digital automation enhances productivity and operational continuity.

The study also reveals a significant positive relationship between system redundancy and work quality in oil and gas companies in Rivers State (r = 0.552, p = 0.000), indicating a moderate relationship. This suggests that redundant technological systems such as mirrored servers, backup networks, and replicated storage enhance the accuracy and reliability of administrative outputs. The availability of alternative systems ensures continuity of operations during technical failures, thereby reducing errors and inconsistencies in documentation. This contributes to improved compliance with organizational procedures and higher-quality work output. This finding is consistent with

Samylovskaya et al. (2022), who emphasized that redundancy improves system reliability and minimizes workflow disruptions. It also supports Onukwulu and Dienagha (2024), who observed improved coordination and operational reliability in organizations with redundant systems.
Furthermore, the study identifies a strong positive relationship between data recovery capability and timeliness ($r = 0.651$, $p = 0.000$). This indicates that efficient data recovery systems significantly enhance the ability of administrative staff to meet deadlines. Effective recovery mechanisms enable quick restoration of lost or corrupted data, minimizing downtime and ensuring continuity of administrative activities. This allows personnel to retrieve essential information promptly, thereby improving response time and adherence to deadlines. This finding corroborates Nelson (2025), who reported that advanced recovery systems reduce downtime and improve efficiency, and aligns with Chux-Nyeche and Obele (2026), who found that cloud-based recovery systems enhance workflow continuity and responsiveness. Moreover, the analysis demonstrates that there is a positive significant correlation between virtual collaboration tools backup and work output with moderating effect of technological infrastructure ($r = 0.643$, $p = 0.000$). It means that the efficiency of backup systems to stimulate work output is reinforced by the existence of the advanced technological infrastructure. Backup technologies are more beneficial when organizations have good infrastructure like a fast network, reliable servers, and integrated digital systems. This facilitates easier teamwork, better access to data and higher productivity of administrative employees. The conclusion is that the technological infrastructure has a significant empowering role in maximizing the influence of backup systems on the employee performance.

Conclusion

The research findings are that backup automation and task productivity, system redundancy and quality of work, ability to recover data and its timeliness, and the moderating effect of technological infrastructure on virtual collaboration tools backup and work output have significant positive relationships in oil and gas companies in Rivers State, Nigeria. These results highlight the paramount role of effective backup systems in the improvement of administration efficiency and efficiency.
The study also shows that although backup technologies enhance productivity, quality, and timeliness, their use is greatly enhanced when they are complemented by good technological infrastructure. This underscores the fact that organizations should use an integrated solution that integrates backup systems with robust digital infrastructure.
These results ratify the applicability of Technology Organization Environment (TOE) model that highlights that the capability of technology, backed by the organizational resources, increases the performance of the operations. Generally, the study confirms that promising backup systems, supplemented with enabling infrastructure, is critical towards enhancing the productivity of administration and efficiency in an organization.

Recommendations

According to the results of the research, the following recommendations can be suggested:

1) oil and gas work in Rivers State need to introduce automated backup systems that enable the possibility of real-time synchronization and frequent cloud-based backups to maintain constant data availability and improve the productivity of tasks.
2) Practices that should be established and or maintained by organizations: Organizations are advised to set up and upkeep redundant technological systems such as mirrored servers, backup communication system and replicated storage system to ensure continuity of operations and to enhance the quality of administrative outputs.
3) Companies ought to enhance their recovery plans through the integration of more modern technologies and methods of disaster recovery, through which they can restore the lost information quickly thus enhancing timeliness, and reducing delays in operations.
4) Oil and gas companies can also invest in an effective technological infrastructure such as good network systems, modern hardware and built-in digital platforms as part of improving

the efficiency of virtual collaboration tools backup and work maximization among administrative personnel.

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