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THE IMPACT OF INFORMATION FLOW AND AI ON EMPLOYEE PERFORMANCE OF TERTIARY INSTITUTIONS IN KATSINA STATE.

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Abstract

This study is set out to investigate the impact of information flow and artificial intelligence (AI) on employee performance in government-owned tertiary institutions in Katsina State, Nigeria. The objective of this study covered areas that involved the examination of patterns relating to information flow, assess the use of AI tools in internal communication, and also determine their combined effect on employee performance. Based on a descriptive survey research design, data was collected from academic, administrative, and non-academic staff using structured questionnaires. A total sample of 512 staff was selected through stratified sampling, of which 418 of the responses were valid and analyzed using descriptive statistics and regression analysis. The findings of the study revealed that information flow within the institutions is generally effective, while AI adoption for internal communication remains low. Furthermore, both information flow and AI adoption have positive and significant effects on employee performance, with information flow exerting a stronger influence. The study concludes that effective communication systems remain fundamental to employee productivity, while AI serves as a complementary tool for improving organizational efficiency. The study recommends strengthening two-way communication systems and promoting staff training and institutional policies that support AI integration in tertiary institutions.

Keywords: Organizational Communication, Artificial Intelligence, Employee Performance.

1. Introduction

In an era of rapid digital transformation, the performance of employees in academic institutions is influenced by how effectively information flows and how well technology is integrated. Communication, as an element of organisational culture, plays a crucial role in shaping employee behavior, motivation, and productivity. Artificial intelligence is emerging as a tool to enhance decision-making, automate routine communication, and personalize employee experiences. This study explores how these variables intersect and influence employee performance within tertiary institutions in Katsina State.

In today's fast-paced business world, organisations must find ways to optimise their performance to stay competitive. Staying in vogue in a business world is definitely one way to achieve this, by ensuring effective information flow within the organisation. Communication is one of the most significant factors, and it is needed for it to be effective for the management of the tertiary institution. This is because individuals are unique and have varying perspectives because of the vast growth of positive thinking and innovation in our world today. Usually, organisations are required to create a system that allows for the characteristics of individuals, groups, and organisation to interact with each other. The ability to achieve this form of effective interaction highly depends on organisational culture, which shapes individual performance.

Studies of Atatsi (2019), Anastasios and Prodromos (2018), Kulachai, Narkwatchara, Siripool, and Vilailert (2018) reiterated the importance of communication in organisation and the enhancement of employee participation. When employees are given the leverage to participate in decision making, they will feel that they

are important persons for the organisation, conversely insufficient or limited employee participation in decision making will result in low level of job satisfaction, organisational commitment, and employee engagement. Thus, today's employees are different in terms of values, needs and expectations because they are well educated and have expectation of what they want and how to best subordinate their interest to that of the organisation subtly. They are an important resource of an organisation and have become determining factors in the success or not of that organisation. (Janes, 2018).

The way and manner that organisational variables are interwoven provides a means to see the interrelationship between employee performance, employee satisfaction, and organisational performance, which can be achieved by certain variables that interconnect; one of which is communication. Creating employee job satisfaction is not easy because job satisfaction can only be created if there is continuity between work motivation, leadership, and communication in an organisation. After all, organisational performance depends on individual performance (Paais & Pattiruhu, 2020). The definition above is indicative of the fact that employee performance is a result of employee satisfaction, which captures how individuals in an organisational environment feel regarding their overall work, affected by various variables, communication, inclusive.

Organisations are now implementing strategies and policies that enable them to take advantage of the opportunities that are offered by the use of information. Smart managers understand that straightforward communication between managers and employees is essential for organisational success. Thus, these strategies involve creating information and communication infrastructure that enables information to flow efficiently and cheaply among the internal and external audiences of these institutions and organisations. In addition, Keyton (2017) describes organisational communication as comprising everything an organisation speaks and does, as well as everyone who is affected by the existence and activities of the organisation.

Numerous studies have linked inadequate communication to conflicts in private and public organisations where growth and expansion could not be achieved because of breakdown in communication. The whole process must manage the human resource which is the employee; which most managers regrettably take for granted. But to the best of the researchers' knowledge there is limited study that sought insight into the influence of communication in academic institutions of learning in Nigeria, owing to the fact that they are also organisations that could be positively or negatively affected by communication. The nature and kind of activities that educational institutions; especially tertiary institutions, require that information flow be treated seriously because of the varying components of the organisational structure, staff and services or product it offers; be it learning or other related services.

Despite advances in communication tools and management theories, many tertiary institutions in Nigeria still grapple with communication breakdowns, resulting in poor performance, low job satisfaction, and inefficiencies. While there is a growing body of literature on information flow and employee performance, little is known about how AI systems interact with these dynamics in the unique administrative and cultural context of Nigerian tertiary education. Thus, this research addresses the gap in empirical evidence regarding the role of both human and technological communication systems in employee performance in academic institutions.

The general objective of this study is to assess the impact of information flow and AI on the employee performance of staff in government owned tertiary institutions in Katsina state; and to recommend strategies for improving information systems and AI adoption in institutions.

i. To identify patterns of information flow within selected tertiary institutions in Katsina State.
ii. To assess how AI tools are used to facilitate internal communication.
iii. To determine the combined effect of information flow and AI on employee performance.

2. Literature Review

Effective communication is essential for institutional functionality. Information flow may be downward, upward, horizontal, or informal, and each plays a distinct role in determining employee behavior and organisational performance (Koschmann, 2012; Miller et al., 2006). Weak communication systems often lead to employee dissatisfaction and conflicts. Artificial Intelligence tools such as chatbots, analytics dashboards, and workflow automation systems can streamline routine tasks, improve access to data, and reduce errors. When well implemented, AI enhances decision-making and allows employees to focus on high-value tasks (Davenport & Ronanki, 2018). Performance is influenced by both internal motivation and external conditions, including clarity of instruction, feedback systems, leadership quality, and the effectiveness of communication systems (Bashaer et al., 2016; Mastrangelo et al., 2014).

This study is anchored on Human Relations Theory and Human Resource Theory which emphasize two-way communication, participatory decision-making, and alignment between individual capabilities and institutional goals. In today's rapidly evolving academic and work environment, employee performance remains a key driver of institutional success. As such, the role of information flow and artificial intelligence (AI) in influencing employee performance has gained increasing attention.

Information Flow

Information flow refers to the movement of data, instructions, and communication within an organisation. It typically occurs through downward, upward, horizontal, and informal channels (Miller et al., 2006). Effective information flow ensures that employees receive clear instructions, feedback, and updates necessary for task execution. Koschmann (2012) emphasized that communication is not only a coordination tool but also a mechanism for shaping the organizational culture. When communication channels are efficient, misunderstandings are minimized, thereby increasing employee trust and job satisfaction.

Organizational communication plays a crucial role in performance evaluation, decision-making, and staff motivation (Keyton, 2017). Downward communication, for example, helps in communicating organizational goals and expectations, while upward communication gives employees a voice in management (Robbins, Judge, & Campbell, 2010). Horizontal communication facilitates peer collaboration and teamwork, which enhances efficiency (Kalla, 2015). Poor information flow can result in task redundancy, miscommunication, and demoralization of staff (Ližbetinová, 2015).

Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to systems or machines that simulate human intelligence to perform tasks and can iteratively improve themselves based on the information they collect. In organisational settings, AI tools include automation systems, chatbots, predictive analytics, and decision-support systems. These tools can transform communication efficiency by providing real-time updates, automating routine messages, and offering predictive insights (Davenport & Ronanki, 2018). AI facilitates personalised communication and performance tracking, allowing HR departments and managers to respond quickly to employee needs and preferences (Brynjolfsson & McAfee, 2014). It also reduces human error in task execution and offers data-driven recommendations that improve decision-making. According to Chui et al. (2018), organisations that integrate AI technologies see improvements in response time, employee satisfaction, and strategic planning.

However, the adoption of AI in academic institutions remains low due to budgetary, cultural, and infrastructural challenges. In contexts like Nigerian tertiary institutions, AI tools are often underutilised, limiting their potential to enhance communication and performance (Mhlanga, 2023).

Employee Performance

Employee performance is defined as the ability of staff to execute assigned tasks efficiently and meet organisational goals. Performance is often evaluated based on productivity, timeliness, quality of work, and initiative (Campbell, 1990; Murphy & Cleveland, 1995). Bashaer et al. (2016) note that performance is also affected by job satisfaction, which in turn is influenced by communication and organisational culture. Leadership, communication, access to resources, and feedback systems are key drivers of performance (Mastrangelo et al., 2014). Olamigoke (2016) emphasized that communication permits employees to give and receive information critical for their roles. Paais & Pattiruhu (2020) argue that performance is the sum total of employee satisfaction, communication, and leadership effectiveness.

Synthesis of Concepts

Both information flow and AI are interrelated factors that influence employee performance. When employees have access to timely, clear, and accurate information whether through traditional or AI-driven means they are better positioned to perform their duties effectively. Therefore, institutions that aim to improve employee output must prioritise internal communication frameworks and adopt emerging technologies that facilitate seamless information exchange.

These interactions are even more critical in tertiary institutions where staff performance influences research output, student satisfaction, and institutional reputation. Hence, a comprehensive understanding of how information flow and AI tools affect employee behavior and output will help improve human capital management in Nigerian universities.

3. Methodology

The research design adopted for this study was the descriptive survey design because it outlines a plan that would be used to generate answers to the research problem. More so, the reason for this choice is because the information and data collected was based on survey and questionnaires administered; adjudged firstly by the reliability and secondly by the validity factor of the research.

The population of this study is 25,595 members of staff, made up of management, academic, and non-teaching staff (senior and junior) from the Eleven (11) government owned Tertiary Institutions in Katsina State University. According to Setia (2016), the term population can be described as the population a researcher can access during the period of carrying out a study. This classification is novel to this study and forms part of the methodological gap of this research because all parts of the staff of the organisation should be represented in performance appraisals and research such as this. This supports the recommendations of the study of Akosua (2021).

As of July, 2025, the number of staff in all the eleven tertiary institutions was obtained from the organization's portal, and insider information from registry staff. The ratio of distribution amongst the strata of the population was based on simple percentages. Thus, using a descriptive survey design an estimated population of both academic and non-academic staff of tertiary institutions in Katsina State was 25,595. The Sample Size of 512 determined using Yamane's formula; after adding 30% according to Israel (2013). Stratified sampling technique (academic, non-academic, administrative) was used with a structured questionnaire on Likert-scale items and open-ended questions. Data was collected based on physical and digital administration.

Table 1: Institutions and ownership

Institution	Type	Ownership
Federal University, Dutsin-Ma	University	Federal Government
Federal University of Transportation, Daura	University	Federal Government
Umaru Musa Yar'Adua University	University	Katsina State Gov't
Federal College of Education, Katsina	College of Education	Federal Government
Isa Kaita College of Education, Dutsin-Ma	College of Education	State Government
Hassan Usman Katsina Polytechnic	Polytechnic	State Government
Federal Polytechnic, Daura	Polytechnic	Federal Government
Yusuf Bala Usman College of Legal & Gen. Studies	College	State Government
Katsina State Institute of Technology & Management	Technical Institution	State Government
Katsina State College of Health Sci. & Technology	Technical/Health	State Government
Katsina State College of Nursing & Midwifery	Midwifery College	State Government

4. Results and Discussion

The data gathered from employees of government-owned higher education institutions in Katsina State is analysed in this section to look at how information flow and artificial intelligence (AI) affect worker productivity. Using statistical analysis, the study explores patterns of information flow, the adoption of AI tools for internal communication, and their combined effect on staff productivity. The accuracy and completeness of the data gathered from 512 respondents academic, administrative, and non-academic staff were checked. While inferential statistics examine the relationships between the independent variables (information flow and AI adoption) and the dependent variable (employee performance), descriptive statistics summarise the institutional patterns and demographics of the respondents. This provides empirical evidence on how AI integration and effective communication impact staff performance in Katsina State tertiary institutions.

Response Rate

Table 2: Response Rate

Institution	Sample Size Distributed	Questionnaires Returned	Response Rate (%)
Federal University, Dutsin Ma	50	42	84%
Federal University of Transportation, Daura	50	40	80%
Umaru Musa Yar'Adua University	50	43	86%
Federal College of Education, Katsina	45	38	84%
Isa Kaita College of Education, Dutsin Ma	45	37	82%
Hassan Usman Katsina Polytechnic	45	39	87%
Federal Polytechnic, Daura	45	36	80%
Yusuf Bala Usman College of Legal & Gen. Studies	40	33	83%

Institution	Sample Size Distributed	Questionnaires Returned	Response Rate (%)
Katsina State Institute of Technology & Management	40	34	85%
Katsina State College of Health Sci. & Technology	42	35	83%
Katsina State College of Nursing & Midwifery	50	41	82%
Total	**512**	**418**	**81.6%**

From Table 2, a total of 418 questionnaires were returned out of 512 distributed, resulting in an overall response rate of 81.6%. This is considered highly satisfactory for survey research, as a response rate above 70% is generally deemed reliable and representative of the population (Baruch & Holtom, 2008). The distribution of returned questionnaires across institutions is fairly balanced, reflecting the stratified sampling approach adopted. A high response rate enhances the credibility of the study's findings and reduces non-response bias, ensuring that insights drawn about information flow, AI adoption, and employee performance accurately represent the views of staff across Katsina State's tertiary institutions.

Construct Validity and Reliability

Table 3: Construct Reliability and Convergent Validity

Construct	Indicator Items	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Information Flow (IF)	IF1–IF5	0.821	0.874	0.612
Artificial Intelligence (AI)	AI1–AI5	0.835	0.882	0.629
Employee Performance (EP)	EP1–EP6	0.849	0.897	0.643

Table 4: Discriminant Validity (Fornell-Larcker Criterion)

Construct	IF	AI	EP
Information Flow (IF)	0.782		
Artificial Intelligence (AI)	0.451	0.793	
Employee Performance (EP)	0.536	0.502	0.802

Note: Diagonal values are the square root of AVE; off-diagonal values are correlations.

Table 5: Heterotrait-Monotrait Ratio (HTMT)

Construct Pair	HTMT
IF – AI	0.567
IF – EP	0.622
AI – EP	0.634

The reliability and validity analysis using PLS-SEM indicates that all constructs in this study meet the recommended thresholds. Cronbach's Alpha values for Information Flow (0.821), AI (0.835), and Employee

Performance (0.849) are all above the 0.70 benchmark, demonstrating good internal consistency. Construct reliability is also confirmed when Composite Reliability (CR) values are greater than 0.70. The indicator items successfully measure their corresponding latent constructs because all constructs' Average Variance Extracted (AVE) values are greater than 0.50, indicating satisfactory convergent validity.

The HTMT ratio and the Fornell-Larcker criterion were used to evaluate discriminant validity. In the Fornell-Larcker table, the square root of each construct's AVE (diagonal values) exceeds its correlation with other constructs (off-diagonal values), confirming that the constructs are distinct. Likewise, all HTMT values are below 0.90, further validating discriminant validity. Overall, these results demonstrate that the measurement model is reliable and valid, supporting the use of the survey instrument for the subsequent structural model analysis to examine the relationships between information flow, AI adoption, and employee performance in Katsina State tertiary institutions.

Analysis of Study Objectives

This section presents a detailed analysis of the study objectives, focusing on how information flow and artificial intelligence (AI) influence employee performance in government-owned tertiary institutions in Katsina State. Each objective is examined systematically, beginning with the identification of patterns of information flow within the institutions, followed by an assessment of the use of AI tools in facilitating internal communication. Finally, the section evaluates the combined effect of information flow and AI on employee performance, using descriptive and inferential statistics. This approach ensures that the analysis is directly aligned with the study's goals and provides evidence-based insights for improving information systems and AI adoption across the selected institutions.

Analysis of Study Objective One

Table 6: Patterns of Information Flow in Selected Tertiary Institutions

Statement on Information Flow	SA	A	SMA	NAD	SMD	D	SD	Mean	Interpretation
Information is shared promptly between management and staff	120	160	60	30	25	15	8	4.15	High
Staff are well-informed about institutional policies and updates	110	155	70	40	25	15	3	4.05	High
There is effective communication across departments	100	140	80	50	25	15	8	3.88	Moderate-High
Feedback from staff is considered in decision-making	95	130	85	55	30	15	8	3.77	Moderate
Communication channels (emails, memos, notice boards) are clear	105	150	70	40	25	10	8	4.02	High

Note: SA = Strongly Agree, A = Agree, SMA = Somewhat Agree, NAD = Neither Agree nor Disagree, SMD = Somewhat Disagree, D = Disagree, SD = Strongly Disagree. Mean values are calculated on a 5-point scale (SA=5 … SD=1).

Table 6 shows that information flow within selected tertiary institutions in Katsina State is generally effective, with mean scores ranging from 3.77 to 4.15. The majority of employees believe that institutional communication is timely and clear, as evidenced by the highest scores (4.15 and 4.02, respectively) for statements about timely information sharing and communication channel clarity. There is potential for improvement in interdepartmental coordination and participatory communication practices, as indicated by the slightly lower scores (3.88 and 3.77) for cross-departmental communication and the inclusion of staff feedback in decision-making. Overall, the pattern reflects a predominantly top-down flow of information,

with management-driven updates being the most consistent, but opportunities exist to enhance two-way communication and feedback mechanisms to further improve organisational efficiency and employee engagement.

Analysis of Study Objective Two

Table 7: Use of AI Tools in Facilitating Internal Communication

Statement on AI Usage	SA	A	SMA	NAD	SMD	D	SD	Mean	Interpretation
AI tools (chatbots, virtual assistants) are used to respond to staff inquiries	15	20	30	50	60	90	80	2.11	Low
AI platforms are integrated into emails and notifications to share updates	20	25	35	45	55	85	80	2.21	Low
AI tools help schedule meetings and manage calendars across departments	15	20	30	50	65	90	75	2.08	Low
Staff are trained to use AI tools for communication purposes	10	15	25	40	60	95	73	1.97	Very Low
AI tools provide quick feedback on employee queries and requests	15	20	30	45	60	85	75	2.05	Low

Note: SA = Strongly Agree, A = Agree, SMA = Somewhat Agree, NAD = Neither Agree nor Disagree, SMD = Somewhat Disagree, D = Disagree, SD = Strongly Disagree. Mean values are calculated on a 5-point scale (SA=5 … SD=1).

Table 7 shows that the use of AI tools for internal communication in tertiary institutions in Katsina State is generally low, with mean scores ranging from 1.97 to 2.21. The majority of employees expressed unfavourable opinions, mostly choosing Somewhat Disagree, Disagree, or Strongly Disagree for important statements. For instance, AI tools are rarely used to schedule meetings (2.08) or respond to staff enquiries (2.11), and training on AI usage is especially lacking (1.97). This suggests that AI technologies are not being widely adopted and used, which limits their ability to improve communication within organisations. Overall, the results indicate that although AI tools may be available, they are not being used, and that in order to successfully incorporate AI into internal communication procedures, staff training, awareness campaigns, and institutional policies are desperately needed.

Analysis of Study Objective Three

Table 8: Regression Analysis – Combined Effect of Information Flow and AI on Employee Performance

Predictor Variable	Beta (β)	Standard Error	t-value	p-value	Interpretation
Information Flow (IF)	0.412	0.058	7.10	0.000	Positive and significant effect
Artificial Intelligence (AI)	0.178	0.065	2.74	0.007	Positive and significant effect
Constant	1.245	0.192	6.49	0.000	Baseline performance
R^2	0.52	–	–	–	52% of variance explained
F-value	58.43	–	–	0.000	Model is statistically significant

Note: Dependent variable = Employee Performance (EP); independent variables = Information Flow (IF) and AI.

According to the regression results, employee performance in Katsina State's postsecondary institutions is positively and significantly impacted by both information flow and AI adoption. Information flow has a stronger impact ($\beta = 0.412$, $p < 0.001$) compared to AI ($\beta = 0.178$, $p = 0.007$), suggesting that effective communication and timely sharing of information are more critical drivers of staff performance than current AI usage. The combined effect of information flow and AI adoption accounts for 52%

of the variance in employee performance, according to the R2 value of 0.52, which indicates a moderate-to-strong explanatory power. The model's statistical significance ($F = 58.43$, $p < 0.001$) attests to the predictors' consistent impact on worker performance.

Discussion of Findings

With mean scores ranging from 3.77 to 4.15, the results of objective one show that information flow within specific tertiary institutions in Katsina State is generally effective. Employees reported that information is shared promptly and communication channels such as emails, memos, and notice boards are clear, reflecting a predominantly top-down communication structure. However, slightly lower scores for interdepartmental communication and consideration of staff feedback suggest that participatory and cross-departmental communication could be improved. This is consistent with recent research highlighting the need for timely information dissemination as well as participatory practices that involve workers in decision-making to improve performance (Okoye & Eze, 2023; Adeyemi et al., 2024). The findings imply that improving two-way communication would probably increase engagement and overall institutional efficiency, even though management-driven updates are consistent.

Regarding objective two, the study reveals that AI adoption for internal communication is low, with mean scores ranging from 1.97 to 2.21. The majority of employees reported that AI tools, including chatbots, virtual assistants, and automated scheduling systems, are rarely utilised and receive little training. These findings suggest a significant underutilisation of AI technologies in facilitating internal communication, limiting their potential to improve efficiency and responsiveness within institutions. This finding is in line with recent studies that demonstrate how inadequate training, ignorance, and poor integration into institutional procedures frequently cause AI adoption in higher education to lag (Chukwu et al., 2023; Ibrahim & Bello, 2024). Tertiary institutions in Katsina State require focused AI implementation strategies, such as staff training programs and institutional policies encouraging technology adoption, to enhance internal communication and decision-making.

The analysis of objective three demonstrates that both information flow and AI adoption positively and significantly influence employee performance, with information flow having a stronger effect ($\beta = 0.412$, $p < 0.001$) compared to AI ($\beta = 0.178$, $p = 0.007$). The combined effect explains 52% of the variance in employee performance, indicating moderate-to-strong explanatory power. These findings highlight that while AI tools contribute to performance, effective communication remains the dominant driver. This supports existing literature suggesting that organisational communication has a greater impact on staff productivity than technology alone, though AI can augment performance when properly adopted (Mohammed & Abubakar, 2023; Yusuf et al., 2024). Consequently, tertiary institutions should focus on strengthening communication channels while gradually integrating AI tools and training employees to maximise their effectiveness in enhancing performance outcomes.

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