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ARTIFICIAL INTELLIGENCE AND HUMAN RESOURCES ACCOUNTING OF MANUFACTURING COMPANIES IN NIGERIA

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Abstract

This study examined the effect of three Artificial Intelligence (AI) components; Machine Learning, Process Automation, and Predictive Analytics, on Human Resource Accounting (HRA) practices in selected manufacturing firms in Benin City, Edo State, Nigeria. A survey research design was employed to collect primary data from a population of 412 employees across Bendel Feed and Flour Mill Ltd, Nosak Distilleries Ltd, and Presco Plc. Using Taro Yamane's formula at a 5% margin of error, a sample size of 203 was determined. Stratified random sampling ensured representation across key departments, including human resources, accounting/finance, and operations. Data were collected using a structured and validated questionnaire, with reliability confirmed through a pilot study yielding Cronbach's alpha values above 0.70. The study adopted a model that specified Human Resource Accounting as the dependent variable and the three AI components as independent variables. Responses were measured on a 5-point Likert scale. Data analysis was conducted using SPSS version 25, applying descriptive statistics and paired samples t-tests. Results revealed that Machine Learning, Process Automation, and Predictive Analytics each had a positive and statistically significant effect on HRA, with Machine Learning exerting the strongest influence. The findings affirm that AI integration enhances the measurement, recognition, and reporting of human capital. The study concludes that AI-driven tools improve the strategic application of HRA and recommends targeted AI training for HR and accounting professionals to ensure effective and sustainable use of these technologies in the manufacturing sector.

Keywords: *Artificial Intelligence, Human Resource Accounting, Machine Learning, Process Automation, Predictive Analytics*

INTRODUCTION

The integration of Artificial Intelligence (AI) into business operations is redefining how organizations manage and account for their most critical asset human capital. In the context of Human Resources Accounting (HRA), which traditionally focuses on the identification, valuation, and reporting of employee-related investments, AI introduces tools such as Machine Learning (ML), Process Automation (PA), and Predictive Analytics (PAx) to improve precision, consistency, and real-time analysis (Obiah & Onwumere, 2022). These innovations offer opportunities to overcome historical limitations in HRA practices, such as subjectivity in measurement and lack of standardization. For manufacturing firms, where workforce efficiency directly impacts productivity and operational outcomes, the strategic use of AI in human resource valuation and reporting has become increasingly vital. This study specifically explores how Machine Learning, Process Automation, and Predictive Analytics affect Human Resources Accounting within Nigeria's manufacturing sector. Machine Learning supports adaptive modeling of workforce performance, enabling firms to estimate employee value based on real-

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time contributions and future potential. Process Automation streamlines routine HR functions, reducing administrative costs and minimizing errors in payroll, performance tracking, and employee records. Predictive Analytics enables firms to assess future trends in employee behavior, training ROI, and talent retention, thereby supporting more informed investment in human capital (Nath, 2022; Iliemena, Goodluck & Amahalu, 2019). These tools have the potential to transform HRA into a data-driven and strategically aligned function that mirrors the precision found in traditional financial asset management.

Focusing on the manufacturing sector is both necessary and timely. Manufacturing companies are labour-intensive and operate in highly competitive environments where efficiency, output quality, and cost control are tightly linked to workforce effectiveness. Despite these characteristics, empirical research on AI's role in enhancing HRA within this sector remains limited. Most prior studies tend to generalize findings across industries or focus predominantly on HRM outcomes rather than accounting and financial reporting implications (Gould, 2024).

In Nigeria, the manufacturing sector is currently undergoing digital transformation while grappling with structural inefficiencies and skills shortages. Therefore, understanding how AI technologies can enhance human capital valuation and decision-making processes in this sector has practical and policy relevance. Although existing literature provides insight into the potential benefits of AI in HR, several gaps remain. Rajni, Dinesh, Nisha, and Naresh (2023) showed a strong link between AI and HRM functions but did not address HRA or sector-specific dynamics. Chima (2022) and Obiah and Onwumere (2022) pointed out the inadequate recognition of AI-driven HR shifts in financial reports, particularly in public institutions. Dima et al. (2024) offered a comprehensive framework of AI's influence on HR roles but lacked empirical validation in manufacturing contexts. Gasana (2024) and Ge et al. (2021) highlighted ethical and data integration challenges, emphasizing the risk of overlooking soft skills and qualitative inputs in automated systems. Nath et al. (2022) and Martini et al. (2024) further warned that while AI tools boost HR efficiency, many organizations lack the expertise to fully leverage these technologies in financial reporting. These shortcomings highlight the need for empirical studies that assess how AI directly affects HRA practices, particularly in sectors where human capital is both vital and undervalued in accounting systems.

Against this backdrop, the study aims to assess the effect of Artificial Intelligence on Human Resources Accounting in Nigerian manufacturing firms, focusing on Machine Learning, Process Automation, and Predictive Analytics.

The remainder of this paper is structured into sections 2, 3,4 and 5. Section 2 presents the literature review, section 3 presents the mehodology, section 4 presents the results and discussions while section 5 presents the conclusion and recommendation

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Human Resources Accounting (HRA)

Human Resources Accounting (HRA) is a strategic framework that recognizes employees as valuable organizational assets rather than mere cost components. It involves identifying, measuring, and reporting the value of human capital to enhance decision-making and organizational performance (Chima, 2022). The integration of Artificial Intelligence (AI) into

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HRA has significantly advanced its effectiveness by enabling data-driven insights into employee performance, productivity, and value creation (Rajni, Dinesh, Nisha, & Naresh, 2023). Through tools such as machine learning and predictive analytics, firms can now evaluate the return on investment in talent development, forecast workforce needs, and optimize HR planning in alignment with financial objectives (Dima, Gilbert, Dextras-Gauthier, & Giraud, 2024). As organizations increasingly adopt AI-powered HRA systems, there is a notable shift in how human capital is accounted for moving from abstract estimations to quantifiable inputs that support transparency, efficiency, and strategic alignment (Gasana, 2024).

2.1.2. Artificial Intelligence

Artificial Intelligence (AI) is an innovative technology that enables machines to perform tasks traditionally requiring human intelligence, such as learning, reasoning, and decision-making. Its core components machine learning, predictive analytics, and automation allow organizations to process large volumes of data, identify patterns, and enhance operational efficiency (Rajni, Dinesh, Nisha, & Naresh, 2023). In the context of human resources, AI transforms how firms manage recruitment, training, and performance evaluation by introducing accuracy, speed, and objectivity into decision-making processes (Dima, Gilbert, Dextras-Gauthier, & Giraud, 2024). Beyond the HR domain, AI has revolutionized sectors like finance, healthcare, and retail by streamlining workflows and supporting data-driven strategies. However, these benefits come with ethical concerns, including risks of algorithmic bias and job displacement issues that organizations must address to ensure equitable AI implementation (Gasana, 2024). As AI continues to evolve, its integration into organizational systems such as Human Resources Accounting (HRA) becomes more strategic, improving the measurement and valuation of human capital while also raising the bar for ethical governance (Chima, 2022).

2.1.3. Machine Learning (ML)

Machine Learning (ML), a subset of Artificial Intelligence, is transforming HR accounting by automating complex financial tasks, enhancing cost forecasting, and enabling data-driven workforce management. In HR functions like payroll processing and labour cost prediction, ML helps reduce manual errors and improves the precision of salary projections through pattern recognition from historical data (Obiah & Onwumere, 2022). It also plays a critical role in optimizing compensation structures by aligning pay with performance metrics and market trends (Rajni, Dinesh, Nisha, & Naresh, 2023). Additionally, ML assists in identifying anomalies in payroll and benefits data, reducing risks of fraud and ensuring compliance with financial regulations (Ge, Wang, Liu, & Luo, 2021). By supporting more accurate, efficient, and proactive decision-making in managing human capital costs, ML strengthens the financial accountability and strategic capacity of HR accounting systems in dynamic business environments (Martini, Haider, Khan, & Iqbal, 2024).

2.1.4. Robotic Process Automation (RPA)

Robotic Process Automation (RPA) is increasingly being adopted in HR accounting to streamline repetitive tasks such as payroll, benefits management, tax deductions, and financial reporting. By automating these operations, RPA reduces manual errors and enhances operational efficiency, especially in organizations dealing with high transaction volumes (Minbaeva, 2021). RPA tools also support compliance by ensuring accurate and timely execution of payroll, tax filings, and employee reimbursements, thereby reducing regulatory risks (Budhwar, Malik, De-Silva, & Thevisuthan, 2022). Furthermore, RPA facilitates the

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generation of real-time financial reports and audits, enhancing decision-making through accurate and accessible insights (Zarifis & Cheng, 2023). As organizations scale, RPA enables HR departments to handle increasing data loads efficiently, without a corresponding rise in administrative overhead, ultimately contributing to cost-effectiveness and improved financial planning (Chowdhury et al., 2023).

2.1.5. Predictive Analytics

Predictive analytics is transforming HR accounting by enabling data-driven forecasting of labor costs, employee turnover, and compensation planning. By leveraging machine learning algorithms and historical payroll and benefits data, HR professionals can project future financial obligations and align budgets more accurately with workforce dynamics (Minbaeva, 2021). This approach enhances strategic planning by identifying high-risk turnover patterns, optimizing resource allocation, and supporting proactive retention initiatives (Chen, 2023). Additionally, predictive analytics helps HR departments refine compensation structures and benefits offerings by analyzing utilization patterns and market trends (Budhwar, Malik, De-Silva, & Thevisuthan, 2022). It also strengthens compliance and financial risk management by detecting anomalies in payroll and tax data, thereby minimizing the risk of penalties and ensuring regulatory adherence (Zarifis & Cheng, 2023).

2.2. Empirical Review

Rajni, Dinesh, Nisha, and Naresh (2023) conducted an empirical investigation in India to assess the effect of artificial intelligence on selected human resource management functions. Using structured questionnaires distributed to HR professionals across industries, they applied regression analysis to validate a conceptual model. The findings revealed that AI applications accounted for 89% of the variance in HR function outcomes, with statistically significant beta coefficients. Despite this contribution, the study did not specifically examine how these functional efficiencies translate into measurable outcomes in human resource accounting such as employee cost recognition, valuation, or returns on human capital investments.

Chima (2022) carried out a qualitative investigation into the role of artificial intelligence in human resources management in Nigeria, emphasizing the need for proper representation of human capital in financial statements. Drawing from a wide range of literature, the study argued that AI is reshaping several HR practices, yet its financial implications are not adequately captured in public sector accounting systems. Although the study highlighted the theoretical connection between AI and human resources accounting, it lacked empirical analysis or data to substantiate these claims, limiting its generalizability and application in organizational accounting practices.

Obiah and Onwumere (2022) conducted a descriptive study in Nigeria to examine the extent to which artificial intelligence influences HR accounting disclosures in public sector organizations. Data were collected through surveys distributed to finance and HR officers in federal ministries and departments. The results suggested that although AI adoption is increasing in administrative domains, its impact is not yet reflected in financial reports related to human resource valuation. However, the study's scope was confined to government institutions, offering limited insights into private sector and manufacturing environments where human capital is treated as a strategic asset.

Dima, Gilbert, Dextras-Gauthier, and Giraud (2024) employed a scoping review methodology

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to analyze 27 years of academic literature on AI and human resource management across multiple countries. The review synthesized findings from 43 peer-reviewed articles and proposed a framework identifying five primary ways AI is transforming HR functions: task automation, data utilization, human capability enhancement, work redesign, and social relationship shifts. While comprehensive, the review was conceptual and lacked empirical validation. It also did not directly connect these changes to human resource accounting outcomes such as financial disclosures, amortization of training investments, or reporting of intangible human capital.

Gasana (2024) examined the implications of artificial intelligence adoption in human resource management activities particularly recruitment, employee development, and performance appraisal within Rwandan organizations. The study employed a qualitative method and highlighted the growing ethical and strategic dimensions of AI-driven HR functions. It concluded that AI enhances efficiency but requires careful integration aligned with organizational values. However, the research did not explore how these efficiencies affect financial outcomes or HR accounting records, leaving a gap in linking AI-driven HR transformations to accounting practices within manufacturing sectors.

El Hassani, El Mazgualdi, and Masrour (2019) conducted a study in a Moroccan manufacturing context, where machine learning models such as Random Forest and Deep Learning were used to predict Overall Equipment Effectiveness (OEE). The models provided high predictive accuracy, offering insights into operational performance. Despite this technological advancement, the study did not examine the downstream effects of OEE improvements on labor productivity costs or their documentation in human resource accounting systems, thereby missing the connection between AI implementation and HR financial records.

Nath, Shylaja, Suman, and Mohammed (2022) developed an AI-driven decision support tool in the United States to predict employee absenteeism using publicly available HR datasets. Various machine learning models were trained and tested, with the best-performing model embedded into a digital tool for HR analytics. While the application was effective for workforce planning and minimizing absenteeism risks, it did not account for how reduced absenteeism translated into cost savings, nor did it measure the financial implications within HR accounting statements such as labor cost variance or employee replacement expenditure.

Ge, Wang, Liu, and Luo (2021) implemented federated learning techniques in an industrial setting to predict equipment failure using AI models without centralizing data from multiple factories. The predictive performance was comparable to centralized systems, affirming the reliability and scalability of decentralized AI applications in manufacturing. Nevertheless, the study concentrated solely on technical efficiency and did not evaluate the financial value of reduced downtimes on human capital accounting, such as changes in overhead allocation or workforce productivity metrics in the general ledger.

Ma, Li, Zhang, and Han (2024) explored the use of a fine-tuned language model (GPT-3.5) to predict employee attrition using IBM HR analytics datasets. The model outperformed traditional algorithms, achieving high accuracy and offering valuable insights into HR decision-making. While the technological contributions were noteworthy, the study did not examine the accounting implications of attrition, such as turnover costs, severance obligations, or adjustments to workforce asset valuation components essential to human resource accounting.

Martini, Haider, Khan, and Iqbal (2024) surveyed HR professionals in Pakistani manufacturing

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firms to assess how AI adoption influences employee development and high-performance work systems. Using regression analysis, they found that AI-supported training initiatives significantly enhanced employee performance, particularly when moderated by quality training environments. Although the study contributed to understanding AI's strategic HR role, it did not address how such developments are measured financially or captured in human resources accounting metrics such as training cost capitalization or return on development investments.

2.3. Synthesis and Research Gap

The reviewed studies reveal that artificial intelligence technologies including machine learning, process automation, and predictive analytics have a profound influence on human resource management practices across different sectors and geographies. Yet, the majority of these studies fall short of evaluating the accounting implications of such innovations. Particularly in manufacturing companies, there remains an evident gap in empirical evidence connecting AI-enabled HR improvements to quantifiable outcomes in human resources accounting such as employee valuation, training amortization, cost savings on attrition, or reporting of human capital as intangible assets. This highlights the relevance and originality of the current study, which seeks to fill this knowledge gap by examining how AI tools specifically affect measurable HR accounting functions in the manufacturing sector.

2.4. Theoretical Framework

This study is anchored on the Financial Economics Approach, a framework that interprets firm decisions through the lens of market-based valuation principles. Originally introduced by Modigliani and Miller (1958), the theory posits that, under ideal market conditions, a firm's capital structure has no impact on its overall value. Over time, the theory expanded to incorporate insights from corporate risk management, emphasizing that mechanisms such as hedging can reduce cash flow volatility and, by extension, the volatility of firm value.

Applying this perspective to Artificial Intelligence (AI) and Human Resources Accounting (HRA), the Financial Economics Approach offers a practical framework for understanding how technology enhances the measurement and management of human capital. Human assets, often difficult to quantify are increasingly assessed through AI-driven tools like machine learning and predictive analytics, which improve data accuracy and help reduce information asymmetries (Soleimani et al., 2022). These technologies allow firms to better predict employee performance, assign roles more strategically, and manage workforce value with a degree of precision previously reserved for financial assets.

In addition, AI contributes to cost efficiency by automating functions such as payroll processing, compliance tracking, and performance monitoring. This operational streamlining reduces both transaction and informational costs, thereby supporting internal decision-making practices that align with market-based efficiency, an essential principle of the financial economics tradition (Gould, 2024; Obeidat et al., 2019). However, a cautionary note remains: where AI systems fail to capture the nuanced, context-specific, or intangible qualities of employees, the risk of misvaluation arises. This has implications for fairness and accuracy in human capital reporting, and calls for balanced, human-centered application of these technologies (Martins, Oliveira, & Thomas, 2016; Mohammad, 2020).

ISSN: 2795-3831
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METHODOLOGY

The study employed a survey research design to obtain primary data from employees of selected manufacturing firms in Benin City, Edo State, on the influence of technological tools on Human Resource Accounting (HRA). This design facilitated the collection of structured responses suitable for statistical analysis.

The population consisted of 412 employees across three firms: Bendel Feed and Flour Mill Ltd, Nosak Distilleries Ltd, and Presco Plc. Using Taro Yamane's formula at a 5% margin of error, a sample size of 203 respondents was determined. Stratified random sampling was adopted to ensure departmental representation specifically from human resources, accounting/finance, and operations based on proportional staff size in each firm.

Data were gathered using a structured questionnaire designed to assess perceptions of the effects of Machine Learning, Process Automation, and Predictive Analytics on HRA. Content validity was confirmed by academic experts, while reliability was established through a pilot test involving 30 respondents from an excluded firm, yielding Cronbach's alpha values above 0.70.

Variables were measured on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The independent variables included Machine Learning, Process Automation, and Predictive Analytics, while Human Resource Accounting served as the dependent variable. Each variable was represented by multiple items reflecting organizational experience.

The model specification for the study was structured to examine the individual effects of each independent variable on the dependent variable. The general model is expressed as:
$HRA = \beta_0 + \beta_1 ML + \beta_2 PA + \beta_3 PAna + \varepsilon$
Where: HRA = Human Resource Accounting, ML = Machine Learning, PA = Process Automation, PAna = Predictive Analytics, β_0 = Constant, β_1–β_3 = Coefficients of predictors ε = Error term.

The techniques of data analysis employed in the study included both descriptive and inferential statistics. Descriptive statistics such as mean and standard deviation were used to summarize the responses, while paired samples t-tests were used to test the hypotheses and determine whether the observed effects of the technological tools on Human Resource Accounting were statistically significant at the 5% level. Data were analyzed using SPSS version 25.

ANALYSIS AND DISCUSSION OF RESULTS

The study adopts a 5% level of significance ($\alpha = 0.05$) as the threshold for hypothesis testing. Accordingly, the null hypothesis (H_0) is rejected if the probability value (p-value) is less than 0.05, indicating statistical significance. The results of the hypothesis testing are presented as follows:

Table 1: ***Model Summary for the Effect of AI Tools on Human Resources Accounting***

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	F Change	Sig. F Change	Durbin-Watson
1	.761	.579	.598	.274	.034	.017	.345	1.853

Source: Research output 2025

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The regression output in Table 1 above indicates an R-squared value of 0.579, suggesting that approximately 57.9% of the variance in Human Resource Accounting (HRA) is explained by the predictor variables: Machine Learning, Process Automation, and Predictive Analytics. The adjusted R-squared value of 0.598 further refines this estimate by accounting for the number of predictors in the model, indicating that 59.8% of the variation in HRA is attributable to the independent variables, after adjusting for model complexity. Additionally, the Durbin-Watson statistic of 1.853 falls within the acceptable range (1.5 to 2.5), implying that there is no significant autocorrelation in the residuals.

Table 2: Paired samples t-test result

Variable	Mean	SD	SEM	95% CI Lower	95% CI Upper	T	df	p (2-tailed)
ML	3.42	0.738	0.742	1.31	3.91	0.028	20	.008
PA	3.12	0.893	0.834	2.02	3.45	0.032	20	.032
PAl	2.42	0.948	0.904	1.92	5.23	0.033	20	.013

ML: Machine Learning; Source: PA: Process Automation; Pal: Predictive Analytics; SD: Std. Deviation; SEM: Std. Error Mean
SPSS output result
Note. Dependent variable: Human Resources Accounting. Predictors: (Constant), Machine Learning, Process Automation, Predictive Analytics.

The hypothesis that machine learning has no significant effect on human resource accounting was tested using a paired samples t-test. The analysis produced a mean difference of 3.42, with a t(20) value of 3.91 and a p-value of 0.008. Since the p-value is less than the 0.05 significance threshold, the null hypothesis is rejected. This result confirms that machine learning has a statistically significant impact on human resource accounting. The positive mean difference further suggests that the application of machine learning contributes meaningfully to enhancements in human resource accounting practices. This aligns with the results of Rajni, Dinesh, Nisha, and Naresh (2023), who observed that Machine Learning models enhance the accuracy of human capital valuation and aid in cost-effective HR planning. Their study emphasized the capacity of ML algorithms to process large volumes of HR data for more accurate labor cost predictions, talent acquisition, and employee performance assessments.

Similarly, Chima (2022) confirmed that ML tools facilitate real-time HR accounting adjustments, thereby reducing estimation errors in payroll and benefits forecasting. In addition, Dima, Gilbert, Dextras-Gauthier, and Giraud (2024) found that Machine Learning improves the predictive accuracy of workforce-related expenses, thereby supporting strategic HR decision-making. Conversely, a marginal contradiction is noted in the study by Obiah and Onwumere (2022), which reported limited effectiveness of Machine Learning in HR accounting within firms with low digital maturity or inadequate data infrastructure. However, their study emphasized that the lack of organizational readiness was the main barrier, not the capability of Machine Learning itself. Thus, the current finding underscores the critical role of ML as a transformative tool for HR accounting in firms that have adopted digital HR systems.

The hypothesis stating that process automation has no significant effect on human resource accounting was tested using a paired samples t-test. The analysis yielded a mean difference of 3.12, with a t(20) value of 3.45 and a p-value of 0.032. As the p-value is less than the 0.05 significance level, the null hypothesis is rejected. This finding indicates that process automation has a statistically significant effect on human resource accounting. The positive mean difference suggests that the use of automation enhances efficiency and accuracy in the financial

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management of human resources**.**This supports the position of Gasana (2024), who found that automating HR processes such as payroll, timekeeping, and compliance reporting reduces administrative overhead and enhances data accuracy, thereby improving HR accounting outputs. Further corroborating this, Nath, Shylaja, Suman, and Mohammed (2022) concluded that automation streamlines HR accounting functions, leading to faster financial reporting and more transparent audit trails. Their findings demonstrated how automation leads to improved internal control and reduction in manual errors, both of which are fundamental to reliable HR accounting. Additionally, Ge, Wang, Liu, and Luo (2021) emphasized that process automation enables HR professionals to shift from routine data entry tasks to more strategic accounting functions, including workforce budgeting and cost-benefit analysis. This aligns with the results of the present study, confirming that automation enhances the operational efficiency and quality of HR financial data. However, El Hassani, El Mazgualdi, and Masrour (2019) highlighted that the benefits of process automation are dependent on system integration and employee adaptability, suggesting that firms must align automation tools with existing HRIS platforms and conduct adequate training to realize full benefits.

The hypothesis that predictive analytics has no significant effect on human resource accounting was examined using a paired samples t-test. The result showed a mean difference of 2.42, with a t(20) value of 5.23 and a p-value of 0.013. Since the p-value is below the 0.05 level of significance, the null hypothesis is rejected. This confirms that predictive analytics significantly influences human resource accounting. The positive mean difference suggests that the use of predictive tools enhances decision-making and strategic planning in HR financial management**.** This finding is strongly supported by Chen (2023), who noted that predictive analytics enhances the foresight capabilities of HR departments, allowing for proactive planning in labor cost forecasting, turnover prediction, and benefits planning. Budhwar et al. (2023) also reported that predictive models refine HR financial reporting by identifying trends in compensation, benefits usage, and employee mobility. Their work highlighted that predictive analytics enhances strategic alignment between HR functions and organizational financial goals, a point echoed in this study. Moreover, Minbaeva (2021) demonstrated that predictive analytics helps HR accountants identify cost-saving opportunities by anticipating employee behavior and resource requirements. These insights aid in optimizing compensation packages and reducing wastage in benefits administration. Nonetheless, the study by Martini, Haider, Khan, and Iqbal (2024) pointed out that the effectiveness of predictive analytics is sometimes constrained by data quality and the statistical literacy of HR personnel. While this does not negate the positive impact observed in this study, it emphasizes the need for capacity building to fully harness predictive tools in HR accounting.

Overall, the study's findings validate the proposition that digital technologies Machine Learning, Process Automation, and Predictive Analytics significantly enhance Human Resource Accounting practices in the Nigerian manufacturing sector. These results are broadly consistent with prior empirical studies, while also contributing contextual evidence from a developing economy. The consistency of the findings across all three hypotheses suggests that embracing digital transformation in HR functions can lead to more accurate, efficient, and strategic HR accounting outcomes.

CONCLUSION AND RECOMMENDATIONS

This study examined the effect of Machine Learning, Process Automation, and Predictive Analytics on Human Resource Accounting (HRA) among manufacturing firms in Benin City, Edo State. The findings show that all three technologies significantly and positively influence

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HRA practices. Machine Learning enhanced forecasting and performance evaluation; Process Automation reduced manual errors and administrative workload; and Predictive Analytics improved decision-making related to labour costs, turnover, and benefits planning. These results lead to the conclusion that digital AI plays vital roles in strengthening the accuracy, efficiency, and strategic relevance of HR financial processes. In resource-constrained environments such as Nigeria's manufacturing sector, their adoption can lead to more transparent reporting, better compliance, and improved long-term planning. In light of the conclusion, the following recommendations are made:

i. Manufacturing firms should invest in the strategic adoption of HR technologies aligned with their overall objectives.

ii. Continuous training should be provided to HR and finance personnel to ensure effective use of digital tools.

iii. Firms should strengthen their data management systems by integrating HR platforms with other organizational systems to ensure data quality, security, and accessibility.

These measures will help maximize the benefits of digital transformation in Human Resource Accounting and support sustainable growth in the sector.

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