ISSN: 2480-2853
Volume 9, Number 2, 2025
Contemporary Accounting and Management Research Journal

IMPACTS OF ARTIFICIAL INTELLIGENCE ON PROJECT MANAGEMENT OF MANUFACTURING FIRMS IN RIVERS STATE

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ABSTRACT

This study examines the Impacts of Artificial Intelligence on Project Management of manufacturing firms in Rivers state. Descriptive survey research design was adopted for this study as this study seek to determine the influence of one variable over the other. The population of this study is thirty two (32) manufacturing companies in Rivers State which are registered with the Rivers state branch of Manufacturers Association of Nigeria (MAN). The sample size for this study is the thirty two (32) manufacturing companies earlier indicated as the population. The study adopted the census techniques. Three key managers (production manager, marketing manager and logistics manager) were chosen as respondents from each using simple random sampling of the thirty two firms constitute the study subject. This gave us a total of ninety two (92) for the study. Structured questionnaire instrument title" the impact of artificial intelligent on project management questionnaire "was developed on five point likert scale. The result of the Cronbach's Alpha reliability test indicates .800 which is above .70 which implies that the items are reliable. Regression analysis was used to test the hypotheses using SPSS (statistical package social sciences). The study revealed that Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state. Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state. Computer Vision significantly influence Project Management of manufacturing firms in Rivers state. The study concluded that Artificial Intelligence have a positive impact on Project Management of manufacturing firms in Rivers state. AI technologies, including RPA, ML, and Computer Vision, have the potential to significantly impact project management in manufacturing firms in Rivers State. The study recommended that manufacturing firms should invest in training and education for their employees to ensure they have the necessary skills to work with AI technologies. This can help to mitigate the challenge of job displacement.

Keywords: Artificial Intelligence, Robotic, Process Automation, Machine Learning, Computer vision and project management

INTRODUCTION

Artificial Intelligence (AI) has been increasingly adopted in various industries, including manufacturing. AI encompasses a wide range of technologies, such as Robotic Process Automation (RPA), Machine Learning (ML), and Computer Vision. These technologies have the potential to significantly impact project management in manufacturing firms by automating routine tasks, enhancing decision-making, and improving operational efficiency. RPA is a form of AI that automates repetitive rule-based tasks. In the context of project management, RPA can be used to automate tasks such as data entry, invoice processing, and scheduling. By automating these tasks, project managers can free up their time to focus on more strategic activities, such as risk management and stakeholder engagement. Moreover, RPA can improve accuracy and reduce the likelihood of errors in data entry and other repetitive tasks (Melanie, 2019).

Melanie (2019) ML is a type of AI that enables machines to learn from data without explicit programming. In the context of project management, ML can be used to analyze historical data and identify patterns that can inform decision-making. For example, ML algorithms can be used to predict the likelihood of project delays or cost overruns based on historical data. This information

can help project managers to proactively manage risks and make more informed decisions about resource allocation. Additionally, ML can be used to optimize supply chain management by predicting demand and optimizing inventory levels.

Mohamed (2021) Computer vision is a type of AI that enables machines to interpret and understand visual information from the world. In the context of project management, computer vision can be used to monitor progress on construction sites or manufacturing plants using drones or other remote sensing technologies. This information can help project managers to identify issues early and take corrective action before they become major problems. Additionally, computer vision can be used to improve quality control in manufacturing processes by automating visual inspections for defects or inconsistencies in products. It is in the light of the above that this study is carried out to determine the Impacts of Artificial Intelligence on Project Management of manufacturing firms in Rivers state.

Statement of the problem

In the study of the impacts of Artificial Intelligence (AI) technologies like Robotic Process Automation (RPA), Machine Learning (ML), and Computer Vision on project management in manufacturing firms, there are several potential problems that must be considered. One major challenge is the quality and availability of data. AI algorithms require large amounts of high-quality data to train and function effectively. However, manufacturing firms may not have access to sufficient data or the data may be noisy, inconsistent, or biased. This can lead to inaccurate predictions and poor decision-making.

Another challenge is integrating AI technologies with existing systems and processes. Manufacturing firms often have complex, legacy systems that are difficult to integrate with new technologies. This can lead to operational inefficiencies, increased costs, and reduced productivity. There are also ethical and societal implications to consider. AI technologies can lead to job displacement, privacy concerns, and other social issues. It is important to ensure that AI is used ethically and responsibly, with consideration for its potential impacts on society. Finally, there is the challenge of technical expertise. AI technologies are complex and require specialized knowledge and skills to implement and manage. Manufacturing firms may struggle to find and retain qualified personnel, leading to suboptimal implementation and use of AI technologies.

Various studies (Adeniran & Ogunkoya 2020; Oluwatayo, & Ajayi, 2018; Akinade, 2020) have been carried out on Impacts of Artificial Intelligence on Project Management in Nigeria, however, it is observed that there are scare literatures on Impacts of Artificial Intelligence on Project Management of manufacturing firms in Rivers state, it is in the light of the above that this study seek to fill this lacuna by providing empirical evidence on the relationship between Impacts of Artificial Intelligence on Project Management of manufacturing firms in Rivers state.

Conceptual Framework

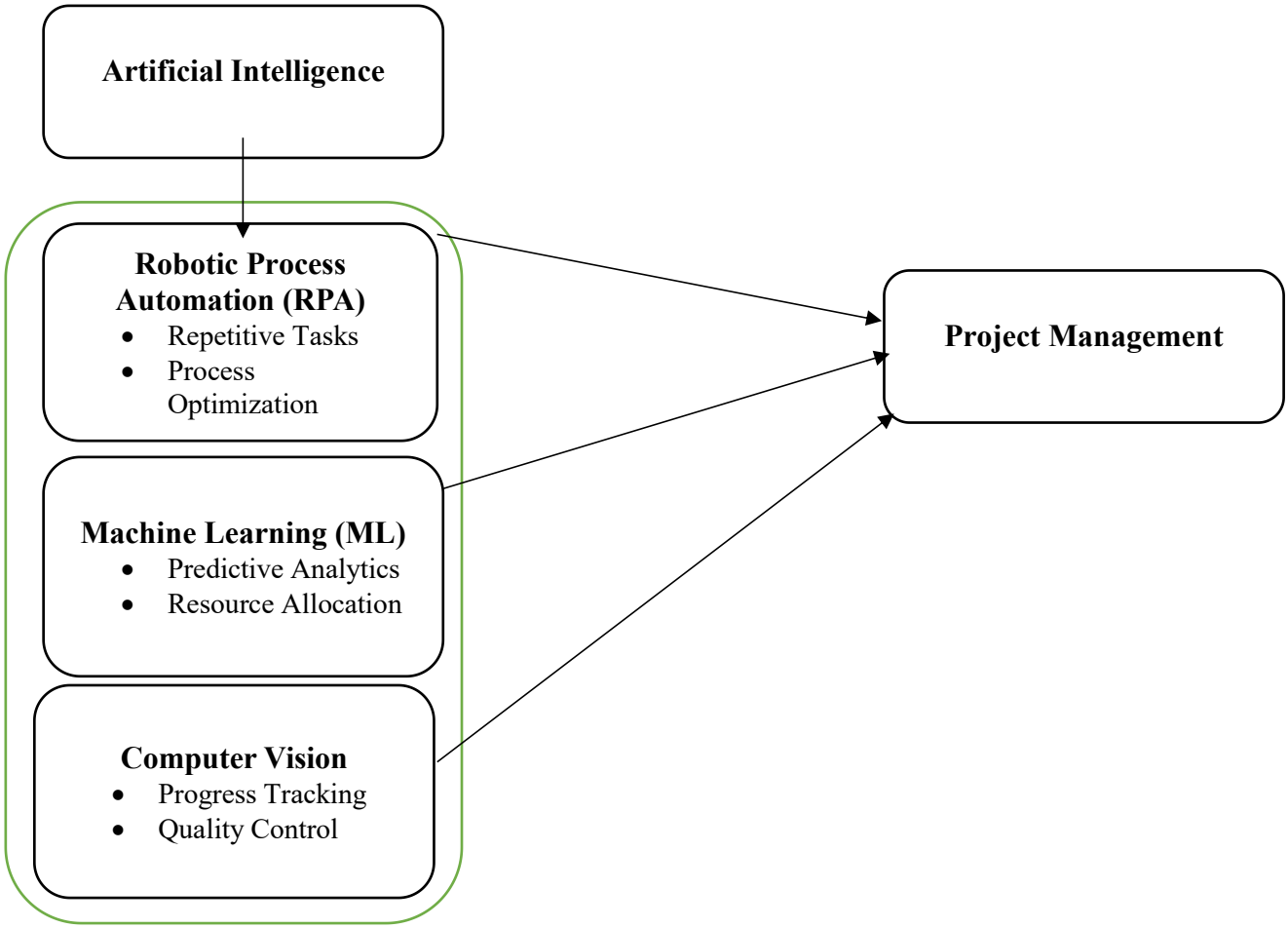

Figure 1: Conceptual Framework on Impacts of Artificial Intelligence on Project Management.**Source**:
Source: Adapted from Mohamed, (2021) and Hao, (2021).

Aims & Objectives of the Study

The aim of this study is to determine the Impacts of Artificial Intelligence on Project Management of manufacturing firms in Rivers state. The study seek to:

1) Determine the influence of Robotic Process Automation (RPA) on Project Management of manufacturing firms in Rivers state.
2) Determine the influence of Machine Learning (ML) on Project Management of manufacturing firms in Rivers state.
3) Determine the influence of Computer Vision on Project Management of manufacturing firms in Rivers state.

Research Questions

The following research questions were raised to guide the study.

1) What is the influence of Robotic Process Automation (RPA) on Project Management of manufacturing firms in Rivers state?
2) What is the influence of Machine Learning (ML) on Project Management of manufacturing firms in Rivers state?
3) What is the influence of Computer Vision on Project Management of manufacturing firms in Rivers state?

Hypotheses

The following null hypotheses were formulated and tested at a significant level of 0.01.

Ho_1: Robotic Process Automation (RPA) does not significantly influence Project Management of manufacturing firms in Rivers state.

Ho_2: Machine Learning (ML) does not significantly influence Project Management of manufacturing firms in Rivers state.

Ho_3: Computer Vision does not significantly influence Project Management of manufacturing firms in Rivers state.

Significance of the study

This study holds significant value for understanding the transformative potential of AI technologies in revolutionizing project management within the manufacturing sector. It sheds light on how these technologies can enhance efficiency, productivity, and overall project success. Here's a breakdown of the study's significance: Improved Project Planning and Scheduling: AI-powered tools can analyze historical data, identify patterns, and predict potential delays or bottlenecks. This enables more accurate project planning and scheduling, leading to better resource allocation and reduced project timelines. Enhanced Risk Management: AI algorithms can analyze vast amounts of data to identify potential risks and predict their impact on projects. This allows for proactive risk mitigation strategies, minimizing disruptions and ensuring project success.

Automated Task Execution: RPA can automate repetitive and mundane tasks, freeing up project managers to focus on strategic decision-making and complex problem-solving. This increases efficiency and reduces human error. Data-Driven Decision Making: ML algorithms can analyze project data to identify trends, patterns, and insights that inform better decision-making. This leads to more informed project management strategies and improved outcomes. Real-Time Monitoring and Control: Computer vision can be used to monitor production processes in real-time, identifying anomalies and potential issues. This enables proactive intervention and ensures project progress remains on track.

Categories of Persons Who Will Benefit from the Study:

i. **Project Managers**: Gain insights into how AI can enhance their skills and improve project outcomes.
ii. **Manufacturing Executives**: Understand the potential of AI to optimize production processes and drive business growth.
iii. Researchers: Identify key areas for further research and development in AI-driven project management solutions.
iv. **Consultants and Industry Experts**: Gain valuable knowledge to advise manufacturing firms on implementing AI solutions for project management.
v. **Students and Professionals in Manufacturing and Project Management**: Acquire knowledge about the latest advancements in AI and its impact on their field.

Review of Related Literature

This section reviews various literatures related to the study under investigations under the headings of conceptual review, theoretical review and empirical review.

Conceptual Review

Artificial intelligence

Artificial intelligence (AI) has become a significant driver of innovation and growth in manufacturing firms. AI refers to the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning, problem-solving, perception, and language understanding. AI applications can help manufacturing firms improve efficiency, reduce costs, enhance product quality, and increase customer satisfaction (Bishop, 2006).

Bishop, (2006) there are several benefits of AI in manufacturing firms. These benefits include: Improved Efficiency and Productivity; AI can help manufacturing firms improve their efficiency and productivity by automating routine tasks, reducing human error, and optimizing production processes. For example, AI-powered robots can perform tasks such as assembly, packaging, and inspection more efficiently than human workers. Moreover, AI algorithms can analyze production data in real-time and identify areas for improvement, leading to increased productivity and reduced downtime. AI can also help manufacturing firms enhance their quality control processes. AI-powered cameras and sensors can monitor products during the manufacturing process and detect defects or anomalies that may not be visible to the human eye. Additionally, AI algorithms can analyze quality control data and provide insights into the root causes of defects, enabling manufacturers to take corrective action before products leave the factory.

Deng, et al., (2014) AI can help manufacturing firms reduce costs by optimizing production processes, reducing waste, and minimizing downtime. For example, AI algorithms can analyze energy usage data and identify opportunities for energy savings. Additionally, AI-powered predictive maintenance can detect equipment failures before they occur, reducing maintenance costs and preventing unplanned downtime. AI can help manufacturing firms increase customer satisfaction by providing personalized products and services. For example, AI algorithms can analyze customer data and provide insights into customer preferences and behaviors. This information can be used to tailor products and services to individual customers' needs, leading to increased customer satisfaction and loyalty.

Despite the benefits of AI in manufacturing firms, there are also several challenges that must be addressed. These challenges include: ; Data Privacy and Security Concerns; AI applications in manufacturing firms often involve the collection and analysis of large amounts of data. This data may include sensitive information about customers, employees, and proprietary processes. Manufacturers must ensure that this data is protected from unauthorized access and use to maintain privacy and security. Implementing AI in manufacturing firms can be expensive. Costs may include purchasing hardware and software, integrating AI systems with existing infrastructure, and training employees to use new technology. Manufacturers must carefully evaluate the costs and benefits of AI implementation to ensure a positive return on investment. AI implementation in manufacturing firms requires a skilled workforce with expertise in areas such as data science, machine learning, and robotics. However, there is a shortage of skilled workers in these areas, making it challenging for manufacturers to implement AI successfully. Manufacturers must invest in training programs to develop the skills necessary for successful AI implementation (Deng, et al.,2014).

Dimensions of Artificial intelligence

Artificial Intelligence (AI) is a multidisciplinary field that focuses on creating intelligent machines capable of mimicking human intelligence and performing tasks that would typically require human intervention. AI has various dimensions, including Robotic Process Automation (RPA), Machine Learning (ML), and Computer Vision.

Robotic Process Automation (RPA)

Russell and Norvig (2021) RPA is a form of business process automation that uses software robots or "bots" to automate repetitive, rule-based tasks. RPA bots can interact with applications and systems in the same way that human users do, enabling them to perform tasks such as data entry, data extraction, and workflow automation. RPA is a form of narrow AI, meaning it is designed to perform specific tasks rather than possessing general intelligence.

Machine Learning (ML)

Hao (2021) ML is a subset of AI that enables machines to learn from data without being explicitly programmed. ML algorithms use statistical models to identify patterns and trends in data, enabling them to make predictions and decisions based on that data. ML algorithms can be categorized into three types: supervised learning, unsupervised learning, and reinforcement learning. Supervised learning involves training an algorithm on a labeled dataset, where the correct output is known. The algorithm uses this data to learn the relationship between the input and output, enabling it to make predictions on new, unseen data. Unsupervised learning involves training an algorithm on an unlabeled dataset, where the correct output is not known. The algorithm uses this data to identify patterns and trends, enabling it to uncover hidden structures and relationships in the data. Reinforcement learning involves training an algorithm to make decisions in an environment by trial and error. The algorithm receives feedback in the form of rewards or penalties, enabling it to learn the optimal behavior over time (Hao, 2021).

Computer Vision

Computer vision is a subset of AI that deals with enabling machines to interpret and understand visual information from the world. Computer vision algorithms can perform tasks such as image recognition, object detection, and image analysis, enabling machines to "see" and understand the world in the same way that humans do. Computer vision algorithms use various techniques, including deep learning, to analyze and interpret visual data. Deep learning is a subset of ML that uses neural networks with multiple layers to learn complex patterns and representations in data. Convolutional Neural Networks (CNNs) are a common type of deep learning algorithm used in computer vision, enabling machines to recognize and classify objects in images and videos (Bishop, 2006).

Project Management

Willcocks, et al., (2015) Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. It is a systematic process that includes initiating, planning, executing, monitoring and controlling, and closing the project. The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived constraints, which typically include scope, time, and budget. (Project Management Institute, 2017) Project management is crucial for the success of any organization, as it ensures that projects are completed on time, within budget, and to the required quality standards. Effective project management helps organizations to deliver products and services that meet customer needs and provide a return on investment. It also helps to minimize risks, reduce waste, and improve communication and collaboration within the organization. (Project Management Institute, 2017)

Cornell University (2010) the key elements of project management include: Project Scope: The project scope defines the work that needs to be done to deliver the project objectives. It includes the project deliverables, features, and functions, as well as any constraints or assumptions that may affect the project. Project Time Management: Project time management involves defining the project schedule, estimating the duration of each task, and monitoring progress to ensure that the project is completed on time. Project Cost Management: Project cost management involves estimating the cost of each task, creating a project budget, and monitoring expenses to ensure that the project stays within budget.

Project quality management involves defining the quality standards for the project, ensuring that the project meets those standards, and continuously improving the project processes. Project Resource Management: Project resource management involves identifying the resources needed for the project, acquiring those resources, and managing their use throughout the project. Project Communication Management: Project communication management involves defining the communication needs of the project stakeholders, creating a communication plan, and managing communication throughout the project. Project Risk Management: Project risk management involves identifying, analyzing, and mitigating the risks associated with the project (Cornell University 2010).

Stanford Graduate School of Business. (2020) the benefits of project management include: Improved project success rates: Effective project management increases the likelihood of project success, as it ensures that projects are completed on time, within budget, and to the required quality standards. Better resource utilization: Project management helps organizations to optimize their resources, reducing waste and increasing efficiency. Improved customer satisfaction: Effective project management ensures that projects meet customer needs and provide a positive customer experience. Reduced risks: Project management helps organizations to identify and mitigate risks, reducing the likelihood of project failures and delays. Improved communication and collaboration: Project management improves communication and collaboration within the organization, reducing conflicts and misunderstandings (Müller & Preuss, 2018).

Theoretical Review

This study was anchored on Diffusion of Innovation Theory and supported by Resource-Based View (RBV) Theory.

Diffusion of Innovation Theory

This theory, developed by Everett Rogers, explains how new ideas and technologies spread through a population. Everett Rogers propounded the Diffusion of Innovation Theory in 1962.

Assumptions of the Diffusion of Innovation Theory

The Diffusion of Innovation Theory rests on several key assumptions:

i. Innovation is a new idea, practice, or product that is perceived as new by an individual or group. This can range from a new technology to a new management technique.
ii. The innovation is communicated through certain channels. These channels can be formal, like a company newsletter, or informal, like word-of-mouth.
iii. The innovation is adopted by individuals or groups over time. This adoption process is not instantaneous but rather occurs in stages.

The adoption process is influenced by a number of factors. These factors include the characteristics of the innovation itself, the characteristics of the adopter, and the social system in which the adoption takes place.

Critique of the Diffusion of Innovation Theory

While the Diffusion of Innovation Theory has been widely influential, it has also been subject to criticism. Some of the main critiques include:

i. The theory is overly deterministic. It suggests that the adoption process is largely predetermined by the characteristics of the innovation and the adopter. This ignores the role of agency and individual choice.
ii. The theory is overly simplistic. It does not adequately account for the complexity of the adoption process, which is influenced by a wide range of factors.
iii. The theory is difficult to test empirically. It is challenging to measure the variables that the theory identifies as influencing adoption.

iv. The theory is culturally biased. It is based on research conducted in Western cultures and may not be applicable to other cultures.

Relevance of the Diffusion of Innovation Theory to the Study of Impacts of Artificial Intelligence on Project Management of Manufacturing Firms in Rivers State The Diffusion of Innovation Theory can be relevant to understanding the adoption of AI in project management within manufacturing firms in Rivers State. Here's how:

i. **Understanding the Innovation**: AI in project management is a new innovation that can be analyzed through the lens of the theory. This includes examining its perceived relative advantage, compatibility, complexity, trialability, and observability.
ii. **Identifying Adopters**: The theory can help identify different types of adopters within the manufacturing firms in Rivers State, such as innovators, early adopters, early majority, late majority, and laggards. This can inform targeted strategies for promoting AI adoption.
iii. **Analyzing Adoption Factors**: The theory can help understand the factors influencing the adoption of AI in project management, such as the firm's size, industry, and organizational culture.
iv. **Developing Strategies for Adoption**: The theory can provide insights into strategies for promoting the adoption of AI, such as providing training, offering incentives, and creating a supportive environment.

By applying the Diffusion of Innovation Theory, researchers can gain a deeper understanding of the factors influencing the adoption of AI in project management within manufacturing firms in Rivers State and develop strategies to facilitate its successful implementation.

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory was primarily developed by Jay Barney in his 1991 article "Firm Resources and Sustained Competitive Advantage." However, it's important to note that the theory builds upon earlier work by Wernerfelt (1984) and Penrose (1959).

Assumptions of the Resource-Based View (RBV) Theory

The RBV theory rests on several key assumptions:

i. Heterogeneity of Resources: Firms possess different bundles of resources, both tangible and intangible.
ii. Resource Immobility: Resources are not perfectly mobile across firms, meaning some resources are difficult to acquire or imitate.
iii. Resource Value: Resources are valuable if they enable firms to exploit opportunities or neutralize threats in their environment.
iv. Resource Rareness: Resources are rare if they are not widely possessed by competitors.
v. Resource Inimitability: Resources are inimitable if they are difficult or costly for competitors to acquire or replicate.
vi. Resource Substitutability: Resources are not substitutable if there are no readily available alternatives that can achieve the same strategic goals.

Critique of the Resource-Based View (RBV) Theory

Despite its widespread acceptance, the RBV theory has faced several criticisms:

i. Difficulty in Identifying and Measuring Resources: Identifying and measuring intangible resources, such as organizational culture or knowledge, can be challenging.
ii. Overemphasis on Internal Resources: The theory may neglect the importance of external factors, such as industry dynamics and competitive rivalry.
iii. Static Nature: The RBV theory may not adequately account for the dynamic nature of resources and the changing competitive landscape.

iv. Lack of Empirical Support: Some studies have questioned the empirical validity of the theory, particularly regarding the relationship between resources and firm performance.

Relevance of the Resource-Based View (RBV) Theory to the Study of Impacts of Artificial Intelligence on Project Management of Manufacturing Firms in Rivers State. The RBV theory provides a valuable framework for understanding how manufacturing firms in Rivers State can leverage AI to gain a competitive advantage. By applying the RBV lens, we can analyze how AI technologies can be considered as valuable, rare, inimitable, and non-substitutable resources for these firms.

Here's how the RBV theory can be applied: AI as a Valuable Resource: AI can enhance project management efficiency, improve decision-making, optimize resource allocation, and automate repetitive tasks, leading to cost savings and increased productivity. AI as a Rare Resource: Not all manufacturing firms in Rivers State may have access to or expertise in implementing AI technologies. This can create a competitive advantage for early adopters. AI as an Inimitable Resource: Developing and implementing AI solutions requires significant investments in infrastructure, data, and skilled personnel. This can make it difficult for competitors to replicate. AI as a Non-Substitutable Resource: AI technologies offer unique capabilities that are not easily replaceable by traditional methods. By analyzing AI technologies through the RBV framework, manufacturing firms in Rivers State can identify potential competitive advantages and develop strategies to leverage AI effectively.

Empirical Review

Oluwatayo and Ajayi (2018) carried out a study on the Impact of Machine Learning on Project Management Practices in Nigeria. Population of the study was Project managers, project team members, and top-level management in Nigerian organizations. Instrument for Data Collection was a structured questionnaire was used to collect data from the respondents. Method of Data Analysis was Descriptive and inferential statistics were used to analyze the collected data. The study found that machine learning has a significant impact on project management practices in Nigeria, particularly in the areas of project planning, scheduling, monitoring, and control. Additionally, the study found that machine learning has helped improve project success rates by reducing cost overruns and time delays. The study concluded that Machine learning has a positive influence on project management practices in Nigeria, and its implementation can lead to improved project performance and outcomes. The study recommends that Nigerian organizations should invest in machine learning technologies to improve their project management practices. Furthermore, the study suggests that there is a need for training and development programs to equip project managers with the necessary skills to effectively utilize machine learning tools in their work.

Akanbi, and Ajayi (2019) carried out a study on an Empirical Study on the Application of Machine Learning Techniques in Project Management. Population of the study was Project managers and IT professionals in Nigerian organizations involved in project management activities. Instrument for Data Collection was Semi-structured interviews were conducted with the respondents to collect data. Method of Data Analysis was Thematic analysis was used to analyze the collected data. The study found that machine learning techniques have been successfully applied in various aspects of project management, including risk identification, resource allocation, and schedule optimization. Moreover, the study found that machine learning has helped improve project outcomes by reducing cost overruns and time delays. The application of machine learning techniques in project management has been shown to have a positive impact on project outcomes in Nigerian organizations. Therefore, there is a need for more research and development efforts in this area to further explore the potential benefits of machine learning for project management practices. The study recommends that Nigerian organizations should invest in machine learning technologies and training programs to enhance their project management capabilities. Furthermore, the study

suggests that there is a need for more research studies to explore the potential benefits of machine learning for other aspects of project management not covered in this study.

Adewale and Ajayi (2020) carried out a study on evaluating the effectiveness of Machine Learning Models in Predicting Project Success. Population of the study was Project managers and top-level management involved in managing projects in Nigerian organizations. Instrument for Data Collection was a structured questionnaire was used to collect data from the respondents. Additionally, historical data on completed projects were also collected for analysis purposes. Method of Data Analysis was descriptive statistics and regression analysis were used to analyze the collected data. The study found that machine learning models can be effective tools for predicting project success based on historical data analysis. Specifically, decision tree models were found to be highly accurate in predicting whether a project will be successful or not based on various factors such as budget allocation, resource availability, and risk factors. Moreover, the study found that using machine learning models can help improve project success rates by identifying potential risks early on and taking appropriate mitigation measures. The study concluded that Machine learning models can be effective tools for predicting project success based on historical data analysis.

Oyelade, (2018) carried out a study on the Influence of Computer Vision on Project Management in Nigeria. Population of the study was 150 project managers in Nigeria. Instrument for data collection was Questionnaires and interviews. Method of data analysis was Descriptive and inferential statistics. The study found that computer vision technologies have significantly improved project management in Nigeria, particularly in areas such as project planning, scheduling, and monitoring. The use of computer vision has also led to increased efficiency, accuracy, and transparency in project management processes. The author concluded that computer vision technologies have the potential to revolutionize project management in Nigeria, and that there is a need for greater awareness and adoption of these technologies among project managers in the country. The author recommended that the Nigerian government should invest in the development and deployment of computer vision technologies in the construction industry, and that project managers should be trained and equipped with the necessary skills to effectively use these technologies.

Ajayi, (2019) undertook a study on an Empirical Study on the Impact of Computer Vision on Construction Project Management in Nigeria. Population of the study was 200 construction project managers in Nigeria. Instrument for data collection was Online surveys. Method of data analysis was Regression analysis. The study found that computer vision technologies have had a positive impact on construction project management in Nigeria, including improved accuracy, efficiency, and safety. The author also found that the use of computer vision technologies has led to a reduction in project costs and completion times. The author concluded that computer vision technologies have the potential to significantly improve construction project management in Nigeria, and that there is a need for greater investment and adoption of these technologies in the industry. The author recommended that the Nigerian government should provide incentives for the adoption of computer vision technologies in the construction industry, and that construction project managers should be encouraged to undergo training and certification programs in computer vision.

Akinade, (2020) carried out a study on the Impact of Computer Vision on Quality Control in Construction Projects in Nigeria. Population of the study was 100 quality control managers in the Nigerian construction industry. Instrument for data collection was Semi-structured interviews. Method of data analysis was Thematic analysis. The study found that computer vision technologies have significantly improved quality control in construction projects in Nigeria, including the detection and prevention of defects and errors. The author also found that computer vision technologies have led to increased accuracy, efficiency, and cost savings in quality control processes. The author concluded that computer vision technologies have the potential to transform quality control in the Nigerian construction industry, and that there is a need for greater

awareness and adoption of these technologies among quality control managers. The author recommended that the Nigerian government should invest in the development and deployment of computer vision technologies in the construction industry, and that quality control managers should be trained and equipped with the necessary skills to effectively use these technologies.

METHODOLOGY

Descriptive survey research design was adopted for this study as this study seek to determine the influence of one variable over the other. The population of this study is thirty two (32) manufacturing companies in Rivers State which are registered with the Rivers state branch of Manufacturers Association of Nigeria (MAN). The sample size for this study is the thirty two (32) manufacturing companies earlier indicated as the population. The study adopted the census techniques. One of the reasons for applying census method is the limited and manageable size of the population. There are only 32 registered firms with MAN in the State. With regard to the respondents of the study given the strategic nature of the study, three key managers (production manager, marketing manager and logistics manager) were chosen as respondents from each using simple random sampling, of the thirty two firms constitute the study subject. This gave us a total of ninety two (92) for the study. Structured questionnaire instrument title" the impact of artificial intelligent on project management questionnaire "was developed on five point likert scale . the impact of artificial intelligent on project management questionnaire was independently subjected to content and construct validity by three Lecturers in the Department of Management, Faculty of Management Sciences, Ignatius Ajuru University of Education, Port Harcourt. The corrections and suggestions of the validators were affected on the finale copy of the instrument. The reliability of empirical measurement is indicated by the internal consistency, One of the most commonly used indicators of internal consistency is Cronbach's alpha coefficient. Questionnaire item statements with Cronbach's alpha reliability coefficient below the 0.70 threshold were eliminated. The results were used in computation using Cronbach's alpha test of reliability.

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
.800	3

Source: Researcher computation via SPSS version 25

The result of the Cronbach's Alpha reliability test indicates .800 which is above .70 which implies that the items are reliable. Regression analysis was used to test the hypotheses using SPSS (statistical package social sciences).

Data Analysis

Ho_1: Robotic Process Automation (RPA) does not significantly influence Project Management of manufacturing firms in Rivers state.

Table 2: Regression on Robotic Process Automation (RPA) influence Project Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761[a]	.579	.574	.706

a. Predictors: (Constant), Robotic Process Automation (RPA)

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	.606	.180		3.363	.001
	Robotic Process Automation (RPA)	.710	.064	.761	11.129	.000

a. Dependent Variable: Project Management

Table 2 Regression on Robotic Process Automation (RPA) influence Project Management revealed that Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state.

Ho_2: Machine Learning (ML) does not significantly influence Project Management of manufacturing firms in Rivers state.

Table 3: Regression on Machine Learning (ML) influence Project Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.741[a]	.549	.544	.719

a. Predictors: (Constant), Machine Learning (ML)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.733	.184		3.988	.000
	Machine Learning (ML)	.685	.065	.741	10.463	.000

a. Dependent Variable: Project Management

Table 3 Regression on Machine Learning (ML) influence Project Management revealed that Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state.

Ho_3: Computer vision does not significantly influence Project Management of manufacturing firms in Rivers state.

Table 4: Regression on Computer vision influence Project Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.722[a]	.521	.516	.740

a. Predictors: (Constant), Computer vision

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.720	.198		3.643	.000
	Computer vision	.674	.068	.722	9.899	.000

a. Dependent Variable: Project Management

Table 4 Regression on Computer vision influence Project Management revealed that Computer vision significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Computer vision significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Computer vision significantly influence Project Management of manufacturing firms in Rivers state.

Discussion of Findings

Table 2 Regression on Robotic Process Automation (RPA) influence Project Management revealed that Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state. Similarly, "Robotic Process Automation (RPA) and Project Management: An Empirical Study of Nigerian Organizations" by Ajayi, Adeniran, & Ogunkoya (2021). The study was conducted among project managers and RPA professionals in Nigerian organizations. Instrument for data collection: A semi-structured interview was used to collect data from the participants. Method of data analysis: Thematic analysis was used to analyze the data. The study found that RPA can help project managers to automate repetitive tasks, reduce errors, and improve efficiency. It also found that RPA can help organizations to reduce costs, improve productivity, and enhance customer satisfaction. The study concluded that RPA has the potential to revolutionize project management in Nigerian organizations and recommended that project managers should embrace RPA to improve their performance. The study recommended that project managers should identify suitable processes for RPA implementation and ensure that their teams have the necessary skills to use RPA tools. It also recommended that organizations should provide adequate support and resources to ensure the success of RPA projects.

Table 3 Regression on Machine Learning (ML) influence Project Management revealed that Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state. Similarly, Oluwatayo and Ajayi (2018) carried out a study on the Impact of Machine Learning on Project Management Practices in Nigeria. Population of the study was Project managers, project team members, and top-level management in Nigerian organizations. Instrument for Data Collection was a structured questionnaire was used to collect data from the respondents. Method of Data Analysis was Descriptive and inferential statistics were used to analyze the collected data. The study found that machine learning has a significant impact on project management practices in Nigeria, particularly in the areas of project planning, scheduling, monitoring, and control. Additionally, the study found that machine learning has helped improve project success rates by reducing cost overruns and time delays. The study concluded that Machine learning has a positive influence on project management practices in

Nigeria, and its implementation can lead to improved project performance and outcomes. The study recommends that Nigerian organizations should invest in machine learning technologies to improve their project management practices. Furthermore, the study suggests that there is a need for training and development programs to equip project managers with the necessary skills to effectively utilize machine learning tools in their work.

Table 4 Regression on Computer vision influence Project Management revealed that Computer vision significantly influence Project Management of manufacturing firms in Rivers state where Standardized Coefficients : .761 = 76% indicating that Computer vision significantly influence Project Management of manufacturing firms in Rivers state hence the study accepted the alternate hypothesis: Computer vision significantly influence Project Management of manufacturing firms in Rivers state. Similarly, Oyelade, (2018) carried out a study on the Influence of Computer Vision on Project Management in Nigeria. Population of the study was 150 project managers in Nigeria. Instrument for data collection was Questionnaires and interviews. Method of data analysis was Descriptive and inferential statistics. The study found that computer vision technologies have significantly improved project management in Nigeria, particularly in areas such as project planning, scheduling, and monitoring. The use of computer vision has also led to increased efficiency, accuracy, and transparency in project management processes. The author concluded that computer vision technologies have the potential to revolutionize project management in Nigeria, and that there is a need for greater awareness and adoption of these technologies among project managers in the country. The author recommended that the Nigerian government should invest in the development and deployment of computer vision technologies in the construction industry, and that project managers should be trained and equipped with the necessary skills to effectively use these technologies.

Summary of findings

- **i.** Robotic Process Automation (RPA) significantly influence Project Management of manufacturing firms in Rivers state.
- **ii.** Machine Learning (ML) significantly influence Project Management of manufacturing firms in Rivers state.
- **iii.** Computer Vision significantly influence Project Management of manufacturing firms in Rivers state.

CONCLUSIONS

The study concluded that Artificial Intelligence have a positive impact on Project Management of manufacturing firms in Rivers state. AI technologies, including RPA, ML, and Computer Vision, have the potential to significantly impact project management in manufacturing firms in Rivers State.

RECOMMENDATIONS

The following recommendations were drawn from the findings of the study:

i. Manufacturing firms should invest in training and education for their employees to ensure they have the necessary skills to work with AI technologies. This can help to mitigate the challenge of job displacement.

ii. To manage the cost of implementation, manufacturing firms could consider a phased approach to AI adoption. This would allow them to gradually integrate AI technologies into their project management processes.

iii. Manufacturing firms should implement robust data security measures to protect against data breaches. This could include encryption, access controls, and regular security audits.

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