IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON BUSINESS OPERATIONS (A STUDY OF ABEEBI FOOD PROCESSING, OSOGBO, OSUN STATE, NIGERIA)

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Abstract
Artificial Intelligence (AI) has emerged as a transformative force in modern business operations, significantly influencing productivity, efficiency, and ethical considerations. This study examined the impact of AI on the business operations of Abeebi Food Processing, Osogbo, Osun State, Nigeria. The research employed a descriptive survey research design. The population of the study comprised 95 staff members of Abeebi Food Processing, while Krejcie and Morgan's (1970) sample size determination table was used, which recommended a sample size of 76 employees. A convenience sampling technique was adopted due to the accessibility of participants and the time-bound nature of the research. The study employed the Pearson Product-Moment Correlation Coefficient (PPMCC) and Structural Equation Modelling (SEM) to analyze the relationship between technological integration, ethical considerations, and moral considerations in AI implementation. Results indicate that AI integration significantly enhances operational efficiency ($\beta = 0.832$, $p < 0.05$) and positively influences ethical and moral considerations ($\beta = 0.727$, $p < 0.05$). The findings suggest that AI adoption improves productivity, and organizations must navigate ethical dilemmas, workforce displacement concerns, and transparency challenges. The study recommends the adoption of ethical AI frameworks, continuous employee training, and regulatory policies to optimize AI implementation in food processing.

***Keywords*:** Artificial, Business, Ethical and Moral, Food, Intelligence, Technological.

Introduction

Integrating Artificial Intelligence (AI) into business operations has become a transformative force across various industries. As organizations increasingly adopt AI technologies, the implications for efficiency, decision-making, and competitive advantage are profound. AI encompasses a range of technologies, including machine learning, natural language processing, and robotics, which enable businesses to analyze vast amounts of data, automate processes, and enhance customer interactions (Chui et al., 2018). Studies indicate that organizations leveraging AI are improving operational efficiencies and redefining their business models. For instance, a report by McKinsey and Company (2021) highlights that companies integrating AI into their operations can achieve productivity gains of up to 40%. This is mainly due to AI's capability to streamline workflows, reduce human errors,

and facilitate faster decision-making processes. Also, AI encompasses a range of technologies, including machine learning, natural language processing, and robotics, which can streamline production processes, optimize supply chains, and enhance customer engagement (Smith & Johnson, 2024). According to Adeyemo and Ojo (2023), the adoption of AI in food processing not only increases productivity but also enhances product quality and safety, thereby meeting consumer expectations. Furthermore, AI facilitates data-driven decision-making, allowing businesses to adapt swiftly to market changes (Ogunleye, 2023). Furthermore, AI technologies assist in predictive analytics, allowing businesses to anticipate market trends and consumer behaviours (Davenport & Ronanki, 2018).

The impact of AI is particularly evident in sectors such as retail, healthcare, and manufacturing. In retail, AI-driven recommendation systems enhance customer experience and increase sales through personalized marketing strategies (Kumar et al., 2021). In healthcare, AI applications range from diagnostic tools that analyze medical images to virtual health assistants that provide patient support, significantly improving patient outcomes and operational efficiencies (Topol, 2019). Similarly, AI-powered robots and automation systems are revolutionizing production lines in manufacturing, leading to enhanced productivity and reduced operational costs (Bhardwaj et al., 2020).

Despite the potential benefits, the adoption of AI also poses challenges, including ethical considerations, workforce displacement, and data privacy concerns. Organizations must navigate these complexities to harness the full potential of AI while ensuring responsible use (Brynjolfsson & McAfee, 2014). As AI technologies evolve, understanding their impact on business operations will be crucial for organizations seeking to remain competitive in an increasingly digital landscape.

Integrating Artificial Intelligence (AI) into business operations has become a pivotal factor in enhancing productivity and efficiency across various industries, including food manufacturing. Abeebi Food Manufacturing, a key player in Nigeria's food sector, stands to benefit significantly from AI technologies. As the demand for food products increases, innovative solutions to streamline operations, improve quality control, and enhance customer engagement become critical. This study aims to explore the impact of AI on the operational processes of Abeebi Food processing, focusing on its potential to transform traditional practices into more efficient, data-driven methodologies.

This study aims to explore the multifaceted impact of AI on business operations, examining both the opportunities and challenges presented by AI integration. By analyzing recent developments and case studies across different industries, this research will contribute to understanding how AI is shaping the future of business.

Statement of the Problem

As businesses incorporate Artificial Intelligence (AI) technologies more and more into their operations, it is critical to comprehend the complex effects of these advancements. AI can potentially improve decision-making, expedite procedures, and increase efficiency, but it is unclear how much of these advantages will materialize. Current literature indicates a growing division between

organizations that effectively leverage AI and those that struggle with implementation (Chui et al., 2021; McKinsey & Company, 2021).

Additionally, the rapid pace of technological advancement raises questions about the adaptability of existing business models and the readiness of organizations to embrace AI-driven change (Bhardwaj et al., 2020). Moreover, there is a lack of comprehensive understanding regarding the specific operational areas most affected by AI integration. For instance, while some studies highlight improvements in customer service and supply chain management, others point to challenges in employee engagement and skill mismatches (Kumar et al., 2021). This inconsistency in findings underscores the necessity for a more nuanced exploration of AI's impact on business operations.

In Nigeria, where the food processing sector plays a crucial role in economic development, the application of AI technologies is particularly relevant. Many food manufacturing businesses, including Abeebi Food Manufacturing, struggle to adapt to AI technologies due to limited expertise, financial constraints, and resistance to change. There is a need to explore the specific impact AI has on business operations in Abeebi Food processing, address these challenges, and determine the overall effectiveness of AI in enhancing productivity.

Ultimately, this study aims to address the knowledge gap regarding how AI technologies are reshaping business operations, identifying both opportunities for improvement and the challenges organizations must navigate. By examining recent developments and case studies, this research aims to provide a clearer picture of the implications of AI integration for Abeebi Food processing, Osogbo, Osun State.

Purpose of the Study

The primary objectives of this study are to:

i. Assess the current state of Technological integration in Abeebi Food Processing, Osogbo, Osun State.

ii. Investigate ethical and moral considerations associated with AI implementation.

Hypotheses of the Study

The study will test the following hypotheses:

H_{01}: The integration of technology in Abeebi Food Manufacturing does not significantly improve operational efficiency.

H_{02}: Ethical and moral concerns negatively affect AI implementation and employee productivity in food processing.

Review of Related Literature

The literature on AI in business operations highlights its transformative potential. According to Mahmood (2025), AI technologies can enhance supply chain management, improve quality control,

and facilitate data-driven decision-making in the food industry. Additionally, studies indicate that organizations that embrace AI experience significant cost savings and improved customer satisfaction (Mahmood, 2025). However, challenges such as resistance to change and ethical dilemmas remain prevalent (Sharma et al., 2024). This literature review examines the current state of research on the impact of AI on business operations, highlighting its benefits, challenges, and implications for various industries.

One of the most frequently cited advantages of AI is its ability to enhance operational efficiency. AI technologies, such as automation and machine learning, can streamline processes, reduce human error, and significantly increase productivity. For instance, McKinsey (2021) reports that companies implementing AI can achieve productivity gains of up to 40% in specific functions, such as manufacturing and customer service. Similarly, Brynjolfsson and McAfee (2014) emphasize that AI-driven automation allows businesses to allocate human resources to more strategic tasks, thereby maximizing overall productivity. AI also plays a crucial role in enhancing decision-making processes (Abiodun et al, 2022). By leveraging data analytics and predictive modeling, organizations can derive insights that inform strategic choices. Davenport and Ronanki (2018) note that AI enables businesses to analyze vast datasets rapidly, allowing for more informed and timely decisions. This capability is particularly valuable in sectors such as finance, where AI algorithms can assess risks and opportunities more effectively than traditional methods (Kumar et al., 2021).

Furthermore, AI technologies, such as recommendation systems and chatbots, have transformed customer interactions by enabling personalized experiences. In retail, for instance, AI-driven recommendation engines analyze consumer behavior to suggest products tailored to individual preferences, resulting in higher sales and improved customer satisfaction (Chui et al., 2021). Moreover, AI-powered customer service solutions can provide immediate support, enhancing the overall customer experience (Bhardwaj et al., 2020).

Despite the benefits, the adoption of AI raises concerns about workforce displacement. As AI technologies automate routine tasks, there is a growing fear that many jobs may become obsolete. A report by McKinsey (2021) estimates that up to 30% of the global workforce could be displaced by automation by 2030. This transition necessitates a rethinking of workforce training and development to equip employees with the skills needed to thrive in an AI-driven environment. Also, the ethical implications of AI integration warrant significant attention. Concerns regarding data privacy, algorithmic bias, and accountability are prevalent in the literature. Brynjolfsson and McAfee (2014) argue that organizations must navigate the ethical landscape carefully to avoid potential pitfalls associated with AI deployment. Furthermore, a lack of transparency in AI decision-making processes can lead to mistrust among consumers and stakeholders (Davenport & Ronanki, 2018). In addition, successful AI implementation is not without its challenges. Many organizations struggle with data quality, integration issues, and a lack of technical expertise. According to a study by Chui et al. (2021), businesses often face hurdles in aligning AI initiatives with overarching strategic goals, leading to underwhelming results. The complexity of AI technologies requires organizations to invest in infrastructure and talent to fully leverage their potential.

In manufacturing, AI-powered robotics and automation have revolutionized production processes, leading to increased output and reduced costs (Bhardwaj et al., 2020). Conversely, industries such as finance and retail have harnessed AI primarily for data analytics and customer engagement, demonstrating its versatility across different contexts (Kumar et al., 2021). Organizations that effectively integrate AI into their operations can gain a competitive edge by improving efficiency and enhancing customer experiences. The resource-based view (RBV) suggests that AI capabilities can serve as a unique resource that is difficult for competitors to replicate, leading to sustained competitive advantage (Mikalef et al., 2021).

Also, AI fosters a culture of innovation by enabling organizations to experiment with new business models and services. This adaptability is crucial in today's fast-paced business environment, where companies must continuously evolve to meet changing consumer demands (Bag et al., 2021). Therefore, the impact of AI on business operations can be measured through various performance metrics, including productivity, customer satisfaction, and financial performance. Organizations must establish clear Key Performance Indicators (KPIs) to assess the effectiveness of AI initiatives and make data-driven adjustments as needed (Chatterjee et al., 2021).

Technological Integration of AI in Business Operations

The integration of Artificial Intelligence (AI) into business operations has transformed various sectors, enhancing efficiency, decision-making, and customer engagement.

AI technologies enable the automation of repetitive tasks, allowing organizations to streamline operations and reduce human error. This automation leads to increased productivity and cost savings, as businesses can allocate resources more effectively (Smith et al, 2024). For instance, AI-driven chatbots enhance customer service by providing instant responses to inquiries, thereby improving customer satisfaction (Bag et al., 2021). Also, AI systems can analyze vast amounts of data to uncover insights that inform strategic decision-making. By leveraging machine learning algorithms, businesses can predict market trends, optimize supply chains, and personalize marketing efforts (Mikalef & Gupta, 2021). This data-driven approach enhances the agility of organizations, enabling them to respond swiftly to changing market conditions (Denicolai et al., 2021). Moreover, AI technologies facilitate personalized customer interactions by analyzing user behavior and preferences. This capability allows businesses to tailor their offerings, improving customer engagement and loyalty (Chatterjee et al., 2021). For example, e-commerce platforms utilize AI to recommend products based on previous purchases, enhancing the shopping experience.

Ethical Considerations in AI Integration

One of the foremost ethical concerns in AI deployment is algorithmic bias, which can lead to unfair treatment of individuals based on race, gender, or socioeconomic status. AI systems often learn from historical data that may reflect existing prejudices, perpetuating discrimination in hiring, lending, and law enforcement (Kriebitz & Lütge, 2020). Organizations must prioritize fairness in AI algorithms to ensure equitable outcomes and uphold moral standards in their operations. Also, the opacity of AI decision-making processes poses ethical dilemmas regarding accountability.

When AI systems make autonomous decisions, it becomes challenging to trace the rationale behind those decisions, raising questions about who is responsible for potential harms caused by AI (Martin, 2019). Businesses must implement transparent practices and establish accountability frameworks to address these concerns, ensuring that ethical considerations are embedded in AI governance. Furthermore, AI systems often require vast amounts of data, raising significant privacy concerns. The collection and processing of personal data can infringe on individuals' rights if not managed ethically. Organizations must navigate the moral implications of data usage, ensuring compliance with privacy regulations and fostering trust with consumers (Thiebes et al., 2020). Ethical data practices are essential for maintaining a positive corporate reputation and safeguarding stakeholder interests.

Moral Responsibilities of Organizations

Businesses that use AI technologies are morally obligated to interact with all relevant parties, such as staff members, clients, and the general public. This interaction promotes an inclusive culture and guarantees that various viewpoints are considered when making decisions (Bietti, 2020). Enterprises can connect their AI strategy with society's values and ethical norms by prioritizing stakeholder interests. Furthermore, in order to handle new issues, continuous ethical evaluations are required due to the dynamic nature of AI technology. In order to adjust to new advancements and societal expectations, organizations should set up procedures for routinely assessing the ethical implications of their AI systems (Ryan & Stahl, 2021). Thanks to this proactive strategy, businesses can handle the challenges of integrating AI while maintaining their moral obligations. Organizations must also promote moral AI development methods in the sector. This involves working with researchers, politicians, and other interested parties to create norms and rules that encourage the responsible use of AI (Floridi et al., 2021). Companies may help create a more just and equitable technological environment by supporting moral AI practices.

Theoretical Framework

The theoretical framework for this study on the Impact of Artificial Intelligence on Business Operations in Abeebi Food Manufacturing is primarily anchored in the Technology Acceptance Model (TAM) developed by Davis (1989). TAM provides a robust theoretical basis for understanding how users perceive and accept new technologies, emphasizing the roles of perceived ease of use and perceived usefulness in technology adoption. According to Venkatesh and Davis (2000), the success of technology adoption largely depends on these two key constructs. This framework is particularly relevant in AI integration in business operations, where user acceptance can significantly influence implementation success. AI adoption in business operations hinges on whether employees find these technologies beneficial and user-friendly, making TAM an appropriate model for evaluating adoption in Abeebi Food processing.

TAM posits that two key factors significantly affect users' decisions to accept and use technology**:** Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)**.** Perceived Ease of Use refers to the degree to which a person believes that using a particular technology would be free of effort (Davis, 1989). In the context of Abeebi Food Manufacturing, if employees perceive AI systems as easy to

use, they are more likely to embrace these technologies. This perception can be influenced by factors such as the level of training provided, technical support availability, and the intuitiveness of the AI systems implemented (Park, 2009). An AI interface that is complex and difficult to navigate may create resistance among employees, thereby slowing adoption (Chuttur, 2009).

On the other hand, perceived Usefulness (PU) denotes the extent to which an individual believes technology will enhance job performance (Venkatesh & Bala, 2008). In a manufacturing setting, if employees believe that AI will improve operational efficiency, quality control, or productivity, they are more likely to accept and utilize AI tools in their daily tasks (Al-Gahtani, 2016). AI applications can enhance business operations by significantly improving and streamlining processes. These include predictive maintenance, automated quality inspections, and data-driven decision-making procedures (Dwivedi et al., 2019). However, if workers do not see the advantages of using AI, they might oppose it, restricting the possible increases in productivity and efficiency (Wirtz & Weyerer, 2019).

The application of TAM in this study allows for a structured analysis of how employees at Abeebi Food Processing perceive AI technologies. The study focuses on perceived usefulness and simplicity of use to investigate the elements that either help or impede the adoption of AI. To ensure that the study captures the complex relationships between operational effectiveness and technological acceptance, the framework will direct the development of research questions and data-gathering techniques. Comprehending these dynamics is essential for effectively incorporating AI into the company, allowing management to remove obstacles and increase staff interest in AI-powered business solutions.

Methodology

This study adopted a descriptive survey research design to explore the impact of Artificial Intelligence (AI) on business operations at Abeebi Food Processing, located in Osogbo, Osun State, Nigeria. The descriptive approach was chosen because it allows for a systematic investigation of opinions, behaviours, and patterns related to AI adoption within a real-life business context. This method was particularly suitable for understanding how AI technologies are integrated into operational systems and how they influence ethical and moral decision-making within a medium-sized enterprise.

The study population comprised all 95 employees of Abeebi Food Processing. To ensure a manageable yet representative sample, the Krejcie and Morgan (1970) sample size determination table was used, which recommended a sample size of 76 employees. A convenience sampling technique was applied due to the accessibility of participants and the time-bound nature of the research. While convenience sampling limits the ability to generalize findings to the entire population, it allowed for the collection of valuable insights from willing and available respondents who have first-hand experience with AI processes in the organization.

Primary data were collected using a structured questionnaire, which was divided into four main sections: demographic information, technological integration, ethical considerations, and moral implications of AI. The questionnaire incorporated standardized measurement scales adapted from previous validated studies, including Technological Integration from Olanipekun et al. (2019), Ethical Considerations from Klettner et al. (2019), and Moral Considerations from McKinsey & Company (2021). Responses were measured on a 5-point Likert scale, ranging from strongly disagree (1) *to* strongly agree (5*)*, enabling the capture of varying degrees of perception and agreement.

For data analysis, the study employed both descriptive and inferential statistical tools. Descriptive statistics were used to summarize the demographic characteristics and item responses. To test the relationships between variables, the Pearson Product-Moment Correlation Coefficient (PPMCC) was applied. Furthermore, the study utilized Path Analysis via Structural Equation Modelling (PA-SEM) to examine the direct and indirect effects of technological, ethical, and moral factors on business performance outcomes. All analyses were conducted using STATA version 15, ensuring a robust statistical environment for accurate interpretation.

To ensure the validity of the research instrument, the questionnaire items were adapted from previous peer-reviewed studies with established credibility. Content validity was further enhanced through expert review by two professionals in the fields of business technology and organizational ethics, who evaluated the relevance, clarity, and comprehensiveness of the items. Construct validity was supported by the alignment of each item with the underlying dimensions it was intended to measure, particularly in the areas of technological integration, ethical impact, and moral judgment in AI usage. Also, the reliability of the research instrument was assessed using Cronbach's Alpha coefficient, which evaluates the internal consistency of the items within each scale. The alpha values for the constructs ranged from 0.792 to 0.832, which exceed the commonly accepted threshold of 0.70, indicating a high level of reliability and suggesting that the items were measuring the constructs consistently across respondents. This reliability supports the robustness of the findings and their suitability for concluding AI integration and its implications for business operations at Abeebi Food Processing.

Evaluation of the Measurement Model

Table 1 presents the factor loadings, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's Alpha, and Variance Inflation Factor (VIF) for the constructs measured.

Table 1: Evaluation of the Measurement Model

Construct	Loading	AVE	Composite Reliability	Cronbach's Alpha	VIF
Technological Integration	0.832 - 0.852	0.810	0.822	0.812	1.998 - 2.452
Ethical Considerations	0.828 - 0.902	0.831	0.861	0.892	1.978 - 2.143
Moral Considerations	0.872 - 0.905	0.859	0.838	0.820	1.998 - 2.165

Source: Data Analysis 2025

The above results indicated strong validity and reliability across all constructs. Factor loadings above 0.8 demonstrate strong correlations, AVE values above 0.8 confirm good convergent validity**,** while CR and Cronbach's Alpha values above 0.8 **indicate** excellent internal consistency**.** VIF values (1.9 - 2.4) suggest low to moderate multicollinearity, ensuring that each item uniquely contributes to the model.

Results

Table 2 shows the analysis of the two hypotheses stated earlier, to present a correlation analysis between technological integration, ethical considerations, and moral considerations in Abeebi Food Processing.

Table 2: Relationship between Variables-

Model	Mean	SD	r-value	p-value	Remark
Technological Integration & Ethical Consideration	79.54 & 61.90	22.045 & 15.695	0.660**	0.000	Significant
Technological Integration & Moral Consideration	79.54 & 57.32	22.045 & 12.763	0.583**	0.000	Significant

Source: Data Analysis 2025

Interpretation:

- Technological Integration & Ethical Considerations**:** The strong positive correlation (r = 0.660, p = 0.000) indicates that AI integration significantly influences ethical decision-making in the organization.
- Technological Integration & Moral Considerations: The moderate positive correlation (r = 0.583, p = 0.000) suggests AI implementation has a meaningful, though slightly lower, impact on moral considerations**.**

Both relationships are statistically significant ($p < 0.05$)**,** emphasizing that AI adoption must be managed carefully to maintain ethical and moral standards in business operations**.**

Structural Equation Modelling (SEM) – Direct Effects

Table 3 presents **Path Analysis results**, assessing the direct effects of **Technological Integration (TI)** and **Ethical & Moral Considerations (EM) on Business Operations (BO).**

Table 3: Path Analysis (Direct Effects)

Path	Beta-Value	t-Value	p-Value	Hypothesis	Remark
TI → BO	0.832	9.98	0.000	H1	Supported
EM → BO	0.727	8.79	0.000	H2	Supported

Source: Data Analysis 2025

Interpretation:

- ❖ Technological Integration →Business Operations (β = 0.832, p = 0.000): The strong and positive beta-value (0.832) shows that technological integration greatly enhances business operations, with an 83.2% improvement in business operations for every unit increase in technological integration. This underscores the significance of AI in promoting innovation and operational efficiency.
- ❖ Ethical & Moral Considerations → Business Operations (β = 0.727, p = 0.000)**:** Ethical and moral considerations also strongly and significantly impact business operations (β = 0.727, p = 0.000)**. A** unit increase in ethical and moral considerations leads to a 72.7% improvement in business operations**,** suggesting that companies that uphold ethical AI implementation benefit from enhanced operational outcomes.

Discussion of Findings

The findings from this study underscore the significant role Artificial Intelligence (AI) plays in enhancing business operations at Abeebi Food Processing. The strong positive correlation between technological integration and ethical considerations ($r = 0.660$, $p < 0.05$) suggests that as AI systems are embedded into daily operations, employees and management become increasingly mindful of ethical standards in data use, automation, and decision-making. This indicates that AI is not only driving efficiency but also prompting organizations to establish clearer guidelines and accountability mechanisms. Furthermore, the significant relationship between technological integration and moral considerations ($r = 0.583$, $p < 0.05$) implies that moral implications such as fairness, employee displacement concerns, and transparency are gaining attention as AI becomes a strategic component of operational systems.

Path analysis further confirmed these relationships. Technological integration showed the strongest direct effect on business operations (β = 0.832, p = 0.000), indicating that effective AI implementation can enhance performance, streamline workflows, and improve productivity. Meanwhile**,** ethical and moral considerations also had a strong positive effect (β = 0.727, p = 0.000), suggesting that organizations that incorporate ethics into their AI strategies are more likely to benefit from sustainable and responsible business outcomes. These findings reinforce the idea that while AI offers immense operational advantages, its success depends on a balanced approach that integrates technological innovation with ethical responsibility.

Conclusion

The findings from this study affirm that AI integration significantly enhances business operations at Abeebi Food Processing, Osogbo, Osun State. The statistical analysis established that technological integration has a strong and positive impact on operational efficiency. At the same time, ethical and moral considerations also play a critical role in AI acceptance and implementation. However, despite the benefits, challenges such as ethical concerns, job displacement, and transparency issues must be addressed to ensure the responsible use of AI in the organization. The study confirms that a balanced approach to AI adoption, one that prioritizes both efficiency and ethical integrity, can lead to sustainable business growth and innovation. Furthermore, ensuring employees are adequately trained

and included in AI adoption strategies is essential for maximizing its benefits while minimizing resistance and ethical conflicts.

Recommendations

Based on the study's findings, the following recommendations are made:

1. Abeebi Food Processing should invest in continuous AI training programs to equip employees with the necessary skills for effective AI utilization. Management should encourage a culture of AI acceptance through interactive workshops, hands-on training, and knowledge-sharing initiatives.
2. The company should implement clear ethical frameworks that guide AI usage, ensuring fairness, transparency, and accountability in decision-making. Meanwhile, an AI ethics committee should be established to oversee ethical concerns, privacy, and the impact of automation on employees.

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