
A STUDY ON ROLE OF AI IN WORKFORCE PLANNING AND COST OPTIMIZATION WITH REFERENCE TO VERTEX AUTO COMPONENTS

***¹Dr. Dhanasekaran. M., ²Ms. Sushmitha. A.**

¹Professor and Head of the Department of Management Studies
Adhiyamaan College of Engineering (Autonomous).

²Department of Management Studies Adhiyamaan College of Engineering (Autonomous).

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***Corresponding Author: Dr. Dhanasekaran. M.**

Professor and Head of the Department of Management Studies Adhiyamaan College of Engineering (Autonomous).

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ABSTRACT

This study investigates the role of Artificial Intelligence (AI) in workforce planning and cost optimization with reference to Vertex Auto Components. It examines how AI-driven tools such as predictive analytics, machine learning, and automation enhance HR decision-making and financial efficiency. Using primary data collected from 100 respondents through a structured questionnaire and supported by secondary sources, the study analyzes AI's impact on demand forecasting, employee productivity, scheduling, and cost control. The findings indicate that AI adoption leads to improved accuracy in workforce planning, reduced operational and labour costs, and better alignment between HR and finance functions. The research also identifies challenges such as skill gaps, implementation costs, and data privacy concerns. Overall, the study concludes that AI is a strategic enabler for achieving operational efficiency and sustainable cost optimization in manufacturing organizations.

KEYWORDS: Artificial Intelligence (AI), Workforce Planning, Cost Optimization, Human Resource Management, Financial Efficiency, Predictive Analytics, Manufacturing Sector.

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformative technology across industries, significantly impacting Human Resource Management (HRM) and financial decision-making. In today's competitive manufacturing environment, organizations are under constant pressure to optimize workforce efficiency while reducing operational costs. Workforce

planning, which involves forecasting labour demand, skill requirements, and resource allocation, has traditionally relied on manual analysis and managerial intuition. However, AI enables more accurate data-driven decision-making through predictive analytics, machine learning, and automation.

In the automotive components sector, companies like Vertex Auto Components face challenges such as fluctuating demand, rising labour costs, and productivity inefficiencies. AI-driven systems help organizations forecast workforce needs, optimize scheduling, reduce downtime, and improve overall efficiency. Additionally, AI supports cost optimization by minimizing wastage, enhancing productivity, and improving financial forecasting. Thus, this study explores the integration of AI in workforce planning and its impact on cost optimization, combining perspectives from HR, finance, and technology using primary data analysis.

2. OBJECTIVES OF THE STUDY

- To study the concept of AI in workforce planning.
- To analyze the role of AI in improving HR decision-making.
- To evaluate the impact of AI on cost optimization.
- To understand employee perception towards AI implementation.
- To identify challenges in adopting AI in organizations.
- To provide suggestions for effective use of AI in workforce planning and cost control.

3. REVIEW OF LITERATURE

1. Smith, J. (2020) examined the application of AI-driven analytics in HR functions within manufacturing firms. The study found that machine learning models significantly improved candidate screening accuracy and reduced hiring time, thereby enhancing recruitment efficiency. It also highlighted the role of predictive analytics in workforce demand forecasting. The research emphasized cost savings through reduced recruitment cycles. Overall, AI was identified as a key enabler of efficient workforce planning.
2. Johnson, R., & Lee, M. (2021) analyzed how AI contributes to cost optimization in industrial operations. Their findings indicated that automation and predictive maintenance reduced downtime and operational expenses. The study also noted improved allocation of human resources through AI-based scheduling. Financial performance improved due to efficient allocation of human resources and reduced wastage through AI-based

scheduling. The authors concluded that AI creates a strong link between HR efficiency and cost control.

3. Kumar, S. (2022) focused on AI applications in financial forecasting and budgeting processes. The research showed that AI enhances forecasting accuracy by analyzing large datasets and identifying hidden patterns and trends. It also supported better workforce cost estimation and planning. The integration of AI tools reduced forecasting errors significantly. The study concluded that AI strengthens financial decision-making in HR contexts.
- Brown, T. (2023) explored AI-enabled workforce scheduling systems and their impact on productivity. The findings revealed that automated scheduling reduces idle time and improves employee utilization. AI systems also help in balancing workloads efficiently. The study concluded that AI positively impacts both productivity and operational costs.
4. Davis, P. (2024) studied the role of AI in employee engagement and performance management. The research highlighted personalized learning and development programs powered by AI. It also showed improvements in performance tracking and feedback systems. Enhanced engagement led to better productivity outcomes. The study emphasized that AI indirectly contributes to cost optimization through improved workforce performance.
5. Wilson, A. (2025) investigated AI's ability to reduce bias in recruitment and evaluation processes. The study found that AI ensures objective decision-making using data-driven insights. It improved fairness and transparency in HR practices. This led to better talent acquisition and improved retention rates. The research concluded that unbiased systems contribute to long-term cost efficiency.
6. Sharma, R. (2020) analyzed AI adoption in the manufacturing sector with a focus on workforce optimization. The study showed that AI reduces dependency on manual labor through automation. It also improves production efficiency and reduces operational costs. Workforce planning becomes more accurate with real-time data. The research concluded that AI is essential for modern manufacturing competitiveness.
7. Patel, K., & Mehta, S. (2021) examined AI-based cost reduction strategies in business operations. The study found that AI minimizes resource wastage and enhances efficiency. It also supports better budgeting and financial control. Workforce costs were optimized through intelligent allocation. The authors concluded that AI significantly contributes to overall cost savings.
8. George, L. (2022) focused on strategic decision-making supported by AI technologies.

The research highlighted improved data analysis and forecasting capabilities. AI systems provided actionable insights for HR and finance departments. This led to better workforce planning and cost management. The study concluded that AI enhances organizational performance.

9. Reddy, V. (2023) studied the integration of AI in HR and financial systems. The findings indicated improved coordination between workforce planning and budgeting. AI tools enabled real-time monitoring of employee performance and costs. Organizations achieved better resource utilization and profitability. The research concluded that AI integration is critical for sustainable growth.

Research Gap: Most existing studies focus either on HR functions or financial outcomes separately. However, there is limited research that integrates AI's role in both workforce planning and cost optimization within manufacturing organizations using primary data. This gap highlights the need for the present study.

4. RESEARCH METHODOLOGY

Research Design

Descriptive research design is used to analyze the impact of AI on workforce planning and cost optimization.

Sources of Data

Primary Data: Collected through structured questionnaire.

Secondary Data: Journals, research papers, company reports, websites.

Sample Size

100 respondents (HR executives, finance staff, and managers).

Sampling Technique

Convenience sampling method was used to collect data from respondents.

Tools for Analysis Percentage analysis Chi-square Test ANOVA.

Hypothesis:

- **H0:** There is no significant relationship between demographic factors and employees’ perception of AI in workforce planning and cost optimization.
- **H1:** There is a significant relationship between demographic factors and employees’ perception of AI in workforce planning and cost optimization.

The collected data was analyzed using statistical tools to interpret the impact of AI on workforce planning and cost optimization.

5. DATA ANALYSIS AND INTERPRETATION

The demographic analysis shows that the majority of respondents are male (63%), with a significant proportion belonging to the 20–25 age group (35%), followed by other age categories. This indicates that the study is largely represented by young and mid-level employees who are generally more adaptable to technological advancements. The distribution across departments—finance (30%), administration (28%), HR (22%), and production (20%)—suggests a balanced representation, providing a broader perspective on AI adoption within the organization.

The findings further reveal a strong positive perception of AI among employees. A majority of respondents agree that AI improves resource utilization (44% strongly agree) and enhances employee productivity (40% strongly agree). Additionally, most respondents believe that AI is widely used in workforce planning and cost optimization, indicating growing acceptance and implementation of AI technologies. Overall, the results highlight AI’s significant role in improving efficiency and supporting organizational decision-making.

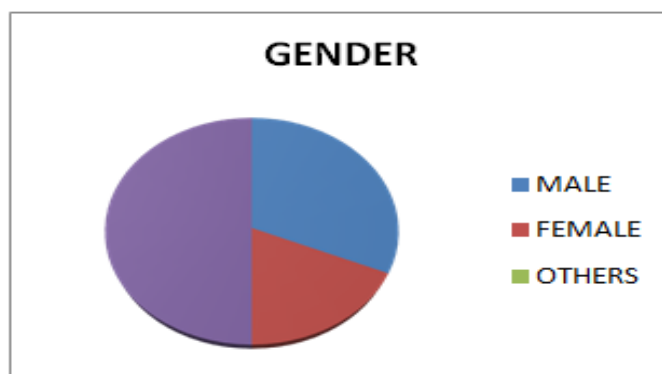


Figure 1 Gender Distribution.

Interpretation

The majority of respondents are male (63%), followed by female (37%), and no respondents in the others category. This shows higher participation of male employees in the study.

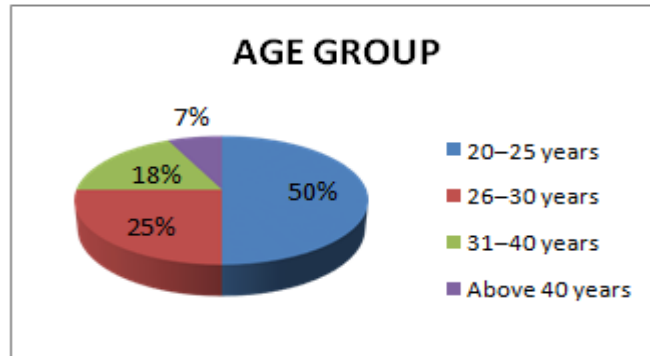


Figure 2 Age.

Interpretation

Most respondents (35%) belong to the 20–25 years age group, followed by 31–40 years (28%). This indicates that the sample mainly consists of young and mid-level employees.

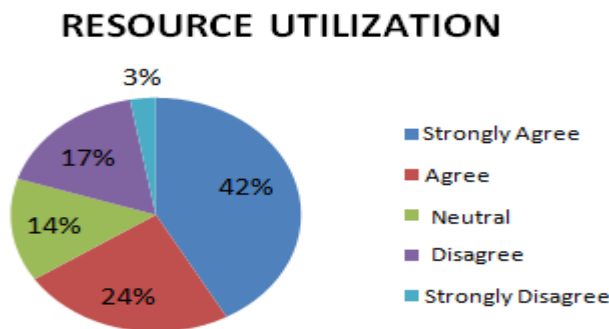


Figure 3 How does AI improve Resource Utilization in organizations?

Interpretation

The majority of respondents (44%) strongly agree that AI improves resource utilization, followed by 25% who agree. This indicates that AI plays a significant role in efficient use of resources. However, a small percentage of respondents disagree, showing that some challenges still exist.

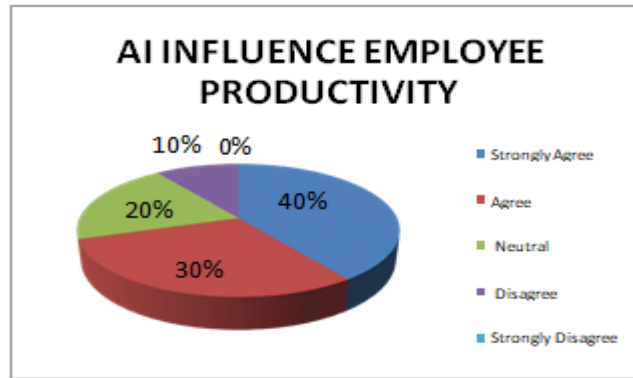


Figure 4 How does Ai Influence Employee Productivity?

Interpretation

The majority of respondents (40%) strongly agree that AI influences employee productivity, followed by 30% who agree. This indicates that AI has a positive impact on improving productivity. A smaller percentage (10%) disagree, while no respondents strongly disagree, showing overall positive acceptance.

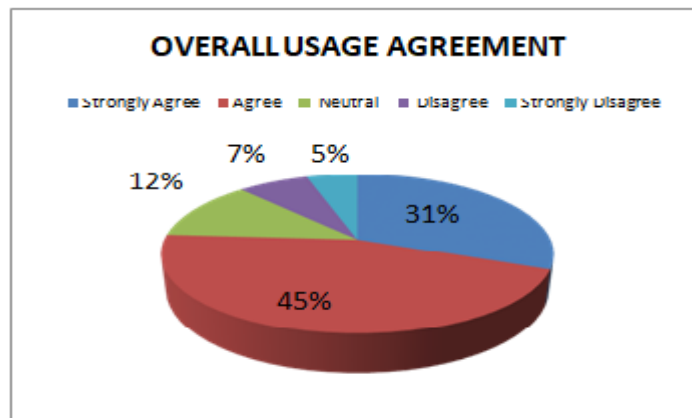


Figure 5 Agreement on AI use in workforce and cost optimization?

Interpretation

The majority of respondents (45%) agree that AI is widely used, followed by 31% who strongly agree. This indicates a high level of acceptance and usage of AI in the organization. Only a small percentage of respondents disagree, showing overall positive perception towards AI usage.

Chi- square Test Analysis

The Chi-square test was conducted to examine the relationship between demographic variables and employees’ perception of Artificial Intelligence in workforce planning and cost

optimization. The result shows that the significance value (0.08) is greater than 0.05, indicating that there is no significant relationship between demographic factors and employee opinions.

RESULT

Chi-square test shows no significant relationship between demographic factors and employees' opinions. Since the p-value (0.08) is greater than 0.05, the null hypothesis (H₀) is accepted.

ANOVA

The ANOVA test was also applied to identify differences in opinions among different demographic groups. The significance value (0.03) is less than 0.05, which indicates a significant difference in opinions across demographic groups. This suggests that factors such as age, experience, or department influence employees' views on AI and its impact on workforce planning and cost efficiency.

Result

ANOVA test shows a significant difference in opinions among different demographic groups.

6. FINDINGS

1. The study reveals that 63% of respondents are male, indicating higher participation of male employees in the survey.
2. Majority of respondents (35%) belong to the 20–25 years age group, showing greater involvement of young employees in AI-related activities.
3. A significant proportion (40%) of respondents strongly agree that AI improves employee productivity, indicating a positive perception towards AI adoption.
4. Around 44% of respondents strongly agree that AI enhances resource utilization, highlighting its effectiveness in improving operational efficiency.
5. Majority (45%) of respondents agree that AI is widely used in workforce planning and cost optimization, indicating increasing acceptance and implementation of AI technologies in organizations.

7. SUGGESTIONS

1. Organizations should enhance the adoption of AI tools in workforce planning to improve productivity and operational efficiency.
2. Training and development programs should be conducted to improve employees' knowledge and skills in AI technologies.
3. Management should focus on utilizing AI for effective resource allocation and cost control.
4. Employees should be encouraged to adapt to AI-based systems to improve overall performance and efficiency.
5. Continuous monitoring and evaluation should be implemented to ensure effective use of AI in HR and financial functions.

6. CONCLUSION

The study concludes that Artificial Intelligence (AI) plays a significant role in enhancing workforce planning and cost optimization in organizations. The findings indicate a positive perception of AI among employees, particularly in improving productivity and resource utilization. AI enables organizations to make better decisions, reduce operational costs, and improve efficiency in both HR and financial functions. Despite certain challenges, the adoption of AI can be considered a strategic approach for achieving organizational growth, improved performance, and long-term sustainability.

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