

# **“A Study on Impact of Advanced Manufacturing Technology Adoption on Marketing Performance”**

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## **ABSTRACT**

Advanced Manufacturing Technology has become a key factor in improving the efficiency, productivity, and competitiveness of manufacturing organizations. This study, titled **"A Study on Impact of Advanced Manufacturing Technology Adoption on Marketing Performance,"** examines how the adoption of modern manufacturing technologies influences marketing performance. The study focuses on aspects such as production efficiency, product quality, customer satisfaction, market reputation, and customer retention. and it improved operational performance and strengthened marketing outcomes. The study also reveals that technological advancements help organizations deliver high-quality products, reduce production time, enhance customer trust, and build long-term customer relationships. Overall, the study concludes that continuous investment in advanced manufacturing technologies is essential for achieving sustainable growth, improving marketing performance, and maintaining a competitive advantage in today's dynamic business environment.

**Keywords:** Advanced Manufacturing Technology (AMT), Marketing performance, Consumer Purchase Behaviour.

## **INTRODUCTION**

Advanced Manufacturing Technology has become a crucial factor in enhancing the efficiency, productivity, and competitiveness of manufacturing organizations in today's rapidly evolving industrial environment. It involves the adoption of modern technologies such as automation, robotics, Artificial Intelligence, the Internet of Things, computer-integrated manufacturing, and digital production systems to improve manufacturing processes and product quality. The implementation of these technologies helps organizations reduce production costs, minimize errors, increase operational efficiency, and respond quickly to changing customer demands. In addition to improving production performance, It has a significant influence on marketing performance by enhancing customer satisfaction, strengthening brand reputation, ensuring timely product delivery, and improving customer retention. Organizations that effectively adopt advanced manufacturing technologies are better positioned to gain a competitive advantage, expand their market share, and achieve sustainable business growth.

## **STATEMENT OF THE PROBLEM**

In today's competitive manufacturing environment, organizations are increasingly adopting Advanced Manufacturing Technology (AMT) to improve production efficiency, product quality, and operational performance. However, many organizations face challenges in effectively implementing these technologies and understanding their impact on marketing performance. While AMT enhances productivity and reduces production costs, its influence on customer satisfaction, market reputation, customer retention, and overall marketing performance requires further study. Therefore, this study aims to examine the impact of Advanced Manufacturing Technology adoption on marketing performance and identify how technological advancements contribute to organizational growth and competitive advantage.

## OBJECTIVES

1. To study the adoption of Advanced Manufacturing Technology (AMT) in the manufacturing organization.
2. To examine the impact of Advanced Manufacturing Technology on production efficiency and product quality.
3. To analyze the influence of Advanced Manufacturing Technology adoption on marketing performance.
4. To evaluate the effect of Advanced Manufacturing Technology on customer satisfaction, market reputation, and customer retention.
5. To suggest suitable measures for improving the adoption of Advanced Manufacturing Technology to enhance marketing performance and organizational growth.

## SCOPE OF THE STUDY

The scope of this study is limited to examining the impact of Advanced Manufacturing Technology adoption on marketing performance in the selected manufacturing organization. The study focuses on understanding how the adoption of technologies such as automation, robotics, digital manufacturing systems, Artificial Intelligence, and the Internet of Things influences production efficiency, product quality, customer satisfaction, market reputation, and customer retention. It is based on the opinions of employees collected through a structured questionnaire and analyzes the relationship between technological adoption and marketing performance. The findings of the study are expected to help the organization improve its manufacturing processes, strengthen its marketing strategies, enhance customer satisfaction, and achieve sustainable competitive advantage and long-term business growth.

## LIMITATIONS OF THE STUDY

- The study is limited to a single manufacturing organization; therefore, the findings may not be applicable to all manufacturing industries.
- The study is based on the responses of 100 respondents, which may not fully represent the opinions of the entire workforce.
- The research focuses only on the impact of Advanced Manufacturing Technology (AMT) on marketing performance and does not cover other organizational functions in detail.
- The accuracy of the findings depends on the honesty and understanding of the respondents while answering the questionnaire.
- The study was conducted within a limited time period, which restricted extensive data collection and analysis.
- Changes in technology and market conditions over time may influence the findings, making them applicable only to the period during which the study was conducted.

## LITERATURE REVIEW

### 1. Sharma, V. and Paliwal, M. K. (2025)

**Title:** *"Driving Industrial Transformation: Exploring the Adoption, Impact, and Strategic Frameworks for Industry 4.0 Technologies in Indian Manufacturing Sectors."*

The study found that technologies such as IoT, Artificial Intelligence, and cloud computing significantly improve operational efficiency, product quality, and cost reduction in Indian manufacturing firms. It concluded that Industry 4.0 adoption strengthens organizational performance and competitiveness.

### 2. Aloksh, M. M. F., Adedokun, M. W., and Iyiola, K. (2025)

examined the relationship between advanced manufacturing technologies, strategic agility, and competitive performance. The study concluded that organizations adopting advanced manufacturing technologies achieve higher strategic agility, stronger business networks, and improved long-term competitive performance.

### 3. Abdela, T. and colleagues (2025)

studied the relationship between Industry 4.0 technologies, knowledge management, and manufacturing performance. The findings revealed that technologies such as autonomous robotics, additive manufacturing, and the Internet of Things positively influence manufacturing performance, while effective knowledge management further enhances organizational outcomes.

### 4. Authors of the Journal of Manufacturing Technology Management (2025)

investigated the impact of additive manufacturing on market performance. The study found that advanced manufacturing technologies improve product quality, design flexibility, and competitive capabilities, which in turn enhance overall market performance and customer satisfaction.

## RESEARCH GAP

The reviewed literature indicates that Advanced Manufacturing Technologies and Industry 4.0 technologies have significantly improved operational efficiency, product quality, productivity, and competitive performance in manufacturing organizations. Most previous studies have focused on the technical, operational, and strategic benefits of technologies such as Artificial Intelligence, Internet of Things, automation, robotics, and additive manufacturing. However, only a limited number of studies have examined the direct impact of Advanced Manufacturing Technology adoption on marketing performance, particularly in terms of customer satisfaction, market reputation, customer retention, and brand competitiveness. Furthermore, there is a lack of research focusing on employees' perceptions regarding the influence of AMT adoption on marketing outcomes in manufacturing organizations. Therefore, this study attempts to bridge this gap by analyzing the relationship between Advanced Manufacturing Technology adoption and marketing performance, providing insights into how technological advancements contribute to both operational excellence and marketing success.

## RESEARCH DESIGN

**Sample size:** 50 Respondents

**Tools for data collection:** Data for this study is collected from primary and secondary sources. Primary data includes surveys and interviews with public. While secondary data encompasses websites and google forms filling to publics.

## ANALYSIS AND INTERPRETATION

The above table shows the age-wise distribution of 50 respondents. Among them, 35 respondents (70%) belong to the 20–30 years age group, which forms the largest share of the sample. This is followed by 8 respondents (16%) in the 30–40 years age group, 4 respondents (8%) above 40 years, and 3 respondents (6%) below 20 years. The findings indicate that the study is largely based on the opinions of young employees, who are generally more adaptable to advanced manufacturing technologies and digital innovations. The participation of respondents from other age groups provides additional experience and balanced perspectives. Overall, the age distribution suggests that the organization has a young and dynamic workforce, making the study reliable in understanding the impact of Advanced Manufacturing Technology adoption on marketing performance.

### 1. How familiar are you with advanced manufacturing technologies used in the company

The above table shows the respondents' familiarity with advanced manufacturing technologies used in the company. Out of 50 respondents, 26 (52%) reported that they are familiar with advanced manufacturing technologies, while 9 respondents (18%) stated that they are very familiar. In addition, 12 respondents (24%) indicated that they are slightly familiar, whereas only 3 respondents (6%) reported that they are not familiar. The findings indicate that the majority of employees possess a good understanding of advanced manufacturing technologies, reflecting effective awareness and exposure within the organization. However, the small percentage of employees who are slightly familiar or not familiar suggests the need for continuous training and awareness programs to improve technological knowledge and ensure successful adoption across all departments.

## 2. How frequently does the company introduce new technology

The above table shows how frequently the company introduces new technology. Out of 50 respondents, 26 respondents (52%) stated that the company frequently introduces new technology, while 17 respondents (34%) reported that it is introduced very frequently. In addition, 6 respondents (12%) indicated that new technology is introduced occasionally, whereas only 1 respondent (2%) felt that it is introduced rarely. The findings indicate that the organization is highly committed to technological advancement and regularly adopts new technologies to improve its manufacturing processes. The high percentage of positive responses reflects the company's continuous focus on innovation, operational efficiency, and maintaining a competitive advantage in the market.

## 3. How much do advanced technology's improve the company's market reputation

The above table shows the respondents' opinion on how much advanced technologies improve the company's market reputation. Out of 50 respondents, 22 respondents (44%) stated that advanced technologies improve the company's market reputation moderately, while 17 respondents (34%) believed the improvement is significant. In addition, 8 respondents (16%) felt the impact is slight, whereas only 3 respondents (6%) stated that advanced technologies do not improve the company's market reputation. The findings indicate that the majority of respondents believe advanced manufacturing technologies positively influence the organization's market reputation by improving product quality, operational efficiency, and customer confidence, thereby enhancing the company's competitive position in the market.

## HYPOTHESIS

**Question: Advanced Manufacturing Technologies improve customer satisfaction.**

**H<sub>0</sub>:** There is no significant relationship between the adoption of Advanced Manufacturing Technologies and customer satisfaction

**H<sub>1</sub>:** There is a significant relationship between the adoption of Advanced Manufacturing Technologies and customer satisfaction

| Category          | Observed | Expected | (O-E) | (O-E) <sup>2</sup> | (O-E) <sup>2</sup> / E |
|-------------------|----------|----------|-------|--------------------|------------------------|
| Strongly Agree    | 18       | 10       | 8     | 64                 | 6.40                   |
| Agree             | 16       | 10       | 6     | 36                 | 3.60                   |
| Neutral           | 8        | 10       | -2    | 4                  | 0.40                   |
| Disagree          | 5        | 10       | -5    | 25                 | 2.50                   |
| Strongly disagree | 3        | 10       | -7    | 49                 | 2.90                   |
| Total             | 50       | 50       |       |                    | 17.80                  |

Calculated X<sup>2</sup> Value = 17.80

Degree of Freedom (df)=4

Table Value (5% level of significance)= 9.488

## Interpretation

The Chi-Square test indicates that there is a significant relationship between the adoption of Advanced Manufacturing Technologies and customer satisfaction at Mach Aero Components Pvt. Ltd. The results suggest that adopting advanced manufacturing technologies positively influences customer satisfaction and supports improved marketing performance.

## Findings

1. The study found that the majority of respondents were familiar with advanced manufacturing technologies, indicating a good level of awareness and acceptance of modern technologies within the organization.
2. The findings revealed that the company frequently adopts new technologies, reflecting its commitment to innovation, continuous improvement, and maintaining a competitive advantage.
3. Most respondents agreed that advanced manufacturing technologies improve production efficiency, product quality, and ensure timely product delivery, thereby enhancing overall operational performance.
4. The study found that the adoption of advanced manufacturing technologies has positively influenced the company's market reputation by increasing customer trust and strengthening its competitive position.
5. Overall, the findings indicate that advanced manufacturing technology adoption has a significant positive impact on marketing performance through improved customer satisfaction, better product quality, enhanced brand image, and long-term business growth.

## Suggestions

1. The organization should continue investing in advanced manufacturing technologies to improve production efficiency, product quality, and overall marketing performance.
2. Regular training and skill development programs should be conducted to enhance employees' knowledge and confidence in using advanced manufacturing technologies.
3. The company should strengthen digital infrastructure and upgrade manufacturing equipment periodically to maintain competitiveness and improve operational efficiency.
4. Management should actively collect customer feedback and use technological innovations to improve product quality, customer satisfaction, and market reputation.
5. The organization should develop a long-term technology adoption strategy by integrating advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and automation to achieve sustainable growth and strengthen its competitive advantage.

## CONCLUSION

The study concludes that the adoption of Advanced Manufacturing Technology has made a significant contribution to improving both manufacturing operations and marketing performance. The findings indicate that the use of automation, digital technologies, and modern manufacturing equipment has increased production efficiency, improved product quality, reduced production time, and minimized production errors. Employees have shown a positive attitude towards the adoption of new technologies, reflecting the organization's commitment to innovation and continuous improvement. The study also reveals that advanced manufacturing technologies have enhanced customer satisfaction, strengthened customer trust, improved the company's market reputation, and supported timely product delivery. These benefits have enabled the organization to achieve better marketing performance and maintain a competitive advantage. Although continuous investment in technology, employee training, and infrastructure development is necessary, the overall results confirm that Advanced Manufacturing Technology is essential for sustainable business growth. Therefore, organizations should continue adopting modern manufacturing technologies to improve operational excellence, enhance customer value, and achieve long-term organizational success.

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