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# A Study on Challenges and Opportunities in Adoption of AI in Garments Industry

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**Abstract:** ***The adoption of Artificial Intelligence (AI) in the garment industry presents both significant opportunities and formidable challenges. However, the implementation of AI also faces challenges such as high initial investment costs, resistance to technological change, skill gaps among workers, and data security concerns. This research examines the key drivers and barriers influencing AI adoption in the garment sector and provides insights into strategies for overcoming these challenges. This study aims to analysis the impact of technological advancements and address the challenges and opportunities in implementation of AI in garment industry.***

**Keywords:** AI, Garments industry, Technological change, Challenges and opportunities.

## 1. Introduction

Technology is a tool. It has served either to provide greater opportunities and success for trained workers and educated professionals, or to replace both workers and professionals with machines. In this regard, AI has a serious potential flaw: It assumes that the problem facing humanity is people, particularly their tendency to make mistakes, be corrupt, or dishonest. Its proponents believe that AI will solve the problems facing humanity by making people obsolete. The garments industry is one of the largest and most dynamic sectors of the global economy, contributing significantly to employment and GDP in many countries. Artificial Intelligence (AI) has emerged as a transformative force in this industry, driving efficiency, innovation, and sustainability across various stages of production and customer experience. The adoption of AI technologies, such as machine learning, computer vision, and robotics, has enhanced productivity while reducing costs and waste. This study will offer insights into how AI continues to revolutionize the garments industry and what lies ahead for businesses and consumers alike.

### Objectives of the Study

- To analyse the impact of technological advancement in garments industry.
- To evaluate the challenges and opportunities in adopting of AI technology in garments industry.
- To study employee perception towards adopting AI technology.

### Statement of the Problem

This study helps in investing the adoption of AI in the garment industry. And also aims to identify implementation costs and lack of skilled personnel. The study explores the AI in textile industry, its transformative impact, the benefits it offers, as well as the challenges and considerations that come with its implementation.

### Research Methodology

- Research Design: Descriptive Research Design
- Area Of the Study: Tirupur
- Sampling Technique: Simple Random Sampling Method
- Data Collection: Primary Data
- Sample Size: 136
- Tools Used for Analysis: Simple percentage analysis, Correlation, Anova.

## 2. Review of Literature

**Ramunas Bermans** (2024) [1] - The textile and apparel industry are increasingly embracing artificial intelligence (AI) to streamline processes and improve overall efficiency. AI technology has the potential to revolutionize the industry by automating various tasks, enhancing quality control measures, and optimizing the production process. This article will explore the role of AI in the textile and apparel industry, its transformative impact, the benefits it offers, as well as the challenges and considerations that come with its implementation.

**Dr. Tanveer hussain** (2023) [2] - However, the industry also faces many challenges, such as changing consumer preferences, environmental concerns, global competition, and complex supply chains. In this article, we will explore how AI can be used for digital transformation of textile and apparel industry in various ways. AI techniques exhibit the ability to recognize patterns, make decisions, and understand natural language. AI is already being used in various ways across the textile and apparel industry to enhance processes for customers and increase the speed of manufacturing and business operations.

## 3. Data Analysis and Interpretation

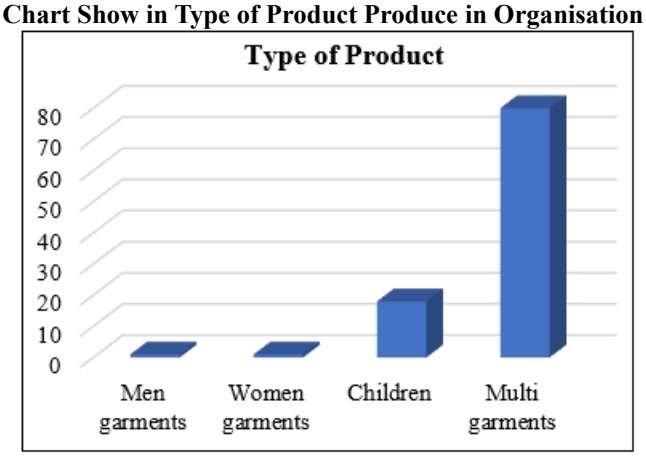
**Table Showing Type of Product Produce in Organisation**
**Simple Percentage Analysis**

| S. NO | Particular | Percentage |
|---|---|---|
| 1 | Men garments | 1 |
| 2 | Women garments | 1 |
| 3 | Children | 18 |
| 4 | Multi garments | 80 |

**Interpretation:**
The table 4.2 shows that 80% of the respondents produces Multiple garments, 18% percentage of the respondents produces Children garments, 1% of the respondents produces

Women garments and 1% of the respondents produces Men garments.

**Chart Show in Type of Product Produce in Organisation**




**Correlation**

| Variable | Pearson Correlation | Significant Level |
|---|---|---|
| AVGIAIT | .630 | .000 |
| AVGAAI | .620 | .003 |
| AVGAIDRIVEN | .259 | .004 |
| AVGSAI | .993 | .001 |
| AVGOW | .412 | .151 |
| AVGIAT | .160 | .225 |
| AVGCSM | .330 | .342 |
| AVGAIT | 1 | 1 |

**Interpretation:**
The adoption and implementation of AI technology in the garment industry show strong correlations with AI advancements. Implementation of AI ($r = 0.630$, $p < 0.000$) and AI adoption ($r = 0.620$, $p = 0.003$) indicate that increased availability and maturity of AI solutions drive adoption and transformation in manufacturing, supply chains, and customer experiences. AI adoption significantly enhances sustainability ($r = 0.993$, $p = 0.001$) by optimizing resources and reducing waste. However, workforce readiness ($r = 0.412$, $p = 0.151$) shows a moderate but statistically insignificant correlation, suggesting challenges in upskilling. Initiatives to adopt AI ($r = 0.160$, $p = 0.225$) have a weak correlation, implying that other factors, such as cost and strategy, play a more critical role in AI integration

**ANOVA**

**Implementation of AI technology and opportunities in adopting AI technology**

| | Sum of squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 0.442 | 5 | 0.088 | 0.969 | 0.002 |
| Within Groups | 5.743 | 63 | 0.091 | | |
| Total | 6.184 | 68 | | | |

**Interpretation:**
Since the p- value= p=0.002, we reject the null hypothesis ($H_0$) and accepts the alternative hypothesis ($H_1$), The analysis confirms that AI adoption significantly influences certain factors in the garment industry, such as Design and product development, improve product quality, reduce operating costs, comply with international standards, smart production planning provides opportunities in adoption AI technology.

**Employee Workforce Readiness and Opportunities in Adopting AI Technology**

| | Sum of squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 0.223 | 5 | 0.045 | 1.341 | 0.000 |
| Within Groups | 2.094 | 63 | 0.033 | | |
| Total | 2.317 | 68 | | | |

**Interpretation:**
Since the p - value =p=0.002, we reject the null hypothesis ($H_0$) and accepts the alternative hypothesis ($H_1$), The analysis confirms that AI adoption plays a critical role in shaping key industry factors along with employee workforce readiness for adopting AI technology such as regular training, hiring skilled workers, collaborating with tech providers.

**Ranking Method**

| Challenges | Mean Rank | Rank |
|---|---|---|
| Lack of standardization | 7.43 | I |
| Supervision | 6.50 | II |
| Mirroring human attributes | 5.59 | III |
| Hiring AI experts | 4.36 | X |
| Job displacements | 4.68 | VIII |
| Quality of privacy and security of data | 4.55 | IX |
| Technical skills and infrastructure | 4.88 | VII |
| Technological dependencies | 5.58 | V |
| High employee turnover | 5.88 | IV |
| Capital investment | 5.55 | VI |

**Interpretation:**
It is interpreted that Lack of standardization will (7.43) imposes the first rank, which implies that it is the major challenges faced in adoption of implementation of AI in garment industry and hiring of AI experts imposes the Tenth rank (4.36).

**Findings of Simple Percentage Analysis:**
Majority of the respondents has produces multi garments (80%)

**Findings of Correlation:**
Implementation of AI technology are highly correlated with AI technology ($r = 0.630$, $p=>0.000$), Adopting AI technology are highly correlated with AI technology ($r=0.620$, $p=0.003$), Sustainability by adopting AI technology is highly correlated with AI technology ($r=0.993$, $p=0.001$).

**Findings of Anova:**
The p - value =p=0.002, The analysis confirms that AI adoption significantly influences certain factors in the garment industry smart production planning provides opportunities in adoption AI technology. The p - value =p=0.002, The analysis confirms that AI adoption plays a critical role in shaping key industry factors along with employee workforce readiness for adopting AI technology.

**Findings of Ranking Method:**
It is interpreted that Lack of standardization will (7.43) imposes the first rank, which implies that it is the major challenges faced in adoption of implementation of AI in garment industry and hiring of AI experts imposes the Tenth rank (4.36).

## 4. Suggestion

From the analysis and findings, it confirms that to successfully adopt AI in the garment industry should address the lack of standardization as it remains the biggest challenge. Establishing standardized frameworks and guidelines will facilitate smoother implementation. Workforce readiness is another key factor, requiring regular training, hiring skilled AI professionals, and fostering collaborations with technology providers.

## 5. Conclusion

The adoption of AI in the garment industry presents both significant challenges and promising opportunities. The lack of standardization emerges as the most critical challenge, along with workforce readiness, high initial costs, and the need for skilled professionals. However, the opportunities outweigh these challenges, as AI - driven smart production planning, sustainability initiatives, and data - driven decision - making can revolutionize the industry.

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