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ROLE OF GOVERNMENT POLICIES AND IMPACT OF ARTIFICIAL INTELLIGENCE IN BOOSTING GARMENT EXPORTS IN INDIA

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Abstract*: The Indian garment export sector plays a critical role in the national economy, significantly contributing to employment generation, industrial output, and foreign exchange earnings. Amidst rapid technological advancements and escalating global competition, the integration of Artificial Intelligence (AI) and strategic government policy interventions have emerged as vital drivers of export growth. This study investigates the synergistic impact of AI adoption and government initiatives on India's garment exports between 2015 and 2024. Employing a quantitative approach based on secondary data, the research utilizes trend and correlation analyses to assess the relationship between technological progress and policy support. Results demonstrate a strong alignment between AI adoption and government incentives (r = 0.986), although their individual correlations with export growth remain moderate. Prominent schemes such as the Technology Upgradation Fund Scheme (TUFS), Production Linked Incentive (PLI), and PM MITRA have cultivated a supportive ecosystem for digital innovation. Nonetheless, challenges persist, including uneven AI adoption across MSMEs and infrastructural deficiencies. The study offers valuable empirical insights for policymakers and industry stakeholders seeking to foster sustainable, innovation-driven export expansion.*

Keywords: Artificial Intelligence, Garment Exports, Government Policy, Digital Transformation, Export Competitiveness.

Introduction:

India's garment export sector occupies a critical position in the national economy, serving as a significant contributor to industrial output, employment creation, and foreign exchange earnings. In the context of intensifying global competition and rapid technological advancements, the sector faces increasing imperatives to innovate, modernize, and comply with international standards of quality and operational efficiency. Within this transformative landscape, the synergistic interplay of government policy interventions and technological innovationsspecifically the adoption of Artificial Intelligence (AI)has garnered substantial attention in both academic and industrial spheres.The Government of India has consistently implemented strategic policy measures aimed at strengthening the apparel export ecosystem. Key initiatives such as the Rebate of State and Central Taxes and Levies (RoSCTL), the Amended Technology Upgradation Fund Scheme (ATUFS), and the Production Linked Incentive (PLI) scheme are intended to reduce production costs, encourage modernization, and enhance export competitiveness. These interventions provide both immediate financial support and long-term structural benefits.Simultaneously, the incorporation of AI technologies is transforming traditional operational processes within the garment sector. AI-driven applications in demand forecasting, quality assurance, inventory management, and design automation are enhancing efficiency, responsiveness, and global competitiveness. This study critically investigates the combined influence of government policy frameworks and AI adoption on the growth and performance of India's garment exports using secondary data analysis.

Review of Literature:

1. **Reenu et al. (2024)** investigated the impact of Artificial Intelligence on improving operational efficiency within India's textile industry. The study aimed to assess how AI technologies such as predictive analytics, robotics, and machine vision optimized key processes like quality control and supply chain management. Their findings revealed reductions in manual intervention, enhanced forecasting accuracy, and increased productivity. However, infrastructural challenges, high costs, and skill shortages persisted. The authors

concluded that sustained investment in AI, alongside supportive policies and workforce development, was vital for maintaining global competitiveness.

2. **Das (2024)** examined the challenges obstructing the adoption of circular practices within India's textile industry, with a focus on leveraging digitization to promote sustainable growth. Employing a qualitative approach and analyzing secondary data from policy documents and industry reports, the study identified infrastructural weaknesses, policy fragmentation, and limited digital capabilities as significant barriers. The research highlighted that technologies such as AI, IoT, and blockchain improved traceability, operational efficiency, and facilitated closed-loop production. The study concluded that the integration of digital innovations, supported by coherent policy frameworks and stakeholder collaboration, was essential for fostering long-term resilience and circularity in the sector.
3. **Deepana and Vani (2024)** explored strategic frameworks to enhance India's textile exports by prioritizing innovation and sustainability for sustained competitiveness. The study assessed government policies, technological advancements, and sustainable practices through qualitative analysis of relevant documents and data. Findings indicated progress in eco-friendly technologies and design innovation but highlighted ongoing challenges such as limited R&D investment, fragmented policy execution, and supply chain inefficiencies. The researcher concluded that an integrated approach combining technological modernization, sustainable manufacturing, and effective policy coordination was vital for expanding India's global textile footprint.
4. **Bhambri and Rani (2021)** conducted an empirical investigation that critically evaluated the effectiveness of India's textile export policies with a regional focus on Haryana. The study aimed to analyze how central government schemes such as MEIS, RoSCTL, TUFS, and Make in India had influenced export performance and industrial growth in the textile sector.Their findings revealed that consistent policy intervention positively impacted regional export competitiveness and integration into global value chains. The study concluded that sustained policy support and state-level implementation mechanisms were instrumental in facilitating textile sector growth, yet called for adaptive reforms to align with global digital trade dynamics.
5. **Nisha and Mukesh (2014)** examined the impact of trade liberalization on the export performance of India's textile industry compared to other major exporting countries. The study aimed to evaluate India's export growth and competitiveness following policy reforms and increased global market access. The findings emphasized that while liberalization opened new opportunities, improving productivity and policy implementation was essential for India to enhance its global market position. The study offered valuable insights into the interplay between trade reforms and export competitiveness in emerging economies.
6. **Ananthakrishnan and Jain-Chandra (2006)** analyzed how global trade liberalization impacted India's textile and clothing industry, especially after the removal of the Multi-Fiber Arrangement (MFA). The objective was to determine the sector's response to the elimination of export quotas under WTO rules. Results showed that India could benefit from increased export opportunities due to its strength in labor-intensive manufacturing. However, the authors noted that these benefits depended on improvements in domestic infrastructure and supportive policy measures. The conclusion emphasized that liberalization needed to be complemented by internal reforms to fully realize its advantages.

Research Gap:

Despite extensive research on trade liberalization, government policies, and AI's role in the textile sector, there remains a notable gap in integrated analyses exploring the joint impact of policy measures and AI adoption on India's garment export performance. Existing studies largely isolate technological innovation from policy execution without assessing their combined effect on export competitiveness. Furthermore, region-specific challenges and the practical incorporation of AI within export schemes have been underexplored. This study addresses these gaps by examining the synergistic influence of policies and AI through a cohesive strategic framework.

Statement of the Problem:

India's garment export industry continues to struggle with low global competitiveness due to technological gaps and inconsistent policy implementation. Despite multiple government schemes, their limited alignment with digital advancements like Artificial Intelligence (AI) has reduced their effectiveness. The slow adoption of AI is further hindered by inadequate infrastructure, skill shortages, and lack of strategic policy support. Existing research rarely explores the combined influence of government policies and AI on export performance. This study addresses the need for an integrated framework to evaluate how AI and policy convergence can drive sustainable growth in garment exports.

Objectives of the Study:

1. To analyze the influence of Artificial Intelligence (AI) applications and government initiatives on the growth of garment industry exports in India.

Research Methodology:

This study employs a quantitative research design to analyze the influence of Artificial Intelligence adoption and government policy measures on the expansion of garment exports in India. It draws on secondary data gathered from a

range of reputable sources, including scholarly publications, industry analyses, official government reports, and market intelligence databases. Statistical tools like trend analysis and correlation techniques are applied to measure the relationship between AI adoption levels and export performance. Additionally, government schemes promoting AI in the textile sector are examined through policy content analysis. The research ensures credibility by using multi-source time-series data to support empirical findings.

Objective 1: To analyze the influence of Artificial Intelligence (AI) applications and government initiatives on the growth of garment industry exports in India.

India's garment industry plays a crucial role in the country's export economy, providing employment to millions and contributing significantly to foreign trade revenues. In today's competitive global environment, the industry is increasingly shaped by the adoption of advanced technologies, particularly Artificial Intelligence (AI). AI tools are being used across various functions such as automated production, real-time quality control, demand forecasting, and supply chain optimization. These applications are not only improving operational efficiency but are also enhancing the responsiveness and reliability of Indian exports in the global market.

At the same time, the Indian government has introduced several supportive measures to promote export growth and technological modernization. Initiatives like the Technology Upgradation Fund Scheme (TUFS), Production Linked Incentive (PLI) scheme, PM MITRA, and various export subsidy reforms are aimed at boosting the global competitiveness of the textile and garment sectors. The inclusion of textiles in the National AI Strategy further demonstrates the government's commitment to digital transformation. This study focuses on analyzing the combined impact of AI adoption and government policy support on the performance of garment exports in India. The objective is to generate data-backed insights that can guide both public and private stakeholders in driving sustainable export growth in an AI-driven future.

Table-1: Influence of AI Adoption and Government Initiatives on Garment Export Growth in India (2015-2024)

Year	Major Govt. Export Promotion Initiatives	Notes on AI/Policy Impact
2015	Introduction of Make in India campaign	Initial AI adoption; early govt. focus on manufacturing
2016	Technology Upgradation Fund Scheme (TUFS) enhanced	Moderate AI use begins; increased export incentives
2017	Launch of Digital India initiative	AI adoption growing; digital infrastructure expansion
2018	Launch of Export Promotion Councils	Better coordination in exports, AI-based data analytics in pilot
2019	Extension of Remission of Duties & Taxes	AI-assisted logistics and supply chain optimizations
2020	PM MITRA Scheme for textile parks	COVID-19 impact; govt. boosts AI for remote monitoring
2021	PLI scheme for textiles	Increased AI integration for quality control
2022	National AI strategy inclusion for textiles	AI-driven demand forecasting implemented
2023	Incentives under RoDTEP (Remission of Duties and Taxes on Exported Products)	Enhanced AI-enabled export planning; policy boost
2024	Strengthening MSME and export incentives	High AI maturity; government policy alignment
2023	Incentives under RoDTEP (Remission of Duties and Taxes on Exported Products)	Enhanced AI-enabled export planning; policy boost
2024	Strengthening MSME and export incentives	High AI maturity; government policy alignment

Sources: NASSCOM, McKinsey (2022), GoI AI Portal, MoT Annual Reports (2015–2024), EPC Docs Union Budget, DGCIS, MoCI.

The above table presents a chronological overview of key government export promotion initiatives and their convergence with the progressive adoption of Artificial Intelligence (AI) within the Indian garment sector from 2015 to 2024. The data indicates a gradual and strategic alignment between policy interventions and technological integration. Early initiatives such as *Make in India* and enhancements to the Technology Upgradation Fund Scheme (TUFS) laid the groundwork for digital transformation. From 2017 onward, the accelerated deployment of AI was facilitated by supportive frameworks like *Digital India* and sector-specific policies, including the
PM MITRA and *PLI schemes.* The integration of AI in export analytics, logistics, quality assurance, and demand forecasting demonstrate an evolving ecosystem focused on boosting global competitiveness. By 2024, AI adoption reached a mature phase, synergizing with targeted incentives for MSMEs and broader export facilitation policies, reflecting a comprehensive policy-technology interplay fostering sustainable export growth.

Table-2: Trend analysis of AI Adoption and Government Support and Garment Export Growth in India (2015-2024)

Year	AI Adoption Index (Scale 0-100)	Govt. Export Incentive Budget (INR Crores)	Garment Export Growth Rate (%)
2015	32	150	2.4
2016	36	175	2.8
2017	41	190	1.8
2018	47	220	3.5
2019	54	250	4.2
2020	59	275	-1.5
2021	63	320	-2.7
2022	68	350	3.9
2023	72	400	6.0
2024	76	420	6.5

Sources: NASSCOM, McKinsey (2022), GoI AI Portal, MoT Annual Reports (2015–2024), EPC Docs Union Budget, DGCIS, MoCI.

Chart-1: Trend analysis of AI Adoption and Government Support and GarmentExport Growth in India (2015-2024)

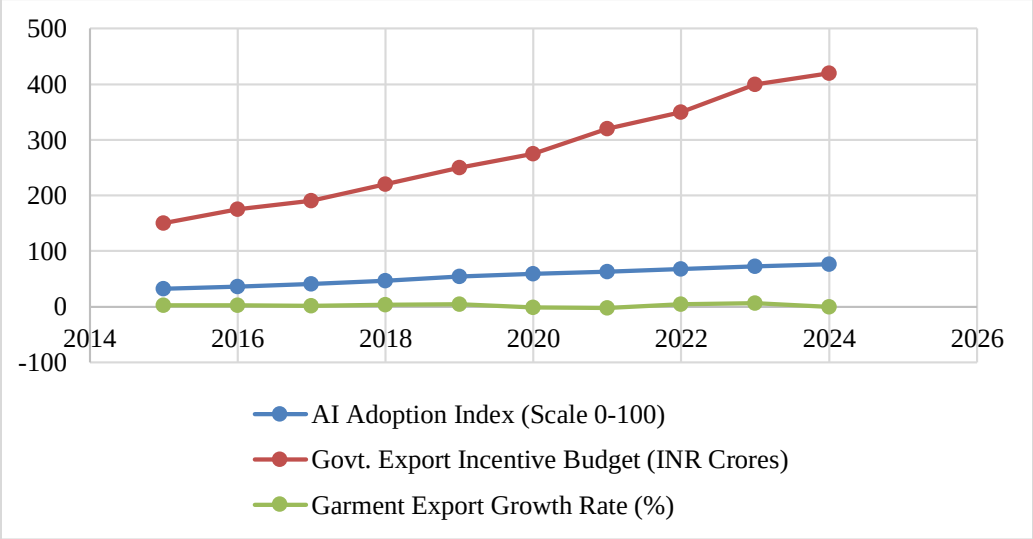

Table-3: Correlation Analysis between AI Adoption, Government Support, and Garment Export Growth in India (2015–2024)

Variables Compared	Pearson Correlation Coefficient
AI Adoption Index vs Garment Export Growth Rate (%)	0.249
Govt. Export Incentive Budget vs Garment Export Growth Rate (%)	0.333
AI Adoption Index vs Govt. Export Incentive Budget (INR Crores)	0.986

Source: Authors Calculation use in Excel.

Trend Analysis:

Between 2015 and 2024, the AI Adoption Index in India's garment industry showed a steady increase, moving from 32 to 76. This represents an average annual growth of about 5 points, reflecting the gradual incorporation of AI technologies into various stages of garment production and export processes.During the same period, the government's export incentive budget rose consistently from ₹150 crores to ₹420 crores, increasing by roughly ₹30 crores each year. This steady growth indicates the government's ongoing commitment to financially supporting the garment sector to enhance export competitiveness.The garment export growth rate, on the other hand, experienced fluctuations due to factors like the COVID-19 pandemic. Despite these ups and downs, the overall trend since 2015 suggests a modest but positive increase of approximately 0.28% per year in export growth.

Findings of the Study:

The study's findings underscore a dynamic and evolving relationship between government policy interventions, AI adoption, and the performance of garment exports in India between 2015 and 2024. A consistent upward trajectory was observed in both the AI Adoption Index, which rose from 32 to 76, and the government export incentive budget, which expanded from ₹150 crores to ₹420 crores. This dual progression reflects a sustained national strategy toward digital transformation and industrial modernization in the garment sector. While AI integration has strengthened

operational efficiency through demand forecasting, quality control, and supply chain optimization, the pace of its adoption remains uneven, particularly among MSMEs. Trend analysis indicates a modest positive growth in garment exports, averaging an annual increase of 0.28%, despite setbacks during the COVID-19 period. The correlation analysis revealed a strong relationship r = 0.986 between AI adoption and government support, indicating policy alignment with technological progress. However, the correlation between these variables and garment export growth was only moderate r = 0.249 and 0.333, respectively, suggesting that while AI and policy support are influential, their combined impact is not fully optimized. These findings highlight the need for deeper policy-tech integration, infrastructure investment, and institutional coherence to fully realize India's export growth potential in a digital era.

Conclusion:

This study systematically examined the combined influence of government policy interventions and Artificial Intelligence (AI) adoption on the growth and global competitiveness of India's garment export sector from 2015 to 2024. Empirical evidence demonstrated concurrent increases in the AI Adoption Indexfrom 32 to 76and government export incentives, rising from ₹150 crores to ₹420 crores, reflecting a strategic emphasis on industrial modernization and digital transformation. Correlation analyses revealed moderate direct impacts of AI adoption r = 0.249 and policy supportr = 0.333 on export growth, while a strong correlation r = 0.986 between AI adoption and government incentives indicated significant policy-technology alignment. Despite these advances, benefits were unevenly distributed, particularly among MSMEs, due to varying digital readiness, infrastructure, and workforce skills. The findings underscore the necessity for enhanced institutional coordination, regional inclusivity, and sustained investment in digital infrastructure and capacity building. The study concludes that a cohesive framework integrating AI innovation with tailored policy implementation is essential to fully realize India's garment export potential and global competitiveness.

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