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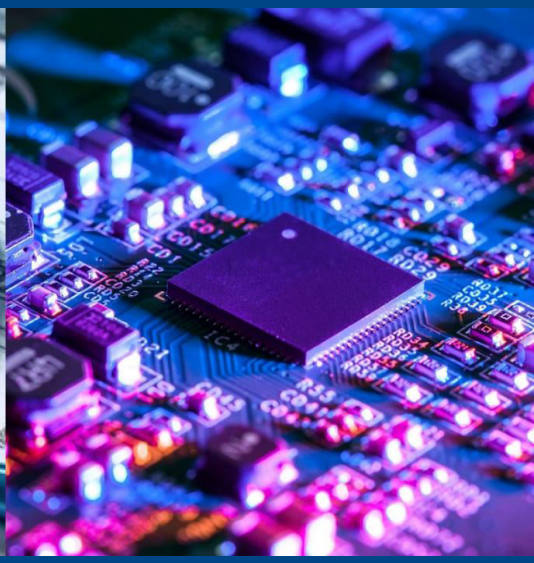

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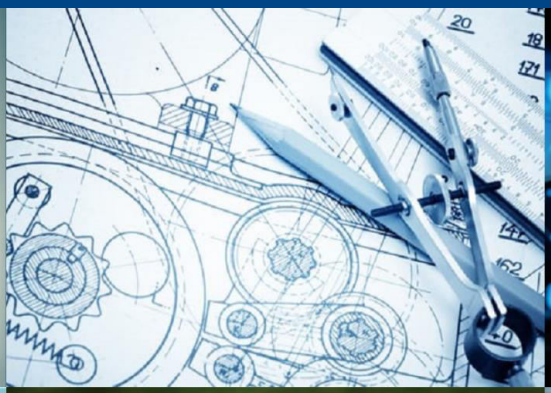

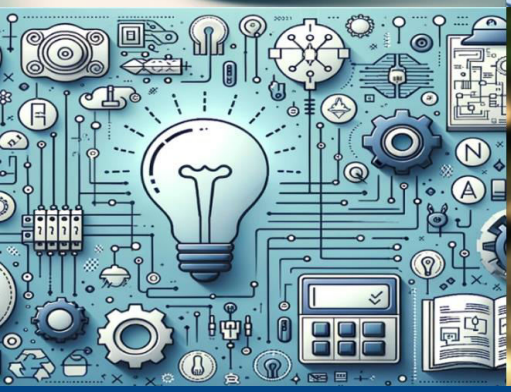

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Role of Assessing the Adoption of Artificial Intelligence in MSMEs, Drivers, Barriers and Economic Impacts in Coimbatore City

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ABSTRACT: The rapid advancement of digital technologies has created transformative opportunities for Micro, Small, and Medium Enterprises (MSMEs) across India. Artificial Intelligence (AI), encompassing machine learning, natural language processing, computer vision, and intelligent automation, holds significant promise for enhancing the operational efficiency, competitiveness, and long-term sustainability of MSMEs. However, despite this potential, AI adoption among MSMEs in Coimbatore City remains uneven and constrained by multiple financial, technological, and organizational barriers. This study examines the current state of AI adoption among MSMEs in Coimbatore, identifies the key drivers and barriers influencing adoption decisions, and evaluates the economic impacts experienced by enterprises that have integrated AI tools into their operations. Primary data were collected through structured questionnaires administered to 110 respondents comprising MSME owners, managers, and employees across manufacturing, retail, service, and food processing sectors. Statistical analysis was conducted using percentage analysis, One-Way ANOVA, and Chi-square tests using SPSS. The findings reveal that while cost reduction aspirations, competitive pressure, and government policy support serve as primary drivers of AI adoption, high implementation costs, limited digital literacy, shortage of skilled personnel, and organizational resistance remain significant barriers. The study further establishes that enterprise size significantly influences both the level of AI adoption and the perceived economic benefits derived from it. The study concludes that targeted policy interventions, capacity-building programs, and stronger industry-academia collaboration are essential to accelerate AI adoption and unlock its full economic potential among MSMEs in Coimbatore.

KEYWORDS: Artificial Intelligence, MSMEs, Coimbatore, Technology Adoption, Drivers, Barriers, Economic Impact, Digital Transformation, Machine Learning, Innovation

I. INTRODUCTION

Coimbatore city, nestled in the western part of Tamil Nadu, has historically been one of India's most vibrant industrial hubs, characterized by a dense network of Micro, Small, and Medium Enterprises (MSMEs) that form the backbone of its economic and social fabric. The region's agglomeration of textile units, engineering firms, auto component manufacturers, pump industries, and service providers reflects a rich industrial legacy that has adapted through successive waves of technological change. In recent years, the advent of digital technologies has brought transformative potential to businesses around the world, with Artificial Intelligence (AI) emerging as one of the most disruptive and promising technologies of the 21st century.

AI encompasses an array of computational techniques such as machine learning, natural language processing, computer vision, robotic process automation, and predictive analytics that enable machines to perform tasks traditionally requiring human intelligence. For MSMEs, AI holds the distinctive promise of enhancing operational efficiency, reducing production costs, boosting competitiveness, improving customer engagement, streamlining inventory management, and enabling real-time decision-making. Yet, despite this immense potential, the systematic adoption and integration of AI within MSMEs in Coimbatore remains uneven and limited, raising critical questions about the interplay between technological opportunity and organizational readiness in an ecosystem where resource constraints and structural challenges intersect with innovation aspirations.

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The significance of assessing AI adoption among MSMEs in Coimbatore stems from the central role these enterprises play in employment generation, regional GDP contribution, export activities, and social development. MSMEs account for a substantial share of India's industrial output and workforce, and in cities like Coimbatore they are tightly interwoven with local value chains and community networks. As the global economy increasingly pivots towards data-driven decision-making and automated processes, understanding how, why, and to what extent MSMEs embrace AI becomes essential not only for academic inquiry but also for practical policy formulation.

Understanding the adoption of AI in MSMEs requires a deep examination of both facilitating forces and inhibiting factors that influence decision-making processes in smaller enterprises. Drivers operate at multiple levels, ranging from internal motivations such as cost reduction aspirations and quality improvement goals, to external pressures like competition from digitally mature firms, evolving customer expectations, and the increasing availability of affordable AI solutions delivered through cloud computing and software-as-a-service (SaaS) models. Barriers, on the other hand, manifest as financial limitations, inadequate digital literacy among employees, lack of awareness about AI capabilities, absence of clear regulatory frameworks, concerns about data security, and cultural resistance to change within family-run or legacy enterprises. The economic impacts of AI adoption extend across multiple dimensions of business performance, including productivity improvements, cost savings, enhanced customer satisfaction, and increased revenue. However, these impacts are not guaranteed or uniform, depending critically on the capacity of enterprises to align technology with strategic goals and invest in complementary resources.

Coimbatore's industrial landscape presents a compelling case for this assessment due to its unique blend of traditional manufacturing heritage and emerging technological entrepreneurship. Previous studies on technology diffusion have highlighted that geographic clusters can accelerate adoption through proximity effects, peer learning, and shared institutional support; yet empirical evidence specific to AI adoption in Indian MSME clusters remains limited. This study seeks to bridge that gap by systematically collecting primary data from MSME stakeholders in Coimbatore, identifying adoption patterns, mapping drivers and barriers, and evaluating economic outcomes to provide actionable insights for businesses and policymakers.

II. REVIEW OF LITERATURE

A growing body of literature explores the adoption of digital technologies and AI among SMEs globally. Davis (1989) introduced the Technology Acceptance Model (TAM), which posits that perceived usefulness and perceived ease of use are the primary determinants of technology adoption decisions. This foundational framework has been widely applied in subsequent studies examining AI adoption in business contexts. Rogers (2003) further elaborated on technology diffusion through the Diffusion of Innovations Theory, emphasizing that the rate of adoption is influenced by an innovation's relative advantage, compatibility, complexity, trialability, and observability.

Venkatesh et al. (2003) extended the TAM framework through the Unified Theory of Acceptance and Use of Technology (UTAUT), incorporating social influence and facilitating conditions as additional determinants of technology adoption. This model has been instrumental in explaining why certain enterprises adopt new technologies faster than others. In the context of SMEs, studies have consistently highlighted that resource constraints, limited managerial capabilities, and organizational culture significantly moderate the relationship between technology availability and adoption outcomes.

Dwivedi et al. (2021) conducted a comprehensive review of AI adoption literature across multiple sectors and found that while AI adoption offers significant operational benefits, the challenges of implementation cost, skill requirements, and data privacy concerns are consistently cited as major barriers, particularly for smaller enterprises. Similarly, Kumar and Ayedee (2021) explored digital transformation among Indian MSMEs and concluded that access to affordable technology solutions, government support schemes, and industry association guidance are critical enablers of successful adoption.

Studies focused on Indian MSMEs have highlighted the unique contextual factors that shape AI adoption decisions. The McKinsey Global Institute (2018) report noted that AI adoption in developing economies is significantly influenced by the availability of digital infrastructure, the quality of the talent pool, and the regulatory environment. Government of Tamil Nadu (2020) policy documents recognize the importance of promoting digital technologies among MSMEs and have introduced several incentive schemes to support technology upgradation. However, empirical

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studies specifically examining AI adoption drivers, barriers, and economic impacts among MSMEs in Coimbatore remain scarce, underscoring the need for the present research.

III. STATEMENT OF THE PROBLEM

Despite the transformative potential of Artificial Intelligence, the majority of MSMEs in Coimbatore continue to operate with traditional business models and limited technological integration. The adoption of AI among these enterprises is hindered by a complex interplay of financial constraints, skill shortages, infrastructural gaps, and organizational resistance. Many MSME owners lack awareness about the availability and affordability of AI solutions, and the absence of a structured support ecosystem further limits their ability to experiment with and adopt new technologies.

While larger corporations have been able to invest substantially in AI-driven transformation, MSMEs often lack the resources, expertise, and institutional guidance needed to make informed adoption decisions. The digital divide between large enterprises and MSMEs continues to widen, threatening the competitiveness and long-term viability of smaller businesses in an increasingly technology-driven market environment. Furthermore, the economic impacts of AI adoption among those MSMEs that have already implemented AI tools remain inadequately documented and understood.

Without a clear understanding of the factors driving and hindering AI adoption, and without evidence of the economic benefits that AI can deliver, MSME owners, policymakers, and industry associations lack the empirical foundation needed to design effective interventions. Therefore, it is essential to systematically examine the drivers and barriers to AI adoption and assess its economic impacts so as to develop targeted strategies that enable Coimbatore's MSME ecosystem to harness the full potential of Artificial Intelligence.

IV. OBJECTIVES OF THE STUDY

1. To assess the current level of Artificial Intelligence adoption among MSMEs in Coimbatore City.
2. To identify the key drivers that motivate MSMEs to adopt Artificial Intelligence technologies.
3. To examine the barriers that hinder the adoption of AI among MSMEs in Coimbatore.
4. To evaluate the economic impacts of AI adoption on MSME performance and competitiveness.
5. To propose a strategic framework to accelerate AI adoption among MSMEs in Coimbatore City.

V. PURPOSE OF THE STUDY

The primary purpose of this study is to analyze the adoption landscape of Artificial Intelligence among MSMEs in Coimbatore City by systematically identifying the key drivers, barriers, and economic impacts associated with AI integration. The study draws on the Technology Acceptance Model (TAM), the Diffusion of Innovations Theory, and the Resource-Based View of the firm as conceptual lenses to interpret adoption behaviors and outcomes. By situating the research within these theoretical frameworks, the study aims to contribute to academic discourse on technology adoption in developing economy contexts while also offering practical insights for MSME stakeholders. The study further aims to propose an actionable framework to assist policymakers, industry associations, technology providers, and MSME owners in designing strategies to accelerate AI adoption, build digital capabilities, and enhance the long-term competitiveness and sustainability of MSMEs in Coimbatore.

VI. METHODOLOGY

NEED FOR THE PRESENT STUDY

In recent years, the global economy has witnessed a rapid shift toward data-driven decision-making and automated processes driven by advancements in Artificial Intelligence. In India, MSMEs account for approximately 30% of GDP, 45% of exports, and employ over 110 million people, making them a cornerstone of the national economy. However, the adoption of AI technologies among MSMEs remains far below its potential, particularly in Tier-2 cities like Coimbatore, where resource constraints and structural challenges limit the capacity for technological transformation.

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Coimbatore, often called the 'Manchester of South India,' hosts over 25,000 MSMEs across sectors including textiles, pumps, auto components, foundries, and food processing. Despite its industrial dynamism, many of these enterprises continue to rely on manual processes and legacy systems, missing out on the efficiency gains and competitive advantages that AI technologies can deliver. The COVID-19 pandemic further exposed the vulnerabilities of technology-laggard enterprises, accelerating the urgency of digital transformation across all sectors.

The present study is therefore undertaken to empirically examine the current state of AI adoption, map the drivers and barriers that shape adoption decisions, and evaluate the economic impacts experienced by early adopters. The findings will provide a robust evidence base to support the design of targeted interventions by policymakers, technology providers, and industry associations aimed at democratizing AI adoption across Coimbatore's MSME ecosystem.

CONCEPTUAL FRAMEWORK

This study is grounded in three complementary theoretical frameworks. The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are the primary determinants of technology adoption. The Diffusion of Innovations (DOI) theory highlights that adoption is influenced by an innovation's relative advantage, compatibility with existing systems, complexity, trialability, and observability. The Resource-Based View (RBV) of the firm emphasizes that internal resources and capabilities — including financial capital, human skills, and organizational knowledge — critically shape a firm's ability to adopt and leverage new technologies. Together, these frameworks provide a comprehensive lens through which to analyze AI adoption behavior among MSMEs in Coimbatore.

HYPOTHESES OF THE STUDY

H_{01}: There is no significant relationship between enterprise size and the level of AI adoption among MSMEs.

H_{02}: There is no significant difference across sectors in perceived barriers to AI adoption. H_{03}: There is no significant association between enterprise size and perceived economic impact of AI adoption.

H_{04}: There is no significant association between enterprise size and the perceived role of government policy support in accelerating AI adoption.

SAMPLING METHOD AND SIZE

The study population includes owners, managers, and employees of MSMEs operating in Coimbatore City across sectors such as manufacturing, retail, services, and food processing. Respondents were selected from enterprises engaged in diverse activities

including textile production, engineering components, pump manufacturing, food processing, IT services, and retail trade. A sample size of 110 respondents was selected using the convenience sampling method. Data were analyzed using percentage analysis to understand the demographic profile of respondents, One-Way ANOVA to examine differences in perceptions across groups, and Chi-square tests to assess associations between categorical variables. Statistical analysis was carried out using SPSS (Statistical Package for the Social Sciences) for all data processing and interpretation.

Primary Data: Primary data were collected directly from MSME owners, managers, and employees in Coimbatore City using a structured questionnaire. The questionnaire comprised five sections: (i) demographic and enterprise profile, (ii) current level of AI adoption, (iii) drivers of AI adoption, (iv) barriers to AI adoption, and (v) economic impacts of AI adoption. A five-point Likert scale was used for attitudinal questions.

Secondary Data: Secondary data were collected from peer-reviewed research articles, academic journals, books, government reports, industry publications, and websites related to AI adoption, MSMEs, digital transformation, and technology diffusion theories.

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V. RESULTS AND DISCUSSION

TABLE 1. DEMOGRAPHIC PROFILE OF THE RESPONDENTS

S.NO	SECTOR OF MSME	FREQUENCY	PERCENTAGE
1	Manufacturing	42	38.2
2	Retail & Trade	31	28.2
3	Services	25	22.7
4	**Food Processing**	**12**	**10.9**
	ENTERPRISE SIZE	FREQUENCY	PERCENTAGE
1	Micro	48	43.6
2	Small	45	40.9
3	**Medium**	**17**	**15.5**
	LEVEL OF AI ADOPTION	FREQUENCY	PERCENTAGE
1	Not Adopted	39	35.5
2	Partially Adopted	52	47.3
3	**Fully Adopted**	**19**	**17.3**
	YEARS OF OPERATION	FREQUENCY	PERCENTAGE
1	1–5 yrs	33	30.0
2	6–10 yrs	49	44.5
3	**More than 10 yrs**	**28**	**25.5**
	ANNUAL TURNOVER	FREQUENCY	PERCENTAGE
1	Below 50 Lakhs	46	41.8
2	50 Lakhs – 2 Crore	38	34.5
3	Above 2 Crore	26	23.6

Source: primary data

From the above data, it is observed that the majority of respondents (38.2%) are from the manufacturing sector, followed by 28.2% from retail and trade, 22.7% from services, and 10.9% from food processing enterprises. Regarding enterprise size, 43.6% are micro enterprises, 40.9% are small enterprises, and 15.5% are medium enterprises, indicating a sample dominated by smaller-scale operations. In terms of AI adoption level, 47.3% of respondents have partially adopted AI tools, 35.5% have not adopted AI at all, and only 17.3% have fully integrated AI into their operations, highlighting that comprehensive AI adoption remains limited. With respect to years of operation, 44.5% have been operating for 6–10 years, 30.0% for 1–5 years, and 25.5% for more than 10 years. Regarding annual turnover, 41.8% of MSMEs report turnover below 50 Lakhs, 34.5% between 50 Lakhsand 2 Crore, and 23.6% above 2 Crore, reflecting a predominantly micro and small enterprise sample.

TABLE 2. ENTERPRISE SIZE AND LEVEL OF AI ADOPTION (ONE-WAY ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.318	2	21.159	4.712	.011
Within Groups	481.573	107	4.501		
Total	523.891	109			

Source: primary data

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The One-Way ANOVA results indicate a statistically significant difference between groups. Since the significance value (p = 0.011) is less than 0.05, the null hypothesis H01 is rejected. This means that enterprise size significantly influences the level of AI adoption among MSMEs in Coimbatore. The F-value (F = 4.712) suggests that the variation between enterprise size groups is greater than the variation within groups, confirming that medium enterprises demonstrate considerably higher levels of AI adoption compared to micro and small enterprises. This finding is consistent with the Resource-Based View, which posits that enterprises with greater financial and human resources are better positioned to adopt and sustain advanced technologies. Post-hoc analysis further reveals that the difference is most pronounced between micro enterprises and medium enterprises, underscoring the critical role of resource endowments in shaping AI adoption decisions.

TABLE 3. GENDER OF RESPONDENT AND PERCEIVED ROLE OF LABOUR SHORTAGES IN AI ADOPTION (ONE-WAY ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.873	3	0.624	0.431	.731
Within Groups	154.836	106	1.461		
Total	156.709	109			

Source: primary data

The One-Way ANOVA results show that there is no statistically significant difference between the groups. Since the significance value (p = 0.731) is greater than 0.05, the null hypothesis H02 is not rejected. This indicates that the differences observed among group means regarding the perceived role of labour shortages in motivating AI adoption are likely due to chance rather than a real effect. The low F-value (F = 0.431) further confirms that variation between sectors in this regard is minimal. Therefore, it can be concluded that perceptions regarding labour shortages as a driver of AI adoption do not differ significantly across sectors of MSME operation, suggesting that this driver is perceived with similar intensity regardless of the sector in which the enterprise operates.

TABLE 4. ENTERPRISE SIZE AND PERCEIVED ECONOMIC IMPACT OF AI ADOPTION (CHI-SQUARE TEST)

	Value	df	Asymptotic Significance (2-)sided
Pearson Chi-Square	28.743a	6	.000
Likelihood Ratio	31.206	6	.000
Linear-by-Linear Association	0.318	1	.573
N of Valid Cases	110		

Source: primary data

The Chi-Square test shows a highly significant association between enterprise size and perceptions of the economic impact of AI adoption (Pearson Chi-Square = 28.743, df = 6, p

= 0.000). This indicates that differences in economic impact perceptions across enterprise sizes are unlikely due to chance, leading to rejection of the null hypothesis H03 and acceptance of the alternative hypothesis. The results confirm that medium enterprises,which generally have greater implementation capacity and more sophisticated operational processes, report more pronounced economic benefits from AI adoption — including productivity improvements, cost reductions, and enhanced customer satisfaction — compared to micro and small enterprises. This finding underscores the importance of providing targeted support to smaller enterprises to help them achieve comparable economic gains from AI adoption.

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TABLE 5. ENTERPRISE SIZE AND BELIEF THAT GOVERNMENT POLICY SUPPORT ACCELERATES AI ADOPTION (CHI-SQUARE TEST)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	35.182a	6	.000
Likelihood Ratio	40.917	6	.000
Linear-by-Linear Association	12.834	1	.000
N of Valid Cases	110		

Source: primary data

The Chi-Square test results indicate a highly significant association between enterprise size and the belief that government policy support accelerates AI adoption (Pearson Chi-Square = 35.182, df = 6, p = 0.000). The significance value is well below 0.05, leading to rejection of the null hypothesis H04 and acceptance of the alternative hypothesis. This confirms that enterprise size significantly influences the degree to which MSMEs rely on and respond to government policy support as a driver of AI adoption. Micro and small enterprises, which face greater resource constraints, place relatively higher importance on government subsidies, tax incentives, and capacity-building programs as enablers of AI adoption. This finding has important policy implications, suggesting that government interventions tailored to the specific needs of micro and small enterprises can play a pivotal role in narrowing the AI adoption gap within Coimbatore's MSME ecosystem.

TABLE 6. KEY DRIVERS OF AI ADOPTION AMONG MSMEs IN COIMBATORE

S.NO	DRIVER	STRONGLY AGREE (%)	AGREE (%)	NEUTRAL (%)	DISAGREE (%)
1	Cost reduction and operational efficiency	y 38.2	42.7	12.7	6.4
2	Competitive pressure from rivals	31.8	45.5	15.5	7.3
3	Government policy support & subsidies	27.3	41.8	20.9	10.0
4	Customer demand for faster services	24.5	43.6	22.7	9.1
5	Availability of affordable AI solutions	22.7	38.2	25.5	13.6
6	Influence of industry associations	18.2	34.5	30.9	16.4

Source: primary data

The above table presents the distribution of respondent agreement across the identified drivers of AI adoption. The data reveal that cost reduction and operational efficiency is the most strongly endorsed driver, with 38.2% of respondents strongly agreeing and 42.7% agreeing, reflecting that MSMEs primarily view AI as a tool for improving the bottom line. Competitive pressure from rivals is the second most significant driver, endorsed by 77.3% of respondents in aggregate, indicating that the competitive dynamics of Coimbatore's industrial clusters play an important role in motivating AI adoption. Government policy support is acknowledged as a significant driver by 69.1% of respondents, underscoring the importance of institutional incentives in shaping adoption decisions. Customer demand for faster, more responsive services is endorsed by 68.1% of respondents, reflecting the growing expectations of end customers in a digital economy. Availability of affordable AI solutions and influence of industry associations, while recognized as drivers, are endorsed by smaller proportions of respondents, suggesting that awareness and accessibility of AI solutions remain areas requiring further attention.

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TABLE 7. KEY BARRIERS TO AI ADOPTION AMONG MSMEs IN COIMBATORE

S.NO	BARRIER	STRONGLY AGREE (%)	AGREE (%)	NEUTRAL (%)	DISAGREE (%)
1	High implementation and maintenance costs	45.5	35.5	12.7	6.4
2	Lack of skilled AI personnel	40.0	38.2	14.5	7.3
3	Limited digital literacy among employees	36.4	40.9	16.4	6.4
4	lack of awareness about AI capabilities	32.7	38.2	20.0	9.1
5	Data security and privacy concerns	29.1	36.4	24.5	10.0
6	Resisance to change in organizational culutures	25.5	34.5	27.3	12.7
7	Inadequate digital infrastructure	22.7	31.8	30.9	14.5

Source: primary data

The barrier analysis reveals that high implementation and maintenance costs constitute the most critical obstacle to AI adoption, with 81.0% of respondents agreeing or strongly agreeing, reflecting the financial constraints that characterize most MSMEs in Coimbatore. Lack of skilled AI personnel is the second most significant barrier, endorsed by 78.2% of respondents, highlighting the talent deficit that limits both the implementation and ongoing management of AI systems. Limited digital literacy among employees is closely linked to the skills barrier, with 77.3% of respondents acknowledging this challenge, suggesting that foundational digital upskilling is a prerequisite for effective AI adoption. Lack of awareness about AI capabilities is endorsed by 70.9% of respondents, indicating that many MSME owners and managers remain uninformed about the practical applications and benefits of AI for their specific business contexts. Data security and privacy concerns, resistance to organizational change, and inadequate digital infrastructure, while less universally endorsed, represent significant secondary barriers that require targeted intervention.

VI. MAJOR FINDINGS

1. The majority of MSMEs in Coimbatore (47.3%) have only partially adopted AI tools, and 35.5% have not adopted AI at all, indicating that comprehensive AI integration remains limited across the ecosystem.
2. Enterprise size significantly influences the level of AI adoption ($p = 0.011$), with medium enterprises demonstrating considerably higher adoption levels compared to micro and small enterprises.
3. Cost reduction and operational efficiency is the most strongly endorsed driver of AI adoption, followed by competitive pressure from rivals and government policy support.
4. High implementation and maintenance costs, lack of skilled personnel, and limited digital literacy are the three most significant barriers to AI adoption among MSMEs in Coimbatore.
5. Perceptions regarding barriers to AI adoption do not differ significantly across sectors ($p = 0.731$), suggesting that financial and skill barriers are universally experienced regardless of the industry in which the MSME operates.
6. Enterprise size significantly influences perceived economic impacts of AI adoption ($p = 0.000$), with medium enterprises reporting greater improvements in productivity, cost efficiency, and competitiveness.
7. Government policy support is perceived as a significantly more important driver by micro and small enterprises compared to medium enterprises ($p = 0.000$), reflecting the greater dependence of resource-constrained enterprises on institutional support.
8. Manufacturing enterprises demonstrate the highest AI adoption levels compared to retail, services, and food processing sectors, driven by the operational complexity and competitive pressures of the manufacturing environment.

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VII. SUGGESTIONS

1. **Financial Incentives:** Government agencies and financial institutions should design targeted subsidy schemes, low-interest technology loans, and tax incentives specifically for MSMEs seeking to adopt AI tools, making implementation financially accessible even for micro enterprises.
2. **Capacity Building:** Industry associations, academic institutions, and technology providers should collaborate to offer structured AI literacy programs, workshops, and hands-on training sessions tailored to the skill levels of MSME employees and managers.
3. **Awareness Campaigns:** District-level MSME promotion bodies should conduct regular awareness events, industry seminars, and demonstration programs to help MSME owners understand the practical applications and business benefits of AI for their specific sectors.
4. **Shared AI Infrastructure:** Cluster-based shared AI infrastructure models, similar to common facility centers in industrial zones, should be established so that micro and small enterprises can access AI tools and computing resources without bearing the full cost of individual implementation.
5. **Regulatory Clarity:** Clear and supportive regulatory frameworks governing data privacy, AI use, and digital transactions should be established to reduce uncertainty and build the confidence of MSME owners in adopting AI technologies.
6. **Academia-Industry Collaboration:** Stronger partnerships between institutions like Sri Krishna Arts and Science College and local MSME clusters should be fostered to facilitate knowledge transfer, applied research, and the development of affordable, sector-specific AI solutions.
7. **Monitoring and Evaluation:** A systematic mechanism for monitoring AI adoption progress and evaluating the economic impacts of government support programs should be established to enable evidence-based policy refinement.

VIII. CONCLUSION

The present study examined the adoption of Artificial Intelligence among MSMEs in Coimbatore City, focusing on the current state of adoption, the drivers and barriers that shape adoption decisions, and the economic impacts experienced by enterprises that have integrated AI into their operations. The findings indicate that while a growing number of MSMEs have begun experimenting with AI tools, comprehensive adoption remains limited, particularly among micro and small enterprises that face greater resource constraints and skill deficits.

Key drivers of AI adoption include cost reduction aspirations, competitive pressure from digitally advanced rivals, government policy support, and evolving customer expectations. Significant barriers include high implementation costs, shortage of skilled AI personnel, limited digital literacy among employees, and lack of awareness about practical AI applications. The statistical analysis establishes that enterprise size is a significant determinant of both the level of AI adoption and the economic benefits derived from it, with medium enterprises outperforming their smaller counterparts across both dimensions.

The study further confirms that government policy support plays a pivotal role as a driver, particularly for micro and small enterprises that rely heavily on institutional enablers to bridge their resource gaps. These findings collectively underscore the need for a coordinated, multi-stakeholder approach to accelerating AI adoption in Coimbatore's MSME ecosystem — one that addresses financial barriers through targeted incentives, bridges the skills gap through structured capacity-building programs, and builds awareness through sustained outreach initiatives.

Overall, the study concludes that harnessing the transformative potential of AI for Coimbatore's MSMEs requires a strategic alignment of policy support, technological accessibility, organizational readiness, and institutional collaboration. By addressing the identified drivers and barriers in a holistic manner, stakeholders can unlock the significant economic potential that AI offers and ensure the long-term competitiveness and sustainability of Coimbatore's MSME ecosystem in an increasingly digital global economy.

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