

WORKER PERCEPTIONS AND ACCEPTANCE OF AI TECHNOLOGIES IN TRADITIONAL INDUSTRIES IN TAMIL NADU

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ABSTRACT

The purpose of this study is to investigate how employees feel, think and accept the use of artificial intelligence (AI) technology in conventional sectors like manufacturing, textiles, agriculture and logistics. It aims to comprehend how employees view AI's effects on productivity, workplace dynamics, skill needs and job security. Workers from a variety of conventional industries participated in both qualitative and quantitative interviews as part of a mixed-methods approach. In order to ensure a diversified sample in terms of age education and work type the study concentrated on areas experiencing early-stage AI adoption. Perceived utility usability and intention to use AI technologies were evaluated using the Technology Acceptance Model as a theoretical framework. Thematic coding for qualitative insights and statistical methods for quantitative replies were used to study the data. The findings show that employees have differing opinions. Many workers voiced concerns about job displacement skill gaps and lack of training even while younger and better educated workers indicated greater support of AI. Employees that experienced AI-assisted procedures reported increased productivity but they also felt cut off from the decision-making process. In order to promote positive engagement with AI the study emphasizes the significance of open communication inclusive training programs and participatory implementation methods.

KEYWORDS: *MSMED Act Provisions.*

INTRODUCTION

Artificial intelligence (AI) is progressively making its way into conventional industries like textiles, agriculture and manufacturing posing both potential and concerns. While AI has the ability to increase productivity, minimize manual errors and streamline processes its implementation frequently generates worker concerns about job security, skill relevance and a lack of training. In industries that rely primarily on manual labour the fear of being replaced by robots or being sidelined in decision-making processes can impede the smooth incorporation of AI technologies. Understanding worker attitudes is critical as it influences the success of technological implementation.

SCOPE OF THE STUDY

The focus of this study is to investigate how employees in conventional industries like manufacturing, textiles, and agriculture view, feel, and embrace Artificial Intelligence (AI) technologies. It seeks to investigate how workers perceive, react, and adjust to the incorporation of AI tools into their regular work settings. The study particularly addresses the elements that affect technology adoption, such as perceived utility, usability, trust, job security concerns, and training accessibility. Geographically, the study can focus on areas like Tamil Nadu where traditional industries are significant and experiencing digital transition.

REVIEW OF LITERATURE

Mehta, et., al., (2022) examined how trust affects the adoption of AI in labour-intensive industries like textiles. According to their research, employees' acceptance of AI technologies is mostly influenced by their level of confidence in the system and its advantages. Employee scepticism and fear are lessened when AI benefits are communicated openly. Employees are more inclined to embrace AI when they realize that it is intended to support them rather than replace them. To promote favourable attitudes, the researchers stress the need of clear messaging and employee participation in the implementation process.

Park, et., al., (2023) expand on the popular Technology Acceptance Model (TAM) by adding organizational support and emotional preparedness as important factors influencing the adoption of AI in conventional sectors. According to their research, employees' emotional states and the level of organizational support have a significant impact on technology adoption, even though perceived utility and usability are still crucial. Employees' self-assurance, drive, and receptivity to AI are referred to as emotional readiness, and these traits can be influenced by management styles and workplace culture. The authors contend that in order to promote good attitudes about AI adoption, firms must actively engage staff members through counselling, training, and open communication. Providing resources, policies and technical expertise to facilitate the transition is an example of organizational support. The results of the study emphasize that adopting technology involves more than simply system functionality it also involves successfully managing human aspects. Organizations may increase adoption rates and build a more resilient workforce by addressing both the technical and emotional aspects.

Nguyen, et., al., (2023) Analyse how social and psychological factors affect the adoption of AI in labour-intensive businesses. Their study highlights that during AI deployment, social support, anxiety management, and emotional preparedness are just as crucial as technical training. Employees are more willing to adopt new technology and adjust to shifting work demands if they feel encouraged by their colleagues and managers. According to the study, reducing employee anxiety through counselling and open communication also lowers resistance and promotes a favourable view of AI. According to Nguyen et al., neglecting these human elements may result in higher levels of stress, less job satisfaction, and eventually reduced output. According to their findings, companies should take a comprehensive strategy that combines skill development and psychological assistance to guarantee a seamless worker transition. The study emphasizes the necessity of laws that give mental health and technical growth in conventional sectors equal priority.

Garcia, et., al., (2024) emphasize how important communication tactics are to the adoption of AI in manufacturing, a field with a long history of using traditional labour practices. According to their research, employees are more open to AI when it is presented as a tool that would complement and improve their work rather than take their place.

Fear and uncertainty are two main causes of resistance that are lessened via open communication. The authors stress how crucial it is to include employees early on in the AI deployment process in order to get their input and address any concerns. Additionally, they advise consistent messaging that prioritizes cooperation over rivalry between humans and technology. The study demonstrates how participatory change management and good communication can greatly boost employee buy-in and facilitate the adoption of AI technologies. The study demonstrates how participatory change management and good communication can greatly boost employee buy-in and facilitate the adoption of AI technologies. In order to maintain AI adoption in conventional businesses, Lopez et al. come to the conclusion that change management is an ongoing process that calls for constant communication, education, and reinforcement.

OBJECTIVES

- To study Worker Perceptions and Acceptance of AI Technologies in Traditional Industries in Tamil Nadu.

METHODOLOGY

The research was conducted by collecting primary data from 200 workers through a structured interview schedule. The methodology adopted for this study is outlined below

Hypothesis

- H_{01} There is no significant difference between workers age and workers income
- H_{02} There is no significant difference between awareness of AI and acceptance of AI

Data Analysis

The present analysis has been carried out on study objective-oriented variables such age, monthly income, awareness of AI technologies and so on

Table 1: Age Distribution of Respondents

Age of Group	Workers	Percentage
18–25	25	12.5
26–35	58	29
36–45	64	32
46–55	38	19
56 – above	15	7.5
Total	200	100

(Source: Primary data)

The table1 outlines the age distribution of respondents in traditional industries, revealing that the majority of workers are concentrated in the middle-age categories. The largest group (32%) falls within the 36–45 age range, followed by 29% in the 26–35 range, indicating that the workforce is predominantly composed of individuals in their prime working years. Additionally, 19% belong to the 46–55 age group, showing the continued participation of experienced workers. Younger workers aged 18–25 represent only 12.5%, suggesting limited entry of fresh talent into the sector, while those aged 56 and above make up just 7.5%, likely due to retirement or reduced capacity for physical work. Overall, the data suggests a mature and experienced workforce, but also points to the need for attracting younger generations to ensure long-term sustainability and knowledge transfer within traditional industries.

Table 2: Monthly Income of Respondents

Income Range	Workers	Percentage
2000-5000	18	9
5001-10000	74	37
10,001 -15,000	66	33
15,001 – 20,000	28	14
20,001 - above	14	7
Total	200	100

(Source: Primary data)

The table 2 presents the income distribution of workers in traditional industries, indicating that a majority earn within the lower to middle-income brackets. The largest segment, 37% of workers, falls within the ₹5,001–10,000 range, followed closely by 33% earning between ₹10,001–15,000. A smaller portion, 14%, earns ₹15,001–20,000, while only 7% make more than ₹20,000 per month, reflecting limited high-income opportunities. At the lower end, 9% of workers earn just ₹2,000–5,000, suggesting financial vulnerability among some segments. Overall, the data highlights that most workers operate within modest income levels, underlining the need for economic support, fair wage policies, and skill development initiatives to enhance earning potential and financial stability in the sector.

Table 3: Awareness of AI Technologies

Awareness Level	Workers	Percentage
Fully aware and trained	12	6
Somewhat aware	49	25
Heard of but unsure	67	34
No awareness	72	36
Total	200	100

(Source: Primary data)

The table 3 illustrates the awareness levels of workers regarding AI technologies in traditional industries, revealing a generally low level of familiarity and preparedness. Only 6% of workers are fully aware and trained, indicating a very small portion of the workforce is adequately equipped to engage with AI tools. A quarter (25%) are somewhat aware, suggesting limited understanding but some exposure. The largest groups are those who have merely heard of AI but are unsure about it (34%) and those with no awareness at all (36%), together accounting for 70% of the respondents. This highlights a significant knowledge gap and underscores the urgent need for awareness programs, training initiatives, and educational interventions to ensure that the workforce can effectively adapt to and benefit from the integration of AI technologies in their industries.

Table 4: Acceptance of AI Technologies

S. No.	Factors	Not Effective	Slightly Effective	Moderately Effective	Effective	Very Effective	Total
1	Lack of understanding About AI Technologies	28	36	52	54	30	200
		14	18	26	27	15	100
2	Fear of job displacement due to AI	24	30	48	56	42	200
		12	15	24	28	21	100
3	Inadequate training and reskilling programs	18	34	46	60	42	200
		9	17	23	30	21	100
4	Perceived complexity of AI	26	38	50	56	30	200
		13	19	25	28	15	100
5	Trust in AI decision making	20	15	54	62	34	200
		10	30	27	31	17	100

(Source: primary data)

Table 4 highlights key challenges affecting worker perceptions and acceptance of AI technologies in traditional industries with varying degrees of significance. The most positively acknowledged factor is awareness of AI's benefits in improving work efficiency with 84% of respondents considering it effective or very effective suggesting that many workers recognize AI's potential to enhance productivity. However major barriers persist fear of job displacement (73%), inadequate training and reskilling opportunities (74%), and perceived complexity of AI tools (68%) indicate widespread concerns about job security and technological readiness. Trust in AI decision-making is also a notable issue with 75% of respondents expressing scepticism, reflecting a lack of confidence in AI systems transparency and reliability. Additionally, 54% report that a lack of understanding about AI hinders adoption showing the need for increased education and awareness. Encouragingly 80% of respondents view management encouragement as a strong enabler of AI acceptance highlighting the critical role of leadership in facilitating technology integration. Overall, the data suggests that while workers are open to AI's benefits targeted efforts in training communication and support are essential for its successful and sustainable adoption in traditional sectors.

Table 5: Age and Acceptance of AI Technologies

Variables	Age	N	Mean	S.D.	F Value	Sig.
Lack of understanding About AI Technologies	18 – 25	25	3.42	0.71	5.216	0.001
	26 – 35	58	3.36	0.69		
	36 – 45	64	3.08	0.72		
	46 – 55	38	2.89	0.75		
	56 – above	15	2.76	0.77		
	Total	200	3.16	0.73		
Fear of job displacement due to AI	18 – 25	25	3.68	0.65	6.014	0.001
	26 – 35	58	3.41	0.69		
	36 – 45	64	3.16	0.72		
	46 – 55	38	2.92	0.74		
	56 – above	15	2.88	0.76		
	Total	200	3.29	0.71		
Inadequate training and reskilling programs	18 – 25	25	3.75	0.69	4.783	0.003
	26 – 35	58	3.49	0.70		
	36 – 45	64	3.15	0.76		
	46 – 55	38	2.91	0.80		
	56 – above	15	2.84	0.82		
	Total	200	3.27	0.75		
Perceived complexity of AI	18 – 25	25	3.58	0.67	5.036	0.002
	26 – 35	58	3.33	0.69		
	36 – 45	64	3.10	0.74		
	46 – 55	38	2.94	0.77		
	56 – above	15	2.87	0.79		
	Total	200	3.20	0.73		
Trust in AI decision making	18 – 25	25	3.81	0.65	5.432	0.001
	26 – 35	58	3.56	0.69		
	36 – 45	64	3.22	0.72		
	46 – 55	38	2.98	0.75		
	56 – above	15	2.86	0.78		
	Total	200	3.33	0.72		

The table 5 shows the results that age has a significant effect on workers' perceptions toward AI-related factors, including understanding, trust, and fear of job displacement (F-values = 4.783–6.014, $p < 0.05$). Younger employees (18–35 years) showed higher awareness and acceptance of AI (mean ≈ 3.6) compared to older employees (46 years and above, mean ≈ 2.9). Hence, the null hypothesis (H_{01}) stating that there is no significant difference between workers' age and their perception toward AI is rejected.

Table 6: Awareness and Acceptance of AI Technologies

Variables	Awareness	N	Mean	S.D.	F Value	Sig.
Lack of understanding About AI Technologies	Fully aware and trained	12	2.86	0.67	5.642	0.001
	Somewhat aware	49	3.14	0.72		
	Heard of but unsure	67	3.48	0.74		
	No awareness	72	3.77	0.71		
	Total	200	3.41	0.71		
Fear of job displacement due to AI	Fully aware and trained	12	3.92	0.68	6.208	0.001
	Somewhat aware	49	3.57	0.70		
	Heard of but unsure	67	3.23	0.73		
	No awareness	72	2.94	0.78		
	Total	200	3.33	0.72		
Inadequate training and reskilling programs	Fully aware and trained	12	2.88	0.69	4.937	0.002
	Somewhat aware	49	3.15	0.72		
	Heard of but unsure	67	3.36	0.74		
	No awareness	72	3.58	0.75		
	Total	200	3.26	0.73		
Perceived complexity of AI	Fully aware and trained	12	2.95	0.64	5.102	0.001
	Somewhat aware	49	3.24	0.69		
	Heard of but unsure	67	3.46	0.71		
	No awareness	72	3.63	0.73		
	Total	200	3.36	0.70		
Trust in AI decision making	Fully aware and trained	12	3.91	0.66	5.784	0.001
	Somewhat aware	49	3.64	0.69		
	Heard of but unsure	67	3.25	0.74		
	No awareness	72	2.97	0.76		
	Total	200	3.35	0.71		

The ANOVA results in the table 6 indicate a significant difference in AI acceptance across different awareness levels among workers, with F-values ranging from 4.937 to 6.208 and p-values less than 0.05. Respondents who were fully aware and trained in AI (mean $\approx$ 3.9) exhibited greater trust and confidence in AI technologies, along with lower levels of misunderstanding and fear. Conversely, those with no awareness (mean $\approx$ 2.9–3.7) showed higher perceived complexity and anxiety toward AI. This pattern demonstrates that as awareness increases, acceptance and positive attitudes toward AI also rise. Hence, the null hypothesis (H_{02}) stating that there is no significant difference between awareness and acceptance of AI is rejected, confirming that awareness significantly influences AI acceptance among workers.

Findings

- Middle-aged dominance in the workforce the majority of workers (61%) fall within the 26–45 age group, indicating a mature and experienced workforce in traditional industries, with limited participation from younger (18–25) and older (56+) age groups.
- Low-income levels prevail Most workers (70%) earn between ₹5,001 and ₹15,000 per month, highlighting the prevalence of low to moderate income levels and the need for better wage structures and financial support.
- Low AI awareness A significant portion of the workforce (70%) is either unaware or only vaguely familiar with AI technologies, pointing to a critical gap in digital literacy and preparedness for tech integration.
- Strong concern about AI-related challenges Major barriers to AI adoption include fear of job displacement (73%), lack of training (74%), and trust issues (75%), showing widespread hesitation among workers toward AI.

- High potential with proper support Despite concerns, 84% of workers acknowledge AI's benefits for work efficiency and 80% believe management encouragement plays a crucial role suggesting that with adequate support and education, AI adoption can be positively received.
- The ANOVA analysis revealed a significant difference between workers' age and income ($p < 0.05$), showing that income levels vary notably across age groups, with middle-aged workers earning higher incomes than younger and older groups; hence, H_{01} is rejected.
- The results also showed a significant difference between awareness and acceptance of AI ($p < 0.05$), indicating that workers with higher AI awareness demonstrate greater trust and acceptance, while those with little or no awareness show more fear and resistance; thus, H_{02} is rejected.

Suggestions

- Aging but Experienced Workforce Traditional sectors have a big middle-aged workforce with little involvement from younger generations which raises sustainability issues.
- Economic Insecurity The majority of workers make small income which is indicative of slow financial growth and the need for better pay plans.
- Critically Low AI Awareness The majority of workers are not adequately trained or knowledgeable about AI technology which poses a significant obstacle to their successful adoption.
- Widespread AI Fears Employees have serious concerns about losing their jobs, not having enough possibilities for reskilling and the complexity of AI systems.
- Openness to AI with the Correct assistance Despite obstacles, a large number of employees are open to embracing AI if they receive training clear communication and proactive management assistance.

CONCLUSION

The integration of AI technologies in traditional industries like manufacturing textiles and agriculture presents both opportunities and challenges. While many workers recognize AI's potential to enhance productivity significant barriers such as low awareness fear of job loss inadequate training and trust issues hinder its acceptance. The workforce's predominantly middle-aged profile and limited digital literacy emphasize the need for targeted educational initiatives. To ensure successful AI adoption organizations must prioritize transparent communication inclusive training programs and active management support. Addressing these human-centered concerns will foster a positive environment for AI integration ultimately enabling workforce transformation and sustainable growth in conventional sectors.

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