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Impact of artificial intelligence on employment in India: A study in Kolkata, West Bengal

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Abstract
Rapid advancements in artificial intelligence (AI) technologies have significant implications for employment patterns in Kolkata, West Bengal. This study investigates the impact of AI on employment in Kolkata through an exploratory and empirical approach, utilizing primary data collected via an online survey of 80 respondents from diverse industries and socioeconomic backgrounds. This study examined the awareness and adoption of AI, perceptions regarding its impact on employment, and the perceived effects of AI on job opportunities and displacement. The findings reveal a significant impact of AI on employment in Kolkata, with mixed perceptions of job creation and displacement. While 50% of respondents believed that AI could create more job opportunities, an equal proportion disagreed that it would lead to increased job displacement. The study also highlights the potential benefits of AI for skilled workers, with 60% of respondents indicating that AI would primarily benefit skilled employees. Furthermore, 50% of respondents agreed that AI adoption requires workers to upgrade their knowledge and skills. The overall impact of AI on employment was perceived as positive by 40% of respondents, while 40% remained neutral, and only 20% perceived a negative impact. This study emphasizes the need for proactive policies to manage AI integration in the workforce, including targeted training programs, clear communication about AI's impact on jobs, and strategies to leverage AI's benefits while mitigating adverse effects. The findings provide valuable insights for policymakers and industry leaders in Kolkata to develop inclusive and sustainable approaches to an AI-driven economy.

Keywords: Artificial Intelligence (AI), employment, Kolkata, job displacement, job creation, skill transformation, policy measures, etc

1. Introduction
Rapid advancements in artificial intelligence (AI) technologies have significant implications for global employment patterns. In India, particularly in Kolkata, West Bengal, the integration of AI is transforming the employment landscape, necessitating a comprehensive understanding of its impact on the job market. The influence of AI on employment can be observed in several dimensions, including automation, job creation, and skill transformation. AI technologies, such as Natural Language Processing, Machine Vision, Automation, and Augmentation, have become integral to processes such as recruitment and selection, delivering outcomes such as increased efficiency and reduced biases in the information technology sector (Hemalatha *et al*., 2021) [12]. However, the broader implications of these technologies extend beyond the recruitment practices. Globally, AI is recognized for its potential to automate jobs, potentially displacing low-skilled labour, and its ability to complement workforce capabilities, leading to job and service enhancements. For instance, studies in the U.S. and South Africa emphasize the dual role of AI in automating jobs while also necessitating new skill sets, particularly affecting low-skilled workers (Bonfiglioli *et al*., 2024; Giwa & Ngepah, 2024) [6, 10]. Importantly, AI also creates new employment opportunities by fostering innovation and creating the need for new job categories in response to technological advancements (Soueidan & Shoghari, 2024) [21]. In Kolkata, a city known for its diverse economic activities ranging from technology to traditional industries, the introduction of AI could have varied impacts. The automation brought on by AI could lead to job displacement in sectors reliant on routine and repetitive tasks, as seen globally (Du, 2024) [8]. However, this also presents opportunities for economic growth if complemented by strategic policy measures, such as upskilling and reskilling programs targeted at equipping the workforce with the necessary competencies to navigate the

changing job market dynamics (Gu *et al*., 2022) [11]. Economic policies that emphasize continuous learning and adaptation can mitigate employment disruptions and foster a smoother transition to AI-integrated work environments. Further investigation into the regional effects of AI on the service industry in China highlights the positive direct and indirect impacts AI can have on employment, including job creation and enhanced employment structures, which can be considered in the context of Kolkata (Gu *et al*., 2022) [11]. Policymakers and industry leaders in India must observe and learn from these international experiences to harness AI's benefits of AI while minimizing its adverse impact on employment. In conclusion, understanding AI's impact on employment in Kolkata suggests a nuanced approach that balances technological advancement with proactive labour market strategies. This ensures that AI integration contributes positively to economic development, while protecting workers' interests and promoting equitable growth.

2. Statement of the Problem

The impact of Artificial Intelligence (AI) on employment in Kolkata, West Bengal, represents a critical area of inquiry owing to the swift advancement in AI technologies and their integration across various sectors. AI's capacity to automate tasks traditionally executed by humans presents both opportunities and challenges for the workforce in Kolkata. As AI continues to advance, it holds the potential to enhance productivity and efficiency across diverse industries while simultaneously posing a threat to human labour, particularly in roles that are routine or require less specialized skills. In Kolkata, a city with a diverse economy significantly supported by sectors such as manufacturing, information technology, and service industries, the introduction of AI necessitates an assessment of its implications for employment in these sectors. Similar to experiences in other regions, AI may lead to job displacement, particularly affecting low-skilled workers, while potentially fostering growth in technology-driven sectors that demand new skill sets and competencies (Giwa & Ngepah, 2024; Lane & Saint-Martin, 2021) [10, 15]. The situation in Kolkata may reflect trends observed in other regions where AI adoption has resulted in a dual impact: on the one hand, enhancing capability and productivity, and on the other, causing shifts in employment structures. This duality underscores the importance of formulating policies that address skill gaps, promote reskilling, and manage transitions to new job roles necessitated by AI advancements (Bessen, 2018; Du, 2024) [5, 8]. Therefore, the challenge lies in understanding the specific nature and extent of AI's impact on the employment landscape in Kolkata, identifying the sectors most vulnerable to automation, and assessing the socioeconomic outcomes for workers. This study aims to discern these impacts to guide policymakers and industry leaders in developing strategies that harness the benefits of AI while mitigating its adverse employment effects.

3. Literature Review

Extensive research has been conducted to explore the multifaceted impact of artificial intelligence on employment in India. Numerous pertinent research articles and papers have examined the effects of AI on employment in India and internationally. This study reviewed the most relevant and recent articles, which are presented below.

Anjali and Sreerekha (2025) [2] analyzed AI's impact on employment in India, examining opportunities and challenges. Their study projects that AI will create 12 million jobs by 2025 in sectors such as IT, healthcare, finance, and manufacturing. However, they note the risks of job displacement in labour-intensive industries. The authors emphasize the need for proactive policies, including upskilling and regulatory frameworks, to ensure an inclusive transition to an AI-driven economy. This paper advocates for strategic investments in human capital to leverage AI's benefits of AI while mitigating its adverse effects.

Bali (2025) [4] examined AI's effects of AI on employment in India, highlighting the opportunities and challenges. The study shows that AI drives innovations across the healthcare, agriculture, finance, and manufacturing sectors, boosting productivity and creating high-skilled jobs. However, it also notes challenges such as the displacement of routine workers, skill gaps, and ethical concerns. This study emphasizes government initiatives such as the National Strategy for AI and Skill India Mission for workforce development. It recommends policies for inclusive growth, ethical AI development, and infrastructure investments to maximize the benefits while minimizing the adverse effects of India's sustainable development.

Huang (2024) [13] investigated AI's impact on U.S. employment across regions from 2010 to 2021. Using the shift-share methodology, the study found that regions with higher AI adoption showed greater declines in employment-to-population ratios. The effects were strongest in manufacturing, low-skill services, middle-skill workers, non-STEM jobs, and workers aged 16-25 and above 46, with men being more affected than women. These findings highlight the uneven distributional impact of AI and the need for targeted policy interventions.

Mishra and Srivastava (2024) [16] examined AI's impact on employment in India. Their study shows that AI will drive the industrial revolution, cause job displacement, and create new opportunities across the manufacturing, retail, healthcare, and finance sectors. The research indicates that while AI may automate tasks, it promotes productivity and growth by creating new roles through upskilling. This study also addresses data privacy and ethical concerns, emphasizing the need for regulations. This study recommends training and policy reforms to leverage the benefits of AI while minimizing risks for sustainable employment in India.

Ahmed (2024) [2] examined artificial intelligence's (AI) impact on employability in India. This study explores AI's potential of AI to transform work opportunities globally through a new industrial revolution. This study analyzed secondary data from 20 research papers and reports. The AI market in India is projected to reach $25 billion by 2025, growing at an annual rate of 30%. AI is revolutionizing multiple sectors, transforming farming in agriculture, driving IT research investments, enhancing healthcare diagnostics, improving banking efficiency, and automating manufacturing while creating skilled labour opportunities. AI and data are expected to contribute $450-500 billion to India's GDP by 2025. While AI threatens some jobs, it will not replace high-level decision-making positions. The AI revolution will enhance India's infrastructure and its economic growth.

Nasreen *et al*. (2025) [17] examined AI's impact of AI on employment as a transformative technology across

industries. This study analyzes AI's influence of AI through automation and AI-enhanced roles, from early automation to current systems. AI creates opportunities in data science, cybersecurity, and AI ethics while displacing jobs in manufacturing, retail, and customer service. This study emphasizes education and reskilling through STEM programs and public-private partnerships to address the employment impact of AI. The study concludes that while AI challenges employment, proactive education and policy measures can ensure an inclusive work future.

Agrawal *et al*. (2024) [1] examined the effects of artificial intelligence (AI) on jobs and work patterns in different industries. They studied this by surveying people aged 18-50 in Bangalore, India. The study found that AI can replace jobs in traditional fields, especially those with routine tasks; however, it also creates new jobs that require technical skills. Economic and social factors affect AI usage. Policies, such as training programs, can help reduce the negative effects of AI on jobs. Policymakers must address job loss while encouraging AI use. Companies should invest in AI training, and schools should meet industry needs. Supportive policies are important for helping workers adjust to the age of AI. Although AI may replace some jobs, it also creates new opportunities. This requires careful planning and teamwork to obtain the benefits and reduce the downsides.

Choudhury (2024) [7] investigated AI's effects of AI on employment in the Indian corporate sector, examining both job creation and displacement. Analysis of Times of India articles on corporate employment from January to June 2024 shows that 92% of Indian knowledge workers use AI, exceeding the global 75% average. AI adoption significantly impacts the BFSI, healthcare, and ITES sectors. While threatening low-skilled jobs, AI creates opportunities for development and data analysis. AI is expected to add $450-500 billion to India's GDP by 2025. However, a skill gap exists between workforce capability and AI requirements. This study emphasizes the need for strategic policies to ensure an equitable AI-driven future in India's corporate sector.

Sharma and Dutt (2024) [20] examined the effect of AI on jobs in India. They studied how AI changes industries and what it means for employment. They used data from the World Economic Forum, NASSCOM, EY, and other sources. This study shows that AI can both replace jobs with machines and create new technology jobs. There is a growing need for AI and data science skills. Important skills include understanding data, programming, and adaptability. Lifelong learning is important for remaining competitive. The study discusses problems such as job loss, skill gaps, and security risks associated with AI. They concluded that AI might create more jobs overall, stressing the need for skill development.

Panigrahi *et al*. (2024) [18] studied how AI affects the Indian economy and management. They found that AI could change the economy, with a $15.7 trillion impact by 2035 and 400,000 new jobs by 2025. The study examines how AI can boost GDP and productivity, possibly adding $967 billion to India's economy by 2035. This supports India's goal of achieving a $5 trillion GDP by 2025. This paper discusses AI's role in agriculture, manufacturing, healthcare, education, and finance, and mentions government efforts to adopt AI. It also discusses challenges, such as a lack of skills and data access, stressing the need for a clear plan and investment. AI may increase productivity in many areas, potentially adding $957 billion to the GDP by 2030. The study predicts 1 million new IT jobs by 2025, with growth in manufacturing, healthcare, education, and customer services. Examples from TCS, Flipkart, and Reliance Jio show the benefits of AI, but they highlight the need to fill skill gaps and use AI ethically.

4. Research Gap

Upon reviewing the existing literature, it is evident that the impact of artificial intelligence (AI) on employment has been extensively examined across various regions in the country. However, comprehensive studies specifically focusing on Kolkata, West Bengal, are lacking. This study aims to address this gap by investigating the influence of AI on employment and job opportunities in Kolkata, India.

5. Rationale of the Study

The justification for examining the impact of artificial intelligence (AI) on employment in Kolkata, West Bengal, arises from the substantial and transformative influence that AI exerts in reshaping global labour markets. The continuous integration of AI technologies has prompted concerns regarding their potential to displace traditional job roles while simultaneously presenting opportunities for innovation and employment growth.

5.1 Economic Context: Artificial intelligence is acknowledged as a catalyst for economic dynamics because of its ability to enhance productivity, streamline operations, and foster business growth across various sectors (R *et al*., 2024). In India, where economic advancement and high-tech developments are rapidly progressing, the role of AI is particularly significant in understanding the impact of emerging technologies on both traditional and modern job markets.

5.2 Local Relevance: Kolkata, a significant urban center in India, exemplifies broader socioeconomic patterns, thus providing a valuable context for examining the employment implications of artificial intelligence (AI). The city's economy includes both traditional industries and burgeoning technology sectors, rendering it an ideal environment for analysing the impact of AI on various job categories, ranging from low-skilled employment to high-tech jobs.

5.3 Employment Dynamics: Extensive research suggests that while artificial intelligence has the potential to generate employment opportunities, particularly in high-skilled and technology-oriented sectors, there is apprehension regarding job displacement, especially in routine tasks and low-skilled occupations (Giwa & Hyee, 2022; Giwa & Ngepah, 2024) [9, 10]. It is crucial for stakeholders to comprehend these dynamics to formulate strategic approaches that mitigate adverse effects while leveraging positive outcomes.

5.4 Policy and Planning: Addressing the impacts of artificial intelligence requires informed policymaking regarding workforce reskilling and economic planning (Soueidan & Shoghari, 2024) [21]. By analysing local data and trends, this study aims to provide insights into

effective strategies for managing the transition toward an AI-integrated economy, thereby ensuring inclusive growth in the region.

5.5 Ethical and Social Considerations: In addition to economic ramifications, the ethical and societal consequences of artificial intelligence, such as transformations in work, concerns regarding automation, and the demand for a skilled workforce, render this study essential for the formulation of social policy (Khogali & Mekid, 2023) [14].

In conclusion, examining the effects of artificial intelligence on employment in Kolkata is essential for comprehending how technological advancements influence labour markets, inform economic and workforce policies, and address the socio-economic challenges and opportunities associated with AI integration. This study provides concrete recommendations applicable to both local and broader contexts in India.

6. Research Objectives

This study has three objectives: (i) to map the current level of awareness and adoption of AI technologies in Kolkata, (ii) to analyse perceptions regarding the impact of AI on employment in Kolkata, and (iii) to examine the perceived effects of AI on employment within the same region.

7. Research Methodology

This study is both exploratory and empirical, employing a combination of primary and secondary data sources. The analysis is based exclusively on primary data collected through an online survey, utilizing a structured questionnaire disseminated via Google Forms to a sample of the respondents. The study population comprised employed, unemployed, and self-employed individuals and students from diverse industries and socio-economic backgrounds in Kolkata. A simple random sampling technique was employed to ensure diverse demographic representation. Conducted in Kolkata, a city renowned for its technological sector and varied industrial environment, this study provides a rich context for examining the impact of AI on employment trends in India. Data collection was facilitated using Google Forms, a widely accessible and user-friendly online survey tool. The survey aimed to capture insights from working-age individuals in Kolkata regarding their experiences, perceptions, and expectations of AI and its influence on employment trends. Secondary data were also utilized to shape the study's framework, sourced from recent and relevant research articles, journals, research papers, academic publications, and various e-resources. After the questionnaire was distributed via Google Forms, 80 respondents completed and returned it to the researcher. The online survey was conducted in August 2025. The reliability and consistency of the questionnaire were assessed using Cronbach's alpha, which yielded a highly satisfactory result of 0.732. This indicates that the analogies and conclusions drawn from the collected data were reliable and authentic. Frequency tables, simple percentages, and statistical tools such as the one-sample t-test, chi-square test, and correlation test were used to evaluate the primary data. The statistical software SPSS (version 26) was used to analyze the survey-based primary data and derive logical conclusions for the study.

8. Research Hypothesis

Seven hypotheses were framed to achieve the research objectives. These are presented below.

- **H_1:** There is no impact of artificial intelligence on employment.
- **H_2:** There is no impact of artificial intelligence on improving efficiency and productivity in workplaces.
- **H_3:** There is no impact of artificial intelligence on the threat to current job security.
- **H_4:** There is no association between the creation of more job opportunities by AI and the overall impact of AI on employment.
- **H_5:** There is no association between the job displacement by AI and the overall impact of AI on employment.
- **H_6:** There is no relation between the skills of employees and the overall impact of AI on employment.
- **H_7:** There is no relation between the increasing usage of AI in various industries in India and the overall impact of AI on employment.

9. Analysis and Discussion

This section of the study is organized into five subsections: Demographic Profile, Awareness and Adoption of AI, Perception of AI in Employment, Perception of Impact on Employment, and Hypothesis Testing. Each subsection is analyzed and discussed in detail in the following sections.

9.1 Demographic Profile

This demographic profile encompasses variables such as gender, age, educational qualifications, and employment status. These variables were analyzed using a frequency table and simple percentage calculations.

9.1.1 Gender of the Respondents

Table 1: Gender of the Respondents

Gender	Frequency	Percent
Male	40	50
Female	40	50
Total	80	100

(**Source:** Primary Data)

Observation: Table 1 indicates that 50% of the respondents were male and the remaining 50% were female.

9.1.2 Age of the Respondents

Table 2: Age of the Respondents

Age		
Age	**Frequency**	**Percent**
20 Yrs	16	20
21-30Yrs	32	40
31-40 Yrs	8	10
41-50 Yrs	16	20
Above 50 Yrs	8	10
Total	80	100

(**Source:** Primary Data)

Observation: Table 2 indicates that 40% of the respondents were within the age range of 21 to 30 years. In contrast, 10% of the respondents were aged 31-40 years and above 50 years. Additionally, 50% of the respondents were male, while the remaining 50% were female.

9.1.3 Educational Qualifications of the Respondents

Table 3: Educational Qualifications of the Respondents

Educational Qualification	Frequency	Percent
Below Secondary	8	10
Secondary	8	10
HS	24	30
UG	16	20
PG	24	30
Total	80	100

(**Source:** Primary Data)

Observation: Table 3 indicates that 30% of the respondents have completed both high school (HS) and postgraduate (PG) education, while 10% possess qualifications below the secondary level and secondary education level.

9.1.4 Employment Status of the Respondents:

Table 4: Employment Status of the Respondents

Employment Status	Frequency	Percent
Employed	40	50
Self-employed	24	30
Student	16	20
Total	80	100

(**Source:** Primary Data)

Observation: Table 4 illustrates that 50% of the respondents were employed, 30% were self-employed, and 20% were students.

9.2 Awareness and Adoption of AI

This section comprises a single subpoint, specifically the respondents' familiarity with AI in their workplace. This aspect is analyzed below using a frequency table and simple percentages.

9.2.1 Familiarity with the Term Artificial Intelligence

Table 5: Familiarity with the Term Artificial Intelligence

Attribute	Frequency	Percent
Very Familiar	24	30
Somewhat Familiar	40	50
Not Familiar	8	10
Not at all Familiar	8	10
Total	80	100

(**Source:** Primary Data)

Observation: Table 4 illustrates that 50% of the respondents were employed, 30% were self-employed, and 20% were students.

9.3 Perception of AI in Employment

This section examines the increasing utilization of artificial intelligence (AI) across various industries in India. AI is anticipated that AI will substantially alter future employment patterns, potentially generate new job opportunities while also causing job displacement. The impact of AI is expected to be more advantageous for skilled workers than for unskilled workers. Furthermore, the adoption of AI is associated with enhanced efficiency and productivity in the workplace, necessitating that workers upgrade their knowledge and skills. These aspects are analyzed below using frequency tables and simple percentages:

9.3.1 The Increasing Usage of AI in Various Industries in India

Table 6: The Increasing Usage of AI in Various Industries in India

Attribute	Frequency	Percent
Agree	40	50
Neutral	32	40
Disagree	8	10
Total	80	100

(**Source:** Primary Data)

Observation: Table 4 shows that 50% of respondents (40 out of 80) acknowledged AI's increasing utilization in India, indicating awareness of its expanding presence across sectors such as IT, healthcare, finance, manufacturing, and agriculture. Additionally, 40% of respondents (32 out of 80) maintained a neutral stance, suggesting uneven AI penetration, possibly due to its concentration in technology-centric industries and metropolitan regions. The remaining 10% (8 out of 80) disagreed, potentially viewing AI adoption as slow or being in industries that are resistant to technological change.

9.3.2 AI Will Change the Employment Pattern in the Future:

Table 7: AI Will Change the Employment Pattern in the Future

Attribute	Frequency	Percent
Agree	48	60
Neutral	8	10
Disagree	24	30
Total	80	100

(**Source:** Primary Data)

Observation: The table shows strong agreement, with 60% of respondents (48 out of 80) believing that AI will alter employment patterns, suggesting a widespread expectation of AI's disruptive impact. In contrast, 30% (24 out of 80) disagreed, indicating scepticism about AI's effects on employment. Only 10% (8 out of 80) remained neutral, demonstrating the topic's polarizing nature of the topic. The response distribution shows a clear binary perception: either AI will significantly change employment, or it will not, with 90% of responses in these opposing camps.

9.3.3 AI Can Create More Job Opportunities

Table 8: AI Can Create More Job Opportunities

Attribute	Frequency	Percent
Agree	40	50
Neutral	24	30
Disagree	16	20
Total	80	100

(**Source:** Primary Data)

Observation: The table shows opinions on AI's potential to generate employment. 50% of the respondents (40 out of 80) agreed that AI could create more jobs, supporting the "creative destruction" theory, which states that AI generates new roles while displacing others. A total of 30% (24 out of 80) remained neutral, significantly higher than the 10% neutrality in the previous table, indicating uncertainty regarding AI's net impact on employment. A total of 20%

(16 out of 80) disagreed, suggesting that AI automation may lead to net job losses. Unlike the strong polarization in the previous table, this distribution shows more nuanced opinions, with the high neutral percentage indicating that AI's employment implications of AI remain debatable in public perception.

9.3.4 AI Can Create More Job Displacement

Table 9: AI Can Create More Job Displacement

AI can create more job displacement		
Attribute	Frequency	Percent
Agree	24	30
Neutral	16	20
Disagree	40	50
Total	80	100

(**Source:** Primary Data)

Observation: The table shows the predominant rejection of AI-driven net-job displacement. 50% of respondents (40 out of 80) disagreed that AI would lead to increased job displacement, suggesting that they believed AI's impact on jobs would be manageable. In contrast, 30% (24 of 80) agreed that AI could cause greater displacement, reflecting concerns about automation. The remaining 20% (16 out of 80) were neutral, a percentage between that of the first table (10%) and the second (30%), indicating ongoing deliberation about AI's employment impact.

9.3.5 AI Will Benefit Skilled Workers Rather than Unskilled Workers

Table 10: AI Will Benefit Skilled Workers Rather than Unskilled Workers

AI will benefit skilled workers rather than unskilled workers		
Attribute	Frequency	Percent
Agree	48	60
Neutral	16	20
Disagree	16	20
Total	80	100

(**Source:** Primary Data)

Observation: The table shows a strong consensus, with 60% of respondents (48 out of 80) indicating that artificial intelligence will primarily benefit skilled workers, suggesting that AI will enhance the value of skills and training, potentially widening workforce disparities. The remaining 40% were split equally between Neutral and Disagree (16 respondents each), indicating no unified alternative view. Those who were neutral may have been uncertain about benefit distribution, while those who disagreed might have believed that AI could empower unskilled workers or affect all tiers equally. The high agreement (60%) indicates that this is one of the more established views, with skilled workers seen as best positioned to benefit from AI.

9.3.6 AI Adoption Improves Efficiency and Productivity in Workplaces

Table 11: AI Adoption Improves Efficiency and Productivity in Workplaces

Attribute	Frequency	Percent
Agree	48	60
Neutral	16	20
Disagree	16	20
Total	80	100

(**Source:** Primary Data)

Observation: Table 11 shows strong agreement, with 60% of respondents (48 out of 80) confirming that AI enhances efficiency and productivity. This indicates a widespread belief in the value of AI for optimizing processes and improving output in business contexts. The remaining 40% were split between Neutral and Disagree (20% each). Those who are neutral may recognize AI's potential but lack conclusive evidence, while those who disagree may have concerns about integration costs or AI's current capabilities. The high agreement rate confirms that AI's core promise of faster and cost-effective task completion resonates with most respondents.

9.3.7 AI Requires Workers to Upgrade Their Knowledge and Skills

Table12: AI Requires Workers to Upgrade Their Knowledge and Skills

AI requires workers to upgrade their knowledge and skills		
Attribute	**Frequency**	**Percent**
Agree	40	50
Neutral	24	30
Disagree	16	20
Total	80	100

(**Source:** Primary Data)

Observation: The table shows widespread recognition of upskilling needs, with 50% of respondents (40 out of 80) acknowledging that AI requires enhanced worker skills. This indicates that many view continuous learning as essential for AI workplace integration. Additionally, 30% of respondents (24 out of 80) remained neutral, suggesting uncertainty regarding AI's specific skill requirements and personal implications. Conversely, 20% (16 out of 80) disagreed, possibly believing that AI implementation would not require widespread skill upgrades and would only affect technical workers while leaving other positions unchanged.

9.4 Perception of Impact on Employment:

This section examines the overall impact of artificial intelligence (AI) on employment, specifically addressing the potential threat AI poses to current job security. The analysis was conducted using frequency tables and simple percentages.

9.4.1 The Overall Impact of AI on Employment:

Table 13: The Overall Impact of AI on Employment

Attribute	Frequency	Percent
Positive	32	40
Neutral	32	40
Negative	16	20
Total	80	100

(**Source:** Primary Data)

Observation: Table 13 shows a significant division among respondents, with positive and neutral perspectives each at 40% (32 respondents). This indicates a lack of consensus on the final outcome, with the audience split between optimism and cautious uncertainty. Only 20% of respondents (16 individuals) perceived negative impacts, suggesting that despite concerns, few anticipated detrimental employment effects. The substantial neutral response (40%) represents those reserving judgment, likely recognizing both potential job creation and displacement while awaiting further evidence or regulatory developments to clarify the situation.

9.4.2 AI Is a Threat to Current Job Security

Table 14: AI is a threat to current job security

Attribute	Frequency	Percent
Significant threat	16	20
Moderate threat	24	30
Not a threat	16	20
Unsure	24	30
Total	80	100

(**Source:** Primary Data)

Observation: The table shows that 50% of respondents view artificial intelligence (AI) as a threat, with 20% seeing it as significant and 30% as moderate. This indicates widespread job security concerns, although the prevalence of "moderate" over "significant" threat suggests recognition of a serious but not catastrophic risk. Moreover, 30% of respondents were uncertain, highlighting a significant lack of information regarding employment risk assessment. This uncertainty emphasizes the need for clearer communication regarding vulnerable roles in the research process. A further 20% of respondents saw no threat from AI, likely believing that their roles require uniquely human skills that AI cannot replicate. The response distribution shows a concentration at the extremes (20% significant threat, 20% no threat) and a substantial middle (30% moderate threat, 30% unsure), reflecting a workforce divided between high concern, minimal concern, and uncertainty.

9.5 Hypothesis Testing

9.5.1 One-Sample t-test: A One-Sample t-test was utilized to ascertain whether the mean of a single sample significantly diverged from a known or hypothesized population mean. In this study, a one-sample t-test was conducted to evaluate the potential impact of artificial intelligence on (i) employment, (ii) enhancing efficiency and productivity in the workplace, and (iii) the threat to current job security.

9.5.1.1 Hypothesis-1

- **H_0:** There is no impact of artificial intelligence on employment.
- **H_1:** There is an impact of artificial intelligence on employment.

Table 15: p-value for the test at the 5% significance level was 0.000, which was below the threshold of 0.05

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
The overall impact of AI on employment	21.379	79	0.000	1.8	1.6324	1.9676

(**Source:** Compiled by Researcher)

Interpretation: According to Table 15, the p-value for the test at the 5% significance level was 0.000, which was below the threshold of 0.05. Consequently, the null hypothesis was rejected in favor of the alternative hypothesis. This indicates the notable impact of artificial intelligence on employment.

9.5.1.2 Hypothesis-2:

- **H_0:** There is no impact of artificial intelligence on improving efficiency and productivity in workplaces.
- **H_1:** There is an impact of artificial intelligence on improving efficiency and productivity in workplaces.

Table 16: One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
AI adoption improves efficiency and productivity in workplaces	17.776	79	0.000	1.6	1.4208	1.7792

(**Source:** Compiled by Researcher)

Interpretation: As shown in Table 16, the p-value for the test at the 5% significance level is 0.000, which is below the threshold of 0.05. Consequently, the null hypothesis was rejected in favor of the alternative hypothesis. This indicates the notable impact of artificial intelligence on improving workplace efficiency and productivity.

9.5.1.3 Hypothesis-3:

- **H_0:** There is no impact of artificial intelligence on the threat to current job security.
- **H_1:** There is an impact of artificial intelligence on the threat to current job security.

Table 17: One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
AI is a threat to current job security	20.753	79	0.000	2.6	2.3506	2.8494

(**Source:** Compiled by Researcher)

Interpretation: As shown in Table 17, the p-value for the test at the 5% significance level was 0.000, which was below the threshold of 0.05. Consequently, the null hypothesis was rejected in favor of the alternative hypothesis. This indicates the notable impact of artificial intelligence on the threat to current job security.

9.5.2 Chi-Square Test: The Chi-Square test was employed to assess the independence of two categorical variables. Specifically, it was used to determine whether there was a significant difference between the averages of the two variables. In this context, the chi-square test was conducted to examine whether there is (i) an association between the creation of additional job opportunities by AI and the overall impact of AI on employment, and (ii) an association between job displacement by AI and the overall impact of AI on employment.

9.5.2.1 Hypothesis-4:

- **H_0:** There is no association between the creation of more job opportunities by AI and the overall impact of AI on employment.
- **H_1:** There is an association between the creation of more job opportunities by AI and the overall impact of AI on employment.

Table 18: Crosstabulation between AI can create more job opportunities and the overall impact of AI on employment

			The overall impact of AI on employment			Total
			Positive	Neutral	Negative	
AI can create more job opportunities	Agree	Number	24	8	8	40
		% of Total	30.00%	10.00%	10.00%	50.00%
	Neutral	Number	0	24	0	24
		% of Total	0.00%	30.00%	0.00%	30.00%
	Disagree	Number	8	0	8	16
		% of Total	10.00%	0.00%	10.00%	20.00%
Total		Number	32	32	16	80
		% of Total	40.00%	40.00%	20.00%	100.00%

Table 19: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	58	4	0.000
Likelihood Ratio	70.585	4	0.000
Linear-by-Linear Association	4.533	1	0.033
No of Valid Cases	80		

(**Source:** Compiled by Researcher)

Interpretation: Table 19 presents the Pearson Chi-Square or P value of the test at the 5% level of significance is 0.000, which is less than 0.05. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. Therefore, it can be concluded that there is an association between the creation of more job opportunities by AI and its overall impact on employment. The cross-tabulation reveals that 50% of the respondents agreed that AI could create more job opportunities, and 40% opined that there is a positive overall impact of AI on employment.

9.5.2.2 Hypothesis-5

H_0: There is no association between the job displacement by AI and the overall impact of AI on employment.

H_1: There is an association between the job displacement by AI and the overall impact of AI on employment.

Table 20: Crosstabulation between AI can create more job displacement and the overall impact of AI on employment

			The overall impact of AI on employment			Total
			Positive	Neutral	Negative	
AI can create more job displacement	Agree	Number	8	8	8	24
		% of Total	10.00%	10.00%	10.00%	30.00%
	Neutral	Number	0	16	0	16
		% of Total	0.00%	20.00%	0.00%	20.00%
	Disagree	Number	24	8	8	40
		% of Total	30.00%	10.00%	10.00%	50.00%
Total		Number	32	32	16	80
		% of Total	40.00%	40.00%	20.00%	100.00%

Table 21: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.667	4	0.000
Likelihood Ratio	40.032	4	0.000
Linear-by-Linear Association	4.752	1	0.029
No of Valid Cases	80		

(**Source:** Compiled by Researcher)

Interpretation: Table 21 presents the Pearson Chi-Square or P value of the test at the 5% level of significance is 0.000, which is less than 0.05. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. Therefore, it can be concluded that there is an association between job displacement by AI and the overall impact of AI on employment.
The cross-tabulation reveals that 50% of the respondents agreed that AI could create more job displacement, and 40% of the respondents opined that there is a positive overall impact of AI on employment.

9.5.3 Correlation Test: Correlation denotes the degree to which two variables are interrelated. When variations in the magnitude of one variable are typically associated with variations in the magnitude of another variable, these variables are considered correlated. In this context, the researcher sought to examine the correlation (i) between the skills of employees and the overall impact of AI on employment, and (ii) between the increasing utilization of AI across various industries in India and the overall impact of AI on employment.

9.5.3.1 Hypothesis-6

- **H_0:** There is no relation between the skills of employees and the overall impact of AI on employment.
- **H_1:** There is a relation between the skills of employees and the overall impact of AI on employment.

Table 22: Correlations

		AI will benefit skilled workers rather than unskilled workers	The overall impact of AI on employment
AI will benefit skilled workers rather than unskilled workers	Pearson Correlation	1	.869**
	Sig. (2-tailed)		0.000
	N	80	80
The overall impact of AI on employment	Pearson Correlation	.869**	1
	Sig. (2-tailed)	0.000	
	N	80	80

(**Source:** Compiled by Researcher)

Interpretation: Table 22 presents the results of a bivariate correlation test that examined the relationship between the challenges associated with using AI in education and the frequency of AI tool use. In the correlation matrix above, the Pearson correlation coefficient is 0.869, and the p-value for a two-tailed test is 0.000, which is below the threshold of 0.05, at the 5% significance level. Therefore, we can infer a strong positive correlation between employees 'skills and AI's overall impact on employment.

9.5.3.2 Hypothesis-7

- **H_0:** There is no relation between the increasing usage of AI in various industries in India and the overall impact of AI on employment.
- **H_1:** There is a relation between the increasing usage of AI in various industries in India and the overall impact of AI on employment.

Table 23: Correlations

		The Increasing Usage of AI in various industries in India	The overall impact of AI on employment
The Increasing Usage of AI in various industries in India	Pearson Correlation	1	.645**
	Sig. (2-tailed)		0.000
	N	80	80
The overall impact of AI on employment	Pearson Correlation	.645**	1
	Sig. (2-tailed)	0.000	
	N	80	80

(**Source:** Compiled by Researcher)

Interpretation: Table 23 presents the results of a bivariate correlation test that examined the relationship between the challenges associated with using AI in education and the frequency of AI tool use. In the correlation matrix above, the Pearson correlation coefficient is 0.645, and the p-value for a two-tailed test is 0.000, which is below the threshold of 0.05, at the 5% significance level. Therefore, it can be inferred that there is a strong positive correlation between the increasing usage of AI in various industries in India and AI's overall impact on employment.

10. Findings of the Study

Based on the analysis presented in this study, the key findings are as follows:

10.1 Impact on Employment

- There is a significant impact of artificial intelligence (AI) on employment in Kolkata. The null hypothesis that there is no impact was rejected.

10.2 Job Creation vs. Displacement

- 50% of respondents agreed that AI could create more job opportunities.
- 50% disagreed that AI would lead to increased job displacement.
- There is a statistically significant association between AI creating job opportunities and its overall impact on employment.
- There is also a significant association between AI causing job displacement and its overall impact on employment.

10.3 Skills and Workforce

- 60% believe AI would primarily benefit skilled workers over unskilled workers.

- Fifty percent of the respondents agreed that AI requires workers to upgrade their knowledge and skills.
- There is a strong positive correlation between employees' skills and the overall impact of AI on employment.

10.4 Efficiency and Productivity
- 60% agree AI adoption improves efficiency and productivity in the workplace.
- AI has a significant impact on improving workplace efficiency and productivity.

10.5 Job Security
- 50% viewed AI as a threat to current job security (20% significant threat, 30% moderate threat).
- AI has a significant impact on threats to current job security.

10.6 Overall Impact
- 40% perceive a positive overall impact of AI on employment
- 40% are neutral about the overall impact
- Only 20% perceive a negative overall impact

10.7 Awareness and Adoption
- 50% of the respondents were familiar with AI in their workplaces.
- 50% acknowledged the increasing usage of AI across various industries in India.

In summary, this study reveals that artificial intelligence is exerting a substantial influence on employment in Kolkata, encompassing both beneficial outcomes, such as job creation and productivity enhancement, as well as challenges, including potential job displacement and the necessity for reskilling. Overall, perceptions tend to be more positive or neutral than negative regarding the impact of AI on employment.

11. Conclusion
This study examines the impact of artificial intelligence (AI) on jobs in Kolkata, West Bengal. AI has a significant impact on jobs, both good and bad. The idea that AI has no impact has been proven wrong. People have mixed feelings about AI and jobs: 50% think AI will create more jobs, while 50% think it will cause job losses. The study shows a strong link between AI's ability to create or eliminate jobs and its overall effect on employment. AI is expected to help skilled workers more than unskilled workers. Approximately 60% of people believe that AI will mostly help skilled workers, and 50% say that workers need to learn more skills because of AI. There is a strong link between workers' skills and the impact of AI on jobs. AI use is growing in Indian industries, with 50% of the respondents noticing this trend. There is a strong link between AI use in industries and its impact on jobs. AI is seen to improve work efficiency and productivity, with 60% of the respondents agreeing. Opinions on AI's threat to job security varied: 50% saw it as a threat (20% big, 30% moderate), 30% were unsure, and 20% saw no threat. Overall, 40% of the respondents viewed AI's impact on jobs as positive, 40% as neutral, and 20% as negative. The study stresses the need for policies to manage AI in the workforce, training programs for workers, clear communication about AI's job impact, and strategies to use AI's benefits while reducing its negative effects. In conclusion, AI brings both opportunities and challenges for jobs in Kolkata, but its overall impact is more positive than negative. The findings highlight the need for skill development, flexible policies, and planning to ensure a smooth transition to an AI-driven economy in the region.

12. Recommendation
Based on the study's findings, the following key recommendations are proposed:

1. Invest in workforce reskilling through targeted AI training programs. Partner with educational institutions to develop AI curricula and incentivize companies to support employees' skill development.
2. Tax incentives and grants should support R&D and technology implementation to promote AI innovation. The establishment of AI hubs in Kolkata and the facilitation of partnerships between AI companies, startups, and industries are recommended.
3. Policies should be formulated to address AI-driven employment transitions through enhanced social safety nets, job transition programs for displaced workers, and incentives for companies to retrain affected employees.
4. To enhance AI literacy, public education campaigns must explain AI's impact and opportunities of AI. Integrating AI education into school curricula and providing resources to help workers understand AI's influence on their industries are essential.
5. To promote AI entrepreneurship, financial support and mentorship for startups, streamlined regulations, and networking platforms that connect entrepreneurs with investors are crucial.
6. To ensure ethical AI development, guidelines and regulations must govern its use in employment, with oversight mechanisms monitoring the labour market impacts and transparency in AI-driven hiring processes.
7. Use AI to enhance public services and create jobs: Integrate AI into the government to boost efficiency and technology employment. AI can be employed to identify job market trends and skill needs. AI-driven job matching and career guidance platforms should be developed.
8. To enhance collaboration, multi-stakeholder working groups must address the challenges of the AI workforce. Funding joint research on the impact of AI employment and developing public-private partnerships are key strategies for effective workforce solutions.
9. Foster inclusive AI growth by ensuring training and employment access for underserved communities. Address biases in AI systems that may worsen inequalities and support diversity in AI education and careers.
10. Continuous monitoring should be implemented to assess the impact of AI by tracking changes in the labour market, revising policies for emerging challenges, and researching AI's effects on employment.

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