

Emerging Technology and the Changing Dynamics of Labour Market Outcomes: Examining the Perspectives of Workers from Rajasthan

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Abstract

Recent advances in automation, AI, and digital platforms are rapidly reshaping work, earnings, and production. Through the partial implementation of these tools in Rajasthan, there is uncertainty and anxiety among workers. This paper focuses on understanding how the workers in Rajasthan perceive these changes in technology and their impact on employment, wages, productivity, and training needs. It adopts a descriptive quantitative design where 150 randomly selected service, clerical & sales, and professional group workers were surveyed using a structured questionnaire. SPSS was used to analyse the data using both descriptive and inferential statistics, including means, standard deviations, and chi-square. Results show technology affects job categories differently: professionals reap benefits, while service workers experience difficulties in employment and training challenges. The research proposes policy interventions, ongoing development of skills, and reasonable adjustment measures to ensure that all segments of the workforce gain the advantages of the technological advancement.

Keywords

Emerging Technology; Technological Change; Labour Market Outcomes; Employment Patterns; Wage Dynamics; Work Productivity.

Introduction

Study Background and Orientation

The labour market has always been influenced by technological change. Starting with the industrial revolution through the digital era, every wave of innovation has influenced the way people work, create, and make a living (Teker & Koc, 2019). Automation, artificial intelligence, robotics, and digital platforms have been transforming industries, employment, wages, and productivity at an accelerated and more profound rate in recent years (Li *et al.*, 2025).

Objective of study

The specific aims of this study are to:

1. Examine workers' perception of technological change, and its effects on job opportunities, security, and stability.
2. Analyse the relationship between technology adoption and changes in wages and income security.
3. Assess workers' views on whether emerging technologies enhance productivity or increase workplace pressure.
4. Provide evidence-based sights for skill development, labour policies, and inclusive technology adaptation in Rajasthan's workforce.

Review of Literature

Studies indicate that though technology may lead to efficiency and new opportunities, it may also render jobs redundant, leading to polarisation or greater inequality unless it is done with caution (Montobbio *et al.*, 2023; Nigar *et al.*, 2025).

These changes can be spotted in both urban and rural economies in India. Technological adoption remains weak in agriculture-dependent states like Rajasthan, reliant on small manufacturing, and services (Verma & Tiwari, 2025). With rising internet access, digital labour markets, and automations, workers are questioning job security, wage equity, and their role in the future (Salari *et al.*, 2025; Li *et al.*, 2025). To develop balanced policies that do not destroy livelihoods and enhance growth, it is important to understand the perceptions of the workers.

Statement of the Problem

Although technological development leads to improved productivity and economic efficiency, there is the uncertainty of unequal adoption of emerging technology among workers in Rajasthan. Many workers encounter shifting skill requirements, volatile incomes, or diminished job security (Li *et al.*, 2025). Yet, scant literature captures workers' personal perceptions of workers towards these changes in Rajasthan's context.

Hypothesis

To achieve its objectives, this study proposes the following hypotheses Emerging technologies have no significant influence on the prospects of employment, job security, and job stability as perceived by the workers across the three job types. 1. There exists no significant linkage between the level of technology adoption and the wage dynamics among the workers across the three job types. 2. The emerging technologies do not play a significant role in improving productivity or enhancing work pressure as perceived by the workers across the three job types. 3. The perceived support of employers, government, or training institutions is not a critical factor in the technology adoption by the workers across the three job types. **Ethical Considerations** The aim of the study was explained to the participants, and their participation was optional. The responses were confidential, and the data were used only for research purposes.

Methodology

Research Design and Approach: This descriptive quantitative study used on a structured survey to systematically assess workers' perceptions and experiences of the workers regarding the impact of the emerging technology's labour market impacts.

Study Population: The study population incorporates workers who are involved in service, clerical & sales, and professional jobs in Rajasthan. These groups have been selected to represent various work groups that are being impacted by technological changes.

Sampling Techniques: Simple random sampling ensured equal selection probability across the three job categories.

Sample Size: An equal number of 50 participants were selected from each of the three job categories. Thus, the total sample size was 150 workers.

Questionnaire Design: A structured self-administered questionnaire with five sections: demographic variables (5 items), technology & employment (5 items), technology & wages (5 items), technology & productivity (5 items), and technology & training support (5 items) was used to collect the data. Items used a 5-point Likert scale of (1 = strongly disagree to 5 = strongly agree).

Data Collection Methodology: Questionnaires were administered in person. All participants received guidance for clarity.

Data Collection Period: The data was collected over a ten-week period, starting the second week of October 2025 and ending the third week of December 2025.

Statistical Tools: Data analysis was made using both descriptive and inferential statistical tools, such as mean, standard deviation, and chi-square test.

Data Analysis Software: SPSS version 23.0 was used to process and analyse the data.

Analysis

Demographic Analysis

Demographic Analysis
Table 1 – Demographic Information of Participants

Demographic Information (N=150)		Frequency	Percent
Gender	Male	98	65.3%
	Female	52	34.7%
Age	20-39	75	50.0%
	40-59	75	50.0%
Locality	Urban	86	57.3%
	Rural	64	42.7%
Education	Up to Graduation	44	29.3%
	PG & Doctorate	37	24.7%
	Diploma & Certificate	28	18.7%
	Professional	41	27.3%
Job Type	Service Jobs	50	33.3%
	Clerical & Sales Jobs	50	33.3%
	Professional Jobs	50	33.3%

The demographic characteristics of the 150 workers reveal that there are 65.3 percent males and 34.7 percent females. This highlights a majority of men in the sample. The analysis of the age structure is even, with half of the workers aged 20-39 and half aged 40-59. The analysis also illustrates that there is an equal

representation of younger and middle-aged workers. Around 57.3 percent of the respondents are urban residents who have easier access to technology and are able to get employment. Education-wise, 29.3 percent of the respondents are graduates or have achieved an education below that level, 24.7 percent of the respondents are postgraduates or doctorate, 18.7 percent of the respondents have passed a diploma or certificate course, and 27.3 percent of the respondents are professionally qualified. Such a mix demonstrates the combination of theoretical and the real world experience among workers.

The distribution of jobs across service, clerical & sales, and professional categories is even with 33.3 percent each. Using the perspective of technological intensity, service jobs are low-tech work, and they may include drivers or cleaners who access simple phones or very little digital technology (Ghosh, 2025). Clerical & sales positions incorporate moderate-tech jobs, which indicate the use of smartphones, point of sale systems, or office software (Ghosh, 2025). Professional careers involve technical jobs, and these are prevalent among engineers, IT experts, or creative professionals who work with advanced digital instruments, software, or analytics (Ghosh, 2025). Thus, the selected sample covers workers with varying levels of technological exposure.

Reliability Analysis of Data
Table 2 – Results of Reliability Analysis

Dimensions	Items	Alpha Coefficient	Result
Employment	5	0.884	Reliable
Wages	5	0.759	Reliable
Productivity	5	0.813	Reliable
Training Support	5	0.761	Reliable

The study computes a Cronbach's Alpha coefficient for reliability analysis to check whether questions in the survey measure the same concept at all times. The greater the Alpha value, the more reasonable the responses. The alpha coefficients of the four selected dimensions of labour market outcomes: Employment, Wages, Productivity, and training support are reported to be 0.884, 0.759, 0.813, and 0.761, respectively, which exceed the standard limit of 0.7. These values exhibit excellent internal consistency among all dimensions.

Descriptive Analysis of Data
Table 3 – Results of Descriptive Analysis

Dimensions	Mean	Standard Deviation
Employment	2.461	1.136
Wages	2.524	1.208
Productivity	2.717	1.294
Training Support	2.925	1.337

Accomplishment of descriptive analysis indicates that the workers in Rajasthan have a moderately negative to a low opinion of the influence of emerging technologies on their employment opportunities, wages, and productivity. Training Support is the dimension with the largest mean (2.925). This indicates that workers perceive receiving some help or training, even though it is not excessive. The mean of employment is the lowest (2.461), which is a cause of worry or doubt about job security as a result of technology advancement. Standard deviations of the dimensions range between 1.136 and 1.337, which indicate a middling range of variation in opinions. This shows that experiences and perspectives of workers vary moderately.

Inferential Testing of Null Hypotheses
Table 4 – Results of Chi-square Analysis

Pearson's Chi-square Statistic	Calculated χ^2 Value	p-value	Test Result
Employment	21.672	.0056	significant at $p < .05$ H_{01} is rejected
Wages	22.918	.0035	significant at $p < .05$ H_{02} is rejected
Productivity	25.136	.0015	significant at $p < .05$ H_{03} is rejected
Training Support	27.523	.0006	significant at $p < .05$ H_{04} is rejected

The Chi-square test of the four dimensions gives values of 21.672, 22.918, 25.136, and 27.523 with p-values below the threshold limit of 0.05. All four null hypotheses are rejected, signifying that the results are statistically significant. This way, workers in three job types in Rajasthan are aware that emerging technologies are largely influencing their terms of employment, wage dynamics, productivity, and training support.

The researcher subsequently analyses what job type is most or least susceptible to the effects of technological advancement in terms of employment prospects, wage dynamics, productivity, and training support. The comparison will be made between the mean impact scores in the jobs, and it will give a clear indication of the sensitivity of the jobs to technology. The results of the analysis are presented using the following figure:

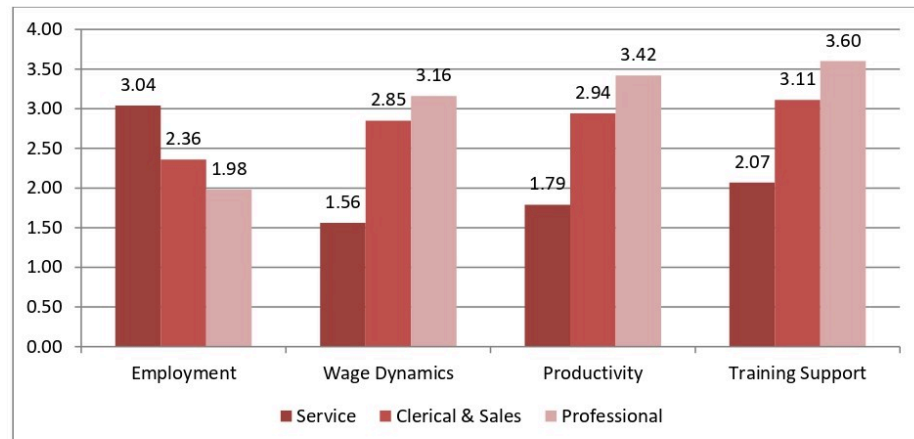


Figure 1 – Comparative Analysis of Job Types across Labour Market Outcomes

The results show that the most technology-impacted fields of work are service jobs in terms of employment. The average employment score in the service jobs stands at 3.04, which is more than the clerical & sales employment score at 2.36 and the professional job score at 1.98. The service sector, automation, and digital systems have lessened the number of employment opportunities by substituting the monotonous manual and customer-service jobs. Professional occupations are least affected, which is probably due to the analytical and decision-making nature of these occupations, which are more difficult to automate (Wang & Lu, 2025).

Further, wage dynamics are the most affected in professional jobs, with a mean score of 3.16. The wage differentiation has risen through technology: highly skilled workers are well paid, while the payment of low-skilled workers stagnates or declines (Smarandescu, 2025). Moderate wage dynamics are found in clerical & sales (2.85) jobs, with demand being made on digital sales and data management capabilities. Limited wage increase is experienced in service jobs (1.56) because many are low-paid and can be easily substituted by the use of technology (Smarandescu, 2025).

Professional jobs demonstrated the strongest influence (3.42) on productivity. This indicates that technology improves productivity and efficiency in knowledge-based jobs in terms of sophisticated tools, analytics, and automation (Prince, 2024). Moderate beneficiaries of clerical & sales jobs (2.94) are seen through digital marketing and customer management systems. Service jobs (1.79) have the lowest productivity gains, as most tasks can be achieved through human interaction and manual labour that cannot be completely substituted by technology (Wang & Lu, 2025).

Regarding training support, workers engaged in professional jobs receive the most technological training support (3.60). This shows that greater investment of organisations in the digital and technical competencies for professional workers. Moderate training is given to clerical & sales workers (3.11) to ensure their adjustment to new systems and tools. The least training is assigned to service workers (2.07), which is probably because less effort is taken to develop skills for routine or temporary jobs.

The findings of the study lead the researcher to propose a number of actions that will help bring technological development to all people, minimise the negative impacts of innovations on the labour force and income, and assist workers to adjust and succeed in the technologically oriented labour market.

1. Strengthen Continuous Skills Learning Programs: Workers must be provided with free, continuing education on digital literacy, automation devices, and emerging technologies in their areas. The cooperation between the

Result and Discussion

government agencies, employers, and training institutions ought to result in short and modular courses that are aligned with the changing tech demands. This will enable workers, particularly in service and clerical & sales jobs, to skill up on a regular basis.

2. Encourage Policies of Inclusive Technological Adaptation: Labour and industry policy should ensure the protection against marginalisation of service-sector workers during the take-up of new technologies. Profit-oriented incentives to companies to invest in human-friendly tools and just transition programs would create a balance between productivity gains and the stability of jobs. This strategy will encourage inclusive development and minimise job insecurity.

3. Promote Wage Protection and Career Progression Structures: With technology shifting the wage structures, policies ought to safeguard income security by enhancing minimum wages, performance pay, and attaining rates of career progression linked to acquiring skills. Clear systems will encourage workers to embrace innovations without their money being withdrawn at a time. This will help maintain financial stability among workers.

4. Foster Workplace Support and Adaptation Mechanisms: Employers should be encouraged to establish supportive environments that reduce technological stress and promote adaptability. Mentorship, feedback, and shared learning make workers share their knowledge and solve problems on emerging technologies, which enhances both their morale and productivity.

Conclusion

The study concludes that the impacts of technological advancement on workers vary across job types. Service workers are exposed to greater risks of employment and less access to training, whereas clerical & sales workers experience moderate impacts. This is more beneficial to the professionals as they can rely on increased productivity, higher wages, and occupational up-skilling. These trends indicate an increasing disparity of employment security and wage stability based on digital preparedness. To address this, focused investment in digital literacy among service workers, applied digital skills for clerical & sales workers and advanced technical training for professional workers is essential. Strengthening continuous learning, equitable pay mechanisms, and participatory technology strategies will facilitate the development of a more robust and equitable workforce in the face of a swift technological transformation.

Moreover, the study highlights that policy-makers must implement to ensure that technology adoption is matched with workforce development in Rajasthan. The observations indicate that the different categories of jobs require specific training and policy intervention against disproportionate tech effects. Policy-makers and scientists are advised to connect the acquisition of digital skills with employment and decent salaries. Further investigation would look into industry-specific approaches to inclusive technological change and the impact of training programs on the worker resilience and productivity in the long run.

References

1. Ghosh, S. (2025). *Future of Jobs Report 2025 - Indian Focus: A Guidance Mechanism for Indian youths to choose their careers based on Future Job Report 2025 in this age of superfast evolution*. SSRN. DOI: 10.2139/ssrn.5279566.
2. Li, Y., Xie, Z., Tui, Z., et al. (2025). *The Impact of Digital Economy on Flexible Employment: The Mediating Role of Laborer Perceptions*. Sage Open, 15(1). DOI: 10.1177/21582440251327017.
3. Montobbio, F., Staccioli, J., Virgillito, M.E., et al. (2023). *The empirics of technology, employment and occupations: Lessons learned and challenges ahead*. Journal of Economic Surveys, 38(5): 1622-1655.
4. Nigar, M., Juli, J.F., Golder, U., et al. (2025). *Artificial intelligence and technological unemployment: Understanding trends, technology's adverse roles, and current mitigation guidelines*. Journal of Open Innovation: Technology, Market, and Complexity, 11(3): 100607.
5. Prince, M. (2024). *The Role of Technology in Improving Operational Efficiency*. American Journal of IR 4.0 and Beyond, 3(1): 28-36.
6. Salari, N., Beiromvand, M., Hosseini-Far, A., et al. (2025). *Impacts of generative artificial intelligence on the future of labor market: A systematic review*. Computers in Human Behavior Reports, 18: 100652.
7. Smarandescu, A. (2025). *The Future of Work: Automation and Its Impact on Wage Inequality*. The Young Economists Journal, 43: 61.
8. Teker, S. and Koc, T.C. (2019). *Industrial Revolutions and its effects on quality of life*. Press Academia, 9(9): 304-311.
9. Verma, S. and Tiwari, N. (2025). *The Impact of Technologies on Indian Society: A Comprehensive Analysis of Rajasthan*. International Journal for Multidisciplinary Research, 7(1): IJFMR250137122.

10. Wang, K-H. and Lu, W-C. (2025). *AI-induced job impact: Complementary or substitution? Empirical insights and sustainable technology considerations. Sustainable Technology and Entrepreneurship*, 4(1): 100085.