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AN EMPIRICAL STUDY ON EMPLOYEE DIGITAL READINESS AND AI ADOPTION IN ADVANCED MACHINE TOOL MANUFACTURING – COIMBATORE

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Abstract—*During recent years, Coimbatore has emerged as a leading industrial city with many migrant workers employed In today's digital environment, there have been increased attempts by firms to integrate technologies related to Artificial Intelligence (AI) in an effort to improve efficiency and maintain competitiveness. Nevertheless, whether such attempts are fruitful depends to a great extent on the degree of readiness of the employees to embrace and use the innovations. It is therefore the objective of this study to determine the readiness level of the employees and the impact of their readiness on adoption of AI within machine tool manufacturing. Quantitative research design of a descriptive nature was chosen. Data for this study was collected from 192 employees by means of questionnaires. Convenient sampling was used in gathering the data. Some of the statistical methods applied included: mean standard deviation, percentages, ANOVA, correlation analysis etc. The above study, the benefits that will be achieved from the findings will be useful to manufacturers, policy makers, and academicians in the development of appropriate training and improvement of digital skills, as well as AI application plans. Additionally, this research underscores the importance of employee involvement, continuous learning, and readiness in achieving successful digitalization in the advanced manufacturing sector*.

Keywords: *Digital Readiness, Artificial Intelligence, Technology Adoption, Innovations, Employee Engagement, Digital Transformation.*

INTRODUCTION

Readiness of workers towards digitalization and AI technologies has become an important factor in modern-day industries, especially those that deal with technology-intensive manufacturing processes. The rapid growth of digitalization and Artificial Intelligence technologies has changed the way organizations manage their communications, operations, and production management. There is a trend where industries incorporate AI-enabled systems such as automation, robotics, machine learning, big data, and intelligent manufacturing technologies to improve efficiency and competitiveness. In today's industrial setting, it is expected that workers would have the necessary digital literacy and technological capabilities required to operate modernized systems. The concept of digital readiness in the context of employees refers to the ability of employees to understand, adopt, and leverage digital technology in their work environment. Digital readiness includes digital literacy, flexibility in terms of technology adoption, a readiness to embrace new technology, and confidence in working with intelligent technologies. AI adoption refers to the use of AI technology by organizations for operational processes and decision-making. The adoption of AI is not only dependent on technology but also on the readiness of the employees, awareness, training, and organizational support. If an organization lacks digital readiness, there is the danger of encountering problems such as reluctance to embrace changes, fears of job security, and inability to cope with the changed working environment. Therefore, organizations need to focus on improving their digital literacy levels and foster a conducive learning environment.

REVIEW OF LITERATURE

Sharma & Gupta (2026) present an article titled "Digital Awareness and Employee Adaptability in Modern Organizations". The research indicates that increased digital awareness enhances employee adaptability and confidence in utilizing new technologies. It underscores that awareness serves as the initial step towards effective digital transformation. Ali (2025) authored an article titled "Factors Influencing AI Readiness". This literature review pinpointed 23 essential factors that affect AI readiness, which include infrastructure, employee skills, management support, and organizational culture. Yilmazdogan (2024) wrote an article titled "Challenges in Smart Technology Adoption". The research identified significant challenges such as a lack of skills, inadequate training, and job insecurity that hinder employee adoption of digital technologies. Reddy & Kumar (2023) published an article titled "Digital Competency and Work Performance". This study establishes a connection between digital skills and employee productivity, revealing that skilled employees execute tasks more efficiently. Conversely, a deficiency in competency results in delays and errors. The research highlights the importance of skill development. **Joseph (2022)** article is titled as **"Training and Development in Digital Workplaces", t**he study focuses on the role of training in improving employee readiness. It concludes that continuous learning is necessary for digital success. Employees benefit from practical training sessions. The research suggests regular updates.

STATEMENT OF THE PROBLEM

The emergence of digital technologies and advancements in them has greatly affected how businesses and communication processes operate in organizations. In this era of fierce competition in the global marketplace, most organizations are using digital technologies and automation to improve their operations and secure their place in the market. Nevertheless, the success in implementing these technologies relies greatly on the willingness and capabilities of the organization's workforce in adapting to such changes. When it comes to an innovative company which emphasizes technology use, it is imperative to evaluate employee readiness in order to achieve organizational goals. Secondly, the lack of training and development opportunities could pose another challenge that prevents people from using digitalization effectively. Training is crucial since without it, employees will not be able to properly understand and use modern technologies which may decrease their performance levels. Another issue concerns job displacement and insecurity. Indeed, employees will most likely be afraid of losing their jobs due to digitalization. Thirdly, poor organizational support as well as lack of clear communication regarding digital initiatives could make it difficult for employees to understand what they should do.

In addition, management should encourage employees to use new technologies as a means of improving their performance levels. Fourthly, the inability to integrate new technologies into daily work activities could be another problem since employees may have difficulties adapting to the changes brought by digitalization. In conclusion, all the above-discussed barriers show how important it is to help employees become ready for using technology and digitalization at work.

OBJECTIVES OF THE STUDY

1. To examine the level of employee digital readiness and AI adoption in advanced machine tool manufacturing
2. To assess the availability of digital infrastructure within the organization.
3. To evaluate employee digital skills and competency levels.
4. To identify employee attitudes toward AI adoption.
5. To analyze challenges faced during digital and AI implementation

SCOPE OF THE STUDY

The study focuses on the digital readiness of the workforce and the integration of AI in the machine tool manufacturing industry sector. The research focuses on the digital skillfulness of the employees, digital awareness, digital adaptability, and preparation to work with the AI-infused systems within the manufacturing process. Besides, the study will also focus on the extent of AI integration within the organization and the influence of technologies like automation, robotics, machine learning, predictive maintenance, and smart manufacturing systems in improving organizational effectiveness. The factors that will determine employee adoption of the use of AI will be considered. These include training, organizational support, digital learning capabilities, management support, and organizational culture. In addition, the challenges faced by the employees in adapting to AI-based work environment will be outlined. The focus of this study is on the workers in the high-precision machining industry and seeks to understand their perspectives, awareness, and

preparedness towards adopting AI technology. Findings from this research can help companies plan effective training programs, develop digital competencies, and implement AI technology effectively in the manufacturing sector.

LIMITATIONS OF THE STUDY

1. The scope of research is limited to the high-end machine tool manufacturing industry only and might not be reflective of other industries.
2. This research has been conducted on the basis of subjective responses provided by the respondents.
3. This research covers only a specific geographical location, and thus limits its applicability.
4. The scope of research is also limited to the readiness of employees for digitalization and adoption of AI only, neglecting other dimensions.
5. There is a risk involved wherein the data collected can also be biased.

RESEARCH METHODOLOGY

The research study titled "Digital Readiness of Employees and Adoption of Artificial Intelligence in Advanced Machine Tools Manufacturing Industries" adopts a descriptive research design for investigating the digital readiness of employees as well as the adoption of Artificial Intelligence technology within manufacturing industries. The descriptive method is used to evaluate digital literacy skills, adaptability towards technology changes, and employee acceptance of AI technology in the work environment.

The study has made use of both primary and secondary data sources. Primary data was collected directly from the respondents working in advanced machine tool manufacturing companies using a well-designed questionnaire, whereas secondary data was collected through journals, books, articles, reports, and websites relevant to the topic of AI adoption and digital readiness. Convenience sampling technique was used to identify the respondents of the research work. Those employees of the advanced machine tool manufacturing firms that were easily available and were willing to take part in the survey formed the sample of this study. In total, 192 respondents were selected for this research work. This research paper has utilized the data that was collected by designing a questionnaire to gain information about their digital skills, technological awareness, and readiness to adopt AI technology, need for training, and the problems faced in the process of digital transformation. Different statistical techniques have been used to analyze the data collected, such as percentage analysis, simple average technique, chi-square test, and correlation analysis to interpret the results the results it shows the relationship between employee digital readiness and AI adoption in advanced machine tool manufacturing industries.

DATA ANALYSIS AND INTERPRETATION

Table No.1: Demographic Profile of the Respondents

Demographic Factor	Options	No. of Respondents	Percent	Total Respondents
Age Group	18 - 25 years	58	30.20 %	192
	25–30 years	67	34.89%	
	30–35 years	42	21.87%	
	Above 35 years	25	13.02%	
Gender	Male	172	89.58%	192
	Female	20	10.42%	
Educational Qualification	Diploma	31	16.14%	192
	Undergraduate	106	55.20%	
	Postgraduate	40	20.83%	
	Others	15	7.81%	
Work Experience	Below 2 years	41	21.35%	192
	2–5 years	121	63.02%	

	5 –20 years	19	9.89%
	Above 10 years	15	7.81%

Sources from primary data Interpretation

From the above demographic distribution of respondents is shown in Table No. 1. Respondents are a mostly male (89.58%), which implies a skewed gender ratio among the company's employees. The 25-30 year category of respondents comprises most employees (34.89%), followed by the 18-25 years group (30.20%). From an educational perspective, the majority of the respondents are graduates (55.20%), suggesting moderate educational levels among employees. Respondents mainly work in the Design/Engineering section (49.5%), followed by Production (24.9%). The majority of employees have worked between 2 – 5 years of experience in the organization (63.02%).

Table No.2: Digital readiness awareness

Factors	Mean	Std. Deviation
Possess adequate basic computer skills	4.77	0.466
Comfortable using digital tools in daily work	3.91	0.491
Easily adapt to new digital technologies	4.54	0.693
Company provides digital training programs	3.98	0.643
Confident in using online systems	4.59	0.612
Willing to learn new technologies	3.99	0.579

Interpretation

The descriptive statistics on digital readiness of the employees is presented in Table No. 2. It can be seen that the highest average score (4.77) was registered for basic computer skills, which reflects strong digital abilities of employees. Another high average value was obtained for adaptability (4.54) and confidence in digital technology use (4.59). At the same time, it should be pointed out that relatively low average values were registered for training (3.98) and willingness to learn (3.99). The low values of standard deviations demonstrate consistency of responses, which means that employees have similar viewpoints regarding digital readiness.

Table No.3: Awareness and understanding of AI Technology

Factors	Mean	Std. Deviation
Awareness of AI concepts	4.72	0.485
Interest in learning AI technologies	3.99	0.562
Received AI-related training	4.48	0.679
AI improves work efficiency	3.97	0.653
Familiarity with AI tools	3.98	0.664

Interpretation

The above table shows the awareness and knowledge about AI technologies possessed by employees. With the highest mean value of 4.71, it can be seen that employees have sufficient knowledge regarding AI technology. Similarly, exposure of employees to AI training has been reported at 4.48. Although moderate means have been observed in terms of familiarity (3.98) and usefulness (3.97) of AI technologies, it reflects a positive attitude of employees towards AI technology.

Table No 4: Correlation between educational qualification and AI awareness

Variables	Pearson correlation	Sig.(p-value)
Educational qualification & AI awareness	0.098	0.277

Interpretation

From the above table represents the correlation between educational qualification and AI technology awareness. The correlation coefficient value obtained (0.098) shows the very week positive relationship between the two variables. The p-value (0.227) is more than 0.05, thus the result implies that there is no significant relationship between the two variables. Hence, the null hypothesis is accepted; therefore, it can be concluded that the educational qualification does not influence AI awareness. It means that other determinants are more effective than education in influencing the level of awareness.

Table No: 5 Comparison Between Factors Influencing the Adoption of AI Driven Technology and Years of Experience of Employees

Null Hypothesis (H_0): There is no significant difference between factors influencing the adoption of AI driven technology and years of experience of employees.

Alternative Hypothesis (H_1): There is a significant difference between the group means factors influencing the adoption of AI driven technology and years of experience of employees.

Descriptive Statistics					
Particulars	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Factors influencing the adoption of AI driven Technology [Management actively supports the adoption of AI-based technologies across the organization.]	192	3	5	4.70	.501
Factors influencing the adoption of AI driven Technology [Availability of advanced technological infrastructure influences the adoption of AI systems.]	192	3	5	3.95	.548
Factors influencing the adoption of AI driven Technology [Training programs provided by the organization help employees adopt AI technologies.]	192	3	5	4.50	.640
Factors influencing the adoption of AI driven Technology [AI technologies are adopted because they improve productivity and operational efficiency.]	192	3	5	4.03	.633
Factors influencing the adoption of AI driven Technology [Competitive pressure from other organizations encourages the adoption of AI technologies.]	192	3	5	4.53	.574
Factors influencing the adoption of AI driven Technology [Employees show a positive attitude toward adopting AI-driven technologies.]	192	2	5	4.06	.671
Valid N (listwise)	192				

ANOVA					
Particulars	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Factors influencing AI Adoption	34.307	3	11.436	2.795	.042
Years of experience	609.575	189	4.091		
Total	643.882	192			

INTERPRETATION

The Anova table indicates how different groups are compared in relation to a given variable. The value of F is 2.795, and the value of significance is 0.042, which is less than 0.05. This implies that there is a statistically significant difference between the groups. This means that the mean values of different groups are not equal. In addition, at least one of the groups differs from others. The variation between groups is 34.307, which is smaller compared to the variation within the group, which is 609.575. The results indicate that the variable used in grouping has a notable effect on the outcome. Since the significance value ($0.042 < 0.05$), you reject the Null Hypothesis (H_0) and accept the Alternative Hypothesis (H_1). This means there is a significant difference among the groups.

Table No. 6: Challenges in AI Adoption

Factors	Mean	Std. Deviation
Lack of training programs	4.21	0.68
Resistance to change	3.98	0.74
Fear of job loss	4.05	0.71
Lack of technical knowledge	4.10	0.69
Lack of technical knowledge	3.92	0.76

Interpretation

Table No. 6, As shown in there are several issues in the implementation of AI technology. The issue with the highest mean (4.21) is a lack of training. The next most significant barrier is the fear of losing one's job (4.05), followed by a lack of technical expertise (4.10). Change resistance and costs are less significant but still important factors.

FINDINGS OF THE STUDY

The results show that the employees have a very good digital readiness and are also open- minded to using the AI technology. It can be seen that there is an overall positive attitude towards learning and using new technology. Nevertheless, some of the major issues like insufficient training, lack of willingness to change, and fear of job loss were considered as major obstacles. Also, it is found from the research that education qualification is not really a contributing factor in having awareness about AI technology. From the results presented above, it is clear that the employees have the necessary knowledge and skills in digital technology basics. As shown, most of the respondents showed confidence in the use of computer devices and digital applications. It means that employees have the necessary technical skills and expertise to operate in a digitally enabled environment. An interesting discovery is that employees are willing to learn and integrate different digital technologies into their operations. From the analysis of the findings, it is clear that an individual's digital readiness is influenced by his/her familiarity with digital technologies and not by the educational qualifications he/she possesses. Also, individuals who are digitally ready are very productive and efficient at accomplishing tasks. Their digital readiness acts as a variable that ensures they accomplish tasks effectively. To conclude, despite the digital readiness of the workers in the organization under study, there is need for the provision of training and exposure for advanced digital technologies such as AI.

SUGESSTIONS

Taking into account the findings from the results, one might conclude that the need for regular training among employees exists. In order to increase the comfort level among employees regarding AI, it would be better to conduct certain awareness programs in order to lessen employee resistance. Additionally, the management should ensure that effective

communication among employees takes place. The organization should offer assistance to the employees in adopting new technology. Learning and development are among the primary factors that need to be considered when preparing the employees digitally. Organizations need to offer regular training and learning workshops to their employees to update themselves about new technological trends. With this, employees will be able to use any complex digital technology confidently.

The second suggestion is to opt for practical training over theoretical training. Employees will be able to learn how digital technology works if they are provided practical exposure to digital technology. This way, the fear in using digital technology can be addressed effectively. In addition to this, corporations need to make sufficient investments in technical resources and systems. Reliable access to the internet, updated software, and prompt technical help guarantee that workers will be able to employ digital devices seamlessly and boost their productivity. Finally, corporations need to perform regular audits to assess the digital readiness of their employees and detect any skill shortages that may require further training programs. Information provided by employees can be utilized to develop tailor-made training programs.

CONCLUSION

Based on the above discussion, it can be concluded that employees' digital readiness is a key enabler that allows for organizational growth and development in the current technologically-based business environment. As shown above, individuals who have high levels of digital literacy are better able to cope with ever-changing requirements. According to the study, most employees already have enough digital skills and are capable of coping with daily routines as well as implementing advanced technological solutions like artificial intelligence.

Moreover, it is evident from the results that digital readiness cannot be viewed merely through the lens of education; instead, it should be approached as a result of continuous learning, hands-on experience, and support provided by an organization. The latter aspect suggests the need to implement various measures to ensure that people can develop digital literacy and be ready to use modern technologies.

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