

# Impact of AI-Enabled Work Environment on Employee Satisfaction in TNSTC: A Study of Madurai Depot

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**Abstract** – Artificial intelligence (AI) is reshaping how transport organizations schedule services, monitor operations, manage maintenance, communicate with employees, and support administrative decisions. These changes may improve operational efficiency, but they can also affect employee autonomy, workload, job security, privacy, training needs, and trust in management. This study examines the relationship between an AI-enabled work environment and employee satisfaction among employees of the Tamil Nadu State Transport Corporation (TNSTC), Madurai Depot. The study adopts a descriptive and analytical cross-sectional research design, with a sample of 150 respondents selected from employees of TNSTC Madurai Depot, representing operational, technical, administrative, and supervisory categories. A structured questionnaire measures the usefulness of AI, ease of use, transparency, training and technical support, human oversight, workload, privacy, job security, and employee satisfaction. Descriptive statistics, reliability analysis, chi-square tests, ANOVA, Pearson correlation, and multiple regression are proposed for data analysis. The results presented in the study are illustrative model values prepared to demonstrate the analytical format and should be replaced with verified field data before empirical submission. The study is expected to provide useful insights into how AI-enabled work practices can be implemented while maintaining employee satisfaction, organizational support, human oversight, and responsible workplace practices.

**Keywords** – Artificial intelligence, AI-enabled work environment, employee satisfaction, TNSTC, Madurai Depot, public-sector transport, digital transformation

## I. INTRODUCTION

Employees are central to the reliability, safety, and service quality of public transport operations. The supplied TNSTC manuscript describes employee satisfaction as important in public-sector transport because employees work under demanding schedules, extended hours, and substantial public responsibility. It also treats the work environment as multidimensional, including physical conditions, organizational culture, interpersonal relationships, and management practices. An AI-enabled work environment extends this concept to digital and algorithmic systems used for scheduling, route and fleet management, predictive maintenance, attendance, performance monitoring, workforce communication and managerial decision-making. Employees may value faster information and coordination, but opaque recommendations, intensified monitoring, inadequate training, privacy concerns and perceived job displacement may reduce satisfaction.

### Theoretical Background

#### Job Demands–Resources (JD-R) Theory

The Job Demands–Resources (JD-R) theory provides a useful foundation for explaining how an AI-enabled work

environment may influence employee satisfaction. The theory distinguishes between job demands, such as workload, time pressure, monitoring, and emotional demands, and job resources, such as autonomy, training, managerial support, technological support, and opportunities for development. In the context of TNSTC, AI can serve as a job resource by reducing repetitive work, improving information availability, supporting scheduling, and helping employees complete tasks more efficiently. However, AI may become a job demand when it increases monitoring, workload, uncertainty or perceived job insecurity. Thus, employee satisfaction is expected to depend on whether AI creates more resources than demands.

#### Job Characteristics Theory

Job Characteristics Theory explains employee attitudes through important characteristics of the job, including skill variety, task identity, task significance, autonomy and feedback. AI-enabled systems can alter these characteristics by automating routine activities, providing faster feedback and supporting decision-making. At the same time, excessive automation may reduce autonomy or make employees feel that important aspects of their work are

controlled by algorithms. Recent research specifically applies Job Characteristics Theory to AI adoption and argues that the relationship between AI adoption and job satisfaction can change depending on whether the benefits of job enrichment outweigh the costs of impairment.

### Technology Acceptance Model (TAM)

The Technology Acceptance Model suggests that employees' acceptance of technology is strongly influenced by perceived usefulness and perceived ease of use. In an AI-enabled TNSTC workplace, employees are more likely to respond positively when AI systems are perceived as useful, reliable and easy to operate. Training and technical support can further improve acceptance. Therefore, perceived usefulness and ease of use are important mechanisms through which AI-enabled work systems may contribute to positive employee attitudes and satisfaction.

### Socio-Technical Systems Perspective

The socio-technical perspective views organisations as systems in which technology and people must be designed together. AI should therefore not be evaluated solely on technical efficiency. Employee skills, organisational culture, communication, human oversight, privacy, trust and work design also influence outcomes. This perspective is particularly appropriate for a public transport organisation because AI-supported systems interact with employees performing safety-critical and operational tasks.

### Theoretical Integration

Based on these theories, the present study considers the AI-enabled work environment as a combination of AI usefulness and reliability, ease of use, training and technical support, transparency and fairness, human oversight, workload, monitoring, privacy, job security, and career development. These dimensions are expected to influence employee satisfaction. The framework therefore recognises that AI can have both positive and negative consequences depending on how it is introduced and managed.

## II. STATEMENT OF THE PROBLEM

The specific problem is the absence of depot-level evidence on how employees at TNSTC Madurai Depot perceive AI-enabled work practices and how these perceptions relate to employee satisfaction. The study therefore considers both the potential benefits of AI-enabled work and the organizational conditions required for responsible adoption.

### Objectives of the Study

- To identify the AI-enabled work practices encountered by employees at TNSTC Madurai Depot.
- To measure employee perceptions of AI usefulness, ease of use, transparency, human oversight, training and support, privacy, job security, and workload.
- To examine the relationship between perceptions of the AI-enabled work environment and employee satisfaction.

## III. REVIEW OF LITERATURE

Zahs and Schmodde (2026) investigated how employees respond to working with generative AI tools, such as ChatGPT, compared with working with human coworkers. Their study focused specifically on job satisfaction in workplaces where generative AI is integrated into task support. The research is particularly relevant to the present study because it goes beyond productivity to consider employees' subjective work experience. It supports the argument that the effect of AI depends on how employees experience AI-supported collaboration.

Subburaj et al. (2025) examined employee retention strategies in the Indian textile industry, focusing on the challenges responsible for high employee attrition. The study highlighted low wages, limited career development opportunities, and inadequate working conditions as major factors influencing employee turnover. The authors emphasised that competitive compensation, career growth, improved workplace conditions, employee engagement, and supportive HR practices are essential for retaining skilled employees. The study concluded that effective retention strategies can improve employee satisfaction, reduce attrition, and strengthen organizational performance in the Indian textile sector.

Subburaj (2025) examined the impact of Artificial Intelligence (AI) in recruitment and selection practices among IT companies in Chennai. The study found that AI-based tools such as chatbots, resume parsers, and predictive analytics can reduce recruitment time, improve candidate–job matching, and enhance recruiter satisfaction. The findings suggest that AI-enabled HRM can make recruitment more efficient, data-driven, and better suited to managing large volumes of applications.

Soulami, Benchekroun, and Galiulina (2024) conducted a bibliometric and systematic review of AI adoption and employee well-being using literature from Scopus and Web of Science. Their analysis identified major themes including ethics, work autonomy, employee stress and mental health. The review concluded that AI can improve autonomy and reduce repetitive work for some employees while also raising concerns about job loss, instability, and stress. The authors also identified a need for more empirical research in non-Western contexts and diverse sectors.

Bankins (2023) conducted a multilevel review of AI in organisations and identified five major areas: human–AI collaboration, perceptions of human and algorithmic capabilities, worker attitudes toward AI, algorithmic management and labour-market implications. The review emphasised that AI changes work processes as well as employee experiences. It also highlighted surveillance and control as important issues associated with algorithmic management. These findings provide a strong theoretical basis for examining human oversight, monitoring and employee attitudes in the TNSTC context.

Purushothaman and Subburaj (2014) studied customer satisfaction towards Aavin milk with special reference to Chennai City. The study highlighted product quality, price, availability, freshness, packaging, and distribution as important factors influencing customer satisfaction and purchasing decisions. The findings emphasized the importance of understanding customer expectations and continuously improving product and service quality to build customer satisfaction and loyalty

#### IV. CONCEPTUAL FRAMEWORK

AI-enabled work environment dimensions—AI usefulness and reliability, ease of use, training and support, transparency and fairness, human oversight, workload, monitoring, privacy, job security and career development—are examined in relation to employee satisfaction. Positive dimensions are expected to strengthen satisfaction, while workload intensification, excessive monitoring, privacy concern and job insecurity are expected to weaken it.

#### V. RESEARCH METHODOLOGY

The study adopts a descriptive and analytical cross-sectional research design with a sample of 150 respondents selected from employees of TNSTC Madurai Depot, covering operational, technical, administrative and supervisory designations through proportionate sampling. Primary data will be collected using a structured questionnaire covering demographic characteristics, AI exposure, AI-enabled work environment, traditional workplace conditions and employee satisfaction, measured on a five-point Likert scale. The questionnaire will be subjected to expert review and pilot testing before final data collection to ensure clarity and reliability. Frequencies, percentages, means, standard deviations, and reliability analysis will be used to describe the data, while chi-square, ANOVA, and Pearson correlation will examine associations and differences among variables. Multiple regression analysis will be employed to determine the independent influence of AI-enabled work-environment dimensions on employee satisfaction.

#### VI. DATA ANALYSIS AND INTERPRETATION

Table 1. Demographic and Occupational Profile of Respondents

| Variable       | Category      | Frequency | Percentage |
|----------------|---------------|-----------|------------|
| Gender         | Male          | 118       | 78.7       |
|                | Female        | 32        | 21.3       |
| Age            | Below 25      | 18        | 12.0       |
|                | 25–35         | 42        | 28.0       |
|                | 36–45         | 46        | 30.7       |
|                | 46–55         | 28        | 18.7       |
|                | Above 55      | 16        | 10.6       |
| Marital Status | Married       | 104       | 69.3       |
|                | Unmarried     | 40        | 26.7       |
|                | Widowed/Other | 6         | 4.0        |
| Education      | SSLC/HSC      | 80        | 53.3       |

|             |                      |     |       |
|-------------|----------------------|-----|-------|
|             | Diploma              | 28  | 18.7  |
|             | Graduate             | 34  | 22.7  |
|             | Postgraduate         | 8   | 5.3   |
| Designation | Driver               | 52  | 34.7  |
|             | Conductor            | 46  | 30.7  |
|             | Technical Staff      | 24  | 16.0  |
|             | Administrative Staff | 18  | 12.0  |
|             | Supervisor           | 10  | 6.6   |
| Experience  | Below 5 years        | 36  | 24.0  |
|             | 6–10 years           | 42  | 28.0  |
|             | 11–15 years          | 40  | 26.7  |
|             | Above 15 years       | 32  | 21.3  |
| Employment  | Permanent            | 112 | 74.7  |
|             | Contract             | 28  | 18.6  |
|             | Temporary            | 10  | 6.7   |
| Shift       | Day                  | 54  | 36.0  |
|             | Night                | 32  | 21.3  |
|             | Rotational           | 64  | 42.7  |
|             | Total                | 150 | 100 % |

\*\*\* Source: Primary data

In this illustrative profile, the workforce is predominantly male (78.7%), with the largest age group being 36–45 years (30.7%). Drivers form the largest designation group (34.7%), 28.0% have 6–10 years of experience, and 74.7% are permanent employees. Rotational-shift employees constitute 42.7%. These values reproduce the demographic pattern provided in the earlier TNSTC manuscript and should therefore be treated as model values only, not as verified Madurai AI-study results.

Table 2. Perceptions of AI-Enabled Work Environment

| Dimension                           | Mean | SD   | Interpretation |
|-------------------------------------|------|------|----------------|
| AI usefulness and reliability       | 3.78 | 0.68 | High           |
| Ease of use and accessibility       | 3.69 | 0.72 | High           |
| Training and technical support      | 3.52 | 0.79 | Moderate       |
| Transparency and fairness           | 3.47 | 0.81 | Moderate       |
| Human oversight                     | 3.61 | 0.75 | High           |
| Workload and duty-hour effect       | 3.29 | 0.86 | Moderate       |
| Monitoring and privacy concern      | 3.18 | 0.91 | Moderate       |
| Job security and career development | 3.42 | 0.83 | Moderate       |
| Overall AI-enabled work environment | 3.5  | 0.78 | High           |

\*\*\* Source: Primary data

Interpretation: The illustrative results suggest that employees perceive AI usefulness and reliability positively ( $M = 3.78$ ), followed by ease of use ( $M = 3.69$ ) and human oversight ( $M = 3.61$ ). Training/support and transparency receive comparatively moderate scores. Workload, monitoring/privacy and job-security dimensions require careful interpretation because their direction depends on item wording. The questionnaire design in the source

specifically recommends reverse-coding negatively worded items before construct scoring.

Table 3. Employee Satisfaction Level

| Satisfaction Level  | Frequency | Percentage |
|---------------------|-----------|------------|
| Highly Satisfied    | 38        | 25.3       |
| Satisfied           | 62        | 41.3       |
| Neutral             | 28        | 18.7       |
| Dissatisfied        | 16        | 10.7       |
| Highly Dissatisfied | 6         | 4.0        |
| Total               | 150       | 100.0      |

\*\*\* Source: Primary data

The illustrative distribution shows that 66.6% of respondents are either highly satisfied or satisfied, while 18.7% are neutral and 14.7% are dissatisfied or highly dissatisfied. This suggests an overall favourable satisfaction pattern, but the dissatisfied group indicates areas requiring managerial attention. The original source reports the same satisfaction distribution for the Mayiladuthurai study; it must not be presented as verified Madurai evidence.

Table 4. Multiple Regression Analysis – AI-Enabled Work Environment Predicting Employee Satisfaction

| Predictor                        | B     | SE B | $\beta$ | t     | p      |
|----------------------------------|-------|------|---------|-------|--------|
| AI usefulness and reliability    | 0.28  | 0.08 | 0.29    | 3.5   | < .001 |
| Training and technical support   | 0.22  | 0.07 | 0.24    | 3.14  | 0.002  |
| Transparency and fairness        | 0.19  | 0.08 | 0.18    | 2.38  | 0.018  |
| Human oversight                  | 0.21  | 0.07 | 0.22    | 3.0   | 0.003  |
| Workload / digital monitoring    | -0.17 | 0.07 | -0.16   | -2.43 | 0.016  |
| Privacy concern / job insecurity | -0.14 | 0.06 | -0.15   | -2.33 | 0.021  |

Interpretation: The illustrative regression indicates positive and statistically significant associations of AI usefulness, training/support, transparency/fairness and human oversight with employee satisfaction. Workload/digital monitoring and privacy concern/job insecurity show negative coefficients, indicating lower satisfaction when these risks are perceived to be higher. On these model values, H1, H2 and H3 would be supported, while H4 would also be supported. However, these are simulated values for table completion and are not empirical Madurai findings. The source recommends reporting model fit, confidence intervals, assumptions, effect sizes and diagnostics with the final regression

## VII. DISCUSSION

If the verified Madurai results follow the illustrative pattern, the findings would suggest that employees respond more favourably when AI-enabled systems are useful, understandable, supported and subject to human oversight. This is consistent with the broader TNSTC literature in the

supplied manuscript, which emphasises supportive workplace conditions, management support, safety and manageable work conditions as important for satisfaction. The negative coefficients for workload/monitoring and privacy/job insecurity in the illustrative model also reflect the need to treat AI as an organisational change rather than simply a productivity technology. Excessive monitoring or unclear data practices may create dissatisfaction even where the technology itself is operationally useful. The final discussion should distinguish employee perceptions from objective system performance.

## Suggestions

- Provide role-specific AI training and explain system capabilities, limitations and error-reporting procedures.
- Retain meaningful human oversight and provide a clear route for employees to question or appeal AI-supported decisions.
- Monitor workload and fatigue rather than focusing only on output.
- Define employee data collection, access, retention, and usage rules.
- Communicate the purpose, benefits, limitations and review process for AI-enabled systems.
- Evaluate AI adoption separately for drivers, conductors, maintenance staff, administrative staff and supervisors.

These recommendations follow the supplied manuscript's emphasis on training, human oversight, workload, privacy, communication, safety, welfare and employee-group differences.

## VIII. CONCLUSION

The study highlights that an AI-enabled work environment can influence employee satisfaction through both positive and negative workplace mechanisms. AI may enhance satisfaction when it improves task efficiency, reduces repetitive work, provides useful information, and is supported by appropriate training and human oversight. However, excessive monitoring, workload intensification, privacy concerns and job insecurity may reduce employee satisfaction. The theoretical framework combining JD-R Theory, Job Characteristics Theory, TAM and the socio-technical perspective provides a comprehensive basis for understanding these relationships. The literature also reveals a research gap concerning AI-enabled work environments in Indian public-sector transport organisations. Therefore, examining employees at TNSTC Madurai Depot can provide context-specific evidence for implementing AI in a productive, responsible and employee-centred manner.

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