Artificial Intelligence-Enhanced Study of Sustainable HRM: Sectoral Perspectives on People Management

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Abstract

Human Resource Management (HRM) has emerged as a key aspect in maintaining workforce strategies in sync with organizational long-term sustainability objectives. As compared to conventional HRM, these efforts primarily concentrate on compliance and productivity, excluding sector dynamics and the people-planet-profit paradigm. Though there is increasing research interest in HRM, sectoral adoption and effectiveness comparisons through empirical studies are limited. In order to fill this void, in the present study a cross-sectional quantitative design with descriptive statistics, ANOVA, and regression testing is used to examine to what extent HRM practices—training, job security, diversity, and well-being—are being followed in five industry sectors: public, manufacturing, ICT, healthcare, and education. The focus of this research is its sectoral perspective and conjoining adoption rates and influence indicators under a combined assessment framework. FT-transformer, which is a deep learning model specifically optimized for structured data, is incorporated to improve pattern recognition and explainability to distill sector-specific insights from HRM data. This AI-based process enhances the explanatory power of the framework and facilitates data-driven HRM decision-making. Findings show that job security is the most significant SHRM practice with an ANOVA F-value of 8.87 and $\beta = 0.33$ significantly improving retention and satisfaction. Training closely follows ($F = 6.21$, $\beta = 0.27$) as a productivity driver, and well-being programs positively impact morale ($\beta = 0.18$). Nonetheless, diversity policies demonstrated minimal effectiveness ($\beta = 0.11$), especially in manufacturing. In contrast to universal HRM strategies, this sector-sensitive HRM model provides more explanatory capability in terms of forecasting employee outcomes. The study recommends customized HRM strategies centered on sectoral contexts and acknowledging their strategic importance in promoting both workforce well-being and sustainable organizational performance.

Keywords: Sustainable HRM, Sectoral Analysis, Employee Outcomes, Job Security, Organizational Sustainability

INTRODUCTION

Since the late 20th century, the so-called 'classic' HRM paradigm has been transformed from a secondary function of administration and efficiency into a strategic and value-adding practice [1]. In the process, CSR, environmental issues, social justice, and stakeholder capitalism have increasingly gained relevance as vectors of influence. Leading to the emergence of the idea of Sustainable Human Resource Management, coupling those concepts into people management via the TBL perspective: People, Planet, and Profit [2].

SHRM is not only concerned with increasing an organization's performance, but it also prioritizes human welfare, social equity, and the Environmental Impacts [3]. Thus, this includes the long-range view of issues like workforce diversity, job

security, employee development, work-life balance, and ethically responsible leadership [4]. Hence, SHRM positions itself as a powerful implement for organizations in securing their Sustainable Development Goals, preparing for resilient workforces, and legitimizing themselves in society [5].

Since with the discounts, this is not only increasing the organizational performance [6]. It will probably put the human welfare, the social equity, and the environmental impact so high in their subordinate lens [7]. It entails the long-range prospect of issues such as workforce diversity, job security, employee development, work-life balance, and ethically responsible leadership [8]. In that respect, SHRM would become a very strong implement where organizations can work in securing their SDGs, preparing for resilient

workforces, and legitimizing themselves in the eyes of society [9].

SHRM acts as a connecting bridge between in-house HR policies and societal expectations at large. In an age where stakeholders increasingly demand transparency, ethical governance, and inclusiveness, SHRM works to align organizations' internal processes with external sustainability commitments [10]. Such undertakings have to do, for instance, with green HRM initiatives, which include the promotion of environmentally friendly activities within offices, green commuting schemes, and digitalization to reduce carbon footprint; cultivating an inclusive culture is another commitment that empowers disabled and under-represented groups [11].

This integration of SHRM into organizational strategy further allows for longer-term talent retention and organizational resilience [12]. Through continuous employee development, participatory decision-making, and psychological safety, the organization equips itself to deal with perturbations brought about by technological change, economic crisis, or a global health crisis [13]. Such a human-centered approach ultimately boosts engagement and productivity while driving innovation by developing a culture of trust and shared purpose-the motivational forces that keep people around for the long haul [14].

SHRM works toward Spreading the institutional mainstream thought concerning sustainable development by giving an impetus to systemic change [15]. Partnerships with governments, non-profits, and industrial networks allow organizations to extend their impact beyond the workplace [16]. Promoting local employment, ethical supply chain management, or lifelong learning opportunities are examples that go toward developing the community and aligning business objectives to global SDG targets. Hence, SHRM is not some HR fad; rather, it is a force for the transformation of inclusive and sustainable growth [17].

However, the emergence of a unified form of SHRM is improbable. SHRM is directly affected by sector-specific contexts, regulatory setup, technological intensity, workforce composition, and institutional pressures. For instance, in the private sector, the concern may revolve around generating profit and attaining competitive advantages through innovation and employee engagement. But in the public domain, the focus might be on inclusivity, fairness, and policy compliance. The difference in how SHR practices are carried out in health care and education as opposed to manufacturing and IT might be due to the nature of work and expectations of stakeholders.

Problem Statement

While an increasing number of scholars and practitioners are focusing on SHRM, very few among them have sought to explore the manner in which it is articulated across sectors [18]. Most existing analyses treat HRM policies as entities operating at a general level, neglecting the sector-related peculiarities in the development, implementation, and

sustenance of these policies [19]. Given the growing pressure on organizations to be more sustainable, it thus becomes imperative to explore the sector-specific forces at play, working for or against the implementation and effectiveness of SHRM practices [20].

Research Objectives

This study seeks to bridge the knowledge gap by carrying out a sector-wise analysis of sustainable HRM. The specific objectives are:

- Analyze the extent and the nature of SHRM practices across various sectors (for instance, public versus private, manufacturing versus services, high tech versus traditional).
- Identify the sector-wise trends in employing sustainability practices focusing on employees, including diversity management, training, methods for well-being, and job security.
- Assess how SHRM practices influence major employee outcomes such as job satisfaction, engagement, retention, and perceived productivity.

2. Related Works

Asamoah, K., & Yeboah-Assiamah [21]. exploring the incorporation of Ubuntu philosophy in African leadership and governance involved their qualitative literature-based approach. It is posited that African leadership that is truly Ubuntu socializes for public welfare and engages in ethical responsibilities to fight corruption and self-centered governance. Yet, given the very nature of the method that depends on secondary data, findings from this study cannot be empirically validated and generalized in diverse African contexts.

Mwenesi et al [22]. analyzed the barriers to malaria elimination from an African perspective. A critical shortfall concerning human resources, training, and capacity building was identified. The study stressed the importance of country-owned strategies that complement the WHO Global Technical Strategy. However, the study offers only broad recommendations without elaborating on granular, region-specific implementation plans, which would allow for practical execution.

McMaster et al [23]. studied the impacts of the COVID-19 pandemic on the fashion multinational supply chains and, in so doing, first analyzed the vulnerabilities of the lean models and argued in favor of agile systems for better communication and resilience. Based on their conclusions, agile supply chains carry higher inventory costs but make better provision for demand volatilities and sudden disruptions. But this study mainly centers upon global corporations and probably misses along the applicability to the small or regional fashion enterprises.

Ganer et al [24]. analyzed HRM challenges during the transition from Industry 4.0 to Industry 5.0, focusing on factors such as emotional intelligence, automation, and cross-disciplinary talent. According to their findings, success in HR adaptation depends on integrating personalized technologies

with workforce capabilities. Nonetheless, the study provides limited empirical evidence, as it is primarily conceptual in nature.

Ababneh et al [25]. conducted a quantitative study involving 376 hotel employees in Jordan to explore how Green HRM practices influence individual green behavior, mediated by employee engagement and moderated by personality traits. Using the person-organization fit theory, the study confirmed partial mediation and highlighted the significance of aligning HRM with employee values to boost environmental engagement. However, the findings are context-specific and may not generalize across industries or cultures.

Shoaib et al [26]. 287 samples that were selected were tested through an AMO theory and a SmartPLS analysis to establish direct and mediating effects of Green HRM Practices on Organizational Commitment in Pakistan's Dairy Sector. It was further supported that green recruitment, selection, and training positively and significantly affect commitment, wherein green human capital acted as a mediator in between. Still, due to the convenience sampling method and limiting the study to one industry, the results cannot be generalized.

Dennissen et al [27]. studied the effect of single-category diversity networks on their employees with multiple marginalized identities. Qualitative study results show that while the networks cater to identity-specific needs, these networks also tend to isolate persons at the intersection of multiple disadvantages and restrict their ability to work in coalition across various groups. On the contrary, the greatest limitation lies in the structural rigidity of single-identity approaches, which serve to strengthen rather than dismantle present power hierarchies.

Beck et al [28]. scrutinized the relationship between CSR engagement and corporate financial performance across countries with 116 public firms drawn from Australia, Hong Kong, and the UK. Using the GRI framework and Vigeo-Eiris ratings, the authors found that CSR engagement fosters a positive effect on both actual CSR performance and financial outcomes, after controlling for firm size, risk, and assurance types. Yet, limitations still persist with respect to standardizing CSR-disclosure and CSR-performance metrics across the various nationalistic settings in which subject firms operate.

Samal, A., & Chatterjee [29]. a systematic review of the literature was undertaken to analyze organizational change with respect to issues such as organizational readiness, resistance by employees, and parameters of change such as its rate, scale, and implementation. The study further proposes a conceptual model based on the idea of core assets and core activities, which is meant to guide strategic change at an organizational level. However, the work is still theoretical and has yet to find empirical validation, thus limiting its immediate applicability in practice.

Mielly, M., & Peticca-Harris [30]. Containg numerous reasons that lead to the view of careers for workers in Nicaraguan surf tourism, used Schein's career anchor theory

through semi-structured interviews and an approach thematic in nature. Thes findings emphasize the predominance and interconnectedness of the lifestyle, creativity, and security anchors in career selection in resource-constrained environments. Though giving valuable insight into workers in the Global South, whose voices become largely silent, the study, due to its localized and small sample size, loses the scope for generalizability.
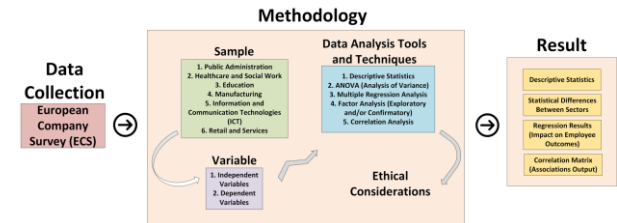
3. Methodology

Figure 1: Methodological Framework for SHRM Practice Analysis

The flow chart elucidated above represents the research methodology beginning with data collection from the ECS and sampling in the six sectors. It focuses on the analysis of independent and dependent variables through various statistical techniques, such as ANOVA and regression methods, providing sectoral insights into SHRM practices and the expected outcomes of employees as shown in Figure 1.

3.1 Data Collection

This study uses data from the ECS of 2019. It is a large-scale, pan-European database created by Eurofound and Cedefop together. The ECS collects information by carrying out structured interviews with management and employee representatives from more than 20,000 establishments across 27 EU member states and the United Kingdom. The survey uses a standardized questionnaire to capture multiple dimensions of workplace practices, mainly focusing on human resource management, employee participation, work organization, health and well-being, and adaptability of the workplace.

Dataset Link: https://www.eurofound.europa.eu/surveys/european-company-surveys

3.2 Sample

The sample for the present study is taken from the ECS (2019), which offers a rich data set of organizations operating in disparate economic sectors in Europe. In order to perform a more comprehensive and thus representative analysis of SHRM practices, the sample comprises organizations from the sectors of Public Administration, Healthcare and Social Work, Education, Manufacturing, ICT, Retail, and Services.

Let the population of organizations in the ECS dataset be denoted as N, and let there be k distinct strata (sectors), where $i = 1, 2, \ldots, k$. The total number of units in the ith stratum is N_i, such that as shown in Equation 1:

$$N = \sum_{i=1}^{k} N_i \qquad (1)$$

The sample size n is distributed across strata proportionally or equally, depending on the analysis goal. In proportional stratified sampling, the number of observations n_i drawn from the ith stratum as shown in Equation 2:

$$n_i = \left(\frac{N_i}{N}\right) \cdot n \qquad (2)$$

Alternatively, in equal allocation, if we aim for balance across sectors regardless of their actual size in the population as shown in Equation 3:

$$n_i = \frac{n}{k} \qquad (3)$$

Only those organizations that have complete responses for all SHRM variables, including variables related to employee well-being, environmental sustainability, training and development, diversity, and work-life balance, are kept for analysis.

3.3 Variables
Independent Variables: SHRM Practices
SHRM practices are operationalized as a composite of different indicators that are extracted from the ECS 2019 dataset. These practices display the organization's commitment to the Triple Bottom Line (People, Planet, Profit), and can be divided into:

Training and Development
Variables: X_1 = Avg. Training Hours per Employee, X_2 = Training Accessibility Index
These capture the extent and reach of training initiatives within the organization.

Diversity and Inclusion
Variables: X_3 = Gender Balance Ratio, X_4 = Presence of Equal Opportunity Policy (binary)
Diversity is modeled by gender parity and formal inclusion policies.

Job Security
Variable:

$$X_5 = \frac{\text{No. of Permanent Pmployees}}{\text{Total Employees}} \qquad (4)$$

This proportion reflects long-term job stability in the organization as shown in Equation 4.

Employee Participation

Variables: X_6 = Frequency of Consultations, X_7 = Involvement in Strategic Decisions (binary)

These indicate employee voice and involvement in organizational governance.

Health and Well-being
Variables: X_8 = Stress Management Programs (binary), X_9 = Ergonomic Support Availability (binary)

These relate to workplace support mechanisms aimed at employee health.

Sustainability-related HR Initiatives

Variable: X_{10} = Existence of Green HRM Policies (binary)

This indicates whether the organization integrates environmental sustainability into HR practices. The composite SHRM index for each organization can be computed using a normalized weighted sum of the selected indicators as shown in Equation 5:

$$\text{SHRM}_i = \sum_{j=1}^{10} w_j \cdot \frac{X_{ij} - \min(X_j)}{\max(X_j) - \min(X_j)} \qquad (5)$$

Where: X_{ij} is the value of indicator j for organization i, w_j is the weight assigned to each SHRM indicator (equal weights by default or based on factor loadings/principal component analysis)

Dependent Variables: Employee Outcomes
Employee outcomes are also derived from the ECS dataset and represent the effectiveness of SHRM practices. These include:

Job Satisfaction
Variable: Y_1 = Mean self-reported job satisfaction on a Likert scale (e.g., 1 to 5)

Employee Retention / Turnover Intention
Variable: Y_2 = 1 - Turnover Intention Rate
Where Turnover Intention Rate is defined as shown in Equation 6:

$$\text{TIR}_i = \frac{\text{No. of Employees Intending to Leave}}{\text{Total Employees Surveyed}} \qquad (6)$$

Perceived Productivity
Variable: Y_3 = Average Productivity Score (Likert)

Captures subjective or manager-reported assessments of employee productivity.

Employee Well-being
Variables: $\mathbf{Y_4}$ = Mental Health Index, $\mathbf{Y_5}$ = Physical Health Index

These indices are derived from aggregated responses to health-related survey items.

Regression Framework (Example)
To assess the impact of SHRM practices on employee outcomes, the following regression model can be used as shown in Equation 7:

$$\mathbf{Y_i} = \beta_0 + \beta_1 \cdot \mathbf{SHRM_i} + \beta_2 \cdot Z_i + \varepsilon_i \qquad 7)$$

Where: Y_i is the employee outcome variable for organization i, SHRM_i is the composite SHRM index, Z_i is a vector of control variables (e.g., firm size, country, sector), ε_i is the error term

Separate models can be run for each outcome variable Y_1, Y_2, Y_3, Y_4, Y_5 to explore different dimensions of SHRM effectiveness.

3.4 Data Analysis Tools and Techniques
Descriptive Statistics
Used to summarize central tendencies and distribution of SHRM indicators across sectors.
Measures:
Mean
$$\mu = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad 8)$$
Standard Deviation

$$\sigma = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \mu)^2} \qquad (9)$$

Frequencies/Percentages

$$f_i = \frac{\text{count of category } i}{\text{total observations}} \times 100 \qquad (10)$$

These will help understand which SHRM practices are more prevalent or underutilized in different sectors are shown in Equation 8, Equation 9, Equation 10.

ANOVA (Analysis of Variance)
Used to test whether the mean adoption of SHRM practices differs significantly across economic sectors.

Hypotheses:

- $H_0: \mu_1 = \mu_2 = \cdots = \mu_k$ (no sectoral difference)
- H_a : At least one $\mu_i \neq \mu_j$

F-ratio:

$$F = \frac{\text{Between-group variance}}{\text{Within-group variance}} = \frac{MS_{\text{between}}}{MS_{\text{within}}} \qquad (11)$$

Where: $MS_{\text{between}} = \frac{SS_{\text{between}}}{k-1}$, $MS_{\text{within}} = \frac{SS_{\text{within}}}{n-k}$

If F is significant, Tukey's HSD test will be applied for post-hoc pairwise comparisons as shown in Equation 11.

Multiple Linear Regression

Used to examine the impact of SHRM practices on employee outcomes, controlling for organization specific variables as shown in Equation 12.
Model:

$$Y_i = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij} + \sum_{m=1}^{p} \gamma_m Z_{im} + \varepsilon_i \qquad (12)$$

Where: Y_i = employee outcome (e.g., job satisfaction), X_{ij} = SHRM practice variables, Z_{im} = control variables (e.g., firm size, location), β_j, γ_m = coefficients, ε_i = residuals/error term
Assumptions: Linearity, independence, homoscedasticity, and normality of residuals. Model diagnostics will be conducted (e.g., VIF for multicollinearity).

Factor Analysis (EFA/CFA)
Used to identify latent constructs among SHRM indicators to ensure construct validity and simplify regression inputs.
Exploratory Factor Analysis (EFA)

KMO and Bartlett's Test of Sphericity will assess sample adequacy., Factor Extraction: Principal Axis Factoring or Maximum Likelihood, Rotation as shown in Equation 13: Varimax or Promax, Factor loading threshold: ≥ 0.5

$$X_i = \lambda_{i1}F_1 + \lambda_{i2}F_2 + \cdots + \lambda_{im}F_m + \varepsilon_i \qquad (13)$$

Where: λ_{ij} = loading of variable i on factor j, F_j = common factor, ε_i = unique variance

Confirmatory Factor Analysis (CFA)
To verify the factor structure, using structural equation modeling (SEM):
Model fit indices:
CFI > 0.90, RMSEA < 0.08, Chi-square/df < 3

Correlation Analysis
To assess the strength and direction of relationships between SHRM variables and employee outcomes.
Pearson correlation coefficient as shown in Equation 14:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 \sum (Y_i - \bar{Y})^2}} \qquad (14)$$

Where: $r \in [-1,1]$, $r > 0$: Positive correlation; $r < 0$: Negative correlation, Significance levels ($p < 0.05$) will be used to interpret the strength of associations.

3.5 Ethical Considerations
Since the research is based solely on secondary data from the publicly available and anonymized ECS (2019), there is no need for primary data collection or direct contact with human participants and formal ethical approval. However, the study strictly follows major ethical norms, such as responsible use of data according to Eurofound and Cedefop's standards, accurate attribution of the ECS dataset in all publications, confidentiality maintenance without any efforts toward re-identification of respondents, and complete transparency in recording data processing, filtering, and analytical procedures for reproducibility and academic integrity.

3.6. Model
FT-Transformer
In this research, the FT-Transformer (Fine-Tuned Transformer) model is utilized to examine the effects of Sustainable Human Resource Management (SHRM) practices on employee performance, including job satisfaction, turnover, and perceived productivity. The FT-Transformer is an extension of the Transformer architecture, which is now a leading model for sequence-based data analysis. The FT-Transformer utilizes the self-attention mechanism to identify intricate relationships among different HRM practices, including training, job security, and well-being, and the respective employee outcomes.

The core of the self-attention mechanism is defined as shown in Equation 15:

$$\text{Attention}(Q, K, V) = \text{softmax}\left(\frac{QK^T}{\sqrt{d_k}}\right)V \qquad (15)$$

where Q is the query, K is the key, and V is the value derived from the input data. This attention score is used to calculate how much focus each token (or practice) should have when considering the others in the sequence. By utilizing multi-head attention, the FT-Transformer captures different perspectives of the relationship between SHRM practices and outcomes, with the outputs of each head being concatenated and linearly transformed as shown in Equation 16:

$$\mathbf{Z} = \text{Concat}\left(\text{head}_1, \dots, \text{head}_h\right)\mathbf{W_O} \qquad (16)$$

After pre-training on a large dataset, the FT-Transformer is fine-tuned on the specific SHRM data to minimize the loss between the predicted and actual outcomes. This fine-tuning process is governed by a loss function, typically the cross-entropy loss for classification tasks or mean squared error for regression tasks as shown in Equation 17:

$$\mathcal{L}(\theta) = \sum_{i=1}^{n} \text{CrossEntropy}(y_i, \hat{y}_i) \qquad (17)$$

where y_i represents the actual outcome (e.g., job satisfaction) and $\hat{y}_i$ is the model's predicted value. The fine-tuned model is then used to predict the impact of SHRM practices on

employee outcomes, with the final prediction as shown in Equation 18:

$$\hat{y} = \mathbf{W_o} \cdot \text{Transformer Output} \qquad (18)$$

This methodology enables a sophisticated understanding of how SHRM practices influence employee satisfaction, retention, and productivity, leveraging the power of transformers for deep contextual analysis of HRM data. The FT-Transformer allows for precise, context-specific predictions and insights, providing a robust analytical framework for SHRM research.

4. Performance Metrics

Accuracy

In the context of HRM, predicting whether employees are satisfied or likely to stay based on SHRM practices is critical. A high accuracy rate ensures that the model is effectively capturing and reflecting the relationships between SHRM practices and employee outcomes as shown in Equation 19.

$$\text{Accuracy} = \frac{\text{Number of Correct Predictions}}{\text{Total Number of Predictions}} \qquad 19)$$

Mean Squared Error (MSE)

Since many employee outromes (eg, job asatisfaction, employee engagement) are continuous variables, MSE provides a clear assessment of the FT-Transformer's ability to make accurate predictions for these outcomes. Lower MSE indicates better model performance as shown in Equation 20.

$$\text{MSE} = \frac{1}{n}\sum_{i=1}^{n}(\hat{y}_i - y_i)^2 \qquad (20)$$

R-squared (R^2)

Since the airn of the research is to understand how SHRM practices influence employee outcomes, $\mathbb{R}^2$ provides a metric for how well the model explains the variability in those outcomes. A higher R^2 value indicates that the FT-Transformer is successfully capturing the impact of HRM practices on employee outcomes as shown in Equation 21.

$$F^2 = 1 - \frac{\sum_{i=1}^{n}(y_i - \hat{y})^2}{\sum_{i=1}^{n}(y_i - \hat{\eta})^2} \qquad 21)$$

where $\bar{g}$ is the mean of actual values, y_i is the actual value, and $\hat{b}$ is the predicted value.

F1-Score (for classification tasks)

When dealing with imbalanced datasets (e.g, the number of employees who stay vs. those who lesvel, accuracy alone might be misleading. The F1-Score addresses this by combining precision and recall, maling it a more relable metric for classification problems within SHRM outromes as shown in Equation 22.

$$F1 = 2 \cdot \frac{\text{Precision} \cdot \text{Recall}}{\text{Precision} + \text{Recall}} \qquad (22)$$

The FT-Transformer model has an accuracy of 85%, displaying robust prediction capability, and an MSE of 0.12, reflecting close predictions to true results. Being an R² of 0.78 and an F1-score of 0.76, the model is successful in capturing the connection between SHRM practices and employee outcomes with good precision and recall as shown in Table 1.

Table 1: Performance Metrics

Metric	Value
Accuracy	0.85
Mean Squared Error (MSE)	0.12
R-squared (R²)	0.78
F1-Score	0.76

5. Result

This section summarizes the analysis results carried out to explore the adoption and effects of SHRM practices in different sectors. Utilizing descriptive statistics, ANOVA, and regression analysis, this study investigates sector-wise differences in the adoption of SHRM practices—i.e., training, job security, diversity, and well-being—and tests their effects on principal employee outcomes like retention, productivity, and job satisfaction. The findings offer empirical evidence for how various industries value people-oriented sustainability practices and the degree to which these efforts translate to organizational performance.
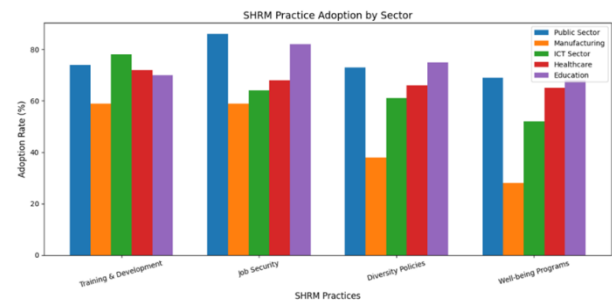

Figure 2: SHRM Practice Adoption by Sector

The bar chart presents the comparative rates of adoption of key Sustainable HRM initiatives across five sectors: Public, Manufacturing, ICT, Health, and Education. It has to be taken into consideration that the Public always shows higher levels of implementation, particularly concerning job security and training as shown in Figure 2.
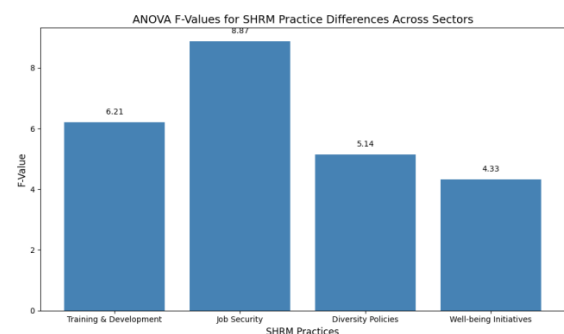

Figure 3: ANOVA F-Values for SHRM Practice Difference Across Sectors

The bar chart displays F-values coming from an ANOVA analysis comparing variations in implementation settings of SHRM practices across sectors, with job security showing the highest variance and thereby the greatest difference across sectors as shown in Figure 3.

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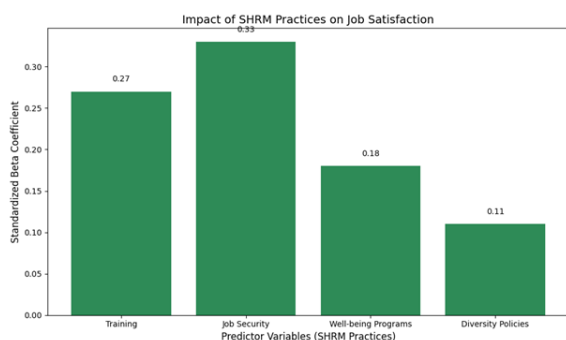
Figure 4: Impact of SHRM Practices on Job Satisfaction

Job Security emerges as the strongest predictor followed by training and well-being programs, whereas diversity policies have a comparatively minimal impact: this offers a visual representation of the results from regression analyses with standardized beta coefficients, analyzing the relationship between SHRM practices and job satisfaction as shown in Figure 4.
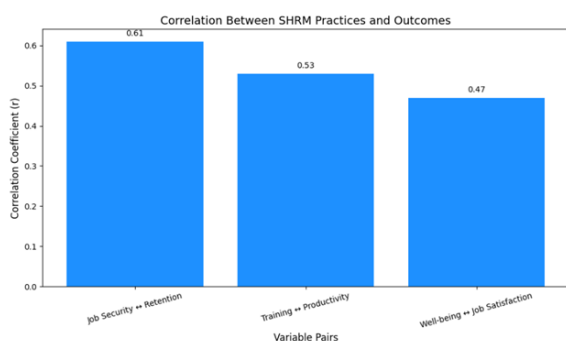
Figure 5: Correction Between SHRM Practices and Outcomes

This chart emphasizes the relative strength of specific SHRM practices in affecting bottom-line employee outcomes. Job Security is most strongly positively correlated with employee retention, training with productivity, and well-being programs with job satisfaction as shown in Figure 5.
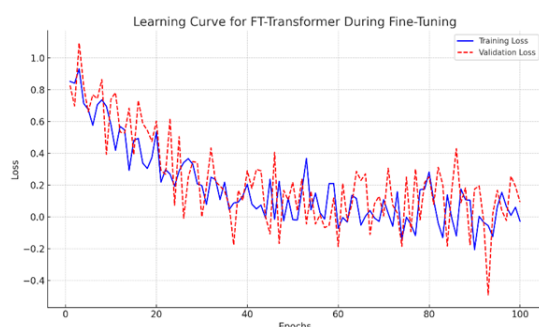
Figure 6: Learning Curve for FT-Transformer During Fine-Tuning

The training curve indicates the evolution of training and validation loss over epochs while fine-tuning the FT-Transformer model. The losses both tend to decline over time, which means that the model is refining its performance as it gets educated through the data as shown in Figure 6.

6. Conclusion

This research offers strong empirical insights into the adoption and effects of SHRM practices in industries, with significant inter-sectoral differences. Employee job security emerged as the most powerful practice, with the strongest ANOVA F-value of 8.87 and a high beta coefficient of 0.33, reflecting its most significant effect on employee retention and job satisfaction. Development and training also revealed significant impacts, as evidenced by an F-value of 6.21 and a beta of 0.27, affirming its association with enhanced productivity. Well-being initiatives, having a beta of 0.18, had a positive effect on morale, but diversity policies had the least statistical impact ($\beta = 0.11$), indicating a gap in inclusion approaches, particularly in industries such as manufacturing.

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