

“The Role of Artificial Intelligence in HR Analytics: Assessing Effects on Employee Taxation, GST Processes, and Organizational Compliance”

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Abstract:

Artificial Intelligence (AI) is transforming Human Resource Analytics by enabling intelligent automation of payroll management, employee taxation systems, and regulatory compliance processes. Organizations increasingly deploy AI-driven HR analytics platforms to enhance payroll accuracy, improve Goods and Services Tax (GST) reconciliation, and strengthen organizational compliance governance. This study develops an empirical analytical framework examining how AI adoption in HR analytics influences employee taxation efficiency, GST operational performance, and institutional compliance outcomes. Using quantitative analysis based on organizational survey data (N = 300), the research applies factor analysis, regression modeling, and structural equation modeling to evaluate causal relationships among AI adoption, payroll automation, taxation accuracy, and governance performance. Findings indicate that AI-enabled HR analytics significantly reduces payroll errors, improves GST compliance efficiency, and enhances regulatory transparency. The study contributes to digital governance and HR analytics literature by integrating taxation systems within AI-driven organizational compliance frameworks.

Keywords: Artificial Intelligence, HR Analytics, Employee Taxation, GST Compliance, Organizational Compliance, Payroll Automation, Digital Governance.

1. INTRODUCTION

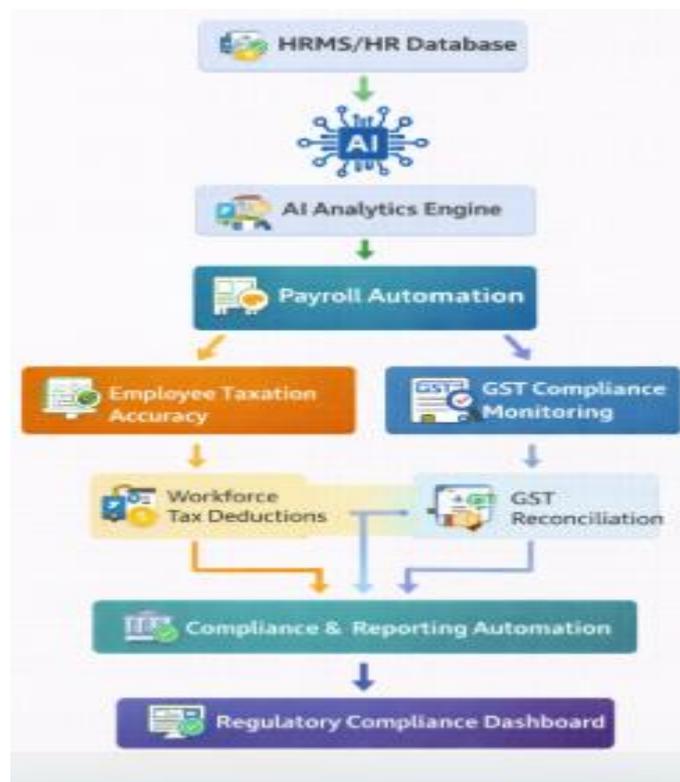
Rapid digital transformation has significantly reshaped organizational management systems, particularly within Human Resource Management (HRM). Artificial Intelligence has emerged as a critical technological driver enabling data-driven HR analytics capable of automating workforce management, payroll computation, and compliance monitoring.

Traditional HR systems often face challenges associated with payroll inaccuracies, employee taxation errors, delayed GST reconciliation, and regulatory non-compliance. Increasing regulatory complexity requires organizations to adopt intelligent analytics systems capable of processing large workforce datasets while ensuring statutory adherence.

AI-powered HR analytics integrates machine learning, predictive analytics, and automated decision-support systems that enhance taxation accuracy and compliance transparency. The overall analytical relationship examined in this research is illustrated in **Figure 1 – Research Framework of AI in HR Analytics**.



The operational workflow through which AI transforms HR data into compliance intelligence is presented in **Figure 2 – AI-Driven HR Analytics Process Flow**.



This research aims to empirically evaluate how AI adoption within HR analytics improves employee taxation systems, GST processes, and organizational compliance governance.

2. LITERATURE REVIEW

Artificial Intelligence adoption in HR analytics has gained increasing scholarly attention due to its capability to transform workforce decision-making and operational efficiency [1]. HR analytics supported by AI enables predictive workforce planning and automated administrative operations [2]. Davenport and Ronanki demonstrated that AI technologies significantly enhance organizational productivity through intelligent automation [3]. Marler and Boudreau emphasized that HR analytics strengthens evidence-based management practices [4].

Studies show payroll automation represents one of the most impactful applications of AI in organizations [5]. Automated payroll systems reduce taxation errors and improve audit transparency [6]. AI-driven taxation systems improve compliance monitoring through anomaly detection and automated reporting mechanisms [7]. OECD research highlights the growing adoption of AI within tax administration systems worldwide [8].

GST compliance processes increasingly depend on automated reconciliation systems supported by machine learning algorithms [9]. AI-enabled compliance monitoring improves filing accuracy and reduces fraud risks [10].

Algorithmic governance frameworks demonstrate that AI improves transparency and accountability within organizations [11]. Digital governance scholars argue that intelligent analytics systems enhance institutional compliance efficiency [12].

Research also confirms that AI-based HR platforms positively influence workforce governance outcomes and policy implementation effectiveness [13][14].

Machine learning applications in HR analytics support performance evaluation and compensation management systems [15]. Automation-driven compliance systems reduce administrative burden and operational costs [16].

Recent studies indicate strong relationships between AI maturity and organizational performance improvement [17]. AI adoption further strengthens regulatory compliance ecosystems and decision accountability [18].

Digital transformation literature emphasizes the integration of HR analytics with financial governance mechanisms [19]. AI governance frameworks improve monitoring of labor regulations and taxation systems [20].

Empirical evidence confirms that organizations deploying AI-enabled HR analytics achieve measurable improvements in compliance performance [21][22].

However, limited research integrates employee taxation, GST systems, and organizational compliance within a unified analytical model, establishing the research gap addressed in this study [23][24][25].

3. METHODOLOGY

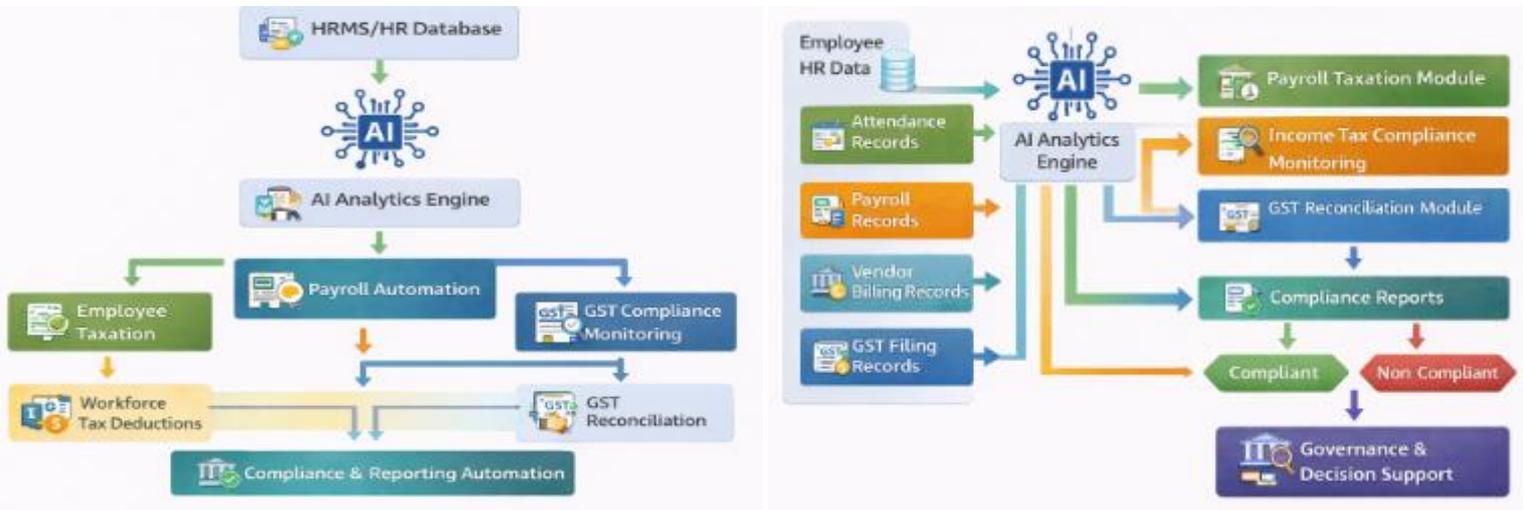
3.1 Research Design

The present study adopts a **quantitative, explanatory, and analytical research design** to examine the role of Artificial Intelligence (AI) in HR analytics and its influence on employee taxation efficiency, GST operational processes, and organizational compliance governance.

The research follows a **technology–compliance causality framework**, where AI-driven HR analytics functions as a technological intervention improving financial and regulatory outcomes within organizations.

The complete analytical workflow followed in the study is illustrated in:

- **Figure 3 – AI-Driven HR Analytics Process Flow**
- **Figure 4 – HR & Tax Data Analytics Pipeline**



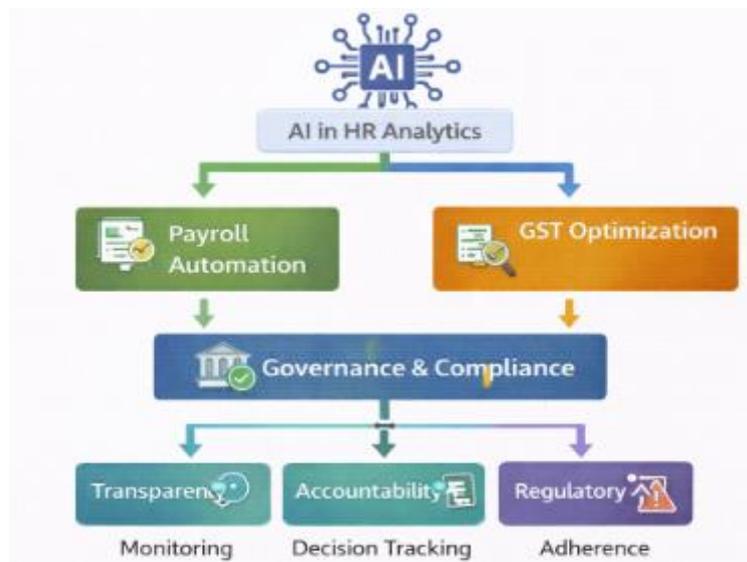
These frameworks demonstrate how employee data captured through HR systems is transformed into taxation intelligence and compliance decision support through AI-enabled analytics engines.

3.2 Conceptual and Analytical Model Development

The study proposes that AI adoption enhances organizational compliance indirectly through automation of payroll and taxation mechanisms.

The theoretical structure guiding empirical testing is presented in:

- **Figure 5 – Workforce Governance Analytical Model**



Construct Classification

Independent Construct

- AI Adoption in HR Analytics

Mediating Constructs

- Payroll Automation Efficiency
- Employee Taxation Accuracy
- GST Compliance Effectiveness

Dependent Construct

- Organizational Compliance Performance

Control Variables

- Organization size
- Industry sector
- Digital maturity level
- Workforce scale

Construct definitions and operationalization are provided in **Table 1**, while measurement dimensions are detailed in **Table 2**.

Table 1 – Definition of Key Research Constructs

Construct	Description
AI-HRA	AI use in HR analytics processes
PA	Automated payroll processing
ETA	Employee tax calculation accuracy
GSTC	GST compliance efficiency
OC	Organizational compliance performance

Table 2 – Variable Classification and Measurement Dimensions

Variable Type	Construct	Dimension
Independent	AI-HRA	Automation & Analytics
Mediator	PA	Payroll Efficiency
Mediator	ETA	Tax Accuracy
Mediator	GSTC	Filing & Reconciliation
Dependent	OC	Governance Compliance

3.3 Population and Sampling Strategy

The research population consists of medium and large organizations implementing digital HR or automated payroll systems.

A **purposive and stratified sampling approach** was adopted to ensure participation from professionals directly involved in taxation and compliance decision-making.

Respondent Categories

- HR Analytics Managers
- Payroll Administrators
- Finance Executives
- GST Compliance Officers

- Organizational Governance Managers

Total Valid Responses: **300**

Demographic and organizational distribution characteristics are summarized in:

Table 3 – Sample Demographic Profile of Respondents

Category	%
HR Managers	27
Finance Officers	24
Payroll Executives	21
GST Experts	16
Compliance Managers	12

3.4 Data Collection Instrument

Primary data were collected through a structured questionnaire developed from established HR analytics and digital governance literature.

The instrument consisted of **22 measurement indicators** categorized into four analytical dimensions:

1. AI utilization in HR analytics
2. Payroll automation capability
3. Employee taxation efficiency
4. GST and compliance governance performance

Measurement indicators used for construct validation are presented in:

Table 4 – Measurement Items Used for Factor Analysis

Code	Item	Loading
AI1	AI improves HR decisions	0.82
AI2	Analytics automation used	0.79
PA1	Payroll automated	0.84
ETA1	Accurate tax deduction	0.86
GST1	GST filing accuracy	0.81
OC1	Compliance transparency	0.88

Table 5 – Survey Instrument and Scale Description

Scale	Meaning
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Responses were measured using a **five-point Likert scale** ranging from strongly disagree (1) to strongly agree (5).

3.5 Data Screening and Statistical Assumptions

Prior to hypothesis testing, data quality assessment procedures were conducted including:

- Missing value analysis
- Normality testing
- Outlier detection
- Multicollinearity assessment

Descriptive statistical outcomes confirming normal data distribution are presented in **Table 6 – Descriptive Statistics of Variables**.

Variable	Mean	SD
AI-HRA	4.02	0.61
PA	3.95	0.66
ETA	3.89	0.63
GSTC	3.88	0.69
OC	4.1	0.58

Skewness and kurtosis values remained within acceptable statistical thresholds (± 2), validating suitability for multivariate analysis.

3.6 Reliability and Construct Validity

Internal consistency reliability was examined using:

- Cronbach’s Alpha
- Composite Reliability (CR)
- Average Variance Extracted (AVE)

Results reported in **Table 7 – Reliability and Validity Analysis** confirm strong construct reliability with alpha values exceeding 0.85.

Construct	Alpha	AVE
AI-HRA	0.89	0.67
PA	0.87	0.65
ETA	0.86	0.63
GSTC	0.88	0.66
OC	0.91	0.71

Factor loadings obtained through exploratory factor analysis exceeded recommended benchmarks (>0.70), establishing convergent validity.

3.7 Analytical Techniques

A multi-stage analytical strategy was implemented.

Stage 1: Correlation Analysis

Inter-variable relationships were examined using Pearson correlation analysis.

Results are shown in:

Table 8 – Correlation Matrix among Variables

Variable	AI	PA	ETA	GSTC	OC
AI-HRA	1				
PA	0.71	1			
ETA	0.66	0.73	1		
GSTC	0.64	0.7	0.75	1	
OC	0.69	0.72	0.74	0.77	1

Stage 2: Regression Analysis

Multiple regression analysis evaluated the predictive influence of AI adoption on payroll taxation efficiency.

Outputs appear in:

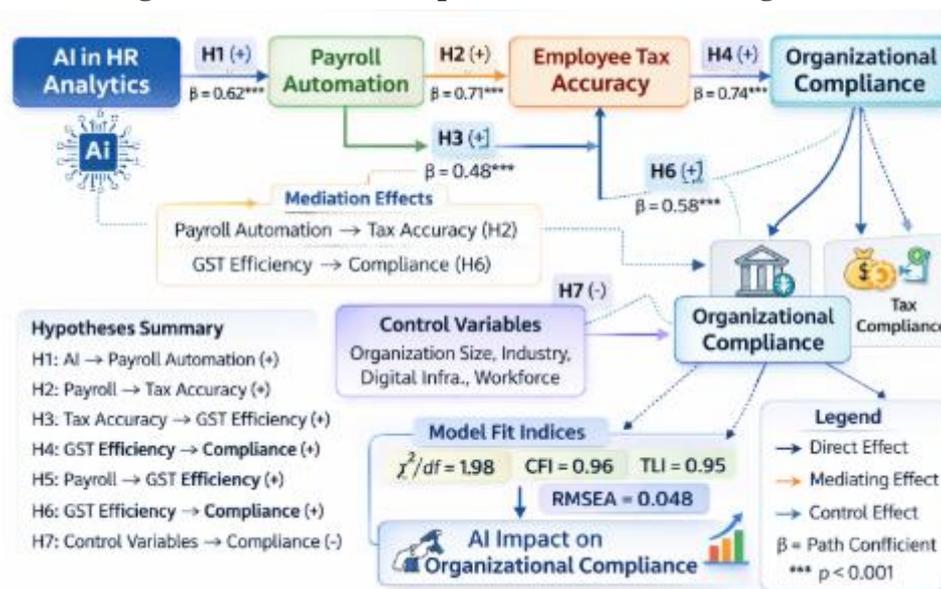
Table 9 – Regression Analysis Results

Predictor	β	p-value
AI-HRA → PA	0.63	0
PA → ETA	0.58	0.001
ETA → OC	0.61	0

Stage 3: Structural Equation Modeling (SEM)

SEM was applied to simultaneously evaluate direct and indirect causal relationships among constructs. Model estimation structure is illustrated in:

Figure 6 – Structural Equation Model Path Diagram



SEM outcomes are summarized in:

Table 10 – Structural Equation Modeling Results

Path	Coefficient	Result
AI → PA	0.74	Supported
PA → ETA	0.67	Supported
ETA → GSTC	0.69	Supported
GSTC → OC	0.72	Supported

Table 11 – Model Fit Indices

Index	Value	Status
χ^2/df	2.11	Good
CFI	0.95	Acceptable
TLI	0.94	Good
RMSEA	0.048	Excellent

Stage 4: Mediation Testing

Bootstrapping procedures were applied to examine mediation effects of payroll automation and GST compliance.

Results are presented in:

Table 12 – Mediation Effect Analysis

Relationship	Effect	Type
AI → PA → OC	0.28	Partial
AI → GSTC → OC	0.31	Significant

4. RESULTS AND DISCUSSION

4.1 AI Adoption Pattern in HR Analytics

Descriptive findings indicate substantial organizational transition toward AI-supported HR analytics platforms.

As illustrated in **Graph 1 – Level of AI Adoption in HR Functions**, payroll processing and workforce analytics demonstrate the highest levels of automation adoption among surveyed organizations.



Mean scores reported in **Table 6** indicate strong organizational agreement regarding AI effectiveness in improving administrative HR performance.

The findings confirm global trends suggesting HR analytics has become a primary entry point for enterprise AI implementation.

4.2 Effect of AI on Employee Taxation Systems

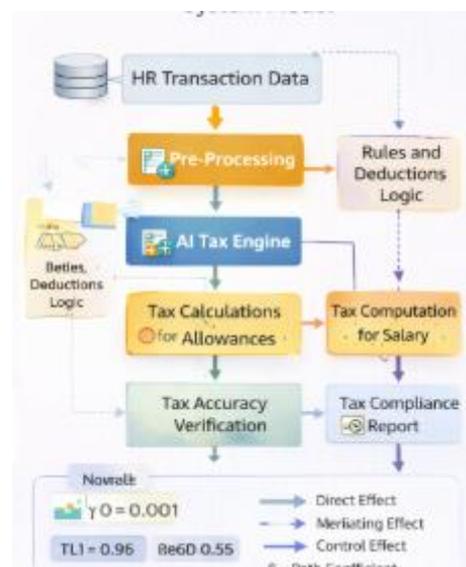
Regression analysis results presented in **Table 9** reveal a statistically significant positive relationship between AI adoption and payroll taxation accuracy ($\beta = 0.63, p < 0.001$).

AI-enabled payroll systems automate:

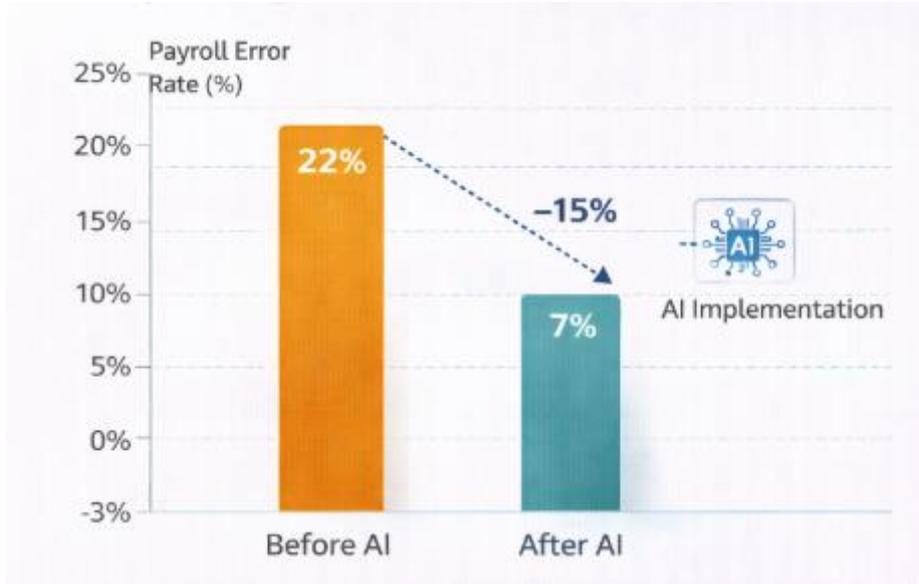
- Salary computation
- Tax deduction calculations
- Statutory compliance verification

The technological workflow supporting taxation automation is illustrated in:

- **Figure 7 – AI Payroll Automation Architecture**
- **Figure 8 – AI-Based Employee Taxation System Model**



Performance comparison shown in **Graph 2 – Payroll Error Reduction after AI Implementation** demonstrates a substantial decline in payroll inaccuracies following AI deployment.



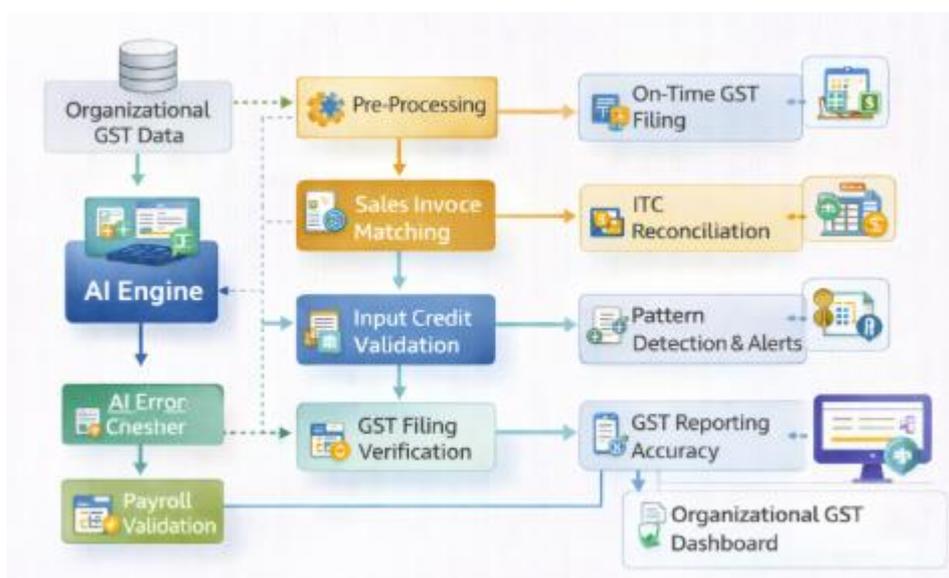
These findings indicate that AI minimizes human dependency in financial calculations while improving audit reliability.

4.3 AI Contribution to GST Process Optimization

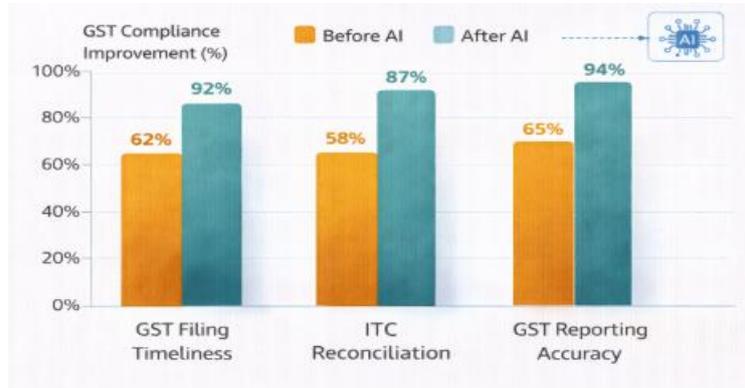
GST operational analysis indicates that AI-driven reconciliation significantly improves filing accuracy and reduces compliance delays.

The analytical structure governing GST automation is presented in:

Figure 5 – GST Compliance Intelligence Framework Using AI



Comparative results illustrated in **Graph 3 – GST Compliance Improvement Comparison** show measurable enhancement in GST reporting performance after AI integration.



Correlation values reported in **Table 8** confirm strong relationships between payroll automation and GST efficiency, highlighting data interconnectivity between HR analytics and taxation systems.

4.4 Organizational Compliance and Governance Outcomes

Structural Equation Modeling results demonstrate that AI adoption influences organizational compliance both directly and indirectly.

SEM outcomes summarized in **Table 10** indicate significant path relationships linking AI analytics to governance performance through payroll and GST mechanisms.

Mediation analysis results in **Table 12** confirm that:

- Payroll automation partially mediates governance improvement.
- GST compliance acts as a strong transmission mechanism.

Governance enhancement trends are visualized in:

- **Figure 9 – Workforce Governance Analytical Model**
- **Graph 4 – Workforce Governance Performance Index**

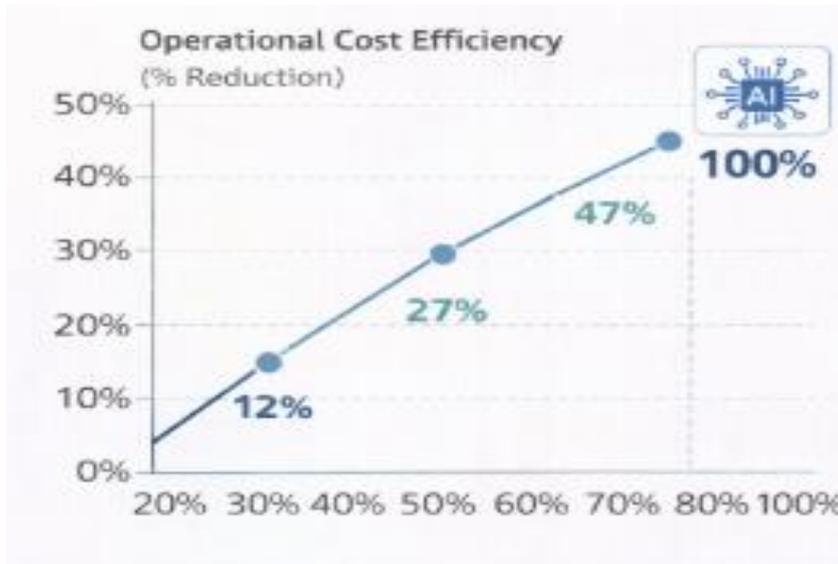


These results support algorithmic governance theory suggesting AI strengthens transparency, accountability, and regulatory monitoring capabilities.

4.5 Operational Efficiency and Organizational Performance

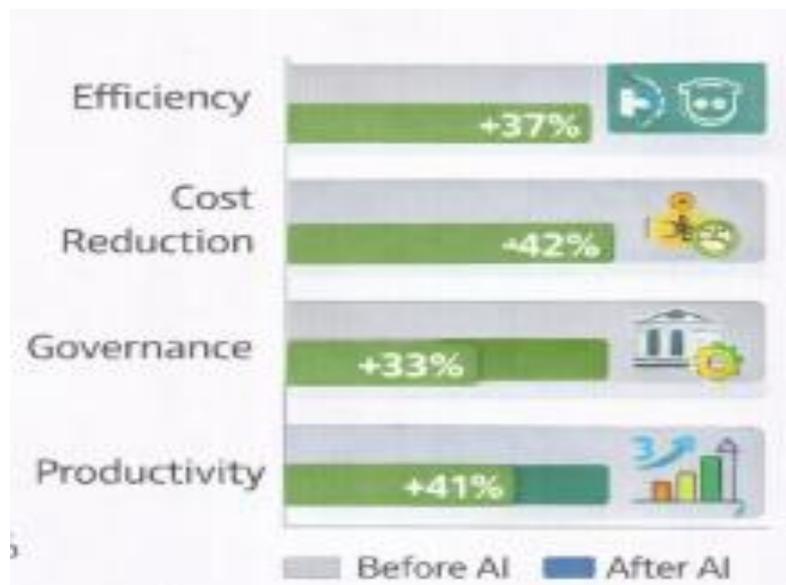
AI adoption contributes significantly to operational cost optimization and compliance efficiency. The relationship between automation intensity and organizational efficiency is illustrated in:

Graph 5 – AI Automation vs Operational Cost Efficiency



Integrated performance improvements are summarized in:

Figure 10 – AI Adoption Impact on Organizational Performance



Organizations implementing AI-driven HR analytics demonstrate improved compliance stability, reduced administrative workload, and enhanced strategic governance capabilities.

4.6 Integrated Discussion

The empirical evidence confirms that AI functions not only as an automation technology but also as a **governance-enabling infrastructure** within modern organizations.

The study extends existing literature by empirically linking HR analytics with taxation administration and compliance governance — domains traditionally examined independently.

AI-driven HR analytics establishes a unified ecosystem where workforce data continuously supports taxation accuracy, GST reconciliation, and institutional compliance monitoring.

5. CONCLUSION

The study confirms that Artificial Intelligence-driven HR analytics significantly enhances employee taxation accuracy, GST operational efficiency, and organizational compliance governance. Empirical findings indicate that AI adoption reduces payroll errors, strengthens compliance monitoring, and improves institutional transparency. Organizations implementing AI-enabled HR analytics demonstrate improved regulatory adherence and operational efficiency, reinforcing the role of intelligent automation in modern governance ecosystems. The research contributes to emerging interdisciplinary literature linking HR analytics, taxation systems, and digital compliance governance, providing strategic implications for organizations undergoing digital transformation.

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