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Assessing the impact of wage policy on employee motivation at Vietnamese railway transport enterprises

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ABSTRACT

There have been many studies worldwide on wage policies, but none have examined their impact on employee motivation at railway transport enterprises in Vietnam. Currently, Vietnam has seven main railway lines, including the national railway line and branch lines, connecting 23 of 34 provinces, and the high-speed railway industry is receiving significant attention from the Government. Currently, there are more than 22,000 workers, of whom about 10,000 have university and post-graduate degrees. Overall, the railway industry needs more human resources to operate new projects, possibly reaching about 26,000-32,000 workers. Therefore, attracting human resources to work for railway transport enterprises requires appropriate policies, in which wage policy is a factor that affects both enterprises and employees. This study investigates the impact of salary and welfare policies on the intrinsic work motivation of employees at Vietnamese railway enterprises (VNR- Vietnam Railways). It proposes improvements to the performance appraisal system (KPI) at railway transport enterprises, specifically using partial least squares structural equation modeling (PLS-SEM) through R programming with bootstrapping (1,000 resamples). The study evaluates the direct effects and tests the correlation models between key motivation factors. The results show that, among the various work motivation factors, there is a lack of satisfactory compensation policies; employee autonomy and working environment are not given sufficient attention; a rigid administrative salary coefficient is in place; limited performance-based differentiation exists; and the current salary system cannot fully reward productivity, efficiency, and individual overall contributions. The paper concludes by proposing a comprehensive KPI-based evaluation framework to enhance fairness, transparency, and motivational effectiveness in salary and benefit policies.

Contribution/Originality: This study is one of the few that investigates the impacts of wage policies on employee motivation, emphasizing the influence of work conditions (Workcond), autonomy (Autonomy), compensation (Compensation), training and development (Training), supervisor support (Support), technology application (Techapp), and work motivation (Motivation) in railway transport enterprises in Vietnam.

1. INTRODUCTION

As Vietnam's railway industry strives to modernize its infrastructure and workforce management practices, human resource optimization has become a strategic imperative. With increasing competition from road and air transport, coupled with growing demands for digitalization and customer service standards, railway enterprises are under pressure to improve operational efficiency and employee engagement (Japan International Cooperation Agency, 2010). Among the key drivers of organizational performance, compensation and benefits policies remain central in influencing employee motivation, satisfaction, and retention, especially in labor-intensive and regulated sectors such as railway transport. Traditional compensation systems in Vietnam's railway enterprises (VNR) were previously shaped by the legacy of state-owned enterprises (SOEs) (General Statistics Office of Vietnam, 2023). These systems rely heavily on fixed salary coefficients, seniority-based salary increases, and administrative classifications, which often fail to reflect individual performance or service quality accurately. Such outdated mechanisms have led to widespread inefficiencies and a lack of intrinsic motivation among employees. Recent empirical studies have highlighted the importance of transitioning from a fixed salary model to a performance-linked framework that incorporates transparent Key Performance Indicators (KPIs), particularly in the public service and transportation sectors (Kang, Nash, Smith, & Wu, 2021; Mladenovic, Vajdic, Wündsch, & Temeljotov-Salaj, 2013).

Recognizing the importance of the human factor in business success, many companies today are interested in salary policies that enhance employee motivation and maximize their potential. Managers have flexibly applied management methods and tools to influence resources, making employees feel enthusiastic and passionate about their work and increasing their loyalty and attachment to the business. When the salary policy is adequately addressed, employees will work with high motivation, be passionate, curious, and creative in their work, and voluntarily contribute to the enterprise. On the contrary, if the salary policy does not meet the requirements, they will not be motivated to work or work with a spirit and attitude of being passive, coping, not showing their full potential, not being autonomous, and ineffective, leading to a decrease in the enterprise's labor productivity and the enterprise's goals not being achieved. Vietnam Railway Corporation has grown strongly and gradually affirmed its position. The company's achievements have contributed to highlighting the milestones on the development path of the Vietnam railway industry. To further develop, the company needs to establish a human resource development policy and a salary and bonus policy. This will play a decisive role in the success or failure of the company.

Based on Herzberg, Mausner, and Snyderman (1959) Two-Factor Theory, which distinguishes between hygiene factors, such as pay, and motivator factors, including recognition and growth, this study examines how pay-related policies affect employees' intrinsic work motivation. The study also builds on the Self-Determination Theory (Deci & Ryan, 2000), which emphasizes autonomy, competence, and relatedness as essential psychological needs that underlie motivation. By integrating these theoretical perspectives, the study explores six exogenous constructs: working conditions, job autonomy, pay, training and development, supervisor and co-worker support, and technology adoption, and their impact on intrinsic work motivation. To empirically validate the proposed conceptual model, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) in R, as this method is well-suited for exploring complex, non-normal data structures with latent variables (Astrachan, Patel, & Wanzenried, 2014; Dash & Paul, 2021). The model was tested on survey data from 551 employees across the entire VNR workforce, representing both frontline and managerial roles. The findings aim to contribute to the academic literature and management practice by proposing a performance-based KPI system that aligns with modern human resource strategies, specifically tailored to the unique operating context of the Vietnamese railway transport industry.

2. LITERATURE REVIEW

2.1. Salary and Bonus Policy

According to the International Labor Organization (ILO), wages refer to the amount of money that employers pay to employees for a specified amount of work over a specific period. Wages do not simply reflect the economic

relationship between employers and employees; due to the special nature of a particular commodity, especially labor, wages also contain a significant social responsibility related to life, social order, and social security.

Salary is an essential concept in the labor relationship between employers and employees. According to Article 90 of the National Assembly of the Socialist Republic of Vietnam (2019), salary refers to the amount of money that an employer pays to an employee in exchange for performing a job, including the salary for the job or position, salary allowances, and other supplements (if applicable). The salary, according to the job or position, must be higher than the regional minimum wage. Employers must ensure equal pay for employees, regardless of gender, for jobs of equal value and worth.

Wage policy is a critical component of the socio-economic policy system. Wages must truly be the primary source of income to ensure the livelihoods of workers and their families; paying wages properly is an investment in human resource development, creating motivation to improve labor productivity and work efficiency of workers, making an essential contribution to realizing social progress and equity, ensuring political and social stability; promoting and enhancing the quality of growth and sustainable development.

The guiding viewpoint also clearly states that reforming wage policy must ensure comprehensiveness, systematization, synchronization, inheriting and promoting advantages, effectively overcoming limitations and shortcomings of the current wage policy, complying with the principle of distribution according to labor and the objective laws of the market economy, taking increased labor productivity as the basis for growing wages; meeting the requirements of international integration; having a roadmap suitable to the socio-economic development conditions and resources of the country (Central Executive Committee of the Communist Party of Vietnam, 2018).

Annual salary paid to an individual for the performance of all professional obligations required by the individual's primary appointment. These professional obligations may include research, teaching, administrative functions, and/or other service activities and are generally identified in the individual's appointment or reappointment letter. Unless otherwise specified, the annual salary stated in the appointment or reappointment letter fully compensates the individual for all professional obligations required by his/her primary appointment. IBS excludes any income that an individual is permitted to earn outside of duties performed as part of his/her primary appointment.

Bonus payments must be approved in accordance with RF Salary Administration policies and procedures and comply with federal and state laws. Bonus payments made to nonexempt employees must comply with the rules outlined in the Requirements for Overtime Pay document. Generally, bonuses, other than lump-sum discretionary bonuses, are includable in the regular rate of pay when calculating the overtime rate. If the funding source is sponsored programs, the award must be reviewed to ensure the payment complies with sponsor requirements and there are no restrictions on bonus payments. Bonus payments must be awarded and processed according to the documentation, approvals, and requirements outlined in this document.

In the literature on CEO compensation (and cash compensation in particular), there is a well-documented phenomenon of asymmetry: CEOs are rewarded for good performance or luck but are not penalized correspondingly for poor performance or luck (Bertrand & Mullainathan, 2001; Dechow, Huson, & Sloan, 1994; Gaver & Gaver, 1998). Further shows that the boards have a tendency to shield CEOs by excluding certain expenses from the performance calculation in bonus performance measures. At the same time, using survey data, Edmans, Fernandez-Perez, Garel, and Indriawan (2022) further substantiate this empirical evidence when the board directors state that decreases in expected pay are rare, with 77% of them never having implemented one.

2.2. Work Motivation

Compensation is an important way to motivate employees. The traditional literature focuses on the impact of absolute pay levels on employee behavior, especially in labor economics, studying the relationship between (Lu & Niu, 2022) pay levels and performance (Akerlof, 1982; Lazear, 2000). In recent years, with the public disclosure of employee compensation data, more scholars are paying attention to the factors that influence employee compensation and their

economic consequences. Lu, Xing, and Ren (2012) show that compared with private enterprises, Chinese SOEs have higher salaries.

According to the SDT (Deci, Olafsen, & Ryan, 2017), it is important to consider not only whether people are motivated or how much motivation they have for an activity *(i.e., the quantity of motivation)*, but also the type of motivation they have (i.e., the quality). The SDT outlines a continuum of motivation, ranging from a complete lack of motivation (amotivation) to engaging in activities for the inherent satisfaction they bring (intrinsic motivation; [IM]). Extrinsic motivation (EM) bridges these two extremes, encompassing types of motivation that differ in respect to how much people internalize the regulation of uninteresting yet important activities. EM thus includes controlled motivation comprising ExR and introjected regulation (IntrojR), and autonomous motivation comprising identified regulation (IdenR) and integrated regulation. Controlled motivation is driven by external demands or internal pressures (no internalization to low, suboptimal internalization), while autonomous motivation stems from genuine willingness and personal choice (high internalization) (see Table 1 for definitions). According to the SDT (Deci et al., 2017), within workplace settings, amotivation is detrimental to performance, while the more internalized motivation is, the more likely individuals are to have better JP. In line with these assumptions, meta-analysis indicated that amotivation is negatively related to JP, while Introjected Regulation (IntrojR), IdenR, and Intrinsic Motivation (IM) positively predicted JP. ExR was found to be negatively related to OCBs and unrelated to overall JP. Despite considerable evidence regarding the link between motivation and performance, the relation between amotivation and performance (especially CP/OCBs) was far less investigated in previous studies than the relation between JP and other types of motivation (Van den Broeck, Howard, Van Vaerenbergh, Leroy, & Gagné, 2021).

2.3. Impact of Salary Policy on Employee Work Motivation

In recent years, the mutual influence of intercorporate financial behaviors and their internal mechanisms has become an important research question. Most research is conducted from an economic perspective, focusing on joint companies in the industry or joint companies within the same network and the customer–supplier network, or adopting an information transmission perspective, such as examining co-directors (Gleason, Jenkins, & Johnson, 2008).

Work motivation is analyzed from many different angles and directions; the definitions of work motivation all refer to the desired tendency "to achieve the goals of the individual/organization."

In Vietnam, in recent years, the work motivation of ward civil servants has gradually received more attention; however, most of this attention is considered in a general context, encompassing the work motivation of commune-level cadres and civil servants, as well as commune-level civil servants. Specific research topics on the work motivation of ward civil servants are generally not diverse, and there is no complete consensus on the scope of the concept.

Based on research and analysis of definitions of related terms such as "work motivation," within the scope of the topic, "work motivation of ward civil servants" is understood as a concept used to refer to the promotion of ward civil servants to work voluntarily with interest, readiness, effort, satisfaction, and higher commitment towards achieving the state management goals of local governments with higher efficiency and effectiveness, towards the development and common interests of the whole society.

3. METHOD

This study applies the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach using the R programming language, specifically the "seminar" package (De Souza Barbosa et al., 2025). R is a statistical programming language widely adopted for data analysis, advanced modeling, and graphical representation. Developed as an open-source platform, R offers substantial flexibility, transparency, and reproducibility compared to commercial statistical software. It enables researchers to fully customize model specifications, bootstrapping procedures, and reporting outputs while also facilitating seamless integration with other advanced analytical

techniques such as exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and predictive modeling (Kruschke, 2015; Saari & Damberg, 2023). PLS-SEM is particularly suitable for this research due to its ability to handle complex models with latent constructs and its robustness in small to medium sample sizes without requiring strict assumptions of multivariate normality (Akter, Fosso Wamba, & Dewan, 2017). Data were collected using a structured questionnaire on a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). The instrument was designed to measure seven latent variables, including six independent variables and one dependent variable, "Intrinsic Work Motivation."

To evaluate the stability and statistical significance of the model's path coefficients, bootstrapping with 1,000 resamples was performed. Reliability and validity assessments included Cronbach's Alpha and Composite Reliability (CR) (Henseler, Ringle, & Sarstedt, 2015). The research model tests the influence of six predictors on the endogenous variable "Intrinsic Work Motivation," as defined by the following hypotheses.
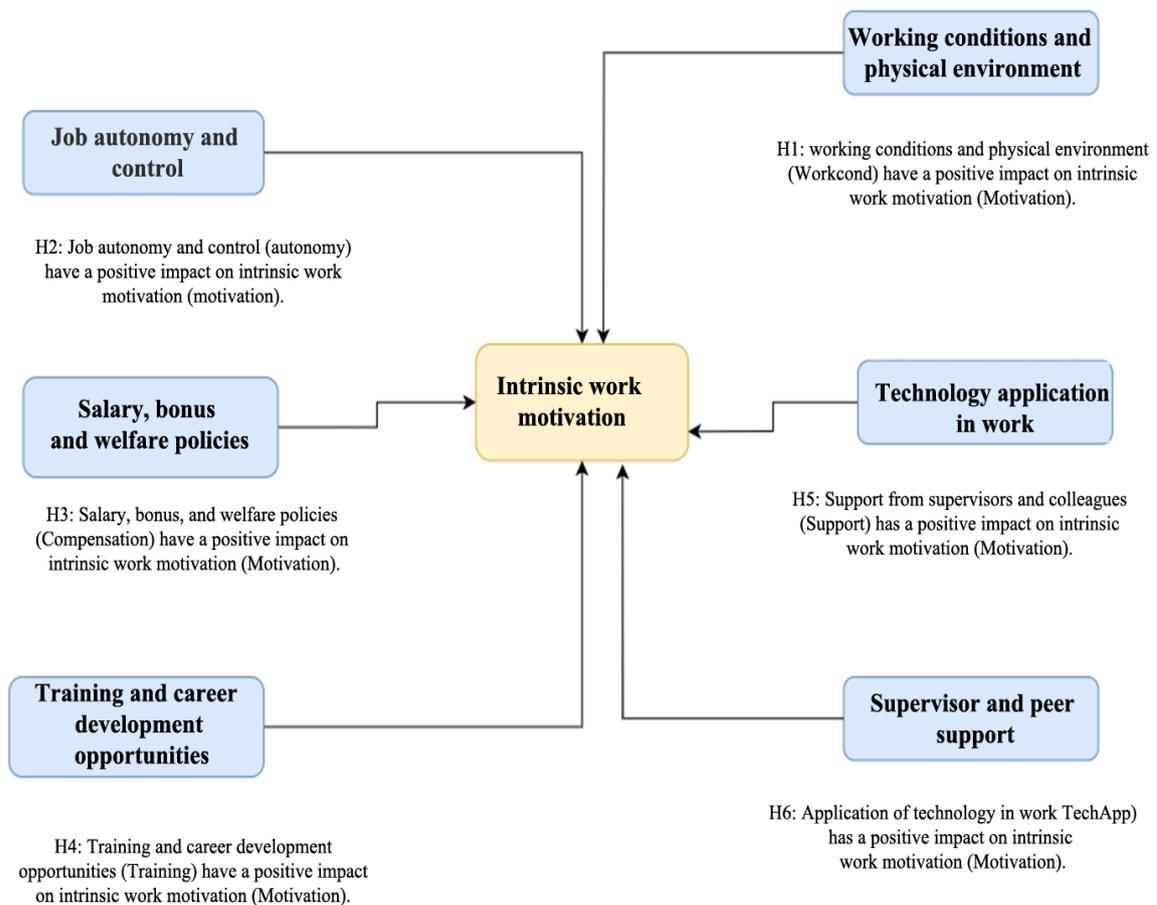

Figure 1. Theoretical research model: Factors influencing intrinsic work motivation.

Figure 1 illustrates the study that inherited Herzberg's Two-Factor Theory (Herzberg et al., 1959); Physical Work Environment criteria (Shiwakoti, Jiang, & Nguyen, 2022; Zhang et al., 2015); Self-Determination Theory (Deci & Ryan, 2000); Job Characteristics Model (Hackman & Oldham, 1975; Kaçan-Bibican, Özkan, & Taubman–Ben-Ari, 2025; Sugama & Okumura, 2024); Equity Theory (Adams, 1963); Expectancy Theory (Herzberg et al., 1959; Pangarso, 2024; Vroom, 1964); Human Capital Theory (Becker, 1964); Career Development Theory (Kitada & Harada, 2019; Noe, 1986; Pangarso, 2024), and the results of previous studies, with expert consultation, to propose a theoretical research model on assessing the impact of salary policy on work motivation at railway transport enterprises, as shown in Figure 1.

Table 1. Evaluation content.

Evaluation content and item code		Theoretical and empirical basis
1. Working conditions and physical environment (Work Cond)		
Workcond1	The workplace is clean, safe, and maintains hygiene standards.	Herzberg's Two-Factor Theory (Herzberg et al., 1959) Physical Work Environment criteria (Shiwakoti et al., 2022; Zhang et al., 2015).
Workcond2	Working conditions are gradually improving over time.	
Workcond3	Noise, lighting, and temperature levels at the workplace are within acceptable limits.	
2. Job Autonomy and control (Autonomy)		
Autonomy1	I have the autonomy to organize my daily tasks.	Self-Determination Theory (Deci & Ryan, 2000); Job Characteristics Model (Hackman & Oldham, 1975; Kaçan-Bibican et al., 2025; Sugama & Okumura, 2024).
Autonomy2	I can decide how to carry out tasks within my assigned responsibilities.	
Autonomy3	I can proactively handle work-related issues without waiting for instructions.	
Autonomy4	I am consulted when changes in tasks or workflows are involved.	
Autonomy5	I can control the progress and quality of the work I personally carry out.	
3. Salary, bonus, and welfare policies (Compensation)		
Compensation1	My salary fairly reflects my effort and contributions at work.	Equity Theory (Adams, 1963); Expectancy Theory (Herzberg et al., 1959; Pangarso, 2024; Vroom, 1964).
Compensation2	Bonus policies at the company are clear and applied fairly.	
Compensation3	Allowances (e.g., night shifts, responsibilities) are fully and properly paid.	
Compensation4	The company has reasonable welfare policies (e.g., leave, health check-ups, hardship support, visits).	
4. Training and career development opportunities (Training)		
Training1	The company regularly organizes training courses relevant to my job.	Human Capital Theory (Becker, 1964); Career Development Theory (Kitada & Harada, 2019; Noe, 1986; Pangarso, 2024).
Training2	I have opportunities for career development and promotion in this organization.	
5. Supervisor and peer support (Support)		
Support1	My supervisor is always willing to listen and support me when I face difficulties at work.	Social Support Theory (House, 1981); Leader-Member Exchange Theory (Graen & Uhl-Bien, 1995)
Support2	My colleagues are friendly, cooperative, and ready to support one another.	
Support3	I receive encouragement and motivation from my supervisor to perform better.	
6. Technology application in work (Techapp)		
Techapp1	Current technologies help me complete tasks more quickly and effectively.	Technology Acceptance Model (Davis, 1989); Empirical studies on technology effectiveness (Zis, Psaraftis, & Reche-Vilanova, 2023)
Techapp2	I receive adequate training and guidance on how to use technologies at work.	
Techapp3	Technology helps minimize errors and improve work quality.	
Techapp4	Technological tools in the railway sector are user-friendly and easy to operate.	
7. Intrinsic work motivation (Motivation)		
Motivation1	When facing difficulties in train operation and passenger service, I maintain high effort and seek solutions to work efficiently.	Self-Determination Theory (Deci & Ryan, 2000); Intrinsic Motivation theories (Herzberg et al., 1959; Vroom, 1964).
Motivation2	I try my best to complete tasks to ensure safety and efficiency in railway transport.	
Motivation3	I am excited about my current job, especially serving passengers and ensuring safe journeys.	

Table 1 Presentation: Working conditions have a positive and significant impact on the work motivation of employees in railway transport enterprises. In a positive and friendly working environment, employees will feel motivated and willing to work more effectively. Working time also plays an important role in employee motivation.

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Designing reasonable working hours and balancing work and family life are essential to creating positive working conditions. Good working conditions, with adequate and safe equipment, reasonable working hours, and a positive working environment, can increase employee motivation.

The nature of work positively affects employee motivation in Vietnamese railway transport enterprises. Aspects of work, such as interest, autonomy, and recognition, significantly influence work motivation. When employees perform engaging and suitable tasks, they are more likely to maximize their knowledge and skills. This enhances work performance, increases their commitment and long-term attachment to the job and organization, according to Self-Determination Theory (Deci & Ryan, 2000); Job Characteristics Model (Hackman & Oldham, 1975; Kaçan-Bibican et al., 2025; Sugama & Okumura, 2024).

Income and benefits have a positive, mutually reinforcing impact on employees' work motivation in railway transport enterprises. When income corresponds to employees' efforts and achievements, it not only ensures survival but also meets basic needs, helping to improve their living standards and those of their families. According to Vroom (1964), expectancy theory 1964 suggests that employee motivation increases only when they feel that their efforts and successes will be appropriately evaluated and, at the same time, lead to worthy rewards. Meanwhile, the company's welfare policy demonstrates its concern for employees' well-being and is an important factor in motivating them.

Training and promotion have a positive, equal impact on employee work motivation in railway transport enterprises. Improving professional qualifications, creating many promotion opportunities, and establishing fair promotion policies are important factors in awakening employees' motivation. The bank's training and promotion policy, especially for outstanding people, not only encourages work motivation but also enhances their value. Creating many opportunities for development and career development helps to reduce the intention of employees to change jobs because they do not have to face the lack of training and career development opportunities, which is the leading cause of the departure of competent employees. Social Support Theory (House, 1981); Leader-Member Exchange Theory (Graen & Uhl-Bien, 1995)

Supervision and peer support from leaders and colleagues positively impact employees' work motivation in railway transport enterprises. Leaders create peace of mind and motivation for employees through fair treatment, concern for subordinates, competence and vision, and the ability to support employees in their work. Create a friendly environment among colleagues for them to exchange and share in work and in life (Social Support Theory (House, 1981); Leader-Member Exchange Theory (Graen & Uhl-Bien, 1995)

Applying technology to work at Vietnamese railway transport enterprises brings positive impacts such as increasing efficiency through automation and data analysis, enhancing collaboration through online working tools, and creating flexibility with remote working models, especially in business administration and inter-provincial passenger and freight transport, as well as import and export to China (Technology Acceptance Model (Davis, 1989); Empirical studies on technology effectiveness (Zis et al., 2023).

4. RESULTS AND DISCUSSION

4.1. Descriptive Analysis

Descriptive statistics were first conducted to examine the demographic profile of respondents and the central tendency of measured items. Figure 2 presents the sample's demographic characteristics, including gender, age, education level, tenure, income, and job position. The majority of respondents fell within the age range of 31–45 years and were predominantly employees from operational and technical departments.

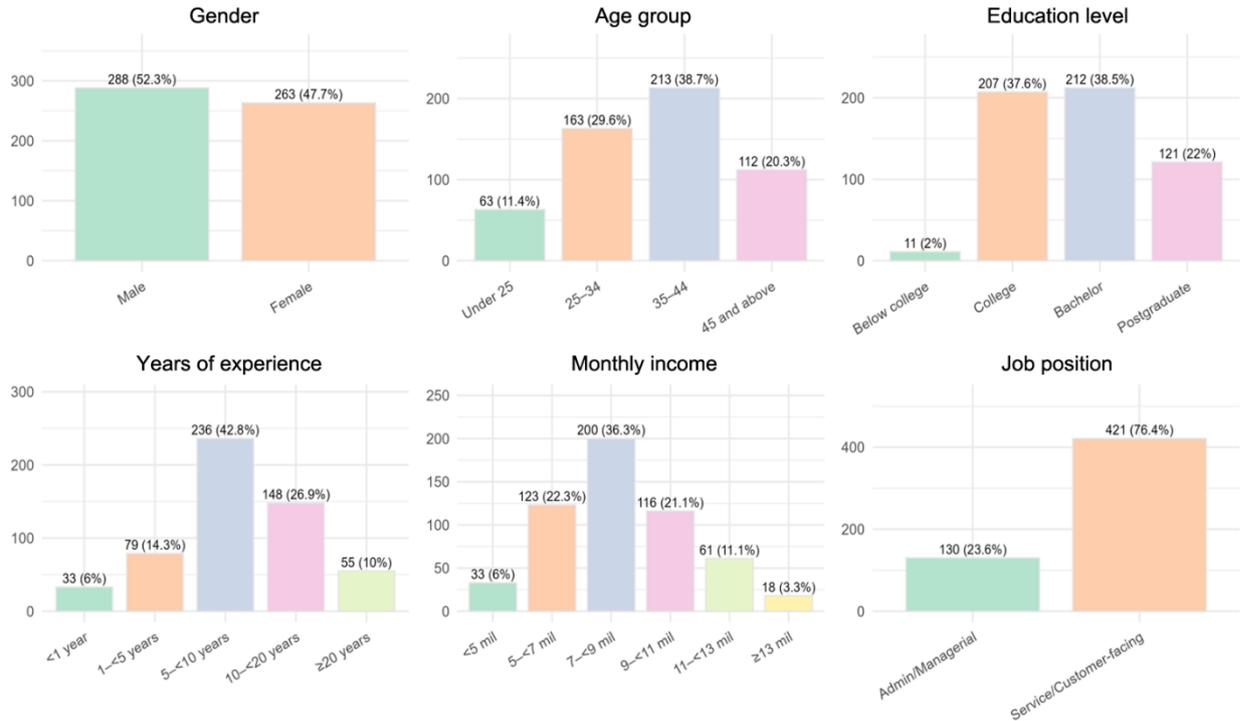## Demographic profile of respondents

Figure 2. Demographic overview.

A series of reliability and validity assessments was performed to ensure the measurement scales' internal consistency and suitability. Table 2 summarizes the results of the Cronbach's Alpha reliability test across all constructs. The results demonstrate that all constructs exceed the commonly accepted threshold of 0.70, indicating satisfactory to high reliability (Gignac, 2009). The construct Autonomy initially exhibited a lower average inter-item correlation, attributed to the weak contribution of the observed variable "autonomy2." Consequently, "autonomy2" was excluded from subsequent analyses to enhance the scale's internal consistency. Likewise, the observed variable "support1" was eliminated after exploratory factor analysis (EFA), as it demonstrated a low factor loading following Promax rotation, indicating insufficient convergence with the intended latent construct (DeVellis, 2012; Hair, Black, Babin, & Anderson, 2010).

Table 2. Reliability assessment of constructs using Cronbach's alpha.

Construct	No. of items	Cronbach's alpha	G6 (SMC)	Average inter-item r	Interpretation
Work conditions (Workcond)	3	0.84	0.78	0.64	Reliable – All item-total > 0.6
Autonomy (Autonomy)	5	0.80	0.80	0.44	Reliable – One item weak (Autonomy2)
Compensation (Compensation)	4	0.88	0.85	0.65	Very reliable
Training & development (Training)	2	0.81	0.68	0.68	Acceptable – Two items only
Supervisor support (Support)	3	0.84	0.78	0.64	Reliable – All items retained
Technology application (Techapp)	4	0.81	0.77	0.52	Reliable
Work motivation (Motivation)	3	0.83	0.76	0.61	Reliable – All item-total > 0.6

Table 2 shows that the constructs achieve acceptable internal consistency, with reliability values exceeding the threshold of 0.70 (Hair, Hult, Ringle, & Sarstedt, 2019). Further, the composite reliability of the latent variables ranges from 0.80 to 0.88, and the average variance extracted (AVE) of the scales is greater than 0.50, as reported in Table 7 (Fornell & Larcker, 1981). All pairs of variables have HTMT values below 0.85 (Table 9). This confirms that the scales in the model meet the criteria of conceptual discrimination according to the HTMT standard (Henseler et al., 2015). The external loading factors for the indicators also exceed the 0.70 threshold, meeting the requirement.

After removing the weak-performing item "autonomy2," the internal consistency of the "Autonomy" construct improved notably.

Table 3. Reliability assessment (After removing "autonomy2").

Construct	No. of Items	Cronbach's Alpha	G6 (SMC)	Average Inter-item r	Interpretation
Autonomy (autonomy)	4	0.88	0.84	0.64	Very reliable – autonomy2 removed due to low item-total correlation

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was calculated for each individual observed variable. All MSA values exceeded the 0.7 threshold, indicating that the data were suitable for factor analysis (Kaiser, 1974). Notably, variables such as "compensation4" (0.935), "techapp2" (0.938), and "motivation2" (0.941) demonstrated particularly strong adequacy.

Table 4. Measure of sampling adequacy (MSA) for observed variables.

Variable	MSA	Variable	MSA
Workcond1	0.888	Training1	0.746
Workcond2	0.906	Training2	0.780
Workcond3	0.888	Support2	0.838
Autonomy1	0.904	Support3	0.852
Autonomy3	0.924	Techapp1	0.920
Autonomy4	0.907	Techapp2	0.938
Autonomy5	0.902	Techapp3	0.921
Compensation1	0.889	Techapp4	0.918
Compensation2	0.92	Motivation1	0.909
Compensation3	0.916	Motivation2	0.941
Compensation4	0.935	Motivation3	0.915

Table 4 presents the MSA values for all observed variables, confirming the suitability of the data for factor analysis. The results of the measurement system evaluation process ensure that the measurement system's variation is minimal compared to the process or tolerance variation. The measurement results are consistent and accurate.

To further verify the suitability of the dataset for factor analysis, Bartlett's Test of Sphericity was performed for each construct. As shown in Table 5, all constructs yielded statistically significant chi-square values ($p < 0.001$), indicating sufficient correlations among items to proceed with factor extraction.

Table 5. Bartlett's test of sphericity for each construct.

Construct	Chi-Square	df	p-value
Work conditions	661.3774	3	< 0.001
Autonomy	1102.2802	6	< 0.001
Compensation	1138.2514	6	< 0.001
Training	334.0164	1	< 0.001
Supervisor support	297.3427	1	< 0.001
Tech application	696.7334	6	< 0.001
Motivation	617.0238	3	< 0.001

In terms of the assessment of data distribution, Figure 3 illustrates the distribution of the observed variables. Visual inspection reveals moderate skewness in several indicators, prompting the need for formal tests of normality. Since PLS-SEM is a non-parametric method that does not require multivariate normality, this step primarily serves to justify the use of PLS over covariance-based SEM (CB-SEM) (Astrachan et al., 2014; Hasselwander, 2025; Trang, Thang, Nguyen, & Nguyen, 2025).

To formally test the normality of the data, the Shapiro–Wilk test was applied to each observed variable and composite score. The results, presented in Table 6, show that all variables significantly deviate from a normal distribution (p < 0.0001), which confirms the presence of non-normality (Monter-Pozos & González-Estrada, 2024).
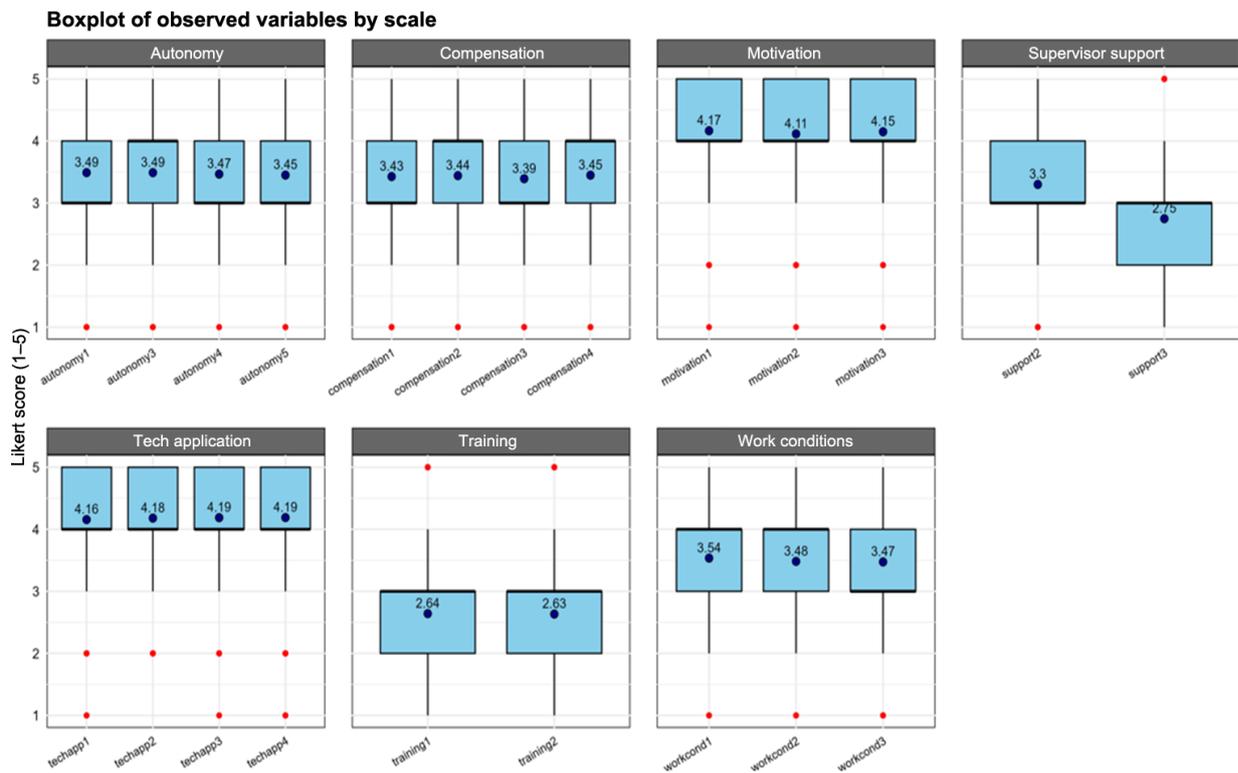

Figure 3. Distribution of observed variables.

Table 6. Shapiro–Wilk Test of Normality for Observed and Composite Variables.

Variable	W	p-value	Conclusion	Variable	W	p-value	Conclusion
Workcond1	0.8632	< 0.0001	Not normal ($\neq$)	training1	0.9003	< 0.0001	Not normal ($\neq$)
Workcond2	0.8646	< 0.0001	Not normal ($\neq$)	training2	0.8971	< 0.0001	Not normal ($\neq$)
Workcond3	0.8686	< 0.0001	Not normal ($\neq$)	support2	0.8736	< 0.0001	Not normal ($\neq$)
Autonomy1	0.8713	< 0.0001	Not normal ($\neq$)	support3	0.9012	< 0.0001	Not normal ($\neq$)
Autonomy3	0.8618	< 0.0001	Not normal ($\neq$)	techapp1	0.8009	< 0.0001	Not normal ($\neq$)
Autonomy4	0.8678	< 0.0001	Not normal ($\neq$)	techapp2	0.8009	< 0.0001	Not normal ($\neq$)
Autonomy5	0.8833	< 0.0001	Not normal ($\neq$)	techapp3	0.8020	< 0.0001	Not normal ($\neq$)
Compensation1	0.8731	< 0.0001	Not normal ($\neq$)	techapp4	0.7882	< 0.0001	Not normal ($\neq$)
Compensation2	0.8682	< 0.0001	Not normal ($\neq$)	motivation1	0.8160	< 0.0001	Not normal ($\neq$)
Compensation3	0.8797	< 0.0001	Not normal ($\neq$)	motivation2	0.8197	< 0.0001	Not normal ($\neq$)
Compensation4	0.8711	< 0.0001	Not normal ($\neq$)	motivation3	0.8207	< 0.0001	Not normal ($\neq$)

Given the consistent evidence of non-normality across all observed and composite variables, as shown in the Shapiro–Wilk test results (Table 6), the application of Partial Least Squares Structural Equation Modeling (PLS-SEM) is appropriate and necessary. PLS-SEM is known for its flexibility in handling non-normal data and is particularly advantageous in exploratory or predictive modeling where assumptions of multivariate normality are not met (Hair et al., 2021). This robustness under distributional violations strengthens the methodological justification

of the study and ensures the reliability of parameter estimates and model evaluation despite deviations from classical normality assumptions.

Following this, Figure 4 displays the Pearson correlation matrix among seven composite variables, offering an initial overview of the relationships among key constructs before structural modeling. All independent variables show positive correlations with the dependent variable, "intrinsic work motivation" (f2_motivation). Specifically, "compensation" (r = 0.50), "technology application" (r = 0.50), "autonomy" (r = 0.48), and "work conditions" (r = 0.45) demonstrate the strongest associations. These findings are consistent with theoretical expectations that fair remuneration, technological integration, job autonomy, and supportive work environments enhance motivation. Although "training" and "support" exhibit slightly lower coefficients (r = 0.38 each), they still indicate meaningful contributions. Additionally, inter-correlations among constructs range from 0.22 to 0.50, suggesting conceptual distinctiveness and the absence of multicollinearity, as no value exceeds 0.85, a threshold commonly used to assess discriminant validity (Hair et al., 2021). This confirms the appropriateness of including these constructs in the structural model and provides a solid foundation for examining direct and mediated relationships using PLS-SEM in subsequent sections.
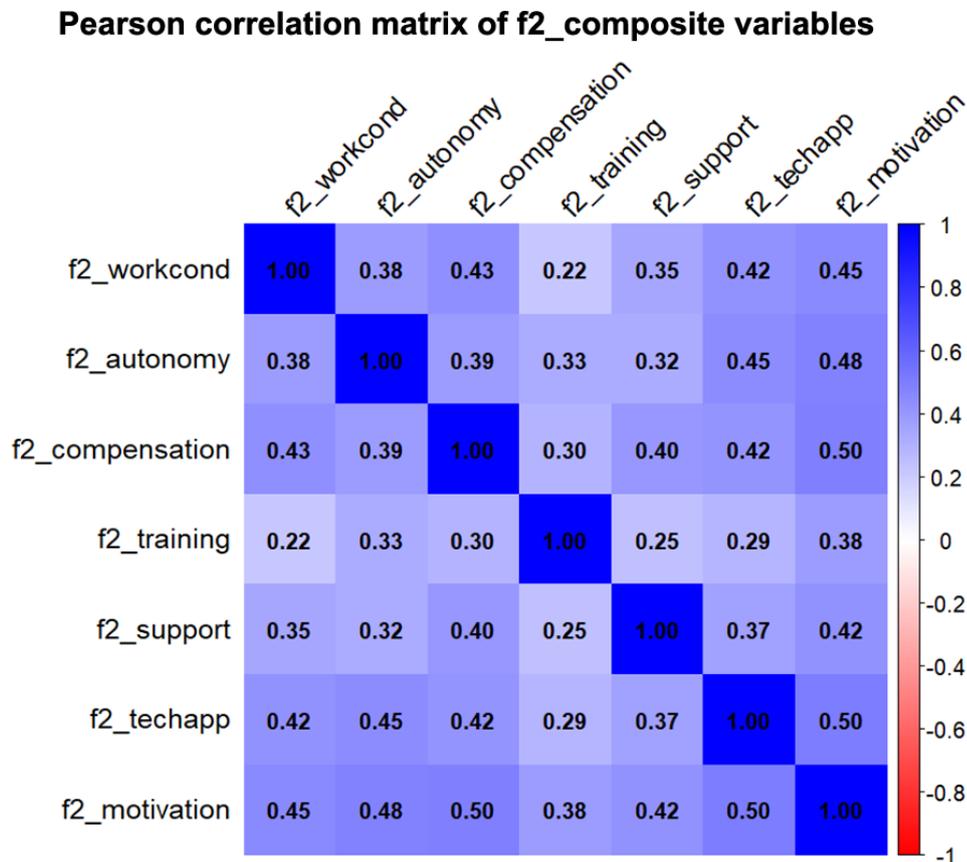

Figure 4. Pearson correlation analysis.

4.2. PLS-SEM Model Specification and Estimation

Building on the correlation analysis and preliminary assessment of measurement adequacy, the study proceeded to specify and estimate the PLS-SEM model. As shown in Table 7, all constructs demonstrated satisfactory internal consistency and convergent validity. Specifically, Cronbach's Alpha and Dillon-Goldstein's rhoA values for all constructs exceed the threshold of 0.7, while Composite Reliability ranges from 0.876 to 0.918, well above the recommended 0.7 level (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). Furthermore, all Average Variance Extracted (AVE) values are above 0.5, indicating that the latent constructs explain more than half of the variance of

their indicators. These results confirm the adequacy of the measurement model and validate the reliability and convergent validity of the scales used.

Table 7. Construct reliability and convergent validity.

Construct	Cronbach's alpha	Composite reliability (ρ_C)	Average variance extracted (AVE)	Dillon-Goldstein's rhoA
Work conditions	0.840	0.903	0.757	0.847
Autonomy	0.877	0.915	0.73	0.882
Technology application	0.810	0.876	0.638	0.813
Compensation	0.882	0.918	0.738	0.883
Training	0.806	0.912	0.838	0.807
Supervisor support	0.843	0.904	0.758	0.881
Motivation	0.827	0.896	0.743	0.827

To evaluate the structural model, Table 8 presents the estimated path coefficients from each exogenous construct to the endogenous variable "Motivation." The coefficients range from 0.141 (Work Conditions) to 0.1866 (Compensation), suggesting that all six predictors have a positive influence on intrinsic work motivation (Chin, 1998). Furthermore, discriminant validity was assessed to ensure the distinctiveness of the latent constructs. Table 9 reports the Heterotrait-Monotrait (HTMT) ratios for all construct pairs. As illustrated, all HTMT values fall below the conservative threshold of 0.85 recommended by Henseler et al. (2015), thereby confirming that the constructs are empirically distinct and that multicollinearity is not a concern.

Collectively, these findings strengthen the validity of the measurement model and provide a sound basis for interpreting the structural relationships among variables in the subsequent stages of analysis.

Table 8. Path coefficients to motivation (Endogenous variable).

Predictor	Path Coefficient
Work conditions	0.141
Autonomy	0.179
Technology application	0.143
Compensation	0.182
Training	0.149
Supervisor support	0.170
R² (Motivation)	**0.458**
Adjusted R²	**0.452**

Table 9. Heterotrait–Monotrait ratio (HTMT) for discriminant validity assessment.

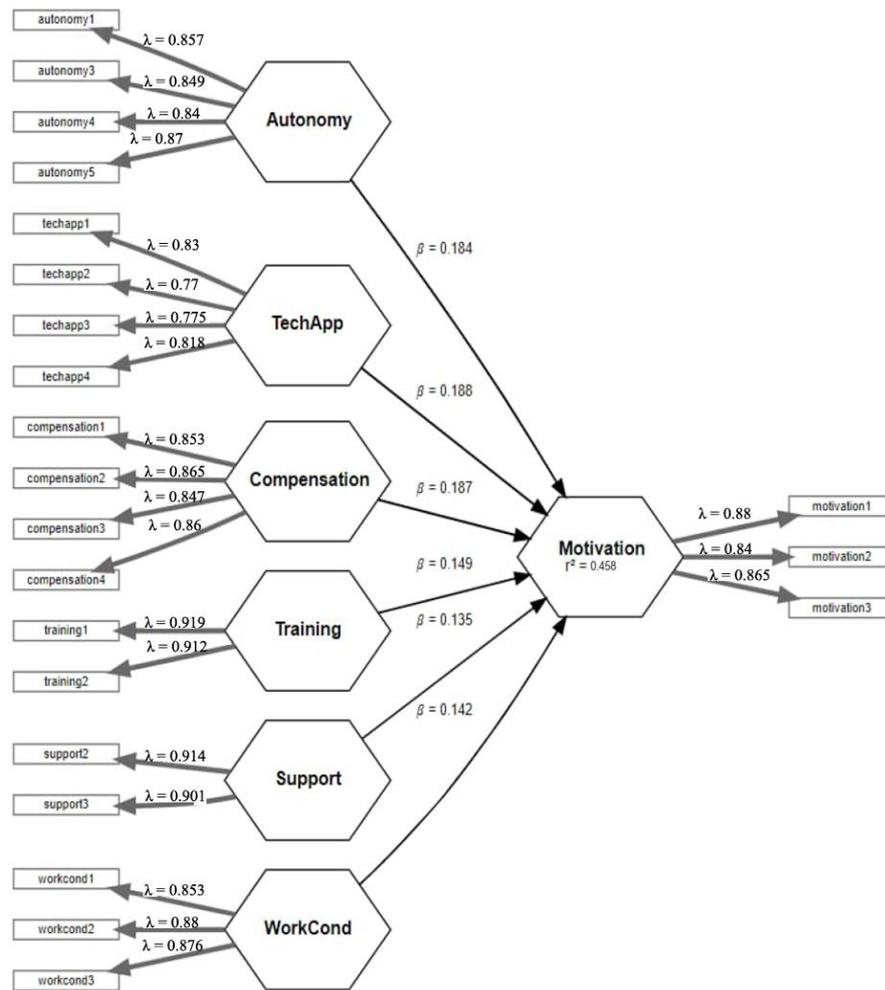|	WorkCond	Autonomy	TechApp	Compensation	Training	Support	Motivation
WorkCond	—						
Autonomy	0.446	—					
TechApp	0.513	0.530	—				
Compensation	0.504	0.441	0.494	—			
Training	0.263	0.387	0.351	0.354	—		
Support	0.486	0.468	0.657	0.531	0.341	—	
Motivation	0.541	0.568	0.611	0.581	0.467	0.601	—

Figure 5. Structural Model with Standardized Path Coefficients and Outer Loadings.

Figure 5 visually reinforces these findings, presenting the standardized path coefficients and outer loadings in the structural model. These estimates are further supported by bootstrapping results shown in Table 10, which confirms that all paths are statistically significant ($p < 0.05$). Notably, the strongest effects were found for Autonomy ($\beta = 0.184$, $p < 0.00001$), Compensation ($\beta = 0.1866$, $p < 0.00001$), and TechApp ($\beta = 0.1877$, $p < 0.00003$), highlighting their critical roles in shaping intrinsic motivation. Even though Support ($\beta = 0.135$) and Work Conditions ($\beta = 0.1421$) show slightly lower coefficients, their contributions remain significant, suggesting that multiple workplace dimensions synergistically influence motivational outcomes.

Table 10. Significant direct effects on work motivation (Bootstrapping results, $p < 0.05$).

Path	Estimate	Boot mean	Boot SD	z-value	p-value
WorkCond → Motivation	0.1421	0.1421	0.0427	3.328	0.0009
Autonomy → Motivation	0.1840	0.1844	0.0376	4.889	< 0.00001
TechApp → Motivation	0.1877	0.1876	0.0445	4.213	< 0.00003
Compensation → Motivation	0.1866	0.1848	0.0385	4.85	< 0.00001
Training → Motivation	0.1487	0.1516	0.0337	4.418	< 0.00001
Support → Motivation	0.1350	0.1360	0.0331	4.073	< 0.00005

4.3. Comparative Analysis of Direct Effects

The comparative analysis of direct effects offers valuable insights into the relative strength and statistical significance of predictors influencing intrinsic work motivation within the proposed PLS-SEM model. As presented in Table 10, all six hypothesized relationships are supported at a significance level of $p < 0.05$, thus confirming the

theoretical assumptions underpinning the research framework. Among these, Technology Application (TechApp) demonstrates the strongest effect ($\beta = 0.1877$, $p < 0.00003$), emphasizing the pivotal role of digital integration in enhancing motivation. In the context of railway operations, where traditional workflows are being gradually replaced by technological innovations, this finding reflects the transformative power of user-friendly and efficient technology in elevating employee engagement.

Closely following are "Compensation" ($\beta = 0.1866$) and "Autonomy" ($\beta = 0.1840$), which also show substantial direct effects ($p < 0.00001$). These findings align with Self-Determination Theory (Deci & Ryan, 2000) and Herzberg's Two-Factor Theory, both of which affirm that financial equity and perceived control over work are core drivers of intrinsic motivation. Meanwhile, Training ($\beta = 0.1487$) and Work Conditions ($\beta = 0.1421$) contribute meaningfully to motivation, highlighting the importance of career development opportunities and safe, well-maintained work environments. Although Supervisor Support presents the lowest coefficient ($\beta = 0.1350$), it remains statistically significant, confirming the continued relevance of relational support in reinforcing motivational outcomes. Altogether, these results not only validate the multidimensional nature of motivation but also provide empirical justification for prioritizing specific HRM interventions.

5. DISCUSSION AND RECOMMENDATION

5.1. Current Status and Key Limitations in the Wage, Bonus, and Benefits Policy of Railway Transport Organizations

The empirical evidence derived from the structural model, particularly the significant effect of compensation on motivation, necessitates a closer examination of the wage and reward structures currently adopted by railway transport enterprises. The compensation system at Vietnam Railway Transport Joint Stock Company reflects a hybrid model comprising time-based, output-based, and revenue-based salary mechanisms. While this system partially incorporates market-oriented elements, it retains many characteristics inherited from the pre-equitization, state-managed framework, most notably, administrative rigidity and average-based income distribution (World Bank, 2014).

This structural rigidity becomes particularly problematic when considering the current income disparities between VNR and other industrial and service sectors. According to data from Vietnam Railways in 2024, frontline employees earn between VND 9–12 million per month, well below their peers in industrial zones and logistics firms, where monthly earnings commonly range from VND 14–20 million. Moreover, banking, e-commerce, and IT sectors routinely adopt performance-based pay models in which bonuses account for 20%–50% of total income, whereas at VNR, such incentives rarely exceed 10%. These discrepancies reveal not only wage gaps but, more critically, fundamental differences in human resource flexibility, reward mechanisms, and competitiveness (Glassdoor, 2025; Pham, Le, Dang, & Nguyen, 2024; VietnamNet, 2024c).

Despite the physically demanding and hazardous nature of many operational roles within the railway industry, VNR's current compensation structure fails to recognize or reward this contribution adequately. Although performance-based components are technically included, through revenue-based bonuses and the A–B–C monthly classification system, their practical implementation is superficial. Criteria remain qualitative and disconnected, mainly from measurable performance indicators such as punctuality, technical error avoidance, or customer satisfaction. Consequently, the system struggles to differentiate between high- and average-performing employees, undermining meritocracy and internal equity (Crowe, 2023; Crowe Vietnam, 2023; Globalization Partners, 2025; Law, 2023; LawNet, 2023b; Nguyen, 2023).

In addition, night shift allowances remain modest, typically 0.3 times the base salary per shift, translating to just VND 300,000–500,000 per month, even for workers handling 7–10 night shifts. This amount is widely considered insufficient compared to international standards and does not adequately reflect night work's health risks and operational demands. Furthermore, VNR has yet to implement long-term incentive mechanisms such as profit-sharing, stock options, or tenure-based salary increases, which are increasingly common in private-sector

counterparts. The absence of these strategic HR tools limits employees' long-term commitment and increases the risk of talent attrition (LawNet, 2023; Vietnam Briefing, 2024; Viindoo, 2023).

A particularly pressing issue is the lack of a modern KPI-based evaluation system (AltexSoft, 2022; Banomyong, 2014; TechRadar, 2025). While some revenue-based bonuses are implemented in the transport division, no formalized KPI structure exists at the individual or team level. Performance assessments are instead based on outdated qualitative reporting and manual scoring, with no real-time feedback mechanisms. This contrasts sharply with international best practices, where railway and logistics companies leverage GPS tracking, passenger data, and automated scheduling systems to monitor and reward individual productivity daily. VNR's efforts to improve motivation and retention will remain constrained without such systems.

In summary, although the quantitative findings affirm the significance of compensation, autonomy, and technology application in enhancing intrinsic motivation, the qualitative evaluation reveals substantial shortcomings in current organizational practices that limit their effectiveness. A critical example of this misalignment is VNR's rigid salary calculation mechanism, which employs a labor-based distribution principle (ASL LAW, 2022; LawNet, 2023a). Monthly salaries are specifically determined using the following formula.

Monthly Salary = Base Salary × Salary Coefficient × (1 + Night Shift Coefficient + Job Responsibility Coefficient)

The base salary is defined as the regional minimum wage established by governmental regulations. The salary coefficient is determined by job title or employee rank. The night shift coefficient is intended to compensate for hazardous or nocturnal working conditions. The responsibility coefficient is allocated to roles involving managerial duties or assignments in remote locations.

While this formula offers a structured and transparent method of salary determination, it is predominantly based on static coefficients and administrative categorizations rather than dynamic performance measures. Consequently, it lacks a direct linkage to critical indicators such as individual productivity, operational efficiency, or customer satisfaction metrics. Employees occupying similar roles may thus receive comparable remuneration despite markedly different contribution levels, resulting in diminished motivation, perceived inequity, and reduced incentives for sustained performance improvement.

Thus, to align compensation practices more closely with the empirical insights obtained from the structural model, particularly the pronounced positive impact of compensation on intrinsic motivation, VNR should urgently consider reforming its current wage structure. Specifically, a transition towards a hybrid compensation model, blending fixed salary elements with clearly defined performance-based components anchored in measurable Key Performance Indicators (KPIs), is strongly recommended. Such a reform would provide a more balanced approach, ensuring that employees' remuneration accurately reflects individual productivity, operational effectiveness, and overall contribution to organizational outcomes. In the absence of these targeted adjustments, VNR faces the significant risk of reduced competitiveness and higher employee turnover within a labor market that increasingly prioritizes flexibility, equity, transparency, and individual performance recognition.

5.2. Policy Orientation for Salary, Bonus, and Benefits Reform

Railway transport enterprises, including VNR, must undertake comprehensive, evidence-based reforms in their salary, bonus, and benefits policies to enhance employee motivation and organizational efficiency. Drawing on the empirical findings from the PLS-SEM analysis and practical experiences from the international transport sector, several policy orientations are proposed below.

First, the enterprise should prioritize developing and implementing a robust KPI-based performance evaluation framework. According to Zis et al. (2023), an effective KPI system must accurately capture productivity, service quality, and organizational behaviors. It should be designed through a structured seven-step approach involving strategic goal setting, real-time data collection, tailored indicator development, pilot testing, and regular revisions. This viewpoint is further validated by Asmild, Paradi, and Pastor (2009), who documented performance

improvements of up to 15% in public transportation organizations that effectively utilized task-specific KPIs. Given the railway industry's substantial increase in passenger volume by 135.4% from 2022 to 2023, there is an urgent need for VNR to adopt precise and responsive evaluation systems. Proposed KPI dimensions include individual productivity metrics (e.g., passengers served, ton-km per employee), service quality indicators (e.g., punctuality rates, customer complaint rates), occupational safety measures (e.g., incident frequency), organizational efficiency (e.g., proportion of shifts exceeding targets, incident response time), and indicators related to employee development (e.g., training participation, innovation contributions). KPI assessments should be transparent, consistently updated (weekly or monthly), and directly integrated with an automated reward mechanism to reinforce performance alignment (Bai, Jin, & Chiu, 2021; Franz, Ayala, & Larranaga, 2024).

Second, the current salary structure should be transitioned toward greater flexibility by reducing the proportion of fixed salary components. Fixed wages represent approximately 85–90% of total earnings, significantly restricting incentive effects. As evidenced by research from Asmild et al. (2009) and Zhang et al. (2015), raising the proportion of performance-based pay to between 30% and 40% of total income creates substantial motivational differentiation between high and average performers. Supported by Vietnam Railways' Ramways' 2023 financial performance (with revenues reaching VND 8,503 billion and post-tax profits at VND 94.8 billion), this structural adjustment appears financially feasible. A recommended allocation structure would comprise 60% fixed basic salary, 30% KPI-driven variable pay (both at the individual and team levels), and 10% quarterly or annual performance bonuses. Institutionalizing this balance within the company's policy will mitigate biases in the evaluation and ensure greater fairness in remuneration distribution.

Third, revising the allowance system, particularly for frontline employees, is essential. Current night-shift allowances at VNR (around 0.3 times the base salary per shift) fall below international standards observed in countries such as South Korea, India, and Malaysia, where such allowances commonly range between 45% to 60% of hourly wages to compensate employees for health and lifestyle disruptions adequately (Sharma, Al-Badi, Govindaluri, & Al-Kharusi, 2016; Zis et al., 2023). Additionally, frontline roles, including train attendants, maintenance workers, and dispatchers who frequently handle night duties and direct customer interactions, currently lack sufficient financial acknowledgment for the inherent risks and job demands. Some branches, such as Saigon Railway JSC, have begun experimenting with increased allowances, yet system-wide implementation remains limited. Consequently, VNR should prioritize establishing a revised allowance structure comprising night-shift allowances of 0.4–0.5 times the base salary per shift, risk allowances of 5–10% for employees in direct customer-facing roles, and regional allowances of 5–8% for remote station placements.

Fourth, implementing strategic long-term incentive mechanisms is crucial for employee retention, particularly for experienced technical personnel and frontline supervisors. VNR lacks comprehensive schemes such as profit-sharing, stock-based incentives, or structured seniority increments. Insights from the Danish public transportation sector suggest that profit-sharing (gain-sharing) models can significantly enhance motivation and retention by allocating portions of profits directly to teams based on their collective achievements (Asmild et al., 2009). Therefore, strategic incentive reforms should include seniority bonuses awarded every 3–5 years, allocating 3–5% of post-tax profits to an internal performance fund, and structured pathways for career advancement, job rotation, and promotions to incentivize long-term employee loyalty.

Finally, integrating training initiatives with performance evaluation and remuneration can establish a continuous feedback loop, fostering consistent performance improvement. Sharma et al. (2016) and Zis et al. (2023) highlight the effectiveness of this "performance improvement loop" model, where training outcomes are directly correlated with measurable performance gains and subsequent compensation adjustments. To operationalize this at VNR, a competency-based training framework should be developed, including clearly defined skill mapping for each job role, systematic pre- and post-training assessments, and explicit linkage between KPI results and decisions regarding

promotions and salary increases. This integration ensures that training investments translate directly into improved operational outcomes, higher employee satisfaction, and sustained organizational development.

These policy orientations provide a robust, empirically grounded foundation for reforming VNR's wage, bonus, and benefits framework (Geetika & Nandan, 2010; Holvad, 2020; Kok, Moerman, Haanstra, Martinetti, & Braaksma, 2024; Ródenas, García, & García, 2017). By adopting these recommendations, the enterprise can move towards a more flexible, transparent, and performance-oriented compensation system, thus directly addressing current motivational challenges and enhancing long-term workforce stability and organizational competitiveness.

6. CONCLUSIONS

This study systematically assessed the impact of compensation and benefits policies on intrinsic work motivation within Vietnam's railway transport enterprises, explicitly focusing on the TRARAVICO Railway Transport Joint Stock Company. By employing Partial Least Squares Structural Equation Modeling (PLS-SEM), the findings established that compensation policies significantly and positively influence employees' intrinsic motivation. Among various motivational factors evaluated, compensation emerged as a dominant predictor, closely accompanied by the integration of effective technology, employee autonomy, and supportive work environments. These results underscore that equitable, transparent, and performance-linked remuneration fosters enhanced motivation and job commitment among railway personnel.

Nonetheless, the qualitative analysis highlighted substantial limitations in the current compensation framework at VNR. Predominantly characterized by rigid administrative salary coefficients and limited performance-based differentiation, the existing wage system fails to reward individual productivity, efficiency, and overall contribution sufficiently. Such shortcomings hinder motivation and job satisfaction and undermine the organization's ability to retain skilled and committed employees in a highly competitive labor market. To address these gaps, the study proposed evidence-based policy reforms centered around developing and implementing a comprehensive Key Performance Indicator (KPI)-based compensation evaluation system. Recommended measures include transitioning towards a hybrid compensation structure with a substantial performance-linked component, significantly improving allowances for frontline workers engaged in night shifts and hazardous duties, introducing strategic long-term incentive mechanisms such as profit-sharing and structured career development programs, and closely integrating employee training initiatives with performance assessments and remuneration decisions.

The proposed policy reforms aim to establish a more responsive, flexible, and motivating compensation and benefits system directly aligned with measurable performance outcomes. Implementing these recommendations would substantially enhance intrinsic motivation, employee retention, and organizational efficiency, positioning Vietnam's railway transport enterprises to compete and thrive effectively in the contemporary labor environment.

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