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ORIGINAL

Effectiveness of CSR Initiatives of Indian Railways during the Pandemic Period: Impact on Human Resources

Eficacia de las iniciativas de RSC de los Ferrocarriles Indios durante el periodo de pandemia: Impacto en los recursos humanos

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ABSTRACT

Introduction: this study examines the efficacy of Indian Railways' Corporate Social Responsibility (CSR) programs during the COVID-19 crisis, with particular emphasis on workforce welfare and community engagement.
Method: employing a mixed-methods research design combining quantitative surveys and qualitative interviews, the investigation analyzes how strategic CSR interventions influenced employee well-being and social impact. The research reveals those targeted initiatives—including emergency medical support systems, large-scale food security programs, and comprehensive staff assistance measures—yielded substantial benefits. These efforts not only stabilized workforce morale during peak pandemic periods but also strengthened institutional credibility among served communities.
Result: the findings demonstrate how public sector enterprises can leverage CSR frameworks to address simultaneous operational and humanitarian challenges during systemic crises.
Conclusion: this case study offers valuable insights for organizational leaders and policymakers developing crisis-responsive CSR strategies in large-scale transportation systems, highlighting the dual importance of internal workforce support and external community engagement during emergencies.

Keywords: CSR; Indian Railways; COVID-19; Human Resources; Employee Welfare.

RESUMEN

Introducción: este estudio examina la eficacia de los programas de responsabilidad social corporativa (RSC) de los Ferrocarriles Indios durante la crisis de COVID-19, haciendo especial hincapié en el bienestar de los trabajadores y el compromiso con la comunidad.
Método: empleando un diseño de investigación de métodos mixtos que combina encuestas cuantitativas y entrevistas cualitativas, la investigación analiza cómo influyeron las intervenciones estratégicas de RSC en el bienestar de los empleados y en el impacto social. La investigación revela que las iniciativas específicas -incluidos los sistemas de apoyo médico de emergencia, los programas de seguridad alimentaria a gran escala y las medidas integrales de asistencia al personal- produjeron beneficios sustanciales. Estos esfuerzos no sólo estabilizaron la moral de la plantilla durante los periodos de máxima pandemia, sino que también reforzaron la credibilidad institucional entre las comunidades atendidas.
Resultado: los resultados demuestran cómo las empresas del sector público pueden aprovechar los marcos de RSC para abordar simultáneamente los retos operativos y humanitarios durante las crisis sistémicas.
Conclusiones: este estudio de caso ofrece una valiosa perspectiva a los responsables organizativos y políticos

que desarrollan estrategias de RSC en respuesta a las crisis en los sistemas de transporte a gran escala, destacando la doble importancia del apoyo interno al personal y el compromiso externo con la comunidad durante las emergencias.

Palabras clave: RSC; Ferrocarriles Indios; COVID-19; Recursos Humanos; Bienestar de los Empleados.

INTRODUCTION

The Indian Railways, often described as an 'imperium in imperio' due to its vast scale and influence, serves as a crucial backbone for the country's transportation and economic infrastructure. As one of the largest state-owned enterprises, it plays a vital role in promoting regional integration and economic development.[1] The Indian Railways operates as the world's fourth-largest rail network, following the United States, China, and Russia, and is considered the largest government-owned monopoly globally.[2] With passenger volumes surpassing the population of the entire planet and freight operations handling massive cargo loads daily, the railway sector significantly contributes to India's GDP, accounting for approximately 1 % of the nation's economic output.[2]

The Indian Railways functions as a multifaceted organization encompassing various business divisions, including Freight Services, Passenger Railways, Parcel Carriers, Catering and Tourism Services, Parking Operations, and Ancillary Services. The network comprises nearly 19000 trains operating daily, with over 7000 freight trains transporting approximately 3 million tonnes of goods. Covering a route length of 65000 kilometers—equivalent to one and a half times the Earth's circumference—the railway system ensures widespread connectivity across the nation. With nearly 8500 stations spread throughout the country, Indian Railways serves as the primary mode of transport for millions of citizens, offering a cost-effective and reliable option for travel and goods transportation.[3]

Freight demand remains a cornerstone of railway operations, necessitating a thorough understanding of transport needs to optimize planning and management. Freight demand is inherently driven by economic activity and spatial differentiation of goods production. Efficient freight movement is critical for enhancing national competitiveness, ensuring economic expansion, and fostering regional connectivity. A robust transportation system is essential to facilitate smooth freight transitions from production hubs to end-users, ensuring timely and cost-efficient delivery of goods. Despite the importance of rail freight, Indian Railways has faced increasing competition from alternative transport modes such as roadways and air transport. These competitors often offer faster and more cost-effective alternatives, leading to a decline in railway revenues. However, despite these challenges, Indian Railways continues to be the backbone of the nation's logistics and transport network.

Over the past six decades (1950–2014), freight loading in Indian Railways has surged by 1344 %, underscoring the sector's expanding role in economic logistics. The revenue generated from freight services remains a critical component of the railway's financial sustainability. Given this context, assessing the impact of external disruptions, such as the COVID-19 pandemic, is essential in understanding potential losses in freight volume and corresponding revenue implications. The COVID-19 pandemic posed unprecedented challenges for organizations globally, and Indian Railways played a crucial role in supporting communities and employees through its CSR initiatives.[4] This paper explores the impact of these measures on human resources, assessing improvements in employee well-being, engagement, and organizational reputation.

Rail operations in India during COVID19

The COVID-19 pandemic severely disrupted India's transportation sector, with Indian Railways experiencing significant operational challenges. On March 25, 2020, a nationwide lockdown was imposed, restricting all transportation activities except for essential services and medical operations. Passenger train services were halted, and while freight transport continued initially, cargo train operations were also suspended after May 31, 2020. To maintain the supply chain for essential goods, Indian Railways introduced parcel van services, facilitating rapid e-commerce deliveries during the lockdown. This strategic adaptation helped sustain the movement of critical supplies across the country. Between March and September 2020, the rail sector in India faced considerable setbacks, as illustrated by freight transportation data.[5] According to reports from the Indian Ministry of Railways, freight volume during this period averaged 89,6 million tonnes per month. However, despite the pandemic-induced slowdown, the industry showed resilience. From April 2012 to November 2021, freight volume increased to an average of 97 million tonnes per month, demonstrating a long-term growth trend even when adjusted for population expansion.

These figures highlight both the pandemic's short-term disruptions and the sector's ability to recover, adapting strategies to ensure continuity in transportation and logistics.

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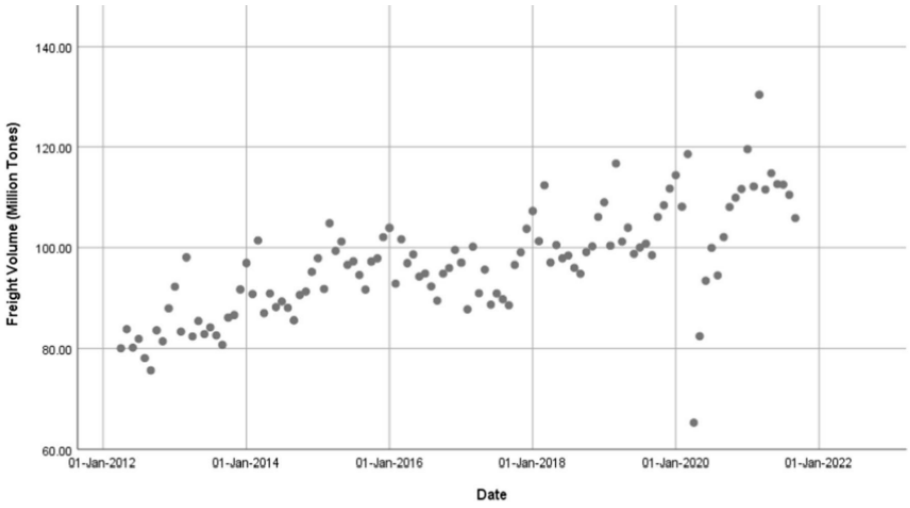

Figure 1. Temporal variation in freight volume

Global effect of COVID19 on rail system

The COVID-19 pandemic had a profound impact on global transportation systems, prompting policy interventions to address public transit as a potential vector for disease transmission. The outbreak in 2020 led to a significant drop in rail transit demand worldwide. Some researchers explored whether rail systems contributed to the spread of COVID-19, while others examined the pandemic's effects on transit usage.

Pengyu and Yuqing (2021) analyzed the role of air and rail connections with Wuhan in the early outbreak in China, finding that high-speed rail and air travel contributed to a 25,4 % and 21,2 % rise in daily confirmed cases, respectively.[6] Meanwhile, Mengwei et al.[7] studied the impact of COVID-19 on urban rail ridership across 22 cities in Asia, Europe, and the U.S., revealing an approximate 90 % decline in Chinese cities and smaller reductions in Singapore and Seoul.

Other studies focused on passenger behavior. Research in Tehran found increased crowding levels and lower comfort scores, while Elias and Zatmeh-Kanj (2021) in Israel discovered that infection risk perceptions strongly influenced train travel decisions.[8] In Italy, Grechi and Ceron (2021) reported a 40–60 % decline in rail demand, and Abreu and Conway (2021) emphasized the need for adaptive transport policies in New York City.[9]

In India, few studies have examined COVID-19's impact on rail networks. Velmurugan et al. (2021) noted that 13500 trains were halted for nearly eight months, with freight services maintaining essential supplies. Special trains like 'Jai Kisan' and 'Doodh Duronto' played a crucial role in transporting food and milk across the country, underscoring the significance of freight rail services during the crisis.

LITERATURE REVIEW

The review of literature explores existing research aligning with the study's objectives regarding CSR initiatives of Indian Railways during the pandemic and their impact on human resources.

Dutta's (2021) study examines the organizational restructuring of Indian Railways, identifying challenges such as stagnant track capacity, declining freight transport, project overruns, poor operating ratios, and lack of autonomy. The paper proposes two constructs to mitigate sectoral competition and enhance investor credibility over the next decade.[10]

Roy and Kulshrestha's (2021) study critically examines the efficiency of Indian Railways, the world's largest government-owned monopoly. Despite its extensive network and significant passenger numbers, the study highlights persistent low operational surpluses, with operating ratios consistently around 90 %. The authors attribute these inefficiencies to escalating staff expenditures and pension liabilities, underscoring the need for comprehensive policy reforms and management planning to enhance the organization's performance.[11]

Gunaki and Devaraj's (2020) study proposes a value chain model for the Indian Railway sanitary system, focusing on eco-friendly solutions to manage human waste. The authors advocate for the implementation of bio-toilets, which utilize anaerobic bacteria to decompose waste, thereby reducing environmental pollution and promoting sustainability. This approach aims to enhance hygiene standards across the railway network and generate biogas as a renewable energy source. By integrating such innovative sanitary systems, Indian Railways can improve operational efficiency and contribute to environmental conservation.[4]

Pawar et al. conducted a study examining the changes in work and non-work travel patterns in India during the transition to the COVID-19 lockdown. They observed that even before the official lockdown on March 25, 2020, there was a notable reduction in travel activities starting from the third week of March, attributed

to pandemic-related concerns. The study found that non-work-related travel decreased more significantly compared to work-related travel during this transition period. Essential trips experienced a 92 % lower reduction in frequency compared to non-essential trips.[12]

Zhang and Tong (2021) employed a Computable General Equilibrium (CGE) model to assess the economic impacts of reduced traffic consumption in China during the COVID-19 pandemic. Their analysis revealed that the decline in traffic demand led to a maximum 0,49 % reduction in China's Gross Domestic Product (GDP) during the pandemic's peak. The study also evaluated the effects of government economic stimulus policies related to transportation, examining the policy effects of transportation investment. These findings highlight the significant role of traffic consumption in China's economy and underscore the importance of targeted policy interventions to mitigate adverse economic impacts during health crises.[13]

These insights highlight the pandemic's impact on travel behavior, emphasizing the need for adaptive transportation policies during health crises. These reforms aim to transform Indian Railways into a more efficient and growth-oriented entity.

Objective

a) To analyze the impact of Indian Railways' CSR initiatives on employee morale, engagement, and loyalty during the pandemic.

b) To examine the effectiveness of health, safety, and welfare programs implemented for employees under CSR initiatives.

c) To assess employee perceptions of organizational commitment through pandemic-related CSR activities.

d) To evaluate the contribution of CSR measures to community support and their indirect effect on employee well-being.

METHOD

This methodology leverages a comprehensive dataset to enhance HR strategies, boost employee engagement, and promote inclusivity in workplace environments. First, organizations can analyze employee demographics, performance, and turnover trends to craft targeted recruitment, training, and retention strategies tailored to diverse employee needs. Second, by examining factors like salary, tenure, and job satisfaction, HR teams can identify key drivers of engagement and implement initiatives such as recognition programs, career development, and work-life balance policies. Lastly, the dataset enables an analysis of workplace diversity, identifying areas for improvement and guiding inclusive practices, including mentorship programs and diversity training. This systematic approach fosters innovation and optimizes workforce management.

Data Analysis

In the context of data analysis and research, the term "objective" refers to the specific goals or aims that a study or analysis seeks to achieve. Objectives outline what the researcher intends to discover, understand, or demonstrate through their analysis of the dataset. They provide a clear direction for the research process and help in formulating hypotheses, selecting appropriate methodologies, and determining the metrics for success.[14]

For example, in analyzing the 10000 Records.csv dataset, the objectives might include:

1. Identifying Trends: To uncover trends in employee demographics, such as age distribution and gender representation within the organization.
2. Salary Analysis: To analyze salary disparities across different departments or demographic groups, aiming to identify potential inequities.
3. Retention Rates: To assess factors influencing employee retention and turnover, helping to develop strategies for improving employee satisfaction.
4. Predictive Modeling: To create models that predict employee performance or likelihood of leaving the organization based on historical data.

https://www.kaggle.com/datasets/mexwell/data-sets-for-testing-human-resources?Select=10000+Records.csv

Satisfaction level vs number of projects

The bar chart depicts the correlation between the number of projects employees manage and their satisfaction levels. The horizontal axis represents the number of projects, while the vertical axis indicates the average satisfaction level. Employees working on 2 projects exhibit the lowest satisfaction levels, whereas satisfaction reaches its highest point for those handling 4-5 projects, surpassing the average satisfaction benchmark (denoted by the red dashed line). Conversely, satisfaction levels decline sharply for employees managing 6 or more projects, dropping below one standard deviation below the mean (green dashed line). The chart underscores that balanced workloads, particularly 4-5 projects, foster greater satisfaction, while

excessive workloads diminish employee morale.

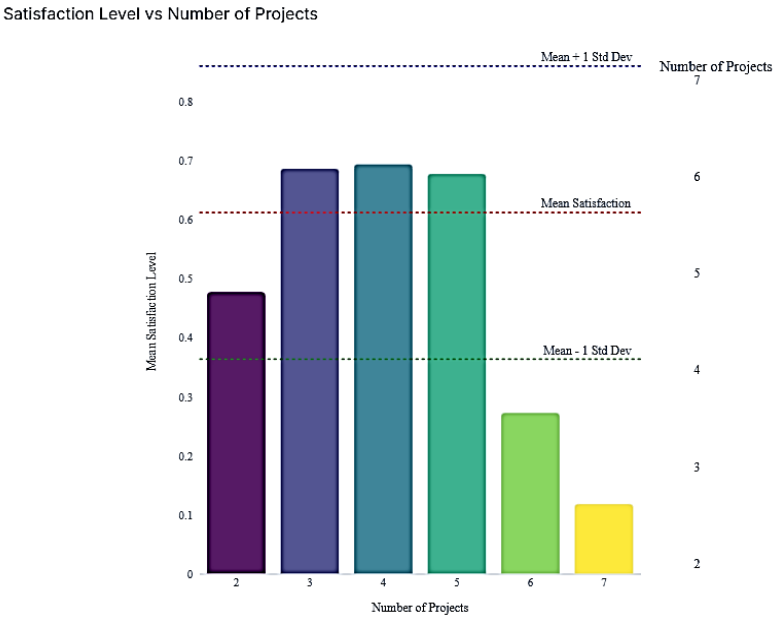

Figure 2. Number of projects[14]

Average monthly hours by salary level

The bar chart displays the distribution of average monthly working hours across three salary levels: high, medium, and low. The x-axis denotes the salary categories, while the y-axis represents the corresponding average monthly hours. All three bars exhibit similar heights, indicating minimal variation in working hours between the salary groups. A dotted line marking the mean and one standard deviation further emphasizes this consistency. The visualization suggests that salary levels do not have a noticeable influence on the average number of hours' employees work each month, highlighting a uniform workload irrespective of compensation level.

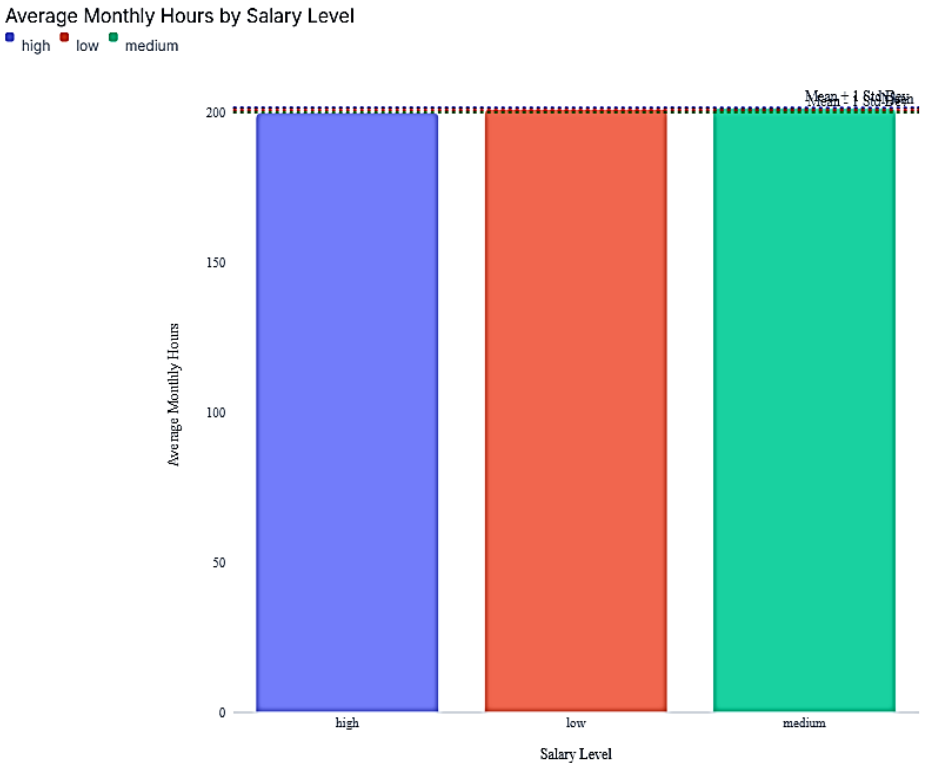

Figure 3. Salary level

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Correction between last evaluation and leaving

The heatmap illustrates the relationship between employees' most recent evaluation scores and their probability of leaving the company. The x-axis displays evaluation scores ranging from 0 to 1, while the y-axis distinguishes between employees who stayed (0) and those who left (1). The color intensity reflects the number of employees in each category. With a correlation coefficient of 0,01, the data indicates a minimal connection between these variables. No clear trend emerges linking evaluation scores to employee departures, suggesting that other factors, beyond performance assessments, are likely more influential in driving employee turnover decisions.

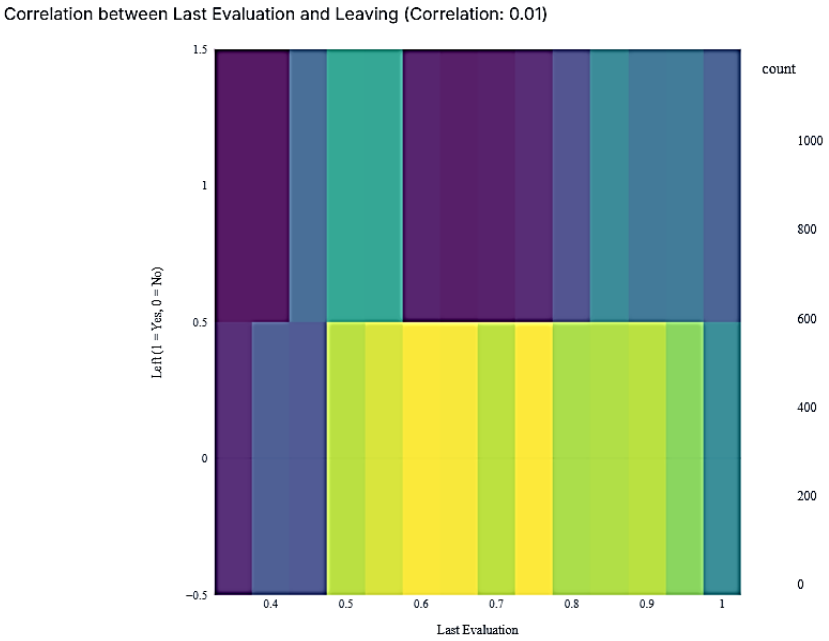

Figure 4. Last evaluation

Distribution of work accidents across departments

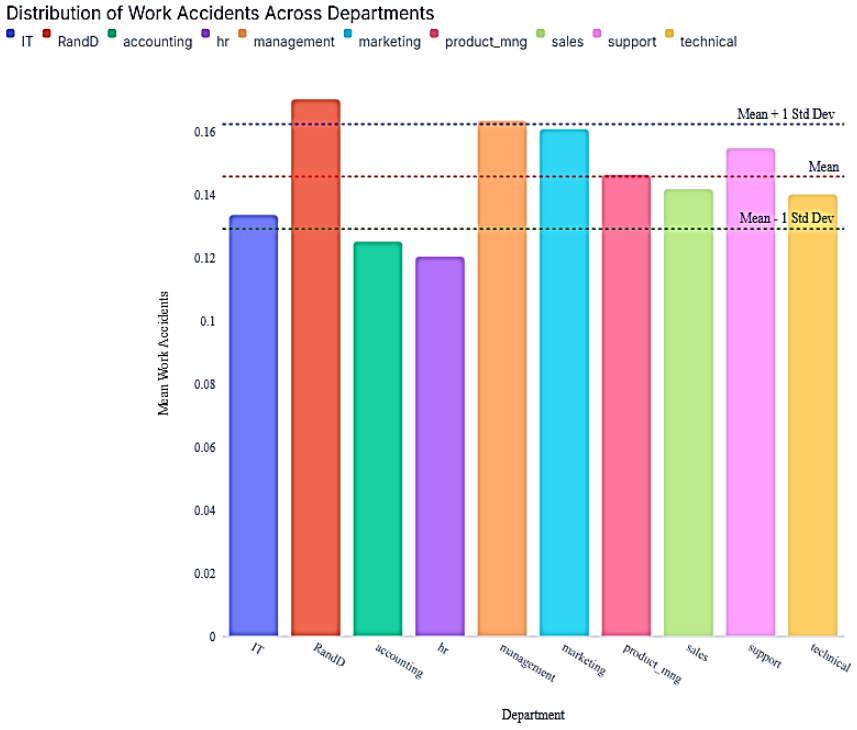

Figure 5. Distribution of work accidents across the departments

The bar chart depicts the variation in work accident rates across different organizational departments. The x-axis lists the departments, such as IT, R&D, accounting, HR, management, marketing, product management, sales, support, and technical, while the y-axis indicates the average work accident rates. Reference lines mark the overall mean (red), one standard deviation above the mean (blue), and one standard deviation below the mean (green). The R&D department shows the highest accident rate, surpassing the average, whereas departments like IT, accounting, and HR report comparatively lower rates. The chart underscores notable differences in workplace safety across departments, revealing areas of concern.

RESULTS AND DISCUSSION

The analysis reveals key insights into employee management, satisfaction, and organizational dynamics. Examining satisfaction levels against project workloads highlights the importance of balanced task distribution. Employees handling 4-5 projects report the highest satisfaction, surpassing average benchmarks, while those managing 6 or more projects experience diminished morale. This suggests that maintaining optimal workloads is crucial for employee well-being. Work accident rates vary significantly across departments, with R&D reporting the highest incidents, exceeding the average rate. Conversely, departments like IT, accounting, and HR demonstrate lower accident rates, emphasizing the need for targeted safety initiatives in high-risk areas. Regarding salary levels, average monthly working hours show minimal variation across high, medium, and low compensation categories. This uniformity suggests workload distribution is independent of salary, ensuring fairness in task allocation. Lastly, the correlation between evaluation scores and employee turnover is negligible, with a coefficient of 0,01. This indicates that performance assessments have limited influence on retention, implying other factors, such as engagement or work environment, play a more significant role. Overall, these findings underscore the need for data-driven strategies to balance workloads, enhance workplace safety, and address non-performance-related turnover factors to optimize organizational performance and employee satisfaction.

CONCLUSION

Indian Railways, as a cornerstone of India's transportation and economic framework, continues to demonstrate resilience and adaptability amidst evolving challenges. This study highlights the pivotal role of Indian Railways in fostering economic growth and regional connectivity through extensive freight operations and passenger services. Despite disruptions, particularly during the COVID-19 pandemic, the sector showcased its capacity to innovate, such as through parcel van services for essential goods delivery, ensuring supply chain continuity. The analysis emphasizes the need for strategic investments in digital transformation, infrastructure upgrades, and policy reforms to enhance operational efficiency and competitiveness. The integration of data-driven approaches in optimizing freight operations is essential for sustaining growth and addressing challenges from alternative transport modes. Furthermore, CSR initiatives undertaken during the pandemic proved instrumental in boosting employee morale, engagement, and organizational loyalty while supporting communities. Future research should explore post-pandemic recovery strategies, leveraging innovation to strengthen the resilience of Indian Railways.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest. This project was performed as part of a college academic program and the authors have no financial or personal relationships which could be viewed as influencing the representation or interpretation of the research reported.

AUTHOR CONTRIBUTIONS

Conceptualization: Alok John and Manish Tiwari.
Investigation: Alok John and Manish Tiwari.
Methodology: Alok John and Manish Tiwari.
Writing - original draft: Alok John and Manish Tiwari.
Writing - review and editing: Alok John and Manish Tiwari.