



ROLE OF UNIVERSITY INFRASTRUCTURE AND FACILITIES IN SHAPING EMPLOYEE WORK PERFORMANCE

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Abstract:

In higher education institutions, employee performance is influenced by multiple organisational factors, among which infrastructure plays a crucial yet often underexplored role. Understanding how infrastructure shapes work outcomes is essential for improving institutional effectiveness. This study examines the role of university infrastructure and facilities in shaping employee work performance, with a specific focus on classifying infrastructure components as performance enablers or constraints. A quantitative descriptive research design was adopted, and primary data were collected through a structured 5-point Likert scale questionnaire administered to 56 teaching and non-teaching staff members from private universities in Pune city. The data were analysed using descriptive statistical techniques, including mean scores, percentage distribution, and frequency analysis. The findings indicate that key infrastructure components, such as modern teaching aids (Mean = 4.59), access to computing resources (Mean = 4.30), and functional administrative spaces (Mean = 4.29), act as strong enablers of employee performance by enhancing efficiency and productivity. In contrast, factors such as storage facilities (Mean = 3.70), parking (Mean = 3.73), and grievance redressal systems (Mean = 3.89) function as moderate enablers with the potential to become constraints if not effectively managed. Additionally, salary satisfaction emerged as an important contextual factor, with relatively low mean scores ($\approx 2.79-2.91$), indicating its influence on employee motivation and overall performance. The study highlights that infrastructure is a dynamic organisational factor whose impact depends on its quality, accessibility, and alignment with employee needs, emphasising the importance of integrating infrastructure development with supportive HR practices, decisions and align engagement strategies with sustainability objectives.

Keywords:

University Infrastructure, Employee Performance, Workplace Facilities, Human Resource Management

1. Introduction

Universities are learning- and knowledge-based institutions where employee performance is a key factor in determining success in teaching, research, and administration. In these settings, workplace factors impacting employee performance have become a growing focus of research in the areas of Human Resource Management (HRM) and Organizational Behavior (OB). Although conventional studies have focused on factors like training, leadership and motivation, workplace infrastructure and facilities have been given less attention, yet are a critical factor in enabling employees to perform their roles effectively (Gifford & Wietrak, 2022).

Workplace infrastructure, comprising workplaces, information technology and environmental factors, is increasingly being identified as a critical factor influencing employee performance and satisfaction. Research indicates that quality infrastructure helps employees attain their work objectives, improves their efficiency, and ultimately impacts organisational performance (Ogunode & Akpakwu, 2023). Likewise, workplace facilities and environmental factors have been shown to play a vital role in employee discipline, engagement and performance (Almita et al., 2023). Despite this increasing recognition, infrastructure remains a variable that has been often overlooked as a critical resource.

Theoretically, the Job Demands-Resources (JD-R) model offers an overarching approach to the impact of infrastructure on employee performance. This model classifies job characteristics into job demands and job resources, with job resources (including infrastructure and facilities) being important in boosting motivation and preventing stress at work (Demerouti et al., 2001). Job resources enhance employee engagement, resulting in increased employee performance (Lee & Jo, 2023). Additionally, the JD-R model highlights that the extent to which resources are available plays a critical role in employees' capacity to successfully cope with different job demands (Bakker & Demerouti, 2007, 2017).

Beyond the JD-R model, Herzberg's Two-Factor Theory also highlights the importance of infrastructure to employee well-being. Herzberg (1966) classifies infrastructure, safety and organizational facilities as hygiene factors. These factors, although not motivating, can cause dissatisfaction and performance issues if absent. Thus, infrastructure is a critical resource in ensuring employee satisfaction and performance. The Resource-Based View (RBV) of the firm also recognises the importance of infrastructure as a valuable resource. Barney (1991) argues that resources that are valuable, rare and well deployed can lead to a competitive advantage. For universities, infrastructure can be considered as a strategic resource, which augments employee skills, facilitates efficient operations and enables success.

Although infrastructure has been theoretically and empirically recognised as an important factor, there are two key gaps in the literature. First, there is a need for a classification system to categorise infrastructure components as performance enablers or constraints. Second, existing research assumes a simple link between infrastructure and performance without considering differences in infrastructure components. Third, few studies link infrastructure with other factors such as job satisfaction and organisational support (Yuniarti, 2022).

2. Literature Review

The role of university infrastructure and facilities in influencing employee job performance is increasingly recognised, especially in higher education institutions where work performance in teaching, research and administration relies heavily on conducive work environments. Ogunode and Akpakwu (2023) report that the infrastructure facilities (classroom, ICT facilities, offices, electricity, laboratory and library) in tertiary institutions have a positive impact on the performance of academic staff. Their research supports the view that infrastructure is not a support facility but an enabler of employee work performance. But their research mainly confirms the existence of a positive relationship and fails to explicitly categorise infrastructure elements as strong enablers and potential constraints.

This debate is further developed by Yuniarti (2022) who looks at the completeness of facilities and infrastructure in relation to education and training and organisational support. This study shows that infrastructure has a positive impact on employee performance and that this effect could be mediated by satisfaction. This is important for the current study as it shows that infrastructure may not be the only factor affecting performance; other factors such as motivation and satisfaction play a role. Similarly, Almita et al. (2023) found that infrastructure and discipline are important factors of performance. This supports the relationship between facilities and workplace performance, but the study is not specific to university employees and does not make distinctions between teaching and/or non-teaching staff.

Three main theories can be used to bolster the theoretical framework of this study. First, according to Herzberg's Two-Factor Theory, facilities are hygiene factors. Classroom and office spaces, safety, IT support and hygiene in the public spaces may not necessarily increase motivation, but their lack may cause dissatisfaction and lower performance. This is linked to the variables in the current study such as comfort, storage, parking, safety, redressal of grievances and hygiene.

Second, the Job Demands-Resources model suggests that infrastructure is a job resource that helps in managing job demands and in achieving work goals. Resources like computers, LMS/ERP, teaching resources, IT support and admin rooms help manage work demands and increase efficacy. This justifies the current research focus on finding elements of infrastructure that help employees do their jobs. Third, the Resource-Based View highlights how organisation resources can lead to sustained competitive advantage if they are valuable and well-managed (Barney, 1991). In this vein, university infrastructure can be considered as a strategic resource, rather than merely an administrative cost. Good infrastructure enhances employee skills and abilities, helps deliver services, and increases institutional effectiveness.

A recent emphasis has also been placed on the importance of work environment, satisfaction and engagement. Boahen et al. (2023) showed that job satisfaction is critical to the link between work environment and productivity. Nguyen et al. (2024) also found the role of engagement and work environment in enhancing performance of the young workforce. Ahmad et al. (2021) (although on green HRM) also supports the notion that work environment and the practices of the organization influence employees' behavior and creativity. The study of job satisfaction in higher education also suggests that teacher performance is related to job satisfaction factors.

In summary, previous research indicates that infrastructure, work environment, satisfaction and resources affect employee performance. But there are three areas of improvement. First, few studies focus on categorising infrastructure factors as facilitating or constraining. Second, there is little research that considers university infrastructure from the viewpoint of teaching and non-teaching employees. Third, previous studies tend to consider infrastructure as a general variable rather than specific aspects of infrastructure such as teaching support, computer access, safety and grievance systems, parking and comfort of workplace. These research gaps result in the current study's hypotheses that infrastructure and facility factors impact employee performance and either facilitate or constrain it, depending on their sufficiency, accessibility and upkeep.

While a considerable amount of research relates to the role of infrastructure and work environment in affecting employee performance, there are a few gaps in literature. Existing studies mostly establish an overall positive association between infrastructure and performance but do not offer a classification of infrastructure components as performance enablers or constraints. Another gap is the aggregation of infrastructure into a single variable, without distinguishing the effects of different infrastructure components (e.g., teaching aids, technological access, workplace environment and support services).

Furthermore, while some research includes variables such as job satisfaction, there is a lack of integration of a range of factors in a holistic manner. The interplay of infrastructure and motivational factors, especially salary satisfaction, is not well understood. Additionally, research mainly concentrates on student or employee outcomes or focuses on a specific group

of employees, whereas there is a lack of consideration for both teaching and non-teaching employees in higher education. In an attempt to fill in these gaps, the current study takes an empirical approach to investigate the influence of university infrastructure and facilities on employee work performance. It aims to determine major infrastructure factors and categorise them as performance enablers and constraints, and explore their influence, along with salary satisfaction, as a moderating factor on performance.

Objectives of the Study

1. To examine the role of university infrastructure and facilities in shaping employee work performance
2. To identify key components of university infrastructure influencing employee performance
3. To classify infrastructure and facility-related factors as performance enablers or constraints
4. To analyze the relative impact of different infrastructure components on employee performance
5. To examine the influence of salary satisfaction as a contextual factor affecting employee performance

Hypotheses of the Study

1. Influence of Infrastructure on Performance

H0₁: University infrastructure and facility-related factors do not influence employee work performance.

H1₁: University infrastructure and facility-related factors influence employee work performance.

2. Infrastructure as Enablers

H0₂: Infrastructure and facility-related factors do not act as enablers of employee work performance.

H1₂: Infrastructure and facility-related factors act as enablers of employee work performance.

3. Infrastructure as Constraints

H0₃: Infrastructure and facility-related factors do not act as constraints on employee work performance.

H1₃: Infrastructure and facility-related factors act as constraints on employee work performance.

4. Salary as a Contextual Factor

H0₄: Salary-related factors do not influence employee work performance.

H1₄: Salary-related factors influence employee work performance.

3. Research Methodology

In this study, quantitative research design was used and the research adopted a descriptive survey approach to investigate the effects of university infrastructure and facilities on employee work performance. The descriptive design was suitable as it allowed for systematic gathering and analysis of employees' perceptions without any manipulation of variables, and thus supported the exploratory study.

3.1 Data Collection and Instrumentation

The study gathered primary data using a questionnaire with a 5-point Likert scale (1 being Strongly Disagree and 5 being Strongly Agree). This questionnaire focused on employee perceptions of the prominent components of infrastructure such as technology facilities, work environment, safety, environment and support services, alongside certain aspects of salary affecting their work performance. Both online and offline methods were used to distribute the questionnaire to increase respondents' ease of participation.

3.2 Sampling Technique and Sample Size

The research used a convenience sampling method, given the accessibility of the research subjects in private universities in Pune city. A total of 56 teaching and non-teaching staff responded to the questionnaire. This is sufficient for descriptive studies which focus on trends and patterns in perceptions, rather than causality.

3.3 Data Analysis Techniques

- The collected data were analyzed using descriptive statistical techniques, including:
- **Mean score analysis** to determine the relative importance of infrastructure components
- **Percentage analysis** to examine response distribution across Likert scale categories
- Frequency distribution to understand overall response patterns

Based on mean score thresholds, infrastructure components were classified into:

- **Strong enablers** (high mean scores)
- **Moderate enablers** (moderate mean scores)
- **Potential constraints** (lower mean scores or inconsistent responses)

Moreover, sub-divided bar diagrams were used to display the frequency of responses for different variables. This facilitated a systematic and empirical categorization of factors related to infrastructure that affect employee work performance, as per the study's objectives.

4. Data Analysis and Result Interpretation

4.1 Identification of Key Infrastructure Components

To meet the first objective of determining the components of infrastructure that affect employee's work performance, the study grouped infrastructure into physical, technological, environmental and administrative components. The data was analysed according to the mean scores of the respondents. Table 1 shows the infrastructure components that have a high mean, suggesting that they have a significant impact on improving employees' work performance.

Table 1: Key Infrastructure Enablers Influencing Employee Performance

Infrastructure Component	Mean Score	Interpretation
Classrooms with modern teaching aids	4.59	Strong enabler of work performance
Access to computer/laptop	4.3	Supports efficiency and task completion
Functional administrative spaces	4.29	Facilitates smooth daily operations
Office/workspace comfort	4.18	Enhances employee satisfaction
Safety and security measures	4.2	Creates a secure work environment

These findings reveal that infrastructure components, such as modern technology teaching aids (Mean = 4.59), access to computer resources (Mean = 4.30) and functional administrative areas (Mean = 4.29) play a significant role as strong performance enablers. They assist employees to efficiently and effectively complete their work. Further, work environment comfort and safety influence physical and psychological comfort, also improving performance. This validates the strategic role of infrastructure in enhancing employee performance, rather than it being a support function.

The subdivided bar diagram in Figure 1 shows the responses for key infrastructure elements.

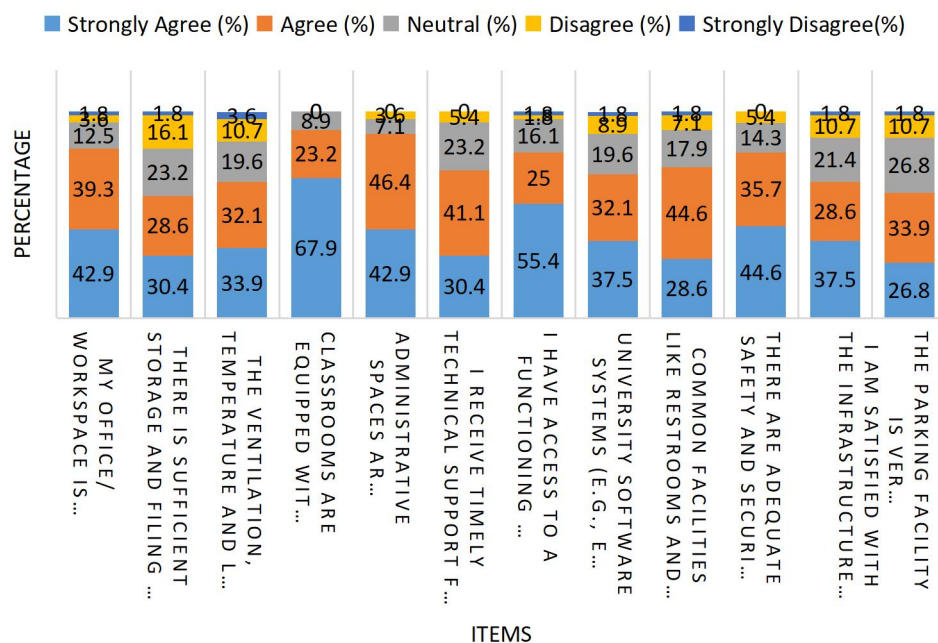


Figure 1: Perception of Key Infrastructure Enablers

The figure shows that the responses for teaching aids, administrative rooms and computer use are highly skewed towards "Agree" and "Strongly Agree", reflecting a high level of satisfaction. Positive perceptions are also seen for safety measures. This pattern echoes the tabular results that key infrastructure elements are generally recognised as performance enhancers.

4.2 Moderate Enablers and Emerging Constraints

While various infrastructure factors are strong enablers, some are moderate in influence and potential limitations. In Table 2, infrastructure components with moderate mean scores suggest that they are only partially effective in contributing to employee performance.

Table 2: Moderate Enablers and Potential Constraints

Component	Mean Score	Insight
Ventilation, lighting, temperature	3.82	Adequate but requires improvement
Storage and filing space	3.7	Space limitations exist
Technical support availability	3.96	Near-enabler, consistency needed
Software systems (ERP/LMS)	3.95	Usability concerns reported
Hygiene of common facilities	3.91	Maintenance improvement needed
Grievance redressal system	3.89	Requires faster response mechanisms
Parking facilities	3.73	Capacity-related issues

Our results suggest these are conditional enablers. While they do not have a significant negative impact on performance, their poor quality affects efficiency. Storage and parking areas (Mean = 3.70 and 3.73, respectively) reflect operational constraints while technical support and software systems reflect problems with usability and consistency. This finding suggests that the effectiveness of infrastructure is not just about availability, but also maintenance, accessibility and functionality. Over time, these may develop into effectiveness constraints. Figure 2 shows the distribution of responses for moderate infrastructure elements.

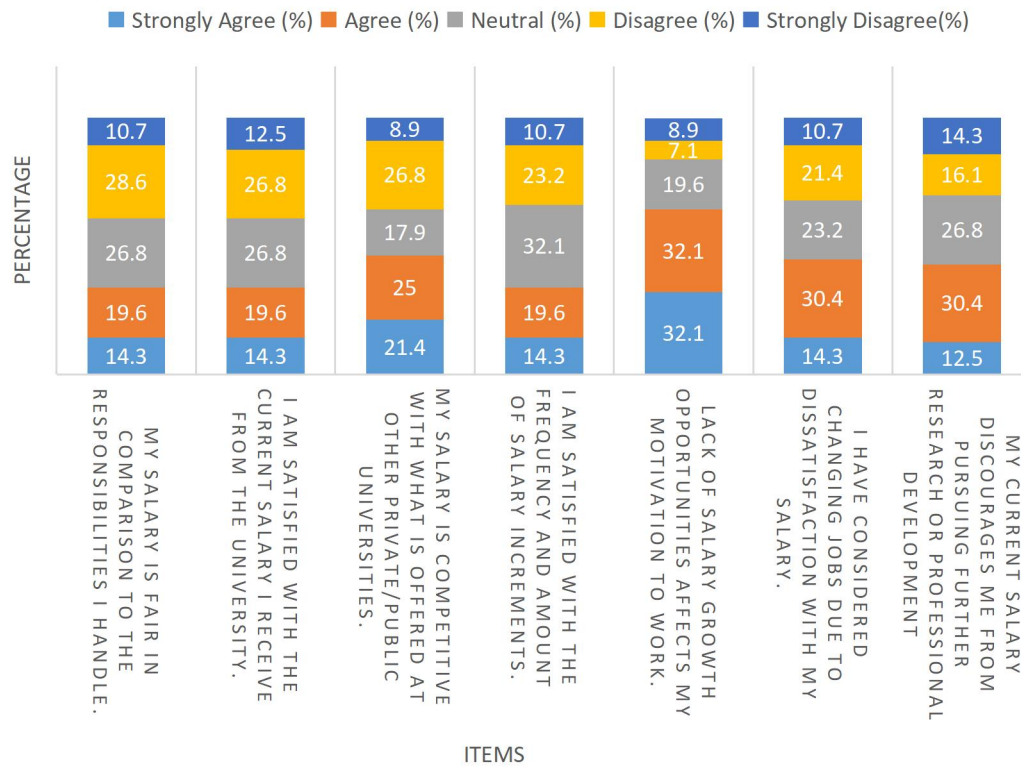


Figure 2: Distribution of Responses for Moderate Infrastructure Factors

The visualisation in Figure 2 suggests that there are more neutral responses for storage, parking and grievance systems than for strong enablers. This could be an indicator of differentiating employee experience and an area of concern for managers. The response variability suggests variation in infrastructure quality.

4.3 Salary Satisfaction as a Contextual Factor

While the main focus is infrastructure, salary-related factors were investigated to explore their effect on employee performance. Table 3 presents employee's satisfaction with salary and its possible impact on performance.

Table 3: Salary Satisfaction and Its Impact on Performance

Salary Dimension	Mean Score	Interpretation
Salary fairness	2.86	Dissatisfaction
Satisfaction with current salary	2.79	Strong constraint
Salary competitiveness	3.14	Neutral perception
Salary increments	2.91	Constraint
Lack of growth affects motivation	3.64	Strong concern
Job change consideration	3.02	Moderate risk
Discourages professional development	3.04	Emerging issue

These findings show relatively low levels of salary satisfaction, especially in terms of current salary (Mean = 2.79) and fairness (Mean = 2.86). Although employees perceive their salary as relatively competitive, they are unhappy with salary increases and salary growth potential, which has a demotivation effect. Many employees also indicated intentions to leave their jobs, indicating potential retention issues. The results suggest that while infrastructure boosts performance, low salaries may limit these benefits. Figure 3 illustrates a sub-divided bar diagram of the responses to salary-related variables.



Figure 3: Salary Satisfaction Response Distribution

Figure 3 shows a dichotomy in responses, with greater levels of disagreement for salary satisfaction and fairness, and greater agreement for the impact of restricted opportunities on motivation. This suggests salary plays a key role in the factors affecting employees' performance.

This study confirms that university infrastructure is an important enabler for employee performance. But some parts of infrastructure are more enabling than others, with core facilities as strong enablers and supporting facilities as moderate enablers. Furthermore, dissatisfaction with salary is an important contextual factor that has a constraining effect, suggesting a need to take a holistic view, integrating both infrastructure and motivational factors in employee performance.

5. Results and Findings

The study offers empirical evidence of the effects of university infrastructure and facilities on employee work performance. Through mean score analysis, infrastructure components were identified as strong enablers, enablers and constraints, based on their level of influence on performance.

5.1 Infrastructure as a Strong Performance Enabler

The results show that various infrastructure components scored high mean values (above 4.0), signalling a high level of agreement among respondents on their positive impact on performance. Critical components like up-to-date teaching equipment (Mean = 4.59), availability of computers/laptops (Mean = 4.30), effective administrative facilities (Mean = 4.29), safety and security arrangements (Mean = 4.20) and work environment comfort (Mean = 4.18) stand out as key enablers. These elements support the actualisation of tasks, increase efficiency and productivity. This evidence strongly supports H₁ and H₁₂, suggesting that infrastructure and facilities-based factors not only suggest an impact on performance but also serve as enablers when well developed and maintained.

5.2 Moderate Enablers as Potential Constraints

Several infrastructure factors have been rated with a medium mean score (between 3.70 and 3.96), which implies their impact on performance is significant, but not at the highest level. These involve environmental factors (ventilation, lighting, temperature), storage and work

areas, technical support, enterprise resource planning/learning management system (ERP/LMS), cleanliness of common facilities, redressal of grievances and parking.

These are conditional factors, implying that they are enablers when they are of high quality, accessible and reliable. When not well managed, they can become limiting factors and create bottlenecks. These results partially confirm H1₃, suggesting that infrastructure can also serve as a constrainer if not adequately maintained and in line with employee needs. The study also shows employees prefer functional infrastructure over non-essential infrastructure.

5.3 Salary as a Contextual Constraint

While the study mainly focuses on infrastructure, variables related to salaries were also considered for context. The findings reveal low mean scores for salary satisfaction (Mean = 2.79), fairness (Mean = 2.86) and salaries increment (Mean = 2.91), which suggest employee dissatisfaction. Further, concerns about lack of development opportunities (Mean = 3.64) suggest that this may have a demotivating effect.

These results confirm H1₄, that salary is a moderating variable that can have a negative impact on the benefits of infrastructure on performance. While infrastructure may be sufficient, a negative attitude towards salary may affect workforce engagement and performance.

This study supports the idea that infrastructure is a complex and dynamic factor that can play a dual role as an enabler and a constraint. The effects on employee performance are contingent on its adequacy, quality and its interaction with other employee motivators like compensation. So, a holistic approach featuring infrastructure and HR management practices is needed to enhance performance.

6. Discussion

The current research investigated the impact of university infrastructure and facilities on employee work performance, and aimed to identify components of infrastructure that play an enabling or constraining role. The results suggest that infrastructure is generally an enabler but its impact varies among different infrastructure components and is moderated by other variables (e.g. salary satisfaction). The findings can be interpreted in the light of previous theorising and empirical research.

The Job Demands-Resources (JD-R) model suggests that infrastructure is an important job resource that supports employee performance by enabling them to complete their work and avoids job-related pressures (Bakker & Demerouti, 2007; Demerouti et al., 2001). The high mean scores for factors like up-to-date teaching resources, access to computers and adequate administration rooms indicate that these resources help employees fulfil their job demands. This finding resonates with the notion that the presence of job resources contributes to positive engagement and performance (Bakker & Demerouti, 2017). Additionally, Lee and Jo (2023) note that these resources boost engagement, a mechanism by which infrastructure contributes to enhanced performance. Thus, the strong enabling influence of infrastructure found in this study can be attributed to its role in decreasing demands and increasing resources.

This study also confirms Herzberg's Two-Factor Theory, which classifies infrastructure as a hygiene factor (Herzberg, 1966). Infrastructure elements, such as a safe and comfortable working environment, comfortable furniture and adequate facilities, avoid dissatisfaction and enable acceptable performance. The positive rating for safety and security measures in this study suggest that employees consider a safe working environment crucial for their ability to focus and perform. But Herzberg also explains the lack of significant impact of moderate infrastructure components, such as storage space, parking facilities and grievance procedures, on performance. Neither does their presence greatly motivate, but if they are not adequate they may dissatisfy employees and hence reduce performance.

The Resource-Based View (RBV) also supports the above interpretation by considering infrastructure as a resource for organisations (Barney, 1991). The infrastructure provides support to employee skills and efficiency, enabling performance. Therefore, the strong

enabling components identified in this study can be seen as valuable resources that confer functional benefits to organisations. But the mixed performance of the auxiliary infrastructure components indicates not all resources are equally valuable, suggesting the need for high-quality infrastructure and effective management to make a difference to performance.

The study is supported by earlier empirical evidence. Ogunode and Akpakwu (2023) showed that infrastructure has a positive effect on the performance of academic staff, and that facilities positively contribute to productivity. Likewise, Almita et al. (2023) and Tahir and Hajjad (2023) found that facilities and infrastructure significantly impact on staff performance. But the current study goes further in providing a deeper insight as it categorises infrastructure into strong enablers and moderate enablers, overcoming the limitation of previous studies.

Furthermore, this study shows that satisfaction is a moderating factor. Yuniarti (2022) noted that infrastructure influences performance through job satisfaction, and Boahen et al. (2023) stressed the influence of work environment quality in improving productivity through satisfaction. The results on salaries in this study align with these assertions, as salary dissatisfaction (including fairness and opportunity for advancement) possibly negates the influence of infrastructure. Jain's research in higher education institutions also supports the relationship between satisfaction and performance, suggesting motivation is important for performance.

The results also echo the broader perspectives on HRM that argue that both the practices and the working conditions affect employee attitudes and performance (Ahmad et al., 2021; Gifford & Wietrak, 2022). What's more, Nguyen et al. (2024) suggest that engagement and work conditions are important for performance, especially in the contemporary and diverse workplace. These findings support the proposition that investing in infrastructure alone is not enough to enhance performance; it needs to be complemented with supportive HRM practices and motivation systems.

Overall, the research adds to the theory and practice by showing how university infrastructure is a dynamic resource that can be both a source of opportunity and constraint. Theoretically, it draws on JD-R, Herzberg's theory and RBV to understand the role of infrastructure in performance. Practically, it suggests the need for institutions to focus not only on the presence but also the quality, accessibility, and maintenance of infrastructure and facilities while also understanding the impact of employee needs for motivation (in the form of remuneration and career advancement).

7. Conclusion

This study confirms that university infrastructure and facilities are a crucial and multifaceted aspect of employee work performance. Infrastructure is not a passive resource but an active organizational factor which requires good quality, accessibility and fit to enjoy the benefits. The results show that critical infrastructure elements like technology, usable office space and safety requirements substantially boost employee productivity and performance, while deficits in ancillary facilities may limit performance potential. The research adds theoretically by providing an empirical typology, categorizing infrastructure into performance enablers and barriers, which enhances its standing in the Human Resource Management and Organizational Behavior literature. Empirically, it shows that the impact of infrastructure resources differ, and highlights the need to identify and prioritise valuable resources such as teaching materials, computer access and administrative systems. In practice, the results indicate universities need to take a proactive stance on infrastructure management, focusing on continuous improvement and maintenance, and linking infrastructure to human resource practices that support employee motivation, such as fair compensation and development opportunities. This study has important implications for management and policy. Universities must prioritise infrastructure investments in line with performance objectives and enhance human resource practices to promote employee motivation and retention. But the study has limitations due to a small sample, cross-sectional approach, self-reported measures and a geographical focus on private universities in Pune, which could limit applicability. To eliminate these shortcomings, future studies should involve larger and more representative

samples, use longitudinal designs and employ sophisticated statistical techniques to test causal links. Cross-regional and cross-sectoral studies would also broaden the scope of the study. In conclusion, the harmonisation of infrastructure investment and motivational aspects is crucial to promote sustained employee performance in higher education and other organisational settings.

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