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## Facilities Management its Effect on Social Sustainability: The Context of South African Higher Education Institution

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## Abstract

*Facilities Management (FM) has a significant role in promoting social sustainability. This study aimed to investigate the impact of FM on social sustainability in a South African Higher Education Institution, specifically Nelson Mandela University (NMU). The study employed an exploratory research design and a qualitative approach, gathering data from observations of three lecture theatres and semi-structured interviews with key personnel from the institution's Estate and Facility Management unit using a purposive sample. The findings highlight the importance of FM in creating a learning environment, reinforcing its role as a strategic enabler of the institution's academic mission. The study also reveals that effective FM, as defined by robust maintenance strategies, user involvement, and integrating physical and digital infrastructures, significantly contributes to the institution's social sustainability. The study emphasises the importance of ongoing dialogue and research in this evolving field, as FM's role in promoting social sustainability in higher education becomes more important. The findings suggest that a strategic and integrated approach to FM can improve social Sustainability in HEIs, providing valuable insights for similar institutions worldwide.*

## 1. Introduction

Higher education institutions (HEIs) have been identified as pivotal agents in fostering societal change and maintaining active engagement with their stakeholders and surrounding communities around the world (Cho, 2017; Jongbloed et al., 2008; Kromydas, 2017; Wolff & Ehrström, 2020). According to Walker et al. (2019), education is not only a driver of long-term economic growth but also a promoter of social sustainability, a concept that encompasses aspects such as social equity, livability, and health.

Researchers such as Wolff and Ehrström (2020) have emphasised the importance of incorporating social sustainability into educational frameworks. As a result of such inclusion in HEIs, more socially engaged societies emerge (Cho, 2017; Hudler et al., 2019). Furthermore, HEIs play a critical role in advancing technological innovation and instigating social transformation, making them critical pillars in the long-term viability of the knowledge economy (Kim and Kim, 2020; Bauer et al., 2021; Caeiro et al., 2020; Kohl et al., 2022; Rieckmann & Bormann, 2020).

FM has a significant impact on social sustainability outcomes in HEIs. The International Facility Management Association (IFMA, 2017) defines FM as a profession that focuses on the integration of people, place, process, and technology to improve the functionality and comfort of built environments. It goes beyond simple upkeep, contributing to areas such as innovation, communication, stakeholder participation, and positive relationship building (Adama, 2019; Adama & Michell, 2018).

Facility infrastructure is critical for research, education, and other academic pursuits in the context of HEIs (Kim & Kim, 2020). However, FM challenges are a pressing concern in African public universities, particularly in South Africa. Many institutions face issues such as overcrowding, skill shortages in FM departments, and financial constraints (Chikafalimani et al., 2021). The physical and social environment of these institutions, which includes security, technological facilities, and the overall ambiance, has a significant impact on both students and staff (Edoghogho, 2011, 2016; Jabbari et al., 2019; Moghayedi et al., 2022; Price et al., 2002; Simpeh & Shakantu, 2019, 2020).

Despite the acknowledged importance of FM in HEIs and its potential impact on social sustainability, there is a dearth of research focusing specifically on South African HEIs.This study seeks to fill that gap by investigating the impact of FM on the social sustainability of South African HEIs. The study hopes to improve understanding of FM's role in enhancing both social and overall sustainability of South African HEIs.

## 2. Literature review

In the ever-changing landscape of South African HEIs, FM plays a critical role in shaping the learning and research environment. The emerging focus on social sustainability, which is becoming increasingly important in HEIs around the world, is central to this discussion. The following literature review will delve deeply into the nuances of South African HEIs, the

significant role FM plays in these institutions, and the integral connection of these elements to social sustainability. This comprehensive analysis will lay the groundwork for understanding the specific research objectives related to these themes, as well as their significance in the larger research context.

### 2.1 Overview of South African Higher Education Institutions

The post-1994 era saw significant changes in South African HEIs, which saw a reduction from 36 to 26 institutions as a result of policy reforms (Tjonneland, 2017). These reforms have had an impact not only on the structure of the institutions but also on the student experience. Recent years, in particular, have been turbulent, with student protests and the COVID-19 pandemic testing the resilience and adaptability of these HEIs. The latter, in particular, shed light on the digital divide and emphasised the need for transformations grounded in social justice principles (Accord, 2021). Nonetheless, the evolving HEI landscape poses challenges due to competitive academic environments (Caleiro, 2018).

### 2.2 Facility Management in Higher Education Institutions

The unique nature of tertiary education settings necessitates a strategic approach to facilities management. FM in HEIs encompasses more than just physical assets; it also includes strategies that promote optimal learning, teaching, and research environments (Alexander, 1996; Lavy, 2008; Odediran et al., 2015). Furthermore, the rapid integration of ICT into HEIs has increased the importance of FM in creating vibrant academic communities. Despite the potential of FM, many public African universities have deteriorating facilities, highlighting the urgent need for efficient FM, particularly in the South African context. This coupled with the need for transformations grounded in social justice principles, places the social sustainability pillar of FM at the forefront in the management of HEIs in the South African context.

### 2.3 Social Sustainability in Higher Education Institutions

The concept of social sustainability exists at the crossroads of economic, environmental, and social considerations. For HEIs, this means creating environments that are inclusive, equitable, and socially responsible, with policies and programmes that emphasise these values (Wolff & Ehrström, 2020; Alnien & Pereira, 2021). FM becomes critical here, ensuring that the physical aspects of HEIs align with and support these core values (Edoghogho, 2011; Alexander, 2012).

## 3. Research method

This section delves into the methodology used to assess the impact of FM on social sustainability at Nelson Mandela University (NMU), with an emphasis on employee perspectives as well as infrastructure observations.

   i. Justification for Single-Case Approach: The study takes a single-case approach, focusing on NMU. A single-case methodology is especially useful when the goal is to conduct an in-depth investigation of a specific context or phenomenon. Given NMU's unique position and significance in South African higher education, it provides a

representative landscape for such a thorough examination. Furthermore, the findings of this specific case can provide preliminary insights that can be used to guide future research in broader contexts within South African higher education.

ii. Facility Manager Interviews: Three facility managers were chosen for face-to-face, semi-structured interviews. The decision to interview three managers was based on their extensive involvement in FM at NMU and distinct roles, ensuring a broad yet in-depth understanding. The interview questions were carefully crafted to correspond to the research objectives. While each participant was asked the same set of questions, they were also encouraged to elaborate on aspects they thought were important, giving the data collection a more exploratory dimension.

iii. Observations: Three pre-selected lecture theatres or classroom venues were used for on-site observations. The criteria for selection were based on a diverse representation of the university's facilities in order to capture a variety of FM practises. During these observations, particular emphasis was placed on structural safety, fire exits, ventilation, and overall aesthetics, among other things. Each observation was carried out in a systematic manner over a predetermined time period, ensuring a consistent data collection process.

iv. Data Analysis: Thematic analysis was used, which is a method for identifying and analysing patterns in data. NVivo, a qualitative data analysis software, was used to code the data and identify emerging themes. This method ensured that the analysis was methodical and rigorous. The researchers worked hard throughout the process to achieve data saturation, ensuring that all potential themes were identified. Multiple researchers independently coded a portion of the data to ensure consistent theme identification, which increased intercoder reliability.

v. Limitations: It is critical to recognise potential limitations in the study. While the single-case approach provides depth, it may pose difficulties in generalising the findings. Furthermore, choosing only three facility managers may not represent the full range of perspectives within the institution's FM department. However, the breadth of insights obtained attempts to compensate for these limitations. A larger participant pool or a multi-case study design could benefit future research..

Based on the above research method steps, the subsequent section will focus on the findings and discussion.

## 4. Findings and discussion

### 4.1 Profile of participants

The semi-structured interviews were conducted using Virtual Interviews with the institutional support management (Microsoft Teams). Table 1 shows the interview profile.

Table 1 Profile of interviewees.

| Interviewee Anonymity code | Profile |
| --- | --- |
| P 1 | Senior Director Infrastructure Services and Space Optimisation |
| P 2 | Director: Technical Services |
| P 3 | Manager Building and Engineering Service |

### 4.1.1 Interviews discussions

P1, the Senior Director of Infrastructure Services and Space Optimisation, spoke about the university's history, beginning with its founding as the University of Port Elizabeth. The estate facilities management (EFM) unit evolved from a rudimentary setup to a comprehensive division handling hard and soft facilities management tasks over time. P1 elaborated on the EFM's vision and mission, which revolve around integrating physical and digital infrastructure for improved space, infrastructure, and human resource management.

P2, the Director of Technical Services, revealed that the EFM lacks a priority management strategy for lecture theatre maintenance. They showed the department's reliance on internal guidelines and the urgency of maintenance requirements. Despite these constraints, an integrated maintenance strategy includes proactive, reactive, and condition-based actions. P2 also acknowledged the department's operational challenges, such as a lack of human resources, budget cuts, and a time-consuming procurement process.

P3, the Building and Engineering Service Manager, confirmed the lack of a public policy for maintaining priority lecture halls. They emphasised the existence of an internal priority guideline that addresses various aspects of maintenance. P3 mentioned that departmental meetings facilitate user involvement in maintenance.

The findings of P1, P2, and P3 together highlight the importance of FM to the teaching and learning experience at the institution. The evidence is consistent with existing literature, emphasising the role of FM in promoting the overall success of an organisation. NMU, like other universities, recognises the importance of strong, dependable, and well-equipped FM in creating a positive learning environment.

The discussions with P1, P2, and P3 provide valuable insight into the role of Facilities F in higher education, specifically at the NMU. Their stories are consistent with existing literature, emphasising the critical role of FM in a company's overall success. This role is even more critical in a school where FM's influence extends beyond infrastructure management to

impact the teaching and learning environment directly. According to Alexander and Brown (2006), FM in higher education institutions should be viewed as a strategic enabler of the academic mission rather than a support function. Thus, as P1, P2, and P3 noted, FM is essential in creating an environment that encourages learning and innovation. Regarding social sustainability, a critical aspect of broader sustainability concerns, the stories from NMU's EFM personnel highlight the importance of FM. The effective prioritisation and management of maintenance needs, as discussed in P2 and P3, has direct implications for the quality of the university's social environment. This aligns with the works of Adama (2019) and Temeljotov Salaj & Lindkvist (2021), who argue that FM is crucial in enhancing social sustainability within organisations. In this light, P1's description of the evolution of the EFM unit at NMU shows a path toward a more integrated and comprehensive approach to FM. This approach, which incorporates advanced software systems and strategic planning, can serve as a model for other South African higher education institutions looking to improve their social sustainability through improved FM.

### 4.1.2 Themes

After rigorous coding through NVivo, five themes emerged of the interviews and discussions which highlight the role of FM in enhancing social sustainability within a HEI context:

i.     Emergent Theme 1: Evolution of FM

P1 recounts the journey from a rudimentary setup to a comprehensive division, highlighting the increasingly sophisticated and nuanced role of FM in HEIs. FM must evolve to meet changing needs and challenges as universities become more complex institutions, integrating both physical and digital infrastructure for more efficient space and human resource management. Given that HEIs are complex organisations with diverse needs, Alexander (1994) believes it is critical to understand how these institutions strategically navigate FM's complexities and how these strategies impact their success.

ii.    Emergent Theme 2: Strategic Vision and Mission of FM

P1's discussion of the EFM unit's vision and mission emphasizes the strategic role of FM in HEIs. The mission to integrate physical and digital infrastructures seamlessly aligns with the institution's overarching goal of creating a conducive learning environment. According to Lavy (2008), as HEIs continue to evolve in their strategic planning, a deeper understanding of these aspects could reveal critical insights, allowing for the development of more effective operational strategies in facilities management practice.

iii.   Emergent Theme 3: Maintenance Strategies

Both P2 and P3 identified the importance of more structured and strategic approaches to lecture theatre maintenance. They emphasized the importance of proactive, reactive, and condition-based actions to ensure that facilities are well-maintained and appropriate for

learning. According to Hinum (1999), understanding the impact of strategic FM is more than just an academic exercise; it has significant practical implications that can shape policies and practises within institutions.

iv.     Emergent Theme 4: Challenges of FM

The constraints and challenges discussed by P2 and P3, such as a lack of human resources, budget cuts, and a lengthy procurement process, highlight the difficulties that FM units face. To overcome these challenges, innovative and strategic solutions are required, emphasizing FM's role as an enabler of the academic mission. According Chikafalimani et al. (2021) HEIs face issues such as overcrowding, skill shortages in FM departments, and financial constraints.

v.      Emergent Theme 5: Role of FM in Higher Education and its Influence on Social Sustainability

This theme runs through all of the narratives, but it is explicitly discussed in the context of social sustainability. The interviewees emphasise the importance of FM in a higher education institution, where its influence extends beyond infrastructure management to have a direct impact on the teaching and learning environment. According to the narratives, FM should be viewed as a strategic enabler of the academic mission rather than merely a support function, which is especially true in the context of social sustainability. Prioritization and effective maintenance management have direct consequences for the quality of the university's social environment, which supports the broader goal of social sustainability. P1's description of the evolution of NMU's EFM unit demonstrates a path toward a more integrated and comprehensive approach to FM, serving as a model for other South African higher education institutions seeking to improve their social sustainability. Universities and colleges commit to creating an inclusive, equitable, and socially responsible environment for their students, faculty, staff, and the larger community as social Sustainability in HEIs. This entails incorporating social considerations into the institution's policies, programs, and operations with a focus on promoting social justice, diversity, community engagement, and staff and student well-being (Wolff & Ehrström, 2020; Žalėnienė & Pereira, 2021).

These themes highlight FM's critical role as a strategic enabler in higher education. It is not only about maintaining infrastructure, but also about fostering learning, innovation, and social sustainability. South African HEIs can improve their FM practices by understanding and addressing these themes, thereby contributing to their students' academic success and the institution's overall social sustainability.

### 4.2 Observation of Classrooms

Three campus classrooms were chosen for their varying sizes and utilization rates in order to provide a comprehensive view of facilities management issues that may impact social sustainability.  The following are the specifics and findings from each.

i.    M-Block-Room 0205, Senate Hall

This conference room and lecture theatre, located in Building 261 M-Block, has a 166.8 m$^2$ floor area and can seat 140 people. The hall, which is primarily used by students and staff from the Faculty of Engineering, the School of Built Environment, and Civil Engineering, is in excellent structural condition, with no visible cracks. Among the critical safety features are double exit doors, two fire extinguishers, a fire pad, a fire detector, a fire rogue system, and a fire alarm system. The lack of windows is offset by a central HVAC system that can be controlled from within the lecture theatre. The Senate Hall has ground acoustic wooden panels fixed around the walls, except for the front. There is also a public address system with an amplifier, microphone, and speaker system. The clean, well-lit room has a carpeted floor and a white-coated acoustic tiled ceiling.

ii.    M-Block Room 0222, Lecture Theatre

M 0222, like the Senate Hall, has 166.82 m$^2$ of floor space and 140 seats. The venue has two exit doors, two fire extinguishers, a fire hose reel, fire detectors, a fire alarm, and a fire sprinkler system. The centrally controlled HVAC system compensates for the lack of windows. Tongue and groove acoustic wooden panels are installed across the walls, barring the front, to absorb sound. The lecture theatre has adequate lighting and is usually kept clean and tidy.

iii.    C-Block Room 0109, Classroom:

This classroom has 46 seats and a smaller floor area of 61.0 m$^2$. It has one exit door and fire extinguisher and maintains good structural integrity and cleanliness. Unlike the other two, this classroom has windows but no HVAC system. The fluorescent and board lights in the classroom are adequate, and daylight can enter the room due to its architectural design. The three lecture halls were observed to have significant differences, with structural safety, lighting, cleanliness, and fire safety being the most satisfactory aspects. However, ventilation and temperature control provided the least satisfaction. Multiple studies support this conclusion, indicating the possibility of accidents due to a lack of safety measures, distraction due to HVAC deficiencies, and health issues due to poor indoor air quality and insufficient ventilation. Lighting, acoustics, indoor air quality, noise control, spatial comfort, seating comfort, audio-visual equipment quality, thermal comfort, and ergonomics were discovered to be factors influencing a lecture hall's overall performance. According to observations and survey responses, the HVAC system was either working correctly or was not present in the classrooms. Sick building syndrome (SBS) can be caused by poor indoor air quality, resulting in respiratory illnesses.

A sound room ventilation system can improve indoor air quality and the efficiency of end users. These findings are supported by the observations, which show that the lecture theatres are structurally sound, have adequate lighting, and are crack-free. The interview participants provided no negative feedback on structural safety or lighting.

FM entails maintaining and improving the quality and usability of physical environments, such as classrooms, which directly impact students and staff's social interactions and learning experiences. The relationship between the physical environment and learning outcomes is well-established in the literature (Closs et al., 2022; Usman & Madudili, 2019). This includes lighting, temperature, and ventilation, all of which were noted during the observations. According to research, a well-lit, temperature-controlled, and ventilated environment can improve student attention, productivity, and overall academic performance (Bishop, 2009; Pohl, 2011). This includes lighting, temperature, and ventilation, all noted in the observations. According to studies, a well-lit, temperature-controlled, and ventilated environment can improve student attention, productivity, and overall academic performance. On the other hand, as seen in some observed classrooms, the absence of inadequacy in these aspects can impede social sustainability.

According to the literature, poor indoor air quality caused by insufficient ventilation can result in' sick building syndrome (Bishop, 2009), negatively impacting health and productivity (Ghaffarianhoseini et al., 2018; Joshi, 2008). Similarly, poor acoustics can hinder communication and learning (Shield & Dockrell, 2003). The absence of such critical features emphasises the importance of effective facility management.

The findings are consistent with the literature, highlighting the importance of adequate facilities management in promoting social sustainability in higher education institutions. Facilities management can significantly influence the quality of education and the overall well-being of students and staff by ensuring structural safety, appropriate lighting, adequate ventilation, and necessary teaching aids. As a result, continuous evaluation and improvement of these facilities are required to achieve social sustainability in the context of South African HEIs.

Based on the observations and discussions subsequent analysis, the major emerging themes based on the data can be grouped as follows:

1. Physical Infrastructure and Safety: This theme is centered on the physical characteristics and safety features of the classroom spaces. This theme includes elements such as the number of seats, floor area, the presence of exit doors and fire extinguishers, structural integrity, and cleanliness. This theme also includes the classrooms' adequacy in terms of lighting, both artificial and daylight, as a result of architectural design.
2. HVAC and Ventilation: Another important theme is the provision of ventilation and temperature control in classrooms. This theme includes the absence of HVAC systems in some classrooms as well as the impact of architectural design on indoor air quality. The possibility of Sick Building Syndrome (SBS) as a result of poor ventilation emphasizes the significance of this theme.
3. Impact on Learning Experience: This theme is concerned with the connection between the physical environment and learning outcomes. This theme emphasizes the

importance of factors influencing the overall performance of a lecture hall, such as lighting, acoustics, indoor air quality, noise control, spatial comfort, seating comfort, audio-visual equipment quality, thermal comfort, and ergonomics. These factors have a significant impact on student attention, productivity, and overall academic performance.

4. Importance of Effective Facility Management: Another important theme is the importance of effective FM in maintaining and improving the quality and usability of physical environments. The importance of FM in managing critical aspects of learning, such as lighting, temperature control, ventilation, and safety measures, is emphasized here. The theme also addresses the consequences of insufficient FM, such as the possibility of impeding social sustainability.

5. Facility Management and Social Sustainability: The role of FM in promoting social sustainability in higher education institutions is the focus of this theme. The potential of FM to influence educational quality and overall well-being of students and staff is highlighted by ensuring structural safety, appropriate lighting, adequate ventilation, and necessary teaching aids. The theme also emphasizes the importance of continuously evaluating and improving these facilities in order to achieve social sustainability in HEIs.

The themes suggest that effective FM, which ensures safe, well-structured, and comfortable learning environments, has a significant impact on social sustainability in HEIs. Adequate lighting, temperature control, ventilation, and safety measures are critical for improving educational quality and the overall well-being of students and faculty. Continuous evaluation and improvement of these aspects is critical for promoting social sustainability in HEIs.

## Conclusion

The research, which focused on the role of FM and its impact on social sustainability in a South African HEI context, yielded insightful findings with both practical and theoretical implications. The study emphasised the importance of FM in creating a conducive learning environment that promotes social sustainability. This is supported by empirical data from physical observation of lecture theatres and semi-structured interviews with key personnel in the institution's Estate and Facility Management unit. It demonstrates the importance of a strategic approach to FM, which includes effective maintenance strategies, user participation, and the integration of digital and physical infrastructures. The study adds to the growing body of literature on FM in higher education and its impact on social sustainability from a theoretical standpoint. The findings are consistent with previous research highlighting the role of FM as a strategic enabler of an organisation's success.

Furthermore, they emphasise the importance of FM in enhancing social sustainability within organisations, a topic that is gaining traction in the literature. Finally, the study highlights the critical role of Facilities Management in supporting higher education institutions' academic missions and promoting social sustainability. It also emphasises the importance of ongoing

research and dialogue in this area, given the ever-changing nature of FM and the growing extent of sustainability in higher education. The findings imply that South African universities and all higher education institutions worldwide can improve their social sustainability by implementing a strategic, integrated approach to FM. The main limitation of this study is its single case. Future research involving many HEIs may overcome this weakness.

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