

A socio-ecological transition framework for regenerative facilities management: thinking beyond operational efficiency

Faranani Gethe¹, Prisca Simbanegavi², Pride Ndlovu³, Yewande Adewunmi⁴ and Matthew Ikuabe⁵

¹⁻⁵School of Construction Economics and Management, University of the Witwatersrand, Johannesburg, South Africa

DOI: 10.36108/cbpm/2026.0194

Abstract

Traditional facilities management (FM) is attributed by regime-bound performance metrics such as asset optimisation, service reliability, maintenance management and cost control etc. This yardstick tends to constrain the capacity to address complex socio-ecological challenges such as resource depletion, climate vulnerability, and other key sustainability indicators. This study drives the concept of repositioning FM from the perspective of operational efficiency to regenerative practice through the lens of sustainability transition theory, using the Multi-Level Perspective (MLP). A qualitative, theory building approach is deployed for the study. This is achieved through the critical synthesis of interdisciplinary literature with informed insights for the development of a socio-ecological transition framework for regenerative facilities management. The study reveals that traditional facilities management limits sustainability outcomes because it focuses too much on efficiency. A socio-ecological transition framework, based on the Multi-Level Perspective, allows for a shift toward regenerative practices by combining changes in institutions, innovation, and the ability to adjust. This approach improves resilience, ecosystem restoration, and long-term value in the built environment. The developed framework articulates pathways for reconfiguring traditional FM systems and scaling regenerative functions across institutional, organisational and technological dimensions. Furthermore, there is the proposition of FM deliverables beyond conventional efficiency metrics through the infusion of regenerative parameters such as adaptive capacity and ecosystem restoration.

Keywords: Facilities Management, Operational Efficiency, Socio-Ecological Transition, Sustainability.

1. Introduction

Facilities management (FM) has historically been placed in a managerial premise that prioritises outcomes such as reliability and efficiency. This concept portrays the wider transformation of the discipline as a support function within organisational set up, where performance is usually assessed based on quantifiable outputs such maintenance efficiency, energy savings, lifecycle cost optimisation, effective space management, and efficient workforce management etc. (Atkins & Brooks, 2021; Ikuabe *et al.*, 2023; Nielsen *et al.*, 2016). While these metrics presents a formidable base for driving operational performance, they remain inadequate in addressing the systemic nature of contemporary environmental challenges. According to the United Nations Environment Programme (2022), the built environment is a major culprit in environmental degradation and carbon emission, thereby positioning facilities as critical nodes within the broader framework of socio-ecological systems. The emphasis of operational efficiency from facilities management obscures underlining structural problems affiliated with unsustainable practices of production and consumption. Amini-Philips *et al.*, (2020) noted that attaining efficiency is important, yet it often produces

incremental instead of transformative change and may inadvertently strengthen existing stance of resource-intensive development. This fundamental limitation gives the need for a shift geared towards a comprehensive approach that engages with regenerative capacity of ecological systems and resilience of social infrastructures. This study extends the theoretical discourse that facilities management must transition from a performance paradigm centred on optimisation toward one that actively contributes to socio-ecological regeneration. In conceptualising the transition, the study is underpinned using the Multi-Level Perspective, a sustainability transition theory, which outlays a framework for understanding how entrenched systems can evolve through interactions between innovation, institutional structures, and external pressures (Geels, 2011). Consequently, the study develops a socio-ecological transition framework that transposes FM as a key driver in achieving regenerative outcomes in the built environment.

2. Theoretical Foundation: Sustainability Transitions and the Multi-Level Perspective

Sustainability transitions theory has become a key approach for examining how large socio-technical

¹ Corresponding Author

Email address: faranani.gethe@wits.ac.za

systems change. A key part of this concept is the Multi-Level Perspective, which views transitions as dynamic processes shaped by interactions across various levels (Geels, 2011). These include the socio-technical regime, which represents the main set of practices, rules, and technologies; niche innovations, which act as incubators for alternative solutions; and the broader landscape, which covers larger forces like climate change, economic shifts, and cultural changes (Markard & Truffer, 2008). In facilities management, the regime consists of established norms and practices that direct the operation and maintenance of built assets. This includes standard procedures and performance measures that focus on efficiency and cost-effectiveness. Such regimes tend to be stable and dependent on existing paths, which can limit the adoption of more transformative sustainability approaches (Karanasios, 2026).

Conversely, specialised innovations offer a space for testing alternative practices. In facilities management, these might involve initiatives that incorporate circular economy principles or nature-based solutions aimed at improving environmental performance. Although these innovations usually operate on the peripheries, they can gain momentum under the right conditions and help change the regime. The environmental conditions brings in external pressures that can alter existing systems and lead to transformation. Issues such as climate change and new regulations regarding sustainability are particularly important. Moreover, stricter environmental rules and heightened awareness of ecological risks are pushing organizations to rethink conventional facilities management practices (Bröchner, 2019). Using the Multi-Level Perspective in facilities management highlights the need for coordinated action across these various levels. Moving towards regenerative practices needs not just technological innovation, but also institutional change and alignment with wider societal goals. This underscores the importance of taking a systems-oriented approach that acknowledges the connections between different parts of the built environment.

3. Limitations of Conventional Facilities Management Paradigms

Conventional facilities management mainly focuses on operational efficiency, while emphasizing on cost reduction and improving service delivery (Ikuabe *et al.*, 2025). While this approach has provided clear benefits, it faces growing criticism for being too narrow and not capable of tackling complex sustainability challenges (Støre-Valen & Buser, 2019). Prioritizing efficiency can lead to short-term gains at the expense of long-term resilience, limiting the potential for real change. Nielsen *et al.*, (2016) stated that a central limitation of this model is its reliance on metrics that overlook the wider impacts of facilities on social and ecological systems. For example, while better energy efficiency

might cut operational costs, it may not consider the lifecycle impacts of materials or the indirect effects of increased consumption (Islam *et al.*, 2021). This highlights a bigger issue in sustainability discussions, where efficiency is often mistaken for effectiveness, leading to a misalignment between performance metrics and environmental outcomes.

The organizational structure of facilities management reinforces some of the highlighted problems. Weerasinghe and Sandanayake (2017) stated that facilities management functions are often isolated in organizations, which limits chances for collaboration across different fields and integrated decision-making. This separation makes it harder to deal with interconnected challenges like climate adaptation and resource scarcity. Additionally, many facilities management contracts, especially in outsourced models, can create misaligned incentives that favour cost-cutting over sustainability goals (Zesach, 2025). Also, time considerations are also crucial in shaping facilities management practices. The focus on immediate results often discourages investments in long-term resilience and regenerative capacity. This is particularly concerning in the context of climate change, where effects build up over time and require proactive measures. As a result, traditional facilities management approaches tend to be reactive, addressing symptoms instead of the root causes.

4. Conceptualising Regenerative Facilities Management

Regenerative facilities management offers a new way of thinking about how buildings operate in harmony with natural and social systems. Adewale *et al.*, (2026) noted that this approach draws on ideas from regenerative development and ecological design. The concept focuses on creating positive effects instead of just reducing harm (Camrass, 2022). It pushes the boundaries of traditional facilities management by seeing buildings as active players in ecological and social processes. Also, regenerative facilities management involves changing both practices and viewpoints. It requires viewing facilities as parts of living systems where human actions and ecological processes influence each other (Pavez *et al.*, 2024). This view promotes using nature-based solutions, like green infrastructure and water-sensitive design, in facility operations. Also, the concept strives to not only improve environmental performance but also support wider ecosystem services, such as promoting biodiversity and regulating the climate (Kasina *et al.*, 2025). Another key part of regenerative facilities management is adopting circular economy principles. According to Onyia *et al.*, (2025), this means rethinking how resources flow within buildings to reduce waste and increase the reuse and regeneration of materials. These methods challenge the linear consumption models found in traditional practices and encourage

more sustainable resource use (Geissdoerfer *et al.*, 2017). Redefining performance metrics to reflect regenerative outcomes is equally important. Traditional indicators, like cost efficiency and service reliability, are joined by measures of ecological health, social value, and adaptive capacity. This calls for new evaluation frameworks that capture the diverse impacts of facilities management activities. Regenerative facilities management also requires a change in organizational culture and governance. It needs a move towards more collaborative and participatory methods, where stakeholders play a role in creating solutions (Kasina *et al.*, 2025). This aligns with broader trends in sustainability governance, which highlight the importance of inclusivity and shared responsibility.

4.1. A Socio-Ecological Transition Framework for Regenerative FM

The proposed socio-ecological transition framework builds on the Multi-Level Perspective to offer a clear way to shift from conventional to regenerative FM. It views this transition as a process of reconfiguring systems that includes changes in institutional arrangements, organizational practices, and technological systems. As shown in Figure 1, at the institutional level, the framework highlights the need for policies and regulations that support regenerative practices. This includes creating standards and guidelines that focus on long-term sustainability rather than short-term efficiency. Policy tools like incentives, subsidies, and performance-based regulations can play a vital role in making this transition happen. At the organizational level, the framework stresses the importance of including regenerative principles in strategic decision-making. This means aligning organizational goals with sustainability aims and

making these priorities part of daily operations. Building capacity and sharing knowledge are crucial for helping organizations gain the skills needed for regenerative FM. Technological innovation is another key factor in this transition. Digital tools like building information modelling and Internet of Things technologies can improve the monitoring and management of facilities, providing useful data for decision-making. However, the success of these technologies relies on their integration within a broader socio-ecological framework that focuses on regenerative outcomes. The framework also acknowledges how external factors can influence the transition. Landscape pressures such as climate change, economic shifts, and societal expectations create both challenges and opportunities for FM. By addressing these pressures, organizations can establish themselves as leaders in sustainability and resilience.

4.2. Implications for Policy and Practice

The move toward regenerative facilities management requires a significant change in both policy and practice. It calls for an intersection between regulations and decision-making processes. At the policy level, there is a need to shift from a focus on compliance to one that supports flexibility and performance. Traditional regulations in the built environment often focus on basic requirements for energy use and environmental rules. While these are important, they are not enough to drive regenerative practices. Policymakers should create regulations that encourage positive environmental outcomes and long-term resilience. Facilities should be assessed not just on how they reduce negative impacts but also on their ability to create ecological and social benefits. Furthermore, financial tools like tax breaks and subsidies can further

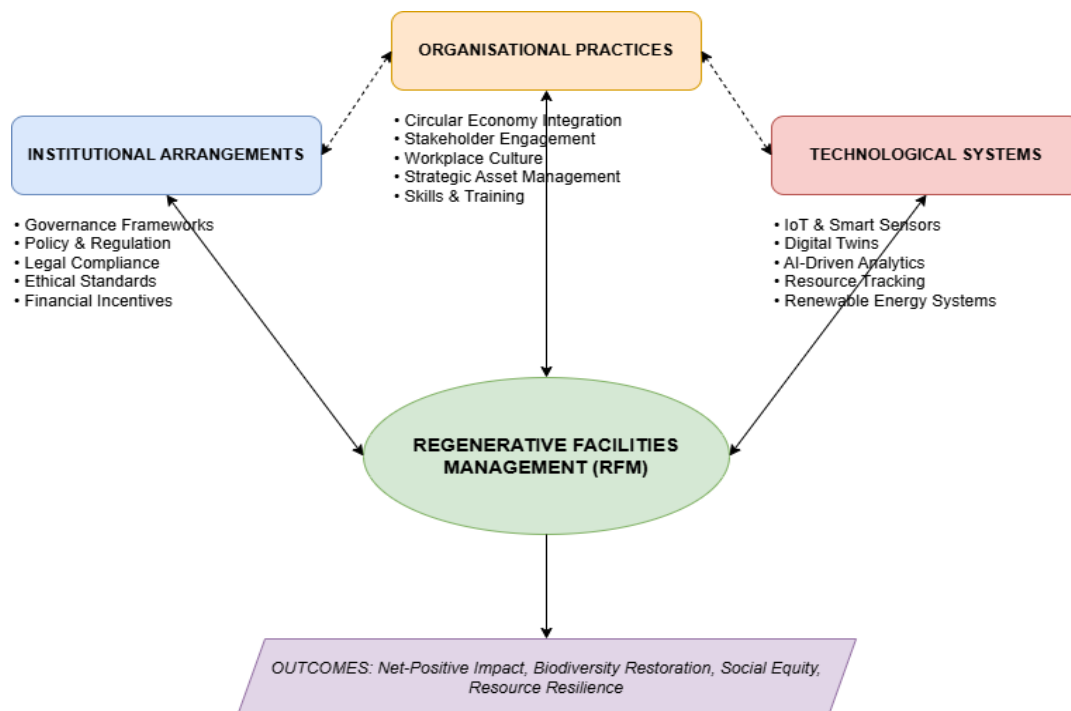


Figure 1: A Socio-Ecological Transition Framework for Regenerative FM

support the adoption of regenerative practices by lowering the perceived financial risks of long-term investments. These policy tools are especially important in developing countries, where funding limitations can hinder the use of innovative sustainable practices. Moreover, leadership from the public sector is essential, given its position as a major client and property owner in the built environment. Governments can use public procurement as a way to promote regenerative facilities management by adding sustainability criteria to bidding processes and service agreements. This involves including requirements for regenerative performance metrics and life-cycle impact evaluations in contracts. By doing this, public institutions can drive market changes and create a demand for regenerative solutions for facilities management.

From a governance perspective, this transition requires a more cooperative institutional drive. The complexity of social and environmental issues demands coordination across several policy areas, such as urban planning, environmental management, infrastructure, and economic policy. Fragmented governance systems often weaken sustainability efforts. Therefore, a more holistic approach is needed, one that supports collaboration across sectors and aligns goals at various decision-making levels. For professionals, this shift has major implications. Regenerative facilities management requires a change in job roles and strategies within organizations. Facilities managers need to go beyond their traditional tasks and engage more deeply with sustainability goals. This means employing systems thinking skills, which outlines the relationships between facility operations and ecological systems. This perspective allows for better decision-making that considers long-term effects and emerging risks. Moreover, integrating regenerative principles into an organization's strategy also means changing how to manage performance. Traditional metrics that focus on cost and reliability need to be supplemented with measures that assess ecological recovery and climate resilience. This calls for new evaluation frameworks and data systems that can handle complex, often unpredictable outcomes. Digital tools like building information modeling and advanced analytics can aid this transition by offering immediate insights into facility performance, but their use must have a clear goal of promoting regeneration to avoid reinforcing a narrow focus on efficiency.

References

- Adewale, B. A., Ogunbayo, B. F., & Aigbavboa, C. O. (2026), *Regenerative Principles in Facilities Design and Urban Re-modeling in Developing Countries*. London: Taylor & Francis.
- Amini-Philips, A., Ibrahim, A. K., & Eyinade, W. (2020), 'Proposed evolutionary model for global facility management practices', *International Journal of Advanced Multidisciplinary Research and Studies*, 1(5), pp. 180-95.

5. Conclusion

This study has advanced the discourse on facilities management by critically interrogating the limitations of an efficiency-driven paradigm and proposing a transition toward a regenerative, socio-ecological model. By placing facilities management within the framework of sustainability transitions and using the Multi-Level Perspective, the study shows that real change in the built environment needs systemic change instead of incremental optimisation. The current facilities management system, which emphasizes operational performance, is increasingly becoming outdated with urgency of today's environmental and social challenges. The socio-ecological transition framework developed in the study offers a way to rethink facilities management practices at institutional, organizational, and technological levels. It underscores the need to connect specialised innovations with broader pressures to enable system change. This framework positions regenerative facilities management not as an optional concept but as a necessary evolution of the discipline in response to global sustainability needs. A key contribution of this study is its rethinking of performance in facilities management. By going beyond traditional efficiency measures, the research highlights the importance of assessing facilities based on their ability to produce positive ecological and social outcomes. This change in how performance is viewed carries significant implications. It challenges long-held beliefs about value creation and calls for new measures and governance methods. The study also emphasizes the need for integrating different fields to tackle complex socio-ecological issues. Facilities management inherently connects with various areas, including engineering, environmental science, economics, and social policy. A regenerative approach requires blending these viewpoints to enable more comprehensive and flexible responses to new risks and opportunities. This interdisciplinary focus is especially important in the face of climate change, where the effects are diverse and interconnected.

- Atkin, B., & Brooks, A. (2021), *Total facility management*. 5th Edition, Wiley Blackwell.
- Bröchner, J., Haugen, T., & Lindkvist, C. (2019), 'Shaping tomorrow's facilities management', *Facilities*, 37(7-8), pp. 366-380.
- Camrass, K. (2022), 'Urban regenerative thinking and practice: a systematic literature review', *Building Research & Information*, 50(3), pp. 339-350.
- Geels, F. W. (2011), 'The multi-level perspective on sustainability transitions: Responses to seven criticisms', *Environmental Innovation and Societal Transitions*, 1(1), pp. 24-40.
- Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017), 'The Circular Economy—A new sustainability paradigm?', *Journal of Cleaner Production*, 143, pp. 757-768.
- Ikuabe, M. O., Aigbavboa, C., Anumba, C., & Oke, A. E. (2025), 'Structural determinants of the uptake of cyber-physical systems for facilities management—a confirmatory factor analysis approach', *Smart and Sustainable Built Environment*, 14(5), pp. 1591-1607.
- Ikuabe, M., Aigbavboa, C., Anumba, C., & Oke, A. (2023), 'Business Environment Factors Influencing the Use of Cyber-Physical Systems for Facilities Management—A Confirmatory Factor Analysis Approach', *Journal of Green Building*, 18(1), pp. 169-188.
- Islam, R., Nazifa, T. H., & Mohamed, S. F. (2021), 'Evaluation of facilities management sustainable parameters for improving operational efficiency', *International Journal of Construction Management*, 21(5), pp. 538-554.
- Karanasios, K. (2026), 'Sustainable facilities management: a sociotechnical system perspective and a review of the literature', *Journal of Facilities Management*, 24(1), pp. 21-61.
- Kasina, T., Salling, S. T., & Perez, C. T. (2025), 'Integration of regenerative building design into construction management', In *Journal of Physics: Conference Series*, 3140 (17), pp. 172001 IOP Publishing.
- Markard, J., & Truffer, B. (2008), 'Technological innovation systems and the multi-level perspective: Towards an integrated framework', *Research Policy*, 37(4), pp. 596-615.
- Nielsen, S. B., Sarasoja, A. L., & Galamba, K. R. (2016), 'Sustainability in facilities management: an overview of current research', *Facilities*, 34(9-10), pp. 535-563.
- Onyia, U., Awuzie, B., Ikuabe, M., & Obi, L. I. (2025), 'Circular procurement implementation barriers in the construction industry of developing economies: a quantitative analysis', *Engineering, Construction and Architectural Management*, 32(13), pp. 319-335.
- Pavez, F., Maxwell, D., & Bunster, V. (2024), 'Towards a Regenerative Design Project Delivery Workflow: A Critical Review', *Sustainability*, 16(13), pp. 5377.
- Store-Valen, M., & Buser, M. (2019), 'Implementing sustainable facility management: Challenges and barriers encountered by Scandinavian FM practitioners', *Facilities*, 37(9-10), pp. 550-570.
- Weerasinghe, R. P. N. P., & Sandanayake, Y. G. (2017), 'Collaborative facilities management model: Sri Lankan perspective', *Built Environment Project and Asset Management*, 7(3), pp. 284-299.
- World Health Organization, UNEP United Nations Environment Programme, & World Organisation for Animal Health. (2022), 'One health joint plan of action (2022–2026): working together for the health of humans, animals, plants and the environment', World Health Organization.
- Zesach, J. (2025), 'How to structure next-gen contracts and deals: A corporate real estate and integrated facilities management perspective'. *Corporate Real Estate Journal*, 14(3), pp. 222-233