Roadmap to Sustainable Cities: *Embedding the Synergy of Sustainable Project Management and Renewable Energy Approaches*

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Abstract

Although having lot of potential for renewable energy in various developing countries, still there are number of cities seemed majorly dependent on the various fossil fuels. This practice of being dependent on fossil fuel usually leads them to be more exposed to the climate challenges. This study is aimed to observe the integration of the Sustainable Practices in the conventional Project Management for bringing better governance and project delivery approach. The study focuses on the case of Karachi with some global comparisons of certain cities where the best practices have been adopted. For the purpose, the informed theoretical framework known for sustainable approaches was adopted for this study. These were the theories of Triple Bottom Line, Inclusive Stakeholder, Institutional Theory backed with the academic and professional PMI-GPM P5 standard and PRiSM methodology. Moreover, it is further grounded in a Qualitative study of peer-reviewed literature, institutional reports, widely accepted sustainability indexes of authentic sources, longitudinal data on the energy, and emissions trajectory of the Karachi as the Developing City. Results of the study reflect that the inadequate institutional coordination with fragmented governance, lack of stakeholder cohesion and inconsistent compliance of the policies at various levels are the precursors greatly contributing to insufficient adaptability of the renewable energy. Renewable contribution demonstrates just 5% out of total urban energy mix of Karachi. Looking at the ARCADIS index and relevant literature, a global comparison was also made to lighten up the understanding on integrated sustainable methods.The study provides the basic sense of direction for urban planners, project managers and especially for policymakers aiming for sustainable urban development with broader climate goals. Further, the findings support the targets of UN-SDG 11 referring Sustainable Cities and Communities leading to bring a sustainable impact.

Keywords: Sustainability, Sustainable Cities, UN-SDG 11, Sustainable Project Management, Renewable Energy, Urban Development, Governance, Karachi, Developing Cities, Greenhouse Gas (GHG), Urban Heat Island (UHI).

Introduction

Cities are believed as the centres of opportunities influencing the patterns of economic and social transformations in current scenario. Simultaneously, the increased population influx associated with urbanization has brought certain challenges. Though the cities usually seemed as the core source of the innovative career and business opportunities yet this rapid urbanization has intensified the associated climate vulnerability as well. These challenges have brought the urge to dive in the causes and seek possible rebuttals to address the prevailing apprehensions.

The attention on development of *Sustainabale Cities* has got the place amongst top primacies in recent years. United Nations Sustainable Development Goal 11 seeks inclusive, safe, resilient cities with sustainable approaches. Still the implementation of this sustainable goal is not achieved the required soulful meaning in the global south. This study reiterates the need of bringing sustainability in practice throughout the processes, because the uneven management has led urban development increasingly vulnerable climatic risks like carbon insensitive practices.

Most of the formal practices of the project management specify the focus on its core triple constraints and usually oversight the need of resilient and sustainable practices. So, this study describes *Sustainable Project Management* as the realistic yet impactful response. This response actually emphasizes to integrated sustainable methods with holistic approach in complete lifecycle of the project. This continuous influence throughout the processes keeps the projects on track with the required sustainability objectives without losing the intended business goals. Moreover, in recent years, the theoretical development and empirical implementation by the widely accepted regulatory organizations like Project Management Institute (PMI) Pennsylvania, USA and Green Project Management (GPM) Detroit, USA with their global presence have caused an increased acceptance within the fraternity also.

Karachi having more than 20 million population of the city, consumes a lot of energy and leaves a considerable carbon foot print by emitting a lot of greenhouse gases because of majorly dependent on the fossil fuel (Habib & Javid, 2022). Concurrently, the proximity of the one of the major wind corridors of the region and high solar irradiance is making the city with substantial potential of the renewable energy too. Carbon emissions in Pakistan surged intensely during 1997 to 2017, worryingly depending on fossil fuels caused by the industrial growth, and swift urban motorization with major contribution from Karachi (Javid & Khan, 2020; Rehman & Rashid, 2021). Studies reveal that the significant increase of the private vehicles has worked as catalyst in negatively impacting the air quality in the city (Ghauri et al., 2021). So, the Karachi remains a focal case, however the study compares local findings with broader international experiences, drawing applicable insights from cities indexed in the list of the *Sustainable Cities* like Copenhagen, Freiburg, and Singapore.

Further, study reflects on how the governance and delivery framework could be embeded with sustainability practices throughout the project lifecycle for urban development projects. To strengthen the claim, it explores how integrating renewable energy approaches can contribute to climate resilience and reduced fossil-fuel dependence in the *Developing Cities*.

An increased use of renewable energy has also been seen in recent years in Karachi coupled with enhanced utilization of the wind corridor in Sindh i.e. Gharo-Jhampir (Anwar & Bhittai, 2022). But still the major part of the electricity generation is dependent on fossil fuel which reflects 90% of the total. (Shah & Solangi 2022; Youaf et al., 2021). Inconsistent policy compliance due to fragmented governance and lack of proper accountability and transparency models makes it persistent prevailence of the gaps in rebutting the climate challenges and integrating the renewable energy sources (Mehmood & Shah, 2022; Van der Waldt, 2022).

The derived information from the data has brought in the understanding on current practices of the dependency on the fossil fuel in contrast to the use of the renewable energy sources in the country, particularly referring to the Karachi. The study elaborates that through the assurance of the pre-requisites of the Sustainable Cities there are enhanced chances of reduction in greenhouse gas emmissions and improved utilization of the renewable energy sources. Futher more, the study responds to the research questions describing that consumption of fossil fuel is directly proportional to the consequences of climate change especially Urban Heat Island (UHI). So, the switching on the sustainable replacements could be the sensible direction to address the prevailing climate issues. Karachi has been showing the enhanced exposure carbon foot prints mainly because of the increased consumption of the fossil fuel.

Globally the Sustainable Cities are systematically associated with technologies including low-carbon transportation, renewable energy adding, circular economy, and green infrastructure (Mok & Wang, 2021; Sorensen & Jacobsen, 2020). Freiburg in Germany is a model for the paradigm shift to solar energy and participatory governance, while Singapore details how compact urban design and advanced waste management improves ecological footprints in positive direction addressing the climatic challenges while preserving high living values (Zhao et al., 2023; UN-Habitat, 2022). Whereas, in South Asian region, this to sustainable cities has been slower and more scattered. Urbanization in Delhi, Dhaka, Colombo, and Karachi has witnessed gaps in institutional capacity building resulting in inefficient energy consumption, inadequate infrastructure, and growing socioeconomic inequality (Bhowmik et al., 2023; Kumar & Choudhary, 2023).

Addressing global climate change and local energy insecurity requires a shift from fossil fuels to renewable energy (IPCC, 2022; World Bank, 2022). Coal, crude oil, and natural gas are the world's principal energy sources, but their finite nature, rising costs, and environmental impacts make alternatives urgent (Nawaz & Solangi, 2021; Khan & Raza, 2023).

Freiburg and Copenhagen show how urban projects can integrate energy transitions with sustainability aims. These global lessons emphasize governance, innovation, and community engagement in renewable energy adoption (Lehtonen & Niemi, 2020; Kalyan & Wiek, 2021).

Financial, institutional, and infrastructural barriers have slowed renewable energy adoption in South Asia. Pakistan relies significantly on fossil fuels, with renewable sources making up less than 5% of its energy mix (Anwar & Bhatti, 2022; Shah & Solangi, 2022). India and Bangladesh have launched large-scale solar and wind projects. Despite its solar irradiation of 5.5 kWh/m²/day and closeness to the Gharo–Jhimpir wind corridor, Karachi relies on fossil fuels, generating over 90% of its electricity from thermal plants (Habib & Javid, 2022; Yousaf et al., 2021).

Statement of the Problem

Urban development in rapidly growing cities poses both opportunities and risks for sustainability. Karachi, as Pakistan's largest metropolitan hub, illustrates this tension acutely. While the city drives national economic growth, it also suffers from severe energy insecurity, air pollution, greenhouse gas emissions, and climate vulnerabilities (Shaikh et al., 2023; Habib & Javid, 2022). Despite having some of South Asia's most promising renewable resources including solar and wind corridors Karachi continues to depend on fossil fuels for over 90% of its electricity generation (Anwar & Bhatti, 2022; Shah & Solangi, 2022).

The problem lies in the persistent gap between potential and practice: abundant renewable resources remain underutilized due to fragmented governance, weak institutional accountability, and limited integration of sustainability into project planning (Mehmood & Shah, 2022; Van der Waldt, 2022). Conventional project management approaches prioritize short-term outputs time, cost, and scope while neglecting broader sustainability imperatives (Silvius & Schipper, 2020; Hussain & Rehman, 2023). This misalignment risks locking Karachi into unsustainable development trajectories that exacerbate climate risks and socio-economic inequities.

Significance of the study

From a theoretical perspective, it contributes to sustainability scholarship by advancing the integration of multiple frameworks, Triple Bottom Line (TBL), Stakeholder Theory, Institutional Theory, GPM P5 Standard, and PRiSM methodology into a unified analytical lens tailored to the realities of developing cities. While prior research has often applied these models in isolation, their combined application in the context of urban sustainability and renewable energy adoption remains underexplored (Silvius & Schipper, 2020; Mahajan et al., 2023; Mishra & Pandey, 2025). This study therefore bridges a conceptual gap by demonstrating how these theories can collectively inform Sustainable Project Management (SPM) in urban development.

From a practical perspective, the research highlights how SPM can transform urban project management by redefining project success criteria. Instead of focusing narrowly on cost, time, and scope, it reframes success to encompass environmental resilience, social inclusivity, stakeholder collaboration, and lifecycle prosperity (Voegtlin et al., 2022; Wang et al., 2022). In doing so, it offers a governance-oriented approach that can strengthen accountability, foster systemic planning, and align urban development with long-term sustainability objectives.

For Karachi, the findings provide timely insights for policymakers, urban planners, and project managers operating in a rapidly urbanizing and climate-vulnerable environment. By addressing weak governance structures, fragmented institutions, and underutilized renewable energy resources, this study demonstrates how embedding SPM principles can improve climate resilience, reduce dependence on fossil fuels, and advance social equity. Furthermore, it situates Karachi's urban transition within the broader global agenda, aligning with the Paris Agreement, SDG-11 (Sustainable Cities and Communities), and SDG-13 (Climate Action) (UN-Habitat, 2022; IEA, 2022).

Objectives of the Study

1. To assess how Sustainable Project Management approaches can be practical in urban development projects to improve sustainability
2. To evaluate the barriers and enablers of renewable energy integration in the *Developing Cities*
3. To analyse how embedding Sustainable Project Management practices in Urban Projects can contribute a roadmap to the *Sustainable Cities*

Research Questions

1. How Sustainable Project Management approaches can be practical in urban development projects to improve sustainability
2. What are the barriers and enablers of renewable energy integration in the *Developing Cities*
3. To analyse how embedding Sustainable Project Management practices in Urban Projects can contribute a roadmap to the *Sustainable Cities*

Literature Review

This chapter synthesizes key debates and recent scholarship to highlight the relevance of *Sustainable Project Management* in the *Developing Cities*, situating Karachi as a critical case. Through organizing the review on urban sustainability, project management, and renewable energy adoption, it develops the conceptual foundation and establishes the research gap.

Urbanization and Sustainability Challenges in the Developing Cities

The rapid expansion of cities across the Global South has intensified pressures on infrastructure, energy, and the environment. Urbanization in these contexts is often unplanned and under-regulated, leading to resource inefficiencies, informal settlements, poor waste management, and escalating carbon emissions (UN-Habitat, 2022; Seto et al., 2023). Karachi faces an augment trajectory outstripping service delivery and contributing to severe air pollution, traffic congestion, and urban heat island (UHI) effects (Rahman et al., 2022; Qureshi & Lu, 2023). While global discourses emphasize that sustainable cities must balance economic viability, environmental resilience, and social inclusivity. Most of the *Developing Cities* remain focused into short-term growth models that neglect long-term sustainability (World Bank, 2021; Acuto et al., 2022).

Transitioning to renewable energy is increasingly recognized as central to urban sustainability. Global exemplars demonstrate that how integrated renewable strategies supported by participatory governance and stable policy frameworks can accelerate decarbonization and urban resilience (IEA, 2022; Sovacool et al., 2023). In contrast, Karachi despite its favorable geography, with solar irradiance exceeding 5.5 kWh/m²/day and proximity to the wind corridor, still remains heavily fossil fuel dependent. The city only contributes less than 5% of its electricity mix at renewables (Raza et al., 2022).

Early frameworks emphasized the Triple Bottom Line (TBL) of sustainability, People, Planet, and Profit, to balance social equity, environmental resilience, and economic viability (Elkington, 1997). Contemporary research, however, stresses that these dimensions cannot be treated in isolation, they also require integrated governance, technological innovation, and community engagement (Ameen et al., 2023; Fainstein, 2022). Global comparative catalogues such as the *Arcadis Sustainable Cities Index* (2016, 2022) demonstrate that the most sustainable cities e.g., Zurich, London, and Singapore excel by balancing all three pillars (TBL) of sustainability rather than over-prioritizing one dimension.

Studied and Identified Research Gaps

Sustainable urban development and renewable energy adoption are mostly studied in European and East Asian cities like Copenhagen, Freiburg, and Singapore (Beatley & Newman, 2020; Yuen, 2021). Few studies on South Asian cities are analytically rigorous (Qureshi & Lu, 2007; Shaikh et al., 2023). Thus, Karachi, a megacity with energy shortfalls, fragmented governance, and climate susceptibility, is underrepresented in global sustainability dialogues (Rahman et al., 2022; Raza, 2022). This disparity limits global frameworks and emphasizes the need for context-sensitive research for localities with limited institutional capabilities.

Urban sustainability evaluations often neglect local climate stressors like urban heat island effects, flooding risks, and declining air quality in favor of energy efficiency and emissions reduction (Li et al., 2020; Santamouris, 2021). Urban morphology, transit infrastructure, and construction practices of the Karachi exacerbate these difficulties, yet there is little research on how *Sustainable Project Management* can mitigate these consequences. *Sustainable Project Management* techniques need to be linked in projects to understand climate resilience metrics to address this gap.

This study shows how *Sustainable Project Management* is integrated into urban development projects, filling gaps in theory and practice. This method boosts renewable energy adoption and climate resilience in Karachi, a city indicative of the rapid urbanization having prominence in the global south.

Research Methodology. Qualitative, interpretivist approach has been employed by integrating secondary data analysis with a theoretical framework–driven analysis, allowing a complete examination of urban sustainability challenges and renewable energy transition of the Karachi. Qualitative review in the study permits the researcher to discover emerging concepts, interpret meanings, and connect findings to contextual realities (Creswell, 2014; Yin, 2021).

Core features include:

(a) Triangulation of Secondary Data: Academic literature, institutional reports, sustainability indexes, and prior empirical datasets were combined to strengthen reliability.
(b) Integration with Prior Research: Earlier literature data on emissions and energy trends of Karachi, revisited and incorporated past data to modern investigation.
(c) Comparative lens: The situation of Karachi is understood against global exemplars (e.g., Copenhagen, Singapore, Freiburg, Curitiba) to contextualize its recital within international sustainability courses.

This hybrid analytical approach ensures a structured alignment between theory and empirical patterns, enhancing both internal rigor and external validity (Baxter & Jack, 2022

Theoretical Underpinning

This study assimilates five perspectives Triple Bottom Line (TBL), Stakeholder Theory, Institutional Theory, the GPM P5 Standard, and the PRiSM methodology to support *Sustainable Project Management* referring its conceptual lens and the practical mechanism for embedding sustainability into urban development projects.

The Triple Bottom Line (TBL) framework emphasizes balancing economic viability, social equity, and environmental stewardship in pursuit of long-term sustainability (Elkington, 1997). Although widely applied, recent studies suggest that in developing cities the TBL is often reduced to symbolic reporting, with economic priorities overshadowing social and environmental concerns (Mishra & Pandey, 2025; Wang et al., 2022).

Stakeholder Theory highlights the importance of inclusive engagement and shared accountability in shaping project outcomes (Freeman, 1984). Urban development involves multiple actors public agencies, private developers, civil society, and communities whose participation influences project legitimacy and social alignment. Evidence indicates that limited stakeholder engagement, as seen in Karachi's predominantly top-down planning practices, contributes to inequitable service delivery and weak ownership of sustainability initiatives (Mahajan et al., 2023; Saleem et al., 2020).

Institutional Theory explains how formal regulations, governance structures, and norms influence sustainability adoption (DiMaggio & Powell, 1983). In Developing Cities, institutional fragmentation and weak enforcement often hinder implementation, even where sustainability policies exist (Voegtlin et al., 2022).

The GPM P5 Standard and PRiSM methodology translate sustainability principles into project practice. The P5 framework expands evaluation beyond time, cost, and scope to include people, planet, prosperity, process, and product, enabling assessment of long-term systemic impacts (Marques et al., 2023). PRiSM operationalizes sustainability by embedding environmental and social performance indicators across the project lifecycle (Silvius & Schipper, 2020).

Comparative Analysis from Global Cities and Convenient Adaptabilities for Karachi

The research has studied the case studies from Copenhagen, Singapore, Curitiba, Freiburg, and Masdar City which illustrate different governance, cultural, and institutional contexts shaoing the roadmap to sustainablele cities. These cities have demonstrated certain most relevant ingredients which actually caused them to be part of the sustainable cities index. These were coordinated governance, strategic land utilization, investment in public transit, and the adoption of renewable energy can significantly improve urban living and reduce environmental impacts (UN-Habitat, 2022).

The determination of the Copenhagen to become the first carbon-neutral city by 2025 demonstrates how policy consistency, long-term planning, and strong public–private collaborations can enable integrated urban sustainability (UN-Habitat, 2022).

Singapore signifies a model of smart and sustainable urbanism where technology is effectively aligned with governance. Initiatives such as the Green Mark Scheme and the SolarNova programme have expanded energy efficiency and renewable adoption across public infrastructure (Yuen, 2021). Experience of Singapore underscores the importance of strong regulatory frameworks, institutional capacity, and transparent monitoring and evaluation elements.

Bus Rapid Transit (BRT) system in Curitiba demonstrates how lifecycle planning, stakeholder participation, and social equity can be implanted within large-scale infrastructure projects (Suzuki et al., 2013). Deliberately balancing environmental, economic, and social objectives, Curitiba operationalised the Triple Bottom Line.

Freiburg, a success as having "solar capital" of Europe reflects not only technological adoption but also strong community engagement and grassroots participation (Beatley & Newman, 2020). Policies promoting solar rooftops and sustainable construction gained legitimacy through co-creation with citizens, reinforcing stakeholder theory on inclusive ownership.

Masdar City in the UAE illustrates the boundaries of top-down sustainability models. Despite advances in renewable energy and smart grids, critiques highlight issues of scalability, affordability, and social addition (Reiche, 2010; Cugurullo, 2020).

The comparative analysis highlights several transferable lessons from these studied cases different cities of the world. These lessons allows to replicate certain approaches in the context of Karachi. Here are the details:

COPENHAGEN: Governance Consistency → Karachi must overcome institutional fragmentation by aligning agencies around integrated sustainability targets.

FREIBURG: Stakeholder Inclusivity → Community participation develops ownership, enhances legitimacy, and fosters renewable adoption.

SINGAPORE: Institutional Capability and Policy Administration → Robust monitoring systems and evaluation mechanisms are critical for scaling renewable adoption and exactly similar to the adaptation of Sustainability in Practice in Project Management.

MASDAR: Context-Sensitive Motivation → Sustainability models must be tailored to socio-economic and cultural landscape of Karachi rather than imported comprehension.

CURITIBA: Cost-Effective Approach → Low-cost, socially equitable solutions such as BRT and Electric Commercial Vehicles can provide scalable sustainability gains in resource-constrained contexts.

Studied Variables:

- Independent Variable:
  - Urban Sustainability Practices
  - Sustainable Project Management
- Dependent Variables:
  - Greenhouse Gas (GHG) Emissions
  - Renewable Energy Utilization

Data Sources

Data sources include peer-reviewed journal from scopus, WoS, and Google Scholar shaped the theoretical foundation of the study. These sources provided insights into global Sustainable Project Management practices, renewable adoption barriers, and sustainability frameworks. Reports from the World Bank (2021, 2022), UN-Habitat (2022), International Energy Agency (IEA, 2022), European Union (EU), World Bank World Development Indicators, and the ARCADIS Sustainable Cities Index (SCI) (Arcadis, 2022) were used to contextualize Karachi within global sustainability benchmarks. These were further backed by the National-level reports, including JICA (2021).

Limitations of the Methodology

The study acknowledges certain limitations:

- Reliance on secondary data restricts the ability to generate primary empirical insights.
- Case focus on Karachi may limit generalizability.
- Some institutional reports (e.g., energy statistics) may not fully capture 2025 realities due to reporting lags.

Despite these limitations, the triangulation of multiple data sources and the application of a robust theoretical framework enhance the validity and reliability of findings.

Discussion and Analysis

The conclusions propose *Sustainable Project Management* and Renewable Energy integration in urban development of Karachi with systematic governance. Institutional fragmentation, poor inter-agency cooperation, and short-term project planning restrict renewable implementation despite solar and wind potential.

Conventional Project Management in the urban development projects of the Karachi mostly inclined to the practices focused on quality delivery of the triple constraints rather than emphasizing on the sustainability inclusion. In contrast to the Karachi, the sustainable cities leading on the global index are influenced by the targets of the sustainability which ultimately leaves productive impact on the outcomes of the projects as well.

Sustainable Cities further requires persistent adaptability to the sustainable practices so study supports the core idea of incorporating the sustainability approaches throughout the project life cycle complying the essence of PMI-GPM P5 Standard and PRiSM Methodology. Every performance domain of the Project Management described by the PMI should integrate the sustainability in practice which definitely would lead to bring the sustainable results. Whereas, renewable energy projects in Karachi are often planned with lesser community cohesiveness which sometimes damaging public trust and long-term viability. So, study refers that the stakeholder theory enhances the ownership of the key opinion leaders of community to keep the results more sustainable. Results brings the attention to the fragmented governance which can negatively affect the assurance of the sustainable development, because without an appropriate accountability and transparency, the desired sustainable results could be exposed to compromised outcomes.

Conclusion and Recommendation

The findings of the study reflect that the technical or resource constraints are not the only precursors in Karachi, which caused a high dependency on fossil fuel, but actually institutional, governance, and project management issues evidently hinder sustainability policy compliance.

For facilitating the adaptability of bringing *"Sustainability in Practice"* the study supports the integration of sustainable approach during all the 5 focus areas and performance domains of the project management by keeping the gist of *Sustainable Project Management*. This adaptability of sustainability practice in urban development projects along with community engagement backed with the good governance would certainly create a roadmap to the sustainable cities. Moreover, renewable energy integration will synergize the impact while addressing the phenomenon of climate action for a resilient environment complying the philosophy of triple bottom line theory. Through anchoring this approach in local data and international experience, the study has gone beyond descriptive analysis by giving a realistic path for implementation in the *Developing Cities*. Eventually, the cities can be resilient, inclusive, and will be able to report low-carbon emission.

References

Acuto, M., Parnell, S., & Seto, K. C. (2022). Building a global urban science. *Nature Sustainability, 5*(6), 487–496.

ADB. (2021). *Sri Lanka energy sector assessment, strategy, and road map*. Asian Development Bank.

Ahern, J. (2011). From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world. *Landscape and Urban Planning, 100*(4), 341–343.

Ahern, J. (2013). Urban landscape sustainability and resilience: The promise and challenges of integrating ecology with urban planning and design. *Landscape Ecology, 28*(6), 1203–1212.

Ahmadi, H. B., Nilashi, M., & Samad, S. (2022). Sustainable project management practices and their impact on organizational sustainability. *Journal of Cleaner Production, 367*, 133003.

Alawneh, R., Ghazali, F., Ali, H., & Sadullah, A. F. M. (2019). A novel framework for integrating sustainability into project management processes. *Sustainable Cities and Society, 49*, 101587.

Ali, M., & Bano, S. (2020). Urban energy transitions in Pakistan: Challenges and opportunities. *Energy Policy, 142*, 111518.

Arcadis. (2016). *Sustainable cities index 2016*. Arcadis.

Arcadis. (2022). *Sustainable cities index 2022*. Arcadis.

Arto, I., & Dietzenbacher, E. (2014). Drivers of growth in global greenhouse gas emissions. *Environmental Science & Technology, 48*(10), 5388–5394.

Bajzelj, B., Allwood, J., & Cullen, J. (2013). Designing climate change mitigation plans that add up. *Environmental Science & Technology, 47*(14), 8062–8069.

Bakhtiari, S. (2014). Risk management: A powerful instrument for sustainable development. *OIDA International Journal of Sustainable Development, 7*(4), 95–104.

Beatley, T., & Newman, P. (2020). Biophilic cities are sustainable, resilient cities. *Sustainability, 12*(6), 2345.

Benson, E., & Craig, R. (2014). The green building revolution: Economic and environmental implications. *Journal of Environmental Planning and Management, 57*(9), 1451–1471.

Berger, M. (2014). The unsustainable city. *Sustainability, 6*(1), 365–374.

Bibri, S. E., & Krogstie, J. (2020). Smart sustainable cities of the future: An extensive interdisciplinary literature review. *Sustainable Cities and Society, 31*, 183–212.

Blassingame, L. (1998). Sustainable cities: Oxymoron, utopia, or inevitability? *The Social Science Journal, 35*(1), 1–13.

Breuste, J., Qureshi, S., & Li, J. (2010). Scaling urban sustainability: Comparing European and Chinese cities. *Ecological Indicators, 10*(1), 107–114.

Carvalho, M. M., & Rabechini, R. (2015). Impact of sustainability on project success: A multi-case study. *International Journal of Project Management, 33*(6), 1137–1152.

Carvalho, M. M., & Rabechini, R. (2017). Can project sustainability management impact project success? *International Journal of Project Management, 35*(6), 1120–1132.

Chan, A. P. C., Darko, A., & Ameyaw, E. E. (2017). Strategies for promoting green building technologies adoption in developing countries. *Building and Environment, 125*, 438–449.

Chandler, D. (2014). *Resilience: The governance of complexity*. Routledge.

Dahl, A. L. (2014). Achievements and gaps in indicators for sustainability. *Ecological Indicators, 17*, 14–19.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality. *American Sociological Review, 48*(2), 147–160.

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Capstone.

Fainstein, S. S. (2022). Resilience and justice in the city. *Urban Studies, 59*(4), 703–720.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Freeman, R. E. (1984). Stakeholder theory and organizational strategy. *California Management Review, 26*(2), 1–23.

Fuenfschilling, L., & Truffer, B. (2016). The interplay of institutions, actors, and technologies in socio-technical systems. *Research Policy, 45*(8), 1493–1506.

Gareis, R., Huemann, M., & Martinuzzi, A. (2013). Relating sustainable development and project management. *International Journal of Project Management, 31*(2), 275–288.

Güney, T. (2021). Renewable energy, non-renewable energy and sustainable development. *International Journal of Sustainable Development & World Ecology, 28*(1), 1–9.

Hasan, A., & Raza, M. (2021). Urban planning practices, spatial inequities, and sustainability in Karachi. *Environment and Urbanization Asia, 12*(2), 197–216.

Hoornweg, D., Hosseini, M., Kennedy, C., & Behdadi, A. (2015). An urban approach to planetary boundaries. *Ambio, 45*(5), 567–580.

Hoornweg, D., & Pope, K. (2017). Population predictions for the world's largest cities in the 21st century. *Environment and Urbanization, 29*(1), 195–216.

IEA. (2021). *World energy outlook 2021*. International Energy Agency.

IEA. (2022). *Renewable energy in cities: Global outlook*. International Energy Agency.

IEA. (2022). *World energy outlook 2022*. International Energy Agency.

IPCC. (2022). *Climate change 2022: Mitigation of climate change*. Cambridge University Press.

IRENA. (2023). *Renewable energy and cities*. International Renewable Energy Agency.

Javed, S. A., & Farooq, M. (2021). Renewable energy in Pakistan: Status and prospects. *Renewable and Sustainable Energy Reviews, 148*, 111313.

JICA. (2021). *Karachi urban transport study*. Japan International Cooperation Agency.

Khan, K., Silvius, G., & Tharp, J. (2023). Embedding sustainability in project management education and practice. *Sustainability, 15*(2), 985.

Kumar, P., Druckman, A., Gallagher, J., & Gatersleben, B. (2022). Urban form and sustainable energy transitions. *Renewable and Sustainable Energy Reviews, 153*, 111754.

Li, Y., Chen, H., & Zhang, S. (2021). Integrating urban planning with renewable energy development. *Renewable Energy, 177*, 122–133.

Mahajan, R., Goyal, M., & Yadav, S. (2023). Stakeholder engagement in sustainable project management. *Journal of Cleaner Production, 412*, 137352.

Marques, G., Cruz, C. O., & Oliveira, M. J. (2023). The GPM P5 standard: A global approach to project sustainability. *International Journal of Project Management, 41*(1), 15–29.

Mebratu, D. (1998). Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review, 18*(6), 493–520.

NEPRA. (2020). *State of industry report 2020*. National Electric Power Regulatory Authority.

Phuangpornpitak, N., & Tia, S. (2013). Opportunities and challenges of integrating renewable energy in smart grid systems. *Energy Procedia, 34*, 282–290.

Qureshi, A., & Huapu, L. (2007). Urban transport and sustainable transportation strategies: A case study of Karachi. *Tsinghua Science and Technology, 12*(3), 309–317.

Rahman, H., Rehman, S., & Qureshi, M. (2022). Urban heat islands and green space dynamics in Karachi. *Environmental Research Letters, 17*(4), 045001.

Rahman, M., Shaikh, S., & Ahmed, S. (2022). Urban heat islands and sustainability challenges in South Asian megacities. *Sustainable Cities and Society, 86*, 104158.

Raza, S. H., Khan, M., & Hussain, F. (2022). Renewable energy adoption in Pakistan: Barriers and opportunities. *Energy Policy, 160*, 112674.

Rehman, S., Ali, S., & Hussain, Z. (2022). Assessing solar potential in Sindh region. *Energy Reports, 8*, 4289–4302.

Saleem, M., Rehman, A. U., & Malik, R. (2020). Institutional challenges in sustainable energy transition: Evidence from Pakistan. *Energy Policy, 137*, 111120.

Seto, K. C., Güneralp, B., & Hutyra, L. R. (2023). Global forecasts of urban expansion. *Proceedings of the National Academy of Sciences, 120*(7), e2209879120.

Sheikh, M. A. (2010). Energy and renewable energy scenario of Pakistan. *Renewable and Sustainable Energy Reviews, 14*(1), 354–363.

Silvius, G., & Schipper, R. (2020). *Sustainability in project management*. Routledge.

Sovacool, B. K., Axsen, J., & Sorrell, S. (2023). Promoting novelty, rigor, and transparency in energy transitions research. *Energy Research & Social Science, 99*, 103054.

UNEP. (2023). *Pathways to sustainable cities: Energy and climate action*. United Nations Environment Programme.

UN-Habitat. (2022). *World cities report 2022*. United Nations Human Settlements Programme.

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.

Voegtlin, C., Scherer, A. G., & Hawn, O. (2022). Global governance in a sustainability context. *Business & Society, 61*(5), 1083–1120.

World Bank. (2021). *Cities and climate change: Policy directions*. World Bank.

World Bank. (2022). *World development indicators*. World Bank.