

AN EMPIRICAL FIVE-PILLAR FRAMEWORK FOR SUSTAINABILITY IN MANAGEMENT EDUCATION

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Abstract. Sustainability has become a strategic priority in management education as higher education institutions are increasingly expected to prepare future leaders capable of addressing complex global environmental, social, economic, and governance challenges. Nevertheless, the development of sustainability-oriented curricula often lacks empirically grounded frameworks that reflect students' perceptions and contemporary sustainability priorities. Addressing this gap, the present study proposes and validates an empirical five-pillar framework for sustainability in management education. Using a sequential mixed-methods approach, the study first explored students' perceptions of sustainability through qualitative interviews conducted with business and law students at an Australian higher education institution. The qualitative findings informed the development of a structured survey administered to 383 respondents. Exploratory Factor Analysis (EFA) and Partial Least Squares Structural Equation Modeling (PLS-SEM) were employed to identify and validate the underlying dimensions of sustainability. The findings reveal five interrelated pillars of sustainability: social, political, environmental, corporate, and economic sustainability. Among these dimensions, social sustainability emerged as the most influential pillar, followed by political and environmental sustainability. The study further identifies variations in sustainability perceptions across demographic and educational contexts, including gender, age, academic level, and student status. The proposed framework extends conventional three- and four-pillar sustainability models by introducing corporate sustainability as a distinct and empirically validated dimension. The study contributes theoretically by offering a data-driven sustainability framework for management education and contributes practically by providing curriculum developers, business schools, and policymakers with a structured model aligned with the United Nations Sustainable Development Goals (SDGs). The framework may support the design of more responsive and future oriented sustainability education strategies in higher education institutions..

Keywords: Sustainable Management Education; Five-Pillar Model; Student Sustainability Perception; SDGs; PLS-SEM.

I. INTRODUCTION

Sustainability has emerged as one of the most critical global agendas shaping contemporary higher education, organizational governance, and management practice. Accelerating environmental degradation, climate change, social inequality, political instability, and economic uncertainty have intensified demands for educational institutions to prepare graduates capable of responding to multidimensional sustainability challenges [1], [2]. In this context, management education plays a strategic role because business schools are responsible for developing future leaders, policymakers, and corporate decision-makers whose actions substantially influence sustainable development outcomes [3]. The growing international commitment toward sustainability has been reinforced through the adoption of the United Nations Sustainable Development Goals (SDGs), which provide an integrated framework for addressing global economic, environmental, and social challenges by 2030 [4]. Since the introduction of the SDGs, higher education institutions (HEIs) have increasingly integrated sustainability principles into curricula, institutional governance, and research agendas [5]. Management education, in particular, has experienced significant transformation through the incorporation of sustainability-oriented learning approaches, ethical leadership frameworks, and responsible business practices [6].

Despite this progress, the implementation of sustainability within management education remains fragmented and conceptually inconsistent. Many existing sustainability frameworks continue to rely predominantly on traditional three-pillar models emphasizing environmental, social, and economic dimensions [7]. More recent studies have expanded these models by incorporating governance and political perspectives to reflect the increasing complexity of sustainable development processes [8]. However, these frameworks are frequently conceptual rather than empirically validated, limiting their applicability for curriculum development and institutional strategy in higher education settings [9]. Furthermore, previous sustainability models often fail to adequately capture the evolving role of corporate responsibility and organizational accountability in contemporary

sustainability discourse. Increasing public scrutiny toward business ethics, environmental impacts, and corporate governance has elevated corporate sustainability into a central concern for management scholars and practitioners alike [10]. As organizations are increasingly expected to contribute directly to SDG achievement, management education must also evolve to address competencies associated with responsible leadership, corporate sustainability strategy, and stakeholder-oriented decision-making [11]. Another critical issue concerns the limited understanding of how students perceive sustainability within management education contexts. Student perceptions are important because they influence learning engagement, sustainability awareness, behavioral intentions, and future professional practice [12]. Prior research demonstrates that sustainability perceptions vary across demographic, cultural, and educational backgrounds, suggesting that sustainability-oriented curricula should be responsive to contextual differences among learners [13]. Nevertheless, empirical investigations examining student-centered sustainability frameworks within management education remain relatively limited, particularly in relation to multidimensional sustainability constructs [14].

In addition, the rapid transition toward digital transformation, artificial intelligence integration, and post-pandemic educational restructuring has reshaped expectations regarding sustainable management competencies [15]. Contemporary management graduates are now expected not only to understand environmental and social sustainability but also to demonstrate adaptive leadership, ethical governance, resilience, and sustainable innovation capabilities [16]. Consequently, HEIs require empirically grounded sustainability frameworks capable of guiding curriculum redesign and aligning management education with emerging global sustainability priorities. Addressing these gaps, this study proposes an empirical five-pillar framework for sustainability in management education. The framework extends traditional sustainability models by integrating social, political, environmental, economic, and corporate sustainability dimensions into a unified empirical structure. Using a mixed-methods approach involving qualitative exploration and quantitative validation, the study examines students' perceptions of sustainability and identifies the core dimensions shaping sustainability-oriented management education.

The study contributes theoretically by advancing an empirically validated multidimensional sustainability framework aligned with contemporary management education discourse and the SDGs. Practically, the findings provide guidance for curriculum developers, policymakers, and business schools seeking to strengthen sustainability integration within higher education programs. The proposed framework is expected to support the development of more adaptive, future-oriented, and socially responsive management education systems. The remainder of this article is structured according to the IMRaD format. Section 2 reviews the relevant literature concerning sustainability frameworks and management education. Section 3 explains the research methodology and analytical procedures. Section 4 presents the empirical findings and discussion, while Section 5 concludes the study by outlining theoretical implications, practical contributions, limitations, and directions for future research.

Sustainability in Management Education

The integration of sustainability into management education has become increasingly important in response to global ecological, social, and economic crises. Higher education institutions are now expected not only to transfer managerial knowledge but also to cultivate ethical awareness, systems thinking, and sustainability-oriented leadership competencies among future professionals [17]. Consequently, business schools are under growing pressure to redesign curricula that align with sustainable development principles and global societal needs. Management education has historically emphasized economic performance, organizational efficiency, and shareholder value creation. However, contemporary sustainability challenges have exposed the limitations of traditional management paradigms that prioritize short-term profitability over long-term societal and environmental wellbeing [18]. As a result, responsible management education has emerged as a transformative educational approach aimed at balancing economic growth with environmental stewardship and social justice [19]. Recent studies indicate that sustainability-oriented curricula contribute positively to students' sustainability awareness, ethical decision-making, and pro-environmental behavior [20]. Sustainability education also strengthens interdisciplinary learning by integrating environmental sciences, governance studies, ethics, economics, and organizational behavior into management-related disciplines [21]. This multidimensional perspective is increasingly viewed as essential for preparing graduates capable of addressing complex sustainability problems in both local and global contexts. Moreover, the Principles for Responsible Management Education (PRME) initiative introduced by the United Nations has encouraged business schools worldwide to embed sustainability values into teaching, research, and institutional governance [22]. Through PRME and SDG-oriented educational reforms, management education has progressively shifted toward stakeholder-centered and socially responsible business approaches. Nevertheless, the implementation of sustainability education remains uneven across institutions due to differences in institutional capacity, curriculum design, faculty readiness, and policy support [23].

Traditional and Contemporary Sustainability Frameworks

The conceptualization of sustainability has evolved significantly over the last three decades. Early sustainability discourse was dominated by the "triple bottom line" framework proposed by Elkington, which conceptualized sustainability through three interconnected dimensions: environmental, social, and economic sustainability [7]. This model became widely adopted in higher education, corporate reporting, and public policy because it provided a relatively simple structure for understanding sustainable development. Environmental sustainability focuses on preserving ecological systems, reducing pollution, minimizing waste, and mitigating climate change impacts [24]. Social sustainability emphasizes human wellbeing, equality, education, healthcare, human rights, and community resilience [25]. Meanwhile, economic sustainability concerns long-term economic stability, employment generation, responsible consumption, and equitable resource allocation [26]. These three dimensions collectively formed the dominant framework guiding sustainability education and corporate sustainability practices for many years. However, scholars have increasingly argued that the traditional three-pillar framework is insufficient

to explain the growing complexity of sustainability challenges [27]. Governance quality, political accountability, and institutional transparency have become central concerns within sustainable development discourse, particularly in relation to corruption, public trust, policy implementation, and institutional resilience [28]. Consequently, some researchers proposed the inclusion of political or governance sustainability as a fourth pillar to reflect the importance of effective institutions in achieving sustainable societies [29]. At the same time, corporate sustainability has emerged as an increasingly independent area of inquiry due to the growing influence of organizations on environmental and societal outcomes. Modern corporations are expected not only to generate economic value but also to demonstrate environmental responsibility, ethical governance, social accountability, and stakeholder engagement [30]. This transformation reflects a broader shift from conventional corporate social responsibility (CSR) toward integrated corporate sustainability strategies emphasizing long-term sustainable value creation [31].

Despite these developments, many sustainability frameworks remain largely conceptual and lack empirical validation, particularly within educational contexts [32]. Existing models are often based on theoretical assumptions rather than stakeholder perceptions or statistical analyses. As a result, there remains limited empirical evidence regarding which sustainability dimensions are perceived as most important by students and future managers. This gap is particularly relevant because students represent key stakeholders in sustainability-oriented higher education systems.

Student Perceptions and Sustainability-Oriented Learning

Student perceptions play a critical role in determining the effectiveness of sustainability education because perceptions influence learning engagement, behavioral intention, and long-term professional attitudes [33]. Constructivist learning theory suggests that students develop deeper understanding when educational content aligns with their prior knowledge, experiences, and perceived relevance [34]. Therefore, identifying how students perceive sustainability can help educators design more responsive and meaningful management curricula. Previous studies have demonstrated that sustainability perceptions vary across demographic, cultural, and educational contexts. Female students, for example, tend to exhibit stronger environmental and social sustainability awareness compared to male students [35]. Likewise, international students and learners from emerging economies may prioritize economic and governance-related sustainability issues differently due to their distinct socio-economic experiences [36]. Such findings highlight the importance of contextualizing sustainability education according to learner diversity. Research also indicates that students frequently associate sustainability primarily with environmental issues while underestimating political, governance, and corporate dimensions [37]. This narrow interpretation may limit the effectiveness of management education because sustainable development requires integrated understanding across multiple dimensions. Consequently, educators are increasingly encouraged to adopt multidimensional sustainability frameworks capable of connecting environmental responsibility with governance, ethics, social justice, and organizational accountability [38].

In addition, recent educational transformations associated with digitalization, artificial intelligence, and post-pandemic learning environments have expanded the competencies expected from management graduates [39]. Sustainability-oriented graduates are now expected to demonstrate adaptive leadership, critical thinking, ethical reasoning, and innovation capabilities within uncertain and rapidly changing environments [40]. These developments further strengthen the need for empirically grounded sustainability frameworks capable of informing future-oriented management education strategies.

Research Gap and Conceptual Positioning

Although sustainability has become a prominent theme within management education research, several important gaps remain evident in the literature. First, many sustainability frameworks applied within higher education remain conceptual rather than empirically validated [32]. Second, previous studies often focus predominantly on environmental sustainability while giving limited attention to political and corporate sustainability dimensions [30]. Third, empirical investigations examining students' sustainability perceptions in management education contexts remain relatively limited, especially using multidimensional analytical approaches [14]. Furthermore, while the SDGs provide a comprehensive sustainability agenda, their practical integration into management curricula remains challenging due to the complex interrelationships among sustainability dimensions [4]. There is therefore a need for empirically derived frameworks that simplify sustainability constructs while maintaining conceptual comprehensiveness and practical relevance for curriculum development.

Addressing these limitations, the present study develops an empirical five-pillar framework for sustainability in management education based on students' sustainability perceptions. The framework integrates social, environmental, economic, political, and corporate sustainability dimensions into a unified model validated through mixed-methods analysis. By doing so, the study contributes to sustainability education literature through the development of a multidimensional, empirically grounded framework capable of supporting curriculum design, educational policy, and responsible management education practices.

II. RESEARCH METHODS

This study employed a sequential mixed-methods research design to develop and validate an empirical five-pillar framework for sustainability in management education. The mixed-methods approach was selected because it enables comprehensive exploration of complex educational and sustainability phenomena through the integration of qualitative and quantitative evidence [41]. In the first stage, qualitative data were collected through semi-structured interviews involving students enrolled in management and business-related programs at higher education institutions. The interviews explored participants' perceptions, experiences, and understanding of sustainability-related issues in management education contexts.

The qualitative findings were analyzed using thematic analysis to identify dominant sustainability dimensions and recurring conceptual patterns. The identified themes subsequently informed the development of the quantitative research instrument. This exploratory stage strengthened the contextual relevance and construct validity of the measurement framework.

The second stage applied a quantitative approach using a structured survey distributed to undergraduate and postgraduate students in management-related disciplines. The questionnaire utilized a seven-point Likert scale ranging from “strongly disagree” to “strongly agree” to measure respondents’ perceptions of sustainability dimensions. Data analysis was conducted using Exploratory Factor Analysis (EFA) and Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the dimensional structure, reliability, convergent validity, and discriminant validity of the proposed sustainability framework. PLS-SEM was considered appropriate because of its suitability for exploratory model development, prediction-oriented analysis, and complex multidimensional constructs within social science research [42]. The methodological framework enabled the identification and empirical validation of five interrelated sustainability pillars comprising social, environmental, economic, political, and corporate sustainability dimensions. Ethical considerations, including informed consent, confidentiality, and voluntary participation, were ensured throughout the research process in accordance with international academic research standards.

III. RESULTS AND DISCUSSION

The empirical analysis confirmed the multidimensional structure of sustainability perceptions within management education contexts. The Exploratory Factor Analysis (EFA) identified five statistically significant sustainability dimensions consisting of social sustainability, political sustainability, environmental sustainability, corporate sustainability, and economic sustainability. The Kaiser–Meyer–Olkin (KMO) value exceeded the recommended threshold of 0.70, while Bartlett’s Test of Sphericity indicated significant inter-item correlations, confirming the suitability of the dataset for factor analysis. Furthermore, the five-factor solution explained a substantial proportion of total variance, indicating strong construct representation across sustainability dimensions. Reliability analysis demonstrated acceptable internal consistency for all constructs, with Cronbach’s alpha and composite reliability values exceeding recommended standards. The Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis further validated the robustness of the proposed framework through satisfactory convergent and discriminant validity indicators. Among the five dimensions, social sustainability emerged as the most influential pillar shaping students’ sustainability perceptions. Human rights, educational accessibility, healthcare quality, equality, and social wellbeing were identified as the strongest indicators within this construct. This finding reflects the increasing prioritization of human-centered sustainability perspectives in higher education and contemporary management discourse [43]. The prominence of social sustainability may also reflect the long-term social impacts of global crises, including post-pandemic inequalities, labor insecurity, and social vulnerability, which have intensified awareness regarding inclusive and equitable development. In contrast to traditional sustainability paradigms that often emphasize environmental concerns as dominant, the present findings suggest that students increasingly perceive social justice and human wellbeing as central sustainability priorities within management education.

Political sustainability emerged as the second most influential dimension. Indicators associated with governance quality, corruption control, institutional accountability, transparency, and abuse of power demonstrated high factor loadings. This finding supports recent arguments that effective governance structures are fundamental prerequisites for sustainable development implementation [44]. Students appear to recognize that sustainability challenges cannot be resolved solely through environmental or economic interventions without institutional integrity and responsible governance mechanisms. The strong significance of political sustainability may also reflect contemporary global conditions characterized by political instability, declining public trust, policy uncertainty, and increasing demands for ethical leadership in both public and private sectors. Environmental sustainability also demonstrated substantial explanatory power within the proposed framework. Climate change, pollution, resource scarcity, industrial waste, and environmental degradation were consistently perceived as important sustainability concerns among respondents. This finding aligns with international sustainability literature emphasizing climate change as one of the most urgent global risks affecting future economic and social stability [45]. However, compared to social and political sustainability, environmental sustainability was positioned as the third strongest dimension. This suggests that students increasingly conceptualize sustainability through integrated socio-political perspectives rather than exclusively ecological concerns. The result reinforces the need for management education curricula that connect environmental sustainability with governance, ethics, and social responsibility dimensions.

Another important contribution of the findings concerns the emergence of corporate sustainability as an independent and empirically distinct dimension. Corporate environmental responsibility, ethical business conduct, stakeholder engagement, and corporate social responsibility (CSR) formed a coherent construct separate from traditional economic sustainability indicators. This result supports the growing academic shift from conventional CSR toward broader corporate sustainability frameworks emphasizing long-term value creation and organizational accountability [46]. The empirical identification of corporate sustainability as a separate pillar highlights the increasingly central role of corporations in addressing sustainability challenges and achieving SDG-related targets. It also demonstrates that students perceive organizations not merely as economic actors but as critical agents of environmental and social transformation. Economic sustainability appeared as the fifth dimension within the framework, although it remained statistically significant and theoretically relevant. Indicators associated with employment, investment, economic growth, inflation, and financial stability loaded strongly within this construct. The relatively lower

prioritization of economic sustainability compared to social and political dimensions may indicate shifting generational perspectives among students, particularly among younger cohorts who increasingly value social equity, ethical governance, and environmental responsibility alongside economic outcomes [47]. This finding reflects broader global discussions regarding sustainable and inclusive economic systems capable of balancing profitability with societal wellbeing and ecological resilience.

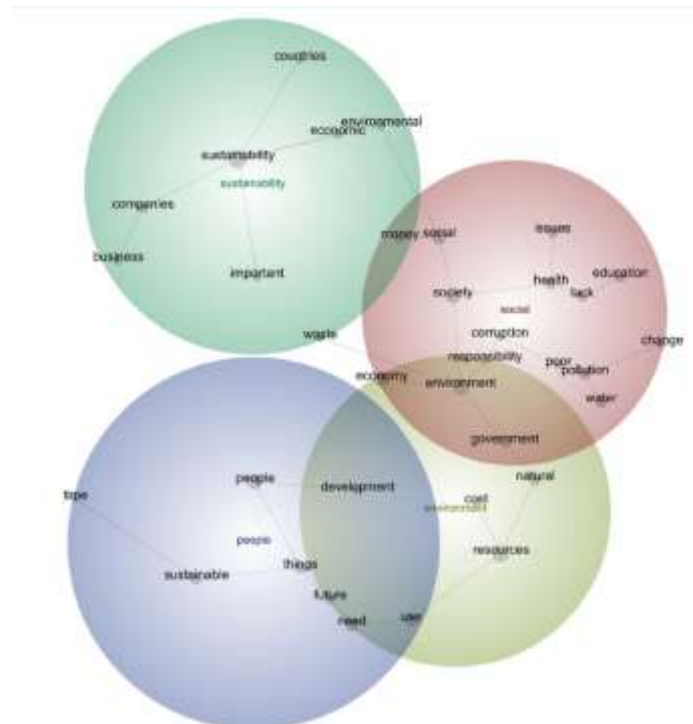


Figure. 1. Leximancer concept map of sustainability themes, issues and linkages

The findings also revealed contextual variations in sustainability perceptions across demographic and educational characteristics. Female respondents demonstrated stronger perceptions of social and environmental sustainability compared to male respondents, supporting previous studies identifying gender differences in sustainability awareness and ethical sensitivity [48]. International students showed relatively stronger concern toward economic and political sustainability issues, potentially reflecting differing socio-economic and governance experiences across countries of origin. In addition, postgraduate students exhibited more integrated sustainability perspectives than undergraduate students, suggesting that educational maturity and academic exposure contribute positively to sustainability understanding. From a theoretical perspective, this study extends sustainability education literature by empirically validating a five-pillar sustainability framework that expands beyond traditional triple-bottom-line approaches. The findings demonstrate that sustainability in management education should not be conceptualized solely through environmental, social, and economic dimensions, but must also incorporate governance-related and corporate responsibility dimensions as distinct constructs. The framework therefore contributes to the ongoing evolution of sustainability theory toward more multidimensional and institutionally responsive perspectives. Practically, the findings provide important implications for curriculum developers, policymakers, and business schools. Sustainability-oriented management education should adopt interdisciplinary learning approaches capable of integrating governance ethics, corporate accountability, environmental stewardship, and social justice into management curricula. Universities may also use the proposed framework as a strategic reference for designing sustainability competencies, evaluating curriculum alignment with SDGs, and strengthening responsible management education initiatives. The empirical evidence additionally highlights the importance of adapting sustainability education according to student diversity, contextual realities, and evolving global sustainability challenges.

IV. CONCLUSION

This study developed and empirically validated a five-pillar framework for sustainability in management education consisting of social, political, environmental, corporate, and economic sustainability dimensions. Using a sequential mixed-methods approach, the findings demonstrated that sustainability perceptions among management students are multidimensional and extend beyond conventional triple-bottom-line frameworks. Among the identified dimensions, social sustainability emerged as the most influential pillar, followed by political and environmental sustainability, while corporate sustainability appeared as a distinct and significant construct within the overall framework. These findings indicate that contemporary sustainability education in management studies increasingly emphasizes human wellbeing, governance integrity, organizational accountability, and

interdisciplinary sustainability competencies alongside traditional economic concerns. The study contributes theoretically by extending sustainability education literature through the introduction of an empirically grounded multidimensional framework capable of integrating emerging sustainability priorities into management education contexts. Unlike traditional sustainability models that primarily focus on environmental, social, and economic dimensions, the proposed framework highlights the growing relevance of political governance and corporate sustainability as independent pillars influencing students' sustainability perceptions. The findings therefore provide a broader conceptual understanding of sustainability in higher education and support the evolution of responsible management education toward more holistic and institutionally responsive approaches. From a practical perspective, the findings provide important implications for higher education institutions, business schools, curriculum developers, and policymakers. Universities are encouraged to redesign management curricula by integrating sustainability-oriented learning outcomes that encompass ethical leadership, governance accountability, environmental responsibility, social justice, and corporate sustainability practices. The framework may serve as a strategic reference for evaluating curriculum alignment with Sustainable Development Goals (SDGs) and strengthening interdisciplinary teaching approaches within management education programs. In addition, educational institutions should consider contextual diversity among students when designing sustainability learning experiences, as sustainability perceptions may vary according to demographic, cultural, and educational backgrounds. The study also suggests that management education should move beyond theoretical sustainability discussions toward experiential and competency-based learning models. Integrating sustainability case studies, community engagement projects, corporate sustainability simulations, and problem-based learning activities may strengthen students' practical understanding of sustainability challenges in real organizational settings. Business schools may further collaborate with industry stakeholders, governmental institutions, and civil society organizations to develop more relevant and future-oriented sustainability education ecosystems. Despite its contributions, this study has several limitations. First, the research focused primarily on students within management and business-related disciplines, which may limit the generalizability of findings across other academic fields. Second, the study was conducted within a specific higher education context, potentially influencing the cultural and institutional interpretation of sustainability dimensions. Third, the cross-sectional nature of the research limits the ability to examine changes in sustainability perceptions over time. Future research is therefore recommended to expand the empirical validation of the five-pillar framework across different countries, educational systems, and disciplinary contexts. Comparative international studies may provide deeper insights into cultural and institutional variations in sustainability perceptions. Longitudinal research is also needed to examine how sustainability awareness and competencies evolve throughout students' educational journeys. In addition, future studies may investigate the relationship between sustainability perceptions and behavioral outcomes such as ethical decision-making, leadership orientation, innovation capability, and organizational sustainability practices. Further exploration of digital transformation, artificial intelligence, and emerging sustainability technologies within management education contexts may also provide valuable directions for advancing sustainability-oriented higher education in the future.

V. References

- [1] J. Sachs et al., "Sustainable development report 2023," Sustainable Development Solutions Network, 2023.
- [2] UNESCO, *Education for Sustainable Development: A Roadmap*, Paris, France: UNESCO Publishing, 2020.
- [3] D. F. Hawkins and T. B. Hoon, "The role of business schools in sustainability transitions," *The International Journal of Management Education*, vol. 19, no. 1, pp. 1–9, 2021.
- [4] United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development*, New York, NY, USA: United Nations, 2015.
- [5] A. Leal Filho et al., "Sustainability in higher education: A review of contributions from universities worldwide," *Journal of Cleaner Production*, vol. 315, pp. 1–14, 2021.
- [6] C. Kolb, M. Fröhlich, and R. Schmidpeter, "Implementing sustainability as the new normal: Responsible management education," *The International Journal of Management Education*, vol. 15, no. 2, pp. 280–292, 2018.
- [7] J. Elkington, "25 years ago I coined the phrase 'triple bottom line': Here's why it's time to rethink it," *Harvard Business Review*, vol. 25, pp. 1–5, 2018.
- [8] K. Brundiers et al., "Key competencies in sustainability in higher education," *Sustainability Science*, vol. 16, no. 1, pp. 13–29, 2021.
- [9] G. Burford et al., "Bringing the missing pillar into sustainable development goals," *Sustainability*, vol. 5, no. 7, pp. 3032–3043, 2019.
- [10] M. Aksoy, M. K. Yilmaz, E. Tatoglu, and M. Basar, "Antecedents of corporate sustainability performance," *Journal of Cleaner Production*, vol. 276, pp. 1–12, 2020.
- [11] R. Weybrecht, "From challenge to opportunity: Management education's crucial role in sustainability," *Journal of Management Development*, vol. 39, no. 2, pp. 162–178, 2020.
- [12] T. Alsaati, S. El-Nakla, and D. El-Nakla, "Level of sustainability awareness among university students," *Sustainability*, vol. 12, no. 8, pp. 1–17, 2020.
- [13] P. Boarin, A. Martinez-Molina, and I. Juan-Ferruses, "Understanding students' perception of sustainability in architecture education," *Journal of Cleaner Production*, vol. 248, pp. 1–13, 2020.

- [14] S. Wersun, A. Klarsfeld, and M. Sieben, "Student perceptions of sustainability education," *International Journal of Sustainability in Higher Education*, vol. 21, no. 7, pp. 1523–1542, 2020.
- [15] OECD, *The Future of Education and Skills 2030*, Paris, France: OECD Publishing, 2021.
- [16] A. Goniadis, M. Klefodimos, and E. Vassilakis, "Digital transformation and sustainability competencies in management education," *Education Sciences*, vol. 14, no. 2, pp. 1–15, 2024.
- [17] W. Leal Filho, A. Lange Salvia, R. Brandli, and U. M. Azeiteiro, "Sustainability and the role of higher education institutions," *International Journal of Sustainability in Higher Education*, vol. 20, no. 4, pp. 1–15, 2019.
- [18] M. M. Lozano et al., "Reconnecting management education with sustainability," *Business Strategy and the Environment*, vol. 29, no. 3, pp. 1–12, 2020.
- [19] C. Storey, P. Killian, and M. O'Regan, "Responsible management education and sustainability transformation," *The International Journal of Management Education*, vol. 21, no. 1, pp. 1–11, 2023.
- [20] A. Findler, N. Schönherr, R. Lozano, and D. Reider, "The impacts of higher education institutions on sustainable development," *International Journal of Sustainability in Higher Education*, vol. 20, no. 1, pp. 23–38, 2019.
- [21] M. Estellés and G. Fischman, "Imagining sustainable futures in higher education," *Teaching in Higher Education*, vol. 26, no. 4, pp. 1–15, 2021.
- [22] United Nations PRME, *Principles for Responsible Management Education Report 2023*, New York, NY, USA: United Nations, 2023.
- [23] R. Valente, P. Sá, J. Soares, and M. Sousa, "Challenges of integrating sustainability into management education," *Sustainability*, vol. 13, no. 7, pp. 1–17, 2021.
- [24] IPCC, *Climate Change 2023: Synthesis Report*, Geneva, Switzerland: Intergovernmental Panel on Climate Change, 2023.
- [25] J. Sachs, *The Age of Sustainable Development*, New York, NY, USA: Columbia University Press, 2020.
- [26] OECD, *Global Outlook on Financing for Sustainable Development 2021*, Paris, France: OECD Publishing, 2021.
- [27] K. Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*, London, UK: Random House Business, 2018.
- [28] Transparency International, *Corruption Perceptions Index 2023*, Berlin, Germany: Transparency International, 2024.
- [29] D. Held and M. Roger, "Political sustainability and global governance," *Global Policy*, vol. 11, no. 2, pp. 213–222, 2020.
- [30] A. Carroll and J. Brown, "Corporate sustainability and stakeholder engagement," *Business & Society*, vol. 61, no. 5, pp. 1–18, 2022.
- [31] S. Dyllick and K. Muff, "Clarifying the meaning of sustainable business," *Organization & Environment*, vol. 34, no. 1, pp. 1–21, 2021.
- [32] G. Burford et al., "Advancing sustainability assessment frameworks in higher education," *Sustainability Science*, vol. 15, no. 6, pp. 1–14, 2020.
- [33] M. Shephard and D. Furnari, "Exploring student attitudes toward sustainability learning," *Higher Education Research & Development*, vol. 40, no. 5, pp. 1–13, 2021.
- [34] J. Biggs and C. Tang, *Teaching for Quality Learning at University*, 5th ed. London, UK: Open University Press, 2022.
- [35] S. Zelezny, P. Chua, and C. Aldrich, "Gender differences in environmental attitudes," *Journal of Environmental Education*, vol. 52, no. 4, pp. 1–12, 2020.
- [36] M. Saqib, S. Zhang, and T. Ahmad, "Sustainability perceptions among students from emerging and developed economies," *Sustainability*, vol. 12, no. 12, pp. 1–18, 2020.
- [37] A. Kagawa, "Dissonance in students' perceptions of sustainable development," *International Journal of Sustainability in Higher Education*, vol. 20, no. 3, pp. 1–15, 2019.
- [38] R. Barth and M. Michelsen, "Integrating sustainability competencies into higher education," *Sustainability*, vol. 13, no. 9, pp. 1–14, 2021.
- [39] World Economic Forum, *Future of Jobs Report 2023*, Geneva, Switzerland: WEF, 2023.
- [40] P. Hanelt, B. Bohnsack, D. Marz, and C. Antunes, "A systematic review of digital transformation and sustainability competencies," *Technological Forecasting and Social Change*, vol. 188, pp. 1–14, 2023.
- [41] J. W. Creswell and V. L. Plano Clark, *Designing and Conducting Mixed Methods Research*, 4th ed. Thousand Oaks, CA, USA: SAGE Publications, 2023.
- [42] J. F. Hair Jr., G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 3rd ed. Thousand Oaks, CA, USA: SAGE Publications, 2022.
- [43] N. Fraser, "Social justice in the age of sustainability transitions," *New Left Review*, vol. 128, pp. 45–67, 2021.
- [44] F. Fukuyama, *Liberalism and Its Discontents*, New York, NY, USA: Farrar, Straus and Giroux, 2022.
- [45] World Meteorological Organization, *State of the Global Climate 2023*, Geneva, Switzerland: WMO, 2024.
- [46] T. Hahn and S. Tampe, "Strategies for corporate sustainability and stakeholder integration," *Business Strategy and the Environment*, vol. 30, no. 8, pp. 1–15, 2021.
- [47] J. Stiglitz, *People, Power, and Profits: Progressive Capitalism for an Age of Discontent*, New York, NY, USA: W. W. Norton & Company, 2019.
- [48] E. Vicente-Molina, A. Fernández-Sáinz, and J. Izagirre-Olaizola, "Does gender make a difference in pro-environmental behavior?" *Journal of Cleaner Production*, vol. 276, pp. 1–10, 2020.