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Article

Opportunities and challenges of empowering SMEs for sustainable Healthcare delivery

Segun Akinola*, Lawrence Obokoh

Johannesburg Business School, University of Johannesburg, Johannesburg 2092, South Africa
*** Corresponding author:** Segun Akinola, Akinolaa@uj.ac.za

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Abstract: This paper examines the sustainability practices implemented by healthcare establishments, mainly Small and Medium enterprises (SMEs), We focus on identifying opportunities with challenges involved. This systematic literature analyses 47 studies that explore sustainability practices in the healthcare system globally. The finding from the studies reveals that healthcare organizations with SMEs adopt diverse measures like renewable energy, a reduction, and a response procurement in minimizing the impact on the environment and ensuring financial stability. The challenges SMEs face comprise limited financial resources, lack of expertise, with difficulties accessing information and support. Furthermore, we suggest opportunities for SMEs to enhance sustainability practices with partnerships with other organizations and investing in educating employees. Implementation of sustainability practices will improve the financial stability, and environmental impact, with the wellbeing of healthcare stakeholders. The empirical evidence, comparative studies with cross-disciplinary are needed in exploring the effectiveness of the different suitability practices, potential trade-offs, synergies between sustainability and other organizational goals, the effect of sustainability practice in the financial with non-financial performance on SMEs in healthcare establishment are positive, with cost-effectiveness, efficiencies operations, improving brand reputations and engaging the employee. Established factors like regulating frameworks and government initiatives play a major role in the influence of adopting sustainability practices with cultural factors.

Keywords: healthcare; Small and Medium enterprises; well-being; sustainability; stakeholders; organizations; sectors

1. Introduction

The health industry is now recognizing the importance of sustainability practices in reducing its environmental impact to achieve financial stability and maintain the well-being of stakeholders. SMEs constitute a significant proportion of healthcare establishments globally. However, SMEs face challenges in implementing sustainable practices due to limited resources and skilled personnel (Sijm-Eeken et al., 2023). The main aim of this review is to provide an overview of sustainable practices adopted in healthcare organizations, with a primary focus on SMEs. The review analyzed 50 studies that examine sustainability practices in healthcare. These studies were selected based on their relevance to the paper's focus and contribution to current sustainability practices (Saeed et al, 2018).This comprehensive review reveals that healthcare organizations recognize the importance of sustainability practices, and establishments are now implementing energy efficiency measures to reduce waste through the adoption of procurement practices. The review highlights various opportunities for SMEs to enhance sustainability practices, including collaboration and partnerships

with the health sector. Government parastatals and non-profit establishments are sharing resources to access funding with experts in sustainability. Furthermore, SMEs could invest in educating and developing stakeholders for the implementation of sustainable practices (Cadil et al., 2018). Non-profit organizations can be valuable partners for SMEs, fostering collaboration with larger healthcare organizations to implement shared sustainability practices or partnering with non-profit organizations to access funding and expertise in sustainability. Additionally, SMEs could invest in employee education and training programs to develop the necessary expertise for effective implementation of sustainable practices (Ho et al., 2022).

This review has implications for policy-making to sustain best practices in the industry. For instance, innovative programs could be developed to support stakeholders (Rostami et al., 2021). The review provides insight into the adoption of sustainability practices by the healthcare sector, including SMEs, and highlights opportunities along with challenges faced in pursuing sustainability practices. It also contributes to implementing best practices that will garner support and promote SMEs and the healthcare sector.

This review thoroughly examined the research gap within the context of sustainability practices in the healthcare sector, specifically focusing on SMEs. The literature, from Wang and Hajli (2017) to Hussain et al. (2019) (refer to **Table A1**), consistently highlights research gaps. As a result, we have identified several areas that require further research, as presented in **Figure 1**. These areas include the specific challenges and opportunities faced by small and medium-sized healthcare organizations in implementing sustainable practices, the need for comparative studies across different healthcare organizations, sectors, and geographic regions, and the scarcity of experiential evidence on the efficiency of various sustainability practices in healthcare establishments.Based on these identified gaps, we have formulated research questions that directly address the areas of limited research and provide a roadmap for future investigations. These research questions explore how key sustainability practices can be effectively implemented by SMEs in healthcare organizations, how the challenges and barriers to sustainability practices in SMEs can be overcome, how institutional and cultural factors influence the adoption of sustainability practices, and the implications of the findings for policy and practice in promoting sustainability practices in SMEs within the healthcare sector.

By clearly identifying and articulating the research gap and formulating relevant research questions, the problem statement and research questions indicate a need for further exploration. Despite the revolutionized sustainability practice in healthcare sectors, there is limited research that focuses on the opportunities and problems faced by SMEs in the context of sustainability. SMEs are pivotal in healthcare and vital for establishing sustainable practices, given their significant involvement in a major portion of healthcare. It is a crucial factor enabling sustainability practices in this segment of the establishment.

Research Questions:

- How will the key suitability practice be fully implemented by SMEs in healthcare organizations?
- How can the challenges and barriers to sustainability practice in SMEs in

healthcare organizations be tackled?

- How do institutional and cultural factors influence the adoption of sustainability practices in SMEs in healthcare organizations?
- What are the implications of the findings for policy and practice in promoting sustainability practices in SMEs in healthcare organizations?

Figure 1. Intersection of themes.

The research gap between healthcare and SMEs provides a roadmap for future research, assisting researchers in identifying areas where further investigation is needed. Research gaps serve as valuable guides, enabling researchers to steer clear of duplicating existing studies and ensuring that their research is both relevant and contributory to the existing body of knowledge. In essence, a research gap helps establish the significance of the research and its potential contributions to the field.One notable gap identified is the incomplete experiential evidence regarding the efficiency of different sustainability practices in healthcare establishments. There is a pressing need for researchers to integrate more perspectives that can effectively manage SMEs within the healthcare sector. This involves addressing the partial research on potential trade-offs (Wicklum et al., 2023) and synergies between sustainability and other organizational goals, such as economic performance coupled with excellent care.

Furthermore, there is a call for more comparative studies to examine sustainability practices across different types of healthcare organizations, sectors, and geographic regions. This approach will enhance our understanding of the varied challenges and opportunities faced by healthcare establishments, especially SMEs, in implementing sustainable practices.

2. Materials and methods

The method utilized in this study draws inspiration from (Saunders et al., 2019), recognizing the value of reviews in developing new research paths and analyzing a substantial amount of scholarly work. Reviews serve as a foundation for future research avenues and contribute to the development of research questions (Massaro et al., 2016). In the context of this research, reviews are considered a sound alternative to traditional literature reviews, such as systematic or bibliometric reviews, for identifying relevant literature on sustainability practices in the healthcare sector.

The purpose of this review is to examine and consolidate prior research findings in the literature, proposing effective strategies for healthcare organizations to promote sustainability. This contributes to the continuity of organizations and the achievement of sustainability practices in the healthcare sector, with a specific focus on addressing

opportunities and challenges for small and medium enterprises (SMEs). The following steps were undertaken:

Philosophical Stance:

The research is guided by a philosophical stance (Wilson, 2014), underpinning the objective analysis and synthesis of existing literature. Assumptions and perspectives that shape this study are aligned with key authors in the field, guided by an interpretive philosophical stance Walsham, 2006. This philosophical stance recognizes the importance of subjective understanding and the social construction of reality. It acknowledges that individuals and organizations interpret and give meaning to their experiences, shaping their perspectives on sustainability practices in the healthcare sector. By adopting an interpretive approach (see **Figure 2**), this research seeks to explore and interpret the experiences, perceptions, and viewpoints of stakeholders involved in sustainable healthcare practices, particularly SMEs.

The interpretive philosophical stance allows for a comprehensive examination of the opportunities and challenges faced by SMEs in implementing sustainability practices within healthcare organizations. It recognizes the need to understand the diverse perspectives and subjective interpretations of stakeholders involved, thereby providing a deeper understanding of the complex dynamics surrounding sustainability in the healthcare sector.

Research Approach:

A qualitative research approach was chosen based on the nature of the research questions and objectives. This approach allows for in-depth exploration and understanding of sustainability practices in the healthcare sector.

Research Strategy:

The research strategy employed involved conducting a systematic literature analysis of 47 studies. This entailed conducting a literature review to identify relevant papers and performing a content analysis of the selected papers to extract and analyze the pertinent information. The content analysis focused on understanding the challenges and opportunities faced by SMEs in implementing sustainability practices in the healthcare sector.

Time Horizon:

The literature analysis covered recent years, providing a temporal context for the selected studies and allowing for a comprehensive understanding of the current state of sustainability practices in healthcare organizations.

Data Collection Methods:

Data were collected from the 47 selected studies using various methods, including keyword searches, database selection, and inclusion/exclusion criteria for article selection. Scopus and Web of Science were utilized to identify and select relevant studies for the review.

Data Analysis Techniques:

The data from the selected studies were analyzed and synthesized using qualitative content analysis, thematic analysis, and potentially other qualitative synthesis methods. These techniques facilitated the extraction of key insights and themes related to sustainability practices in healthcare organizations.

Validity and Reliability:

To ensure the validity and reliability of the research findings, clear criteria were established for selecting relevant studies. The quality of the studies was evaluated, and the validity of the evidence was assessed. These measures ensured the inclusion of appropriate studies and gave appropriate weight to high-quality studies in the synthesis of findings.

Result Analysis:

The results obtained from the literature analysis were discussed, and recommendations were made to provide a roadmap for future research. The discussion drew on the insights and recommendations of key authors in the field, highlighting areas that require further investigation.

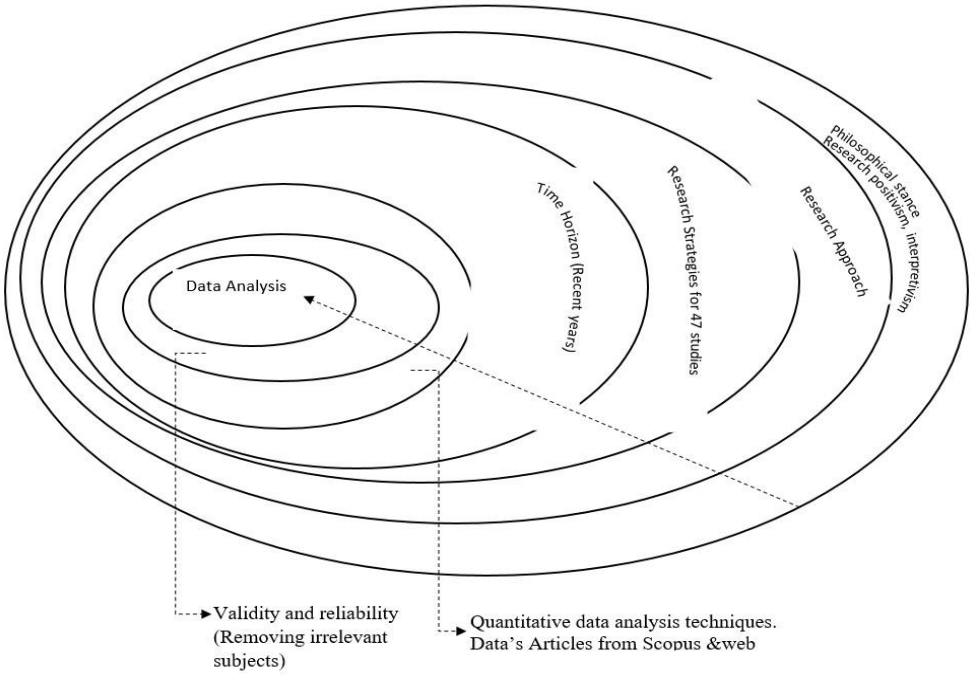

Figure 2. Research onion (Walsham, 2006).

3. Results

The flowchart illustrates in **Figure 3** the process of empowering small and medium enterprises (SMEs) in the healthcare sector for sustainable healthcare practices. It begins with identifying the SMEs and assessing their current sustainability practices. Opportunities for improvement are then unveiled, and the SMEs are empowered through education and training. The aim is to promote the adoption of sustainable healthcare practices while addressing challenges and obstacles along the way. Collaboration with stakeholders is crucial for success. Monitoring and evaluation help track progress, and strategies are adjusted as needed. This systematic approach empowers SMEs to contribute to sustainable healthcare, promoting environmental responsibility and positive societal impact in the healthcare industry.

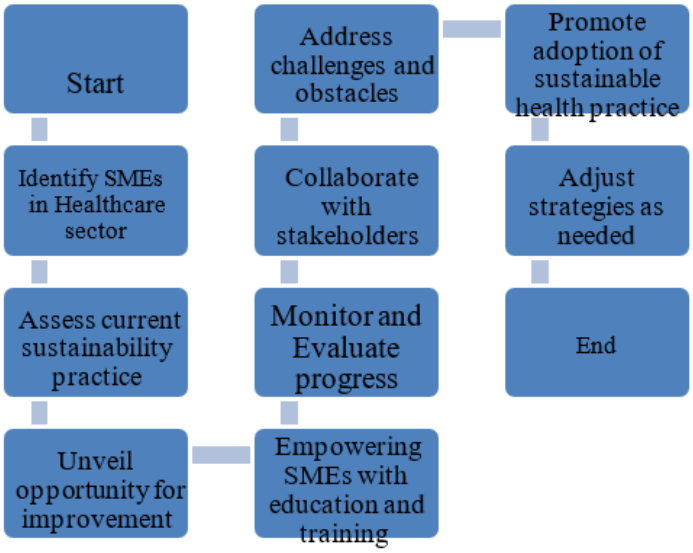

Figure 3. The process of empowering small and medium enterprises (SMEs) in the healthcare sector.

3.1. Key sustainability practices adopted by SMEs in healthcare organizations

In the realm of healthcare organizations, small and medium enterprises (SMEs) have been adopting various sustainability practices to reduce their environmental impact and ensure financial stability. This section discusses some key sustainability practices embraced by SMEs in healthcare organizations. Firstly, SMEs are actively incorporating renewable energy sources into their operations. Implementing solar panels, wind turbines, or geothermal systems allows them to generate clean energy, reducing their reliance on fossil fuels and minimizing their carbon footprint (Spector). Secondly, waste reduction strategies play a significant role in sustainable healthcare practices. SMEs are implementing waste segregation programs, recycling initiatives, and waste-to-energy systems to minimize the amount of waste generated and promote a circular economy approach (Vicente-Oliva et al., 2015). Furthermore, responsible procurement practices are being adopted by SMEs to support sustainability. They prioritize suppliers with eco-friendly practices and engage in ethical sourcing of goods and services. This includes selecting suppliers that adhere to sustainable forestry, fair trade, and environmentally friendly packaging (Mehra et al., 2021).

SMEs are majorly promoting resource efficiency with measures like the conservation of water and optimization of HVAC systems and energy. This will help in reducing resource consumption and operation, and minimize costs while promoting sustainability practices. This major sustainability adoption by SMEs in the healthcare sector demonstrates a commitment to environmental stewardship and financial capability. The implementation of waste reduction, accountable procurement, renewable energy, and resource management will contribute to SMEs more in healthcare.It is revealed that sustainability in healthcare has provided a foundation for subsequent analysis through various techniques that are placed for the assessment of healthcare by healthcare experts. Aras-Beger et al. (2021) used analytic hierarchy process and interpretive structural modeling within a strategies framework for sustainable healthcare measures. The key findings show that indigenous production

and research with innovations are major drivers in measuring healthcare. Furthermore, waste reduction and management provide strong directions for experts.

3.2. Drivers and obstacles to adopting sustainability practices in SMEs in the healthcare sector

Adopting sustainability practices in SMEs in the health sector is majorly influenced by diverse drivers, which are hindered by numerous obstacles. Understanding the factors for promoting sustainable practices in context, we discuss the major drivers and problems of adopting sustainability practices in SMEs in health sectors. One force that drives sustainability practices includes poly regulation compliance; this is how SMEs are compelled to meet the environmental standards set by government authorities (Spillias et al., 2023). Finance also plays a major role, with incentives like saving costs from energy management and waste reduction. The market demand for environmentally friendly products motivates SMEs to align with good practices and principles to attract more customers, ultimately increasing revenue and product deliveries.

However, there are several challenges in adopting sustainability practices, such as the limitation of financial resources. The process requires upfront payment, which is not always available and affects budgeting plans in SMEs (Sumrin et al., 2021). The lack of expertise is a major problem in SMEs, affecting internal production capacities. The problem of accessing information and support networks for implementation is another challenge, affecting all parts of the process. Furthermore, SMEs may be less aware of the potential benefits related to sustainability practices compared to larger sectors, resulting in lower motivation and prioritization of efforts in sustainability (Govindan and Hasanagic, 2018). The lack of awareness of the importance of sustainability and its link to long-term business success will be a major problem for SMEs in achieving their goals. Solving these problems and leveraging the drivers is crucial in promoting the adoption of sustainability practices in SMEs in healthcare organizations. Various policies that support financial incentives, capacity building, and education will solve these problems and enable good practices.

3.3. Measuring and reporting sustainability performance by SMEs in the healthcare sector

The measurement and reporting of sustainability performance are vital for SMEs in the healthcare sector to track progress and communicate efforts to principal players. Here we discuss the importance of measuring and reporting sustainability performance and reveal relevant case studies. The measurement of sustainability performance allows SMEs to assess the effectiveness of their sustainability initiatives, improving areas and setting good targets (Ahi and Searcy, 2013). Furthermore, it enables monitoring of environmental, social, and economic indicators such as waste generation and energy management, as well as community engagement (Shankar et al., 2017).

The measurement of SMEs demonstrates a commitment to sustainability, giving a reputation to end-users and investors. The reporting of the Sustainability Act provides a means for SMEs to communicate their progress and achievements. It allows

them to showcase their sustainable practices, initiatives, and impact on various stakeholders. Transparent reporting enhances responsibility, builds trust, and fosters engagement with customers, employees, suppliers, and regulatory bodies (Horsburgh et al., 2017). Studies have highlighted the importance of developing appropriate measurement frameworks and reporting systems for SMEs in healthcare organizations (Loh et al., 2017). These frameworks should consider the unique features and resource constraints of SMEs, ensuring that the measurement and reporting processes are practical, relevant, and associated with sustainability goals (Smaltz et al., 2006). Empirical evidence in (Aras and Crowther, 2011) shows from their survey data that the healthcare sector needs professionals for effective operations and to drive the agenda of the health sector.

3.4. Effects of sustainability practices on the financial and non-financial performance of SMEs in healthcare organizations

In this section, we provide insights into the effects of sustainability practices on the financial and non-financial aspects of SMEs in the healthcare sector, showcasing significant gains. The potential impact of adopting sustainability practices on the performance of SMEs is explored. Applying sustainability practices can positively influence the financial performance of SMEs in the healthcare sector. Research reveals that sustainability initiatives, such as energy productivity measures, waste reduction strategies, and accountable procurement practices, can lead to cost savings and real efficiencies. For example, reducing energy consumption can result in lower utility bills, while waste reduction measures can minimize disposal costs. Moreover, sustainable practices can enhance brand reputation, attract socially conscious customers, and create opportunities for market differentiation, leading to increased revenues and market share. The non-financial impact of adopting sustainable practices is equally positive, improving environmental outcomes through reduced carbon emissions, minimized waste generation, and conservation of resources. This contributes to a better and more sustainable future for establishments and society as a whole.

Furthermore, sustainability initiatives enhance morale, retention, and increase work productivity (Sunmola et al., 2021). Studies have emphasized the potential merits of sustainability practices on both financial and non-financial performance in the context of SMEs in healthcare organizations (Cochran et al., 1984). These findings highlight the value of incorporating sustainability practices into the business strategies of SMEs to achieve lasting success.

3.5. Influence of Institutional and cultural factors on the adoption of sustainability practices in SMEs in Healthcare sectors

In this section, we elaborate on the adoption of sustainability practices in SMEs within healthcare organizations, influenced by a range of institutional and cultural factors. The impact of these factors on the adoption of sustainability practices is discussed, citing relevant studies. Established factors play a vital role in shaping the adoption of sustainability practices in SMEs. Regulatory guidelines, industry standards, and policies endorsing sustainability can provide a helpful environment for SMEs to engage in sustainable practices (Aragón-Correa et al., 2020). For instance,

government initiatives incentivizing sustainability measures, such as tax benefits or subsidies, can encourage SMEs to invest in eco-friendly technologies and practices. Additionally, the presence of industry relations and networks focused on sustainability can aid knowledge sharing, collaboration, and collective action among SMEs (Walker et al., 2008).

Cultural influences also play a crucial role in shaping the adoption of sustainability practices in small and medium enterprises (SMEs). Organizational culture, principles, and attitudes toward sustainability significantly impact the willingness of SMEs to participate in sustainable practices. These cultural factors influence the overall mindset and values within an organization, affecting the extent to which SMEs embrace sustainable performance. Leadership commitment plays a vital role in driving sustainability initiatives within SMEs. When leaders prioritize sustainability and demonstrate a strong commitment to integrating sustainable practices into the organizational strategy, it positively influences the engagement of employees and other stakeholders. This engagement, in turn, fosters a culture of sustainability within the organization. Furthermore, employee engagement is an essential aspect of creating a sustainable culture within SMEs. When employees are actively involved in sustainability initiatives, they feel a sense of ownership and are more likely to embrace and participate in sustainable practices. This active engagement can lead to innovative ideas and behaviors that promote sustainability.

Perception also plays a role, as the organization's perception of sustainability as a planned priority influences the level of commitment and investment in sustainable practices. When sustainability is recognized as a strategic priority, SMEs are more likely to allocate resources, develop sustainable policies, and integrate sustainability into their day-to-day operations. Additionally, previous studies have highlighted the influence of institutional and cultural factors on the adoption of sustainability practices in SMEs within the healthcare sector (Hahn et al., 2015). These studies emphasize the interaction between institutional forces, such as regulations and industry standards, and cultural factors, including values, norms, and beliefs, in shaping the adoption and implementation of sustainability practices. By considering these cultural influences, we aim to provide a comprehensive understanding of how organizational culture, principles, and attitudes toward sustainability shape the willingness of SMEs to participate in sustainability practices. Our research explores the intricate relationship between these factors to shed light on effective strategies for promoting sustainability in SMEs.

Regional/Jurisdictional Particularities, Resource Availability, Cultural Factors, Economic Factors, and Government Policies: The availability of resources, such as renewable energy sources, water, and waste management infrastructure, can vary widely by region, influencing the feasibility of certain sustainability practices. Cultural norms and values can play a significant role in shaping sustainability practices, with regions exhibiting strong environmental consciousness potentially adopting different approaches to sustainability. Economic conditions and disparities across regions can impact the financial resources available to healthcare SMEs for sustainability investments. Variations in government policies, incentives, and regulations in different jurisdictions can lead to differences in the prioritization and implementation of sustainability practices.

3.6. Implications of the outcomes for policy and practice in upholding sustainability practices in SMEs in the healthcare sector

This paper presents the important effects of policy practice for promoting sustainability practice in SMEs in the health sectors (see **Figure 4**) This is the global statistical findings presented by Aragón-Correa et al. (2020). Furthermore, we discuss the implications with various case studies:

Figure 4. Key area of health policy action.

I. One of the key findings in this study is that achieving sustainability in healthcare involves economic sustainability practices driving social sustainability practices, linked through environmental sustainability practices. The framework for sustainable healthcare suggests implementing green healthcare initiatives with circular practices through the integration of care facility design, waste reduction, and management. Sustainable procurement, coupled with green growth and employee satisfaction strategies, will result in saving healthcare costs.

II. The support of government policies and major players is crucial in promoting the sustainability of SMEs in health. Government-developed policies have a significant impact, and if they are supportive and encouraging, the process goes smoothly. This support policy can take the form of grants and subsidies.

III. Capacity building will help increase the expertise of SMEs, enhancing their knowledge for better understanding and implementation of sustainability strategies. Collaboration, additional research, and facilitating knowledge exchange will make sustainable practices a reality (Walker et al., 2008).

IV. Knowledge sharing and collaboration will enable SMEs to learn from each other's experiences and best practices to reach their goals. The creation of forums, networking, and associations will be instrumental in achieving the best practices. Larger healthcare organizations and non-profit organizations can play a role in

promoting sustainable practices and addressing common challenges (Collins et al., 2007).

V. Financial Support: Access to financial resources is a critical factor in the adoption of sustainability practices by SMEs. Financial institutions, investors, and funding agencies can provide financial support to SMEs to implement sustainability initiatives. This can include offering favorable loan terms, investment opportunities, or grants specifically dedicated to supporting sustainable projects in healthcare SMEs (Workman et al., 2018).

The implications outlined above are supported by studies that have examined the role of policy and practice in promoting sustainability practices in SMEs across various industries. These findings highlight the need for a multi-faceted approach involving policy support, capacity building, knowledge sharing, and financial assistance to foster sustainability practices among SMEs in healthcare organizations.

Appendix B comprises 56 components that support sustainability practices in the healthcare sector. These components play a major role in implementing best practices in healthcare and SMEs, contributing to a greener and more sustainable healthcare system that promotes patient well-being.

4. Discussion

Implications

Theoretical Implications: The findings of this study have theoretical implications related to the effectiveness, trade-offs, and synergies associated with sustainability practices in healthcare establishments. It underscores the influence of regulations, government initiatives, and cultural factors as major hurdles in the implementation of sustainability practices in healthcare, especially within SMEs. The theoretical implications extend to the need for further exploration of the effectiveness of different sustainability practices, potential trade-offs, and synergies between sustainability and other organizational goals.

Practical Implications: From a practical standpoint, the adoption of sustainability practices in healthcare establishments, particularly SMEs, can lead to improved financial stability, reduced environmental impact, and enhanced well-being for healthcare stakeholders. The empirical evidence suggests positive effects on cost-effectiveness, operational efficiency, brand reputation, and employee engagement.

Comparative Studies and Cross-disciplinary Research: The study suggests that comparative studies and cross-disciplinary research can contribute to a deeper understanding of the financial and non-financial performance outcomes associated with sustainability practices in SMEs within the healthcare sector.

Government Initiatives and Cultural Factors:Theoretical implications also encompass the significant role played by regulatory frameworks, government initiatives, and cultural factors in influencing the adoption of sustainability practices. These factors shape the landscape for sustainable practices in healthcare organizations.

5. Conclusion

This review provides valuable insights into sustainability practices in the healthcare sector, with a specific focus on SMEs. The healthcare sector, including SMEs, is adopting diverse sustainability measures such as renewable energy and waste reduction, with a commitment to responsible procurement practices. While the paper identifies challenges, including limitations in skilled personnel, financial constraints, and difficulties accessing information and support, it also suggests opportunities for enhancing sustainability practices, such as partnerships with other healthcare sectors, stakeholders, and investments in education.

Future recommendations

Research on Sustainability Practices in Various Sectors: Future research should extend beyond SMEs in the healthcare sector and explore sustainability practices in various sectors. Additionally, there is a need for comparative analyses, especially in larger healthcare organizations.

Identifying Strategies for SMEs: Future research should focus on identifying specific strategies and interventions to address the challenges faced by SMEs in implementing sustainability practices. This could include practical solutions and interventions to overcome barriers.

Impact of Sustainability Practices: Further studies should examine the impact of sustainability practices on both financial and non-financial performance indicators to provide a comprehensive understanding of their benefits.

Cross-disciplinary Collaboration: There is a need for more research that integrates insights from healthcare management, sustainability studies, and related fields to foster cross-disciplinary collaboration and knowledge exchange.

Role of Stakeholders: Future research should explore the role of stakeholders, such as patients, employees, and local communities, in shaping the adoption and success of sustainability practices in healthcare organizations. This would provide a more holistic understanding of sustainability practices in the healthcare industry.

In conclusion, addressing the identified limitations and focusing on the suggested research gaps can contribute to the promotion of sustainable practices in healthcare organizations, leading to improved environmental outcomes, financial stability, and overall well-being. The practical implications, such as financial stability and environmentally impacted employee engagement, along with theoretical implications and the influence of regulatory frameworks and cultural factors, provide a comprehensive foundation for future research and practice.

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Appendix

Table A1. The literature paper included in the research.

S/N	Keywords	Journals	Findings	Type	Years	Ref
1	Enabling Digital Transformation in the Health Source Chain: A Guide towards Unlocking Advantages with Enhancing Healthcare Services	Journal of Business Research	Big data analytics capabilities in healthcare generate valuable business outcomes.	Paper	2017	(Wang, Y., & Hajli, N., 2017)
2	Healthcare in SMEs, implications and Challenges	International Journal of Globalisation and Small Business	impacted SMEs; measures to mitigate crises and leverage opportunities.	Paper	2022	(Dheer, Ratan JS, and Aidin Salamzadeh, 2022)
3	The utilization of digitalization by (SMEs) leads to enhanced efficiency. SMEs.	Journal of Business Research 1	Robotic devices enhance SME productivity and create complementarity among factors.	Paper	2020	(Ballestar, et al., 2020)
4	Challenges preventing the adoption of digitalization among manufacturing SMEs	Journal of Intelligent Manufacturing	Digitization enables manufacturing SMEs to transform, prioritize digital quality practices, and adapt to market trends. Key findings: PDCA cycle, holistic approach, five prioritized processes	Paper	2021	(Dutta, G, et al., 2021)
5	Sustainability, healthcare, knowledge assets, survey, Italy.	Journal of Cleaner Production,	Results show the adoption of formalized sustainability plans, IC's influence on sustainability initiatives, and the importance of advanced technologies for sustainability. The developed model aids healthcare managers in leveraging IC for sustainability.	Paper	2017	(Cavicchi, C., & Vagnoni, E., 2017)
6	companies specializing in healthcare waste disposal operate within a framework of healthcare waste management.	Resources, Conservation, and Recycling	Poor healthcare waste management in Cameroon risks health and the environment.	Paper	2011	(Manga, V. E, et al., 2011)
7	Healthcare sustainability encompasses various aspects such as healthcare education, promoting a healthy diet, utilizing knowledge graphs, and incorporating traditional medicine.	Public Health Nutrition	The innovative Mediterranean diet pyramid promotes a healthy lifestyle and cultural preservation.	Paper	2011	(Bach-Faig, A, et al., 2011)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
8	In the realm of healthcare, digital innovation plays a vital role in promoting sustainability, particularly for small enterprises. It enables incremental development and fosters collaborative learning, facilitating the integration of knowledge.	Education and Information Technologies	Digital transformation in higher education for competitive advantage and strategic evolution.	Paper	2021	(Mohamed Hashim, M. A. et al., 2021)
9	The concept of sustainability in healthcare emphasizes patient-centeredness and is facilitated through the use of digital platforms that encourage interaction.	sustainability	Digital platforms that encourage interaction.	Paper	2021	(Baran, Grzegorz, and Aleksandra Berkowicz, et al., 2021)
10	When it comes to healthcare, the evaluation methods used in health technology assessment are aligned with the viable systems approach, with a focus on sustainability.	International Journal of Technology	Understanding innovation of health technology assessment gives value to well-being	Paper	2022	(Jiu, Li, Milou A. 2022)
11	Sustainable enterprise refers to the practice of corporate sustainability, encompassing social enterprise and social healthcare enterprise. It relates to the sufficiency economy and involves brand management while considering the socioeconomic aspects.	Baltic Journal of Management	The empirical findings indicate evolutionary changes as companies move on a continuum from superficial to embedded sustainable business models and the application of sustainable business practices	Paper	2014	(Høgevold, et al., 2014)
12	An engagement platform in the context of digital health contributes to social sustainability.	Sustainability	using a multiple linear regression analysis, showed that the social sustainability of the digital health platform was directly influenced by online engagement, generating a positive effect on physician loyalty.	Paper	2019	(Lo Presti, et al., 2019)
13	Healthcare sustainability involves anti-corruption measures implemented by healthcare organizations through the implementation of corruption prevention plans.	Global Health Action	the anti-corruption, transparency, and accountability is the key to SMEs and Healthcare	Paper	2020	(Wierzynska, et al., 2020)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
14	Adaptive enterprise architecture is designed specifically for the digital healthcare sector, enabling flexibility and responsiveness to evolving technological advancements and healthcare needs.	Journal of infomation	The digital healthcare industry needs an expert with skilled and re-skilled	Paper	2021	(Masuda, Y, et al., 2021)
15	Small enterprises are driving sustainable innovations that contribute to the transformation of the primary healthcare sector.	International Journal of E-Services and Mobile Applications	Transforming healthcare through entrepreneurial innovations	Paper	2017	(Wallin, Arto, 2017)
16	Challenges of Digitalization in the public sector	2022 IEEE International Smart Cities Conference	Digitalization in the public sector will bring growth to the sector	Paper	2022	(Vaira, Viviana, 2022)
17	Insights of French shareholders on AI in the health sector	Sustainability	Education and communication are essential to shift the traditional points of view on nature in the city.	Paper	2022	(Duffaut, et al., 2022)
18	The general practice of primary healthcare	Sustainability	The finding reveals a growing utilization of telehealth, AI, and mobile health technologies in vascular (circulatory) healthcare.	Paper	2023	(Akinola, Segun, and Arnesh Telukdarie, 2023)
19	Barriers regarding AI implementation in organizations	54th Hawaii International Conference on System Sciences	lack of organizational capabilities related to data; (2) a lack of individual competencies related specifically to AI; and (3) generic implementation barriers previously observed in implementation research that persist with this innovation.	Paper	2021	(Bérubé et al., 2021)
20	Sustainable practices; the healthcare industry; pneumonia acquired within the community.	Clinical Infectious Diseases	pneumonia acquired within the community.	Paper	2010	(Grijalva et al., 2010)
21	What are the challenges faced by small and medium enterprises (SMEs) in adopting digitalization	Nigeran Journal on SMEs	Benefits of information and communication technology in small and medium-sized enterprises:	Paper	2010	(Apulu, Idisemi, and Ann Latham, 2010)
22	How can the obstacles to technology adoption be reduced?	Journal of Enterprise Information Management	SMEs develop ICT-based capabilities in response to their environment	Paper	2018	(Neirotti et al., 2018)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
23	To what extent do small and medium enterprises (SMEs) have access to and utilize technology tools?	The Electronic Journal of Information Systems	The Adoption of e-commerce in the Lesotho Tourism Industry	Paper	2016	(Mapeshoane, Tsebetso J., and Shaun Pather, 2016)
24	How does the utilization of technology impact the livelihood of microenterprises and underprivileged communities?	The electronic journal of information systems	Emergence and a Typology for SMEs and Healthcare	Paper	2008	(Mukerji, Maitrayee, 2008)
25	Is anything significant about cell phones in fostering commercial development with creating innovative prospects for small with medium enterprises (SMEs)?	Journal of Global Information Technology Management	ICT capabilities and the cost of starting businesses in sub-Saharan African economies	Paper	2021	(Samoilenko, Sergey, and Kweku-Muata Osei-Bryson, 2021)
26	How can technology contribute to socio-economic development?	Edward Elgar	Technology contributes to the socioeconomic of SMEs	Paper	2007	(Karake-Shalhoub, Zeinab, and Lubna Al Qasimi, 2007)
27	Healthcare facilities, hospitals, and their supply chains play a vital role in promoting environmental sustainability through lean and Six Sigma practices, emphasizing green initiatives.	Journal of Information & Knowledge Management	Healthcare facilities, hospitals, and their supply chains play a vital role in promoting environmental sustainability	Paper	2020	(Jassim, et al., 2020)
28	Leadership in sustainable healthcare, particularly within pharmaceutical companies, is crucial for driving sustainability performance.	Journal of Health Organization and Management,	20 unidimensional strategic leadership and management factors toward sustainability in healthcare. The findings indicate significant positive effects on SPO in healthcare organizations. Significant factors include human resource management/development, ethics, quality, environment and social responsibility, and stakeholder considerations.	Paper	2022	(Suriyankietkaew, et al., 2022)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
29	In Greece, the intersection of climate change, open health, waste organization, and healthcare excess highlights the significance of sustainability practices in the healthcare sector, particularly in managing medical waste.	Energy Procedia	Climate change, open health, waste organization, and healthcare excess	Paper	2015	(Gusca, et al., 2015, Massoud et al., 2010
30	Monitoring systems play a crucial role in healthcare organizations to ensure the control, viability, and sustainability of operations.	Sustainability	healthcare organizations to ensure the control, viability, and sustainability of operations.	Paper	2018	(Saviano, et al., 2018)
31	Sustainability and the achievement of Sustainable Development Goals (SDGs) are central to the healthcare delivery system,	Primary health care and the Sustainable Development Goals	two to environmental health; and one to achieving universal health coverage (UHC). Four further targets relate to tobacco control, vaccines and medicines, health financing and workforce, and global health risk preparedness.	Paper	2015	(Pettigrew, et al., 2015)
32	The sustainability and governance of open-source electronic health records are key considerations for the healthcare sector.	Journal of the American Medical Informatics Association	Open-source electronic health records are key considerations for the healthcare sector.	Paper	2014	(Goldwater, et al., 2014)
33	The implementation and sustainability of videoconferencing for remote consultations in care homes have the potential to positively impact older adults' admissions and enhance the uptake of healthcare services.	Health & Social Care in the Community	Consultations in care homes have the potential to positively impact older adults' admissions and enhance the uptake of healthcare services.	Paper	2022	(Dennett, et al., 2022)
34	Within the healthcare area, the assessment of SD with human rights is crucial.	Procedia-Social and Behavioral Sciences	The practices are essential, particularly in waste management, including the proper handling of healthcare and hazardous waste materials.	Paper	2016	(Marimuthu, et al., 2016)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
35	In university settings, sustainable practices are essential, particularly in waste management, including the proper handling of healthcare and hazardous waste materials.	Critical Reviews in Environmental Science and Technology	The results highlight the importance of knowledge and awareness of best practices for infection and injury prevention for waste management among workers. An average of 38.9% of medical waste was segregated for proper management, and only 41% of workers were trained in-service for medical waste disposal.	Paper	2022	(Singh, et al., 2022)
36	Andrew Jameson and Jessica Pierce have explored ethical concepts such as beneficence, distributive justice, and rationing within the context of sustainability.	Perspectives in Biology and Medicine	beneficence, distributive justice, and rationing within the context of sustainability.	Paper	2005	(Carrick, Paul, 2005)
37	sustainability in the healthcare sector extends to addressing community-acquired pneumonia, focusing on long-term environmental, social, and economic considerations.	Journal of management	The healthcare sector extends to addressing community-acquired pneumonia, focusing on long-term	Paper	2020	(Plessen, et al., 2020)
38	In developing countries, the normal economy serves as a management tool for SD, particularly in the context of waste management indicators.	Journal of environmental management	The serves as a management tool for SD, particularly in the context of waste management	Paper	2011	(Pires, et al., 2011)
39	In the UAE, social sustainability factors play a significant role in healthcare supply chains, serving as motivators for sustainable practices.	Management Research Review	sustainability factors play a significant role in the healthcare supply	Paper	2015	(Mani, et al., 2015)
40	The integration of sustainable development principles and practices into the business model and supply chain of the healthcare industry fosters sustainability.	Health care analysis	The model integration of sustainable development	Paper	2013	(Brandão, et al., 2013)
41	Stakeholder theory is applied in the context of social sustainability within the healthcare supply chain.	Management Research Review	Stakeholders play a vital role in theory that is applied in the	Paper	2015	(Subramanian, et al., 2020)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
42	Water sustainability is a crucial aspect of sustainability in healthcare, particularly in hospitals.	Sustainable Futures 2	sustainability in healthcare is driven by key players	Paper	2020	(Damoah, et al., 2021)
43	In developing countries, sustainable development encompasses the use of medical drones	Journal of Cleaner Production	Findings indicate that an AI-enhanced medical drone application in HSC contributes significantly to the host country's HSC and sustainable development goals (SDGs) with particular emphasis on climate (SDGs 3, 8 & 13).	Paper	2021	(Hussain, et al., 2019)
44	Stakeholder theory and the Analytic Hierarchy Process (AHP) are utilized to analyze motivators and promote social sustainability within the healthcare supply chain.	Management and Policy Journal	The exploratory phase identified 34 barriers that are relevant to a healthcare supply chain. These barriers were grouped into the following categories: poor infrastructure, organizational culture, poor coordination, stakeholder disparity, and uncertainty. Organizational culture and poor coordination were assigned the highest priority through the AHP. Overall, lack of management support, lack of commitment, and lack of coordination were found to be the top relevant barriers to a healthcare supply chain	Paper	2019	(Li, et al., 2021)
45	The interval-valued fuzzy DEMATEL method is employed to identify key factors and assess the sustainable elements of healthcare waste management.	Journal of Material Cycles and Waste Management	the legal framework supporting sustainability, strengthening sustainable management training or education programs, and positive attitude and perception towards sustainable healthcare waste management are the top three most important factors	Paper	2021	(Ullah, et al., 2021)

Table A1. (*Continued*).

S/N	Keywords	Journals	Findings	Type	Years	Ref
46	Resource interaction in hospitals plays a significant role in achieving social and economic sustainability within the healthcare sector.	International Journal of environmental research and public health	Management must participate in work safety affairs directly and formulate indigenous policies and programs according to local needs. Job analysis is needed to redesign job structures to meet workplace safety requirements. Formal and informal training will be beneficial to make workers and supervisors more aware, more sensitive, and more responsible regarding work safety	Paper	2021	(Dwivedi, et al., 2022)

Table A2. Components that support the sustainability practice in the healthcare sector.

Components	Function	Ref
Environmental Management Systems	Implement sustainable practices to reduce waste, optimize energy and water consumption, and use environmentally friendly materials.	(Chu, et al., 2018)
Green Supply Chain Management	Partner with suppliers who follow environmentally friendly practices, source eco-friendly products, and reduce transportation emissions.	(Powell, et al., 2015)
Stakeholder Engagement	Foster a culture of sustainability, communicate goals and progress, and involve stakeholders in decision-making processes.	(International Organization for Standardization, 2015)
Energy Efficiency and Renewable Energy	Improve energy efficiency in facilities, implement energy-saving technologies, and utilize renewable energy sources.	(Zhu, Q., & Sarkis, J. 2004)
Sustainable Healthcare Waste Management	Implement waste segregation practices, promote recycling and reusing	(Mitchell, R. K, et al., 1997)
Environmental Impact Assessment	Conduct assessments to identify and mitigate the environmental impacts of healthcare operations and services.	(International Energy Agency, 2020)
Water Conservation Measures	Implement strategies to reduce water consumption, such as efficient water fixtures and water recycling systems.	(Chartier, Yves, ed, 2014)
Sustainable Building Design	Incorporate sustainable design principles, use energy-efficient materials, and optimize natural lighting and ventilation.	(Glasson, J., et al., 2019)
Staff Training and Education	Provide training programs to raise awareness about sustainability practices and encourage staff to adopt sustainable behaviors.	(Gleick, P. H., 2003)
Patient Education	Educate patients about sustainable healthcare practices, promote responsible resource use, and encourage them to participate in recycling and waste management initiatives.	(Council, US, 2014)
Community Outreach Programs	Engage with the local community, promote sustainability initiatives, and collaborate on environmental projects.	(Wang, et al., 2018)
Life Cycle Assessment	Evaluate the environmental impact of products and services throughout their life cycle to identify areas for improvement.	(Rosato,et al., 2021)
Carbon Footprint Reduction	Implement procedures to decrease greenhouse gas emissions and minimize the carbon footprint of healthcare operations.	(Pidgeon, et al., 2008)
Sustainable Procurement	Source products and services from suppliers who adhere to sustainability criteria and ethical standards.	(Ramström, et al., 2020)

Table A2. (*Continued*).

Components	Function	Ref
Green IT Practices	Optimize energy consumption and reduce electronic waste through efficient use of information technology.	(Blanes i Vidal, Jordi, and Mareike Nossol., 2011)
Biodiversity Conservation	Protect and enhance biodiversity on healthcare organization premises, promote green spaces, and support local ecosystems.	(Colvile, R. N., Hutchinson, E. J., Mindell, J. S., & Warren, R. F., 2001)
Sustainable Food Practices	Source locally produced and organic food, reduce food waste and implement sustainable food management practices.	(Rana, R. K., & Paul, J., 2017)
Telemedicine and Remote Monitoring	Utilize telemedicine technologies and remote monitoring systems to reduce patient travel and carbon emissions.	(Dangelico, R. M., & Pujari, D. 2010)
Occupational Health and Safety	Ensure a safe and healthy work environment for employees while implementing sustainability measures.	(Welford, 1999)
Energy Management Systems	Implement systems to monitor, control, and optimize energy usage in healthcare facilities.	(Filho, W. L., 2018)
Climate Change Adaptation	Develop strategies to mitigate risks and adapt to the influences of climate change on healthcare operations with infrastructure.	(Sarkis, J, 2010)
Renewable Energy Generation	Install renewable energy systems, such as solar panels or wind turbines, to generate clean energy on-site.	(Butt, J. 2020)
Medication Waste Management	Establish proper procedures for the disposal and recycling of unused or expired medications to minimize environmental impact.	(Ramanathan, U., & Gunasekaran, A., 2014)
Sustainable Transportation	Encourage the use of public transportation, promote cycling and walking, and provide electric vehicle charging stations.	(Jabbour, et al., 2013)
Green Building Certifications	Obtain certifications, such as LEED (Leadership in Energy and Environmental Design), for sustainable building practices.	(Chan, E. S., & Hsu, C. H. 2016)
Health Technology Assessment	Assess the environmental impact and sustainability of health technologies before implementing them in healthcare settings.	(Chen, Y.-S., & Lai, S. B. 2013)
Noise Pollution Control	Implement measures to reduce noise pollution in healthcare facilities, creating a healing and comfortable environment.	(Sharma, A., & Henriques, I. 2005)
Renewable Energy Purchasing	Procure renewable energy from external sources to offset the organization's energy consumption.	(Gungor, A., & Gupta, S. M. 1999)
Sustainable Event Management	Organize sustainable events and conferences, considering factors such as waste reduction, energy efficiency, and responsible catering.	(Gold, S., Seuring, S., & Beske, P. (2010)
Green Cleaning Practices	Use environmentally friendly cleaning products and methods to minimize the use of harmful chemicals and promote indoor air quality.	(Orlitzky, et al., 2003)
Sustainable Staff Transportation	Encourage staff to use public transportation, or carpooling, or provide incentives for using sustainable modes of transportation to reduce carbon emissions from commuting.	(Zhu, et al., 2007)
E-waste Management	Properly dispose of electronic waste through recycling programs and ensure the safe handling and recycling of old electronic equipment.	(Linnenluecke, M. K., & Griffiths, A. 2010)
Green Pharmacy Practices	Implement environmentally responsible practices in medication management, such as proper disposal of pharmaceutical waste and promoting sustainable drug procurement.	(Singh, et al., 2012)
Water Harvesting Systems	Install systems to collect rainwater or condense water for non-potable uses, such as irrigation or flushing toilets, reducing water consumption.	(Svensson, G., & Wagner, B. 2014)
Sustainable Event Procurement	Source event materials and services from environmentally responsible suppliers, considering factors such as eco-friendly packaging and low-impact transportation.	(Kolk, A., & van Tulder, R. 2002)
Renewable Energy Credits	Purchase renewable energy credits or certificates to support renewable energy production and offset the carbon emissions associated with energy consumption.	(Butt, J. 2020).

Table A2. (*Continued*).

Components	Function	Ref
Health and Wellness Promotion	Integrate sustainability into health and wellness programs for employees, patients, and the community, promoting healthy and sustainable lifestyle choices.	(Zeng, et al., 2010)
Green Data Management	Implement sustainable practices in data management, such as virtualization, server consolidation, and responsible disposal of electronic data storage devices.	(Banerjee, S. B. 2003)
Sustainability Governance Structure	Establish a dedicated sustainability governance structure within the organization, including sustainability committees or teams responsible for planning and implementing sustainability initiatives.	(Zhu, Q., et al., 2008)
Water Treatment and Filtration	Implement sustainable water treatment systems to ensure the provision of safe and clean water while minimizing water wastage and chemical usage.	(Jiang, J., & Qu, L. (2020).
Energy-Efficient Lighting	Upgrade lighting systems to energy-efficient alternatives, such as LED lighting, and utilize natural light optimization strategies to reduce energy consumption.	(Sharma, S., & Vredenburg, H. 1998)
Green Public Relations	Communicate sustainability efforts to the public and stakeholders, enhancing the organization's reputation and promoting sustainable healthcare practices.	(Shankar, K. Madan, Devika Kannan, and P. Udhaya Kumar)
Sustainable Landscaping	Adopt sustainable landscaping practices, including native plant selection, efficient irrigation systems, and stormwater management, to minimize environmental impact.	(Bansal, P. 2005.)
Environmental Compliance	Ensure compliance with applicable environmental regulations, permits, and standards, reducing the organization's environmental footprint and legal risks.	(Klassen, R. D., & Whybark, D. C. 1999)
Green Research and Innovation	Encourage research and development of sustainable healthcare solutions, fostering innovation in areas such as green technologies, eco-friendly products, and sustainable healthcare models.	(Sarkis, J. 1998)
Community Health Partnerships	Collaborate with local community organizations and public health agencies to address community health needs, including environmental health concerns and social determinants of health.	(Sharma, S., & Henriques, I. 2005)
Paperless Practices	Promote electronic medical records and digital documentation systems to reduce paper usage, increase efficiency, and decrease reliance on physical storage.	(Lozano, R. 2006)
Sustainable Financial Practices	Incorporate sustainability criteria into financial decision-making, including responsible investment strategies and green banking initiatives.	(Smith, A. D., & Offodile, O. F. 2008)
Sustainable Volunteer Programs	Engage volunteers in sustainability initiatives, such as community clean-up activities, environmental education programs, and sustainable healthcare projects.	(Banerjee, S. B. 2002)
Research Ethics and Integrity	Promote ethical conduct in healthcare research, ensuring transparency, accountability, and responsible use of resources in scientific studies.	(Kuei, et al, 2015)
Energy-Efficient Equipment	Upgrade medical equipment and devices to energy-efficient models, reducing energy consumption and associated greenhouse gas emissions.	(Brown, J. D., Earle, J. S., & Lup, D. 2005).
Pharmacy Automation and Packaging	Implement automation technologies and sustainable packaging solutions in pharmacy operations, optimizing efficiency and reducing waste generation.	(Mol, A. P. 2003)
Green Meetings and Conferences	Organize sustainable meetings and conferences, minimize resource consumption, promote virtual participation options, and select eco-friendly venues.	(Curkovic, S., Sroufe, R., & Landeros, R. 2008)
Sustainable Disaster Preparedness	Develop sustainable disaster response plans, considering environmental and social impacts, and ensuring the resilience of healthcare facilities and services.	(Lin, C. H., Shiang)
Staff Empowerment and Recognition	Empower employees to contribute to sustainability initiatives, recognize their efforts, and provide incentives to encourage sustainable behavior	(Porter, M. E., & Van der Linde, C. 1995) (Zhu, Q., Sarkis, J., & Lai, K.-H. 2013)