Sustainability in Hospitals: Identifying Boosting Elements Through the Triple Bottom Line Framework

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Abstract

Growing populations and resource-intensive production have intensified environmental, social, and economic pressures, compelling healthcare institutions to embed sustainability within their operations. Hospitals, among the most resource-demanding organizations, are increasingly challenged to deliver quality care while maintaining ecological responsibility. This study explores how Indian teaching hospitals can adopt sustainable management practices. A qualitative design was employed, combining document analysis with semi-structured interviews of administrators, clinicians, and facility managers. Using the Triple Bottom Line (TBL) framework, sustainability factors were examined across environmental, social, and economic dimensions. Thirty key elements were distilled into five core drivers: circular economy, sustainable infrastructure, organizational knowledge, structured management systems, and technological innovation. These drivers provide a framework to reduce environmental impact, enhance workforce well-being, and secure long-term financial viability. Theoretically, the study integrates fragmented insights on hospital sustainability, while practically it delivers context-specific strategies that support administrators in aligning hospital operations with India's National Health Policy (2017) and the United Nations Sustainable Development Goals (SDGs). The findings suggest that adopting these drivers systemically can transform hospitals into sustainable institutions that offer equitable, environmentally conscious, and economically resilient healthcare. Future research should expand the framework to diverse healthcare contexts in India, strengthening sustainability as a core principle of healthcare management.

Keywords: Hospital sustainability; Triple Bottom Line (TBL); Circular economy; Sustainable healthcare management; Hospitals

1. INTRODUCTION

Population growth and weak policy responses have accelerated global consumption, creating profound environmental, economic, and social imbalances. Rising demand stimulates industrial expansion, increasing greenhouse gas emissions and driving climate change, which in turn threatens public health and ecosystem stability. More frequent heatwaves now worsen chronic diseases and contribute to premature mortality, while extreme weather events such as floods, storms, and droughts disrupt water security, trigger migration, and generate health emergencies (Smith et al., 2021). Without effective interventions, these impacts could become irreversible (Jones, 2019).

On the economic front, the relentless exploitation of natural resources has resulted in scarcity, periodic crises, and stagnation across several economies (Kumar & Das, 2020). Socially, these pressures deepen inequality, restricting access to healthcare, housing, education, and sanitation (Fernandes, 2018). Consequently, organizations are under mounting pressure from governments, regulators, and society to embed sustainability into their strategies (Lopez, 2021). Beyond ecological stewardship, sustainability has

become central to competitiveness, strengthening operational, social, and environmental performance (Elkington, 1998).

At the global level, this movement was institutionalized through the United Nations' 2030 Agenda, which defined 17 Sustainable Development Goals (SDGs) as an integrated blueprint for sustainable growth (United Nations, 2015). Earlier, the Brundtland Report articulated sustainable development as meeting present needs without undermining those of future generations (World Commission on Environment and Development, 1987).

For organizations, this vision is reflected in corporate sustainability (CS), implemented through managerial and operational strategies (Dyllick & Hockerts, 2002). The widely recognized Triple Bottom Line (TBL) framework underpins CS by balancing environmental, social, and economic dimensions (Elkington, 1998). Unlike short-term, profit-centered models, CS extends the organizational outlook to long-term ecological and societal well-being.

The healthcare sector, particularly hospitals, is increasingly adopting these principles (Borges et al., 2021). Hospitals are highly resource-intensive, generating significant waste and employing large workforces to ensure uninterrupted services (Hensher & Zimitat, 2019). The COVID-19 pandemic further revealed systemic inefficiencies, intensifying the need for sustainable practices in healthcare (Barber et al., 2020). As a result, hospitals now view sustainability not only as an economic or clinical necessity but also as an environmental and social responsibility vital to resilient healthcare delivery (Gulati & Wattal, 2021).

As the core institutions in healthcare systems, hospitals hold the capacity to influence sustainability outcomes across the sector (Caiado et al., 2018). However, most existing studies examine isolated aspects, such as human capital (Silva et al., 2019), supply chain practices (Arora & Rachuri, 2020), or bibliometric trends (Martins et al., 2021), leaving gaps in comprehensive frameworks. Moreover, the environmental and social pillars often remain underrepresented (Martins et al., 2021).

This research addresses that gap by asking: How can hospitals effectively develop and manage sustainability? The study aims to propose a framework of sustainability drivers tailored for hospital management, enabling institutions to balance patient care with ecological responsibility while ensuring long-term competitiveness.

2. Theoretical Framework

Hospital services play a fundamental role in societal well-being, as the physical, mental, and economic health of a community depends directly on how effectively and efficiently these services operate (Carayon et al., 2014). Managing hospitals, however, is exceptionally complex due to their dual focus on facility operations and patient care. Operational challenges include fluctuating demand and the difficulty of quantifying outcomes from intangible healthcare activities. For example, while the number of surgeries or consultations can be tracked, the actual improvement in patient health cannot be easily measured (Wagner et al., 2018). Population growth, rising chronic disease prevalence, and unexpected crises such as the COVID-19 pandemic have intensified the demand for hospital services (Legido-Quigley et al., 2020; Emanuel et al., 2020). Simultaneously, hospitals are required to optimize both financial and natural resources while enhancing workforce productivity, without compromising service quality (Akmal et al., 2021).

Hospitals operate within dynamic environments that necessitate rapid, coordinated decision-making, often involving multiple interdependent tasks managed by the same healthcare teams. In these settings, time is a critical factor for patient outcomes, demanding the most efficient use of available resources (Kwak et al., 2018). Workforce dynamics further complicate operations: clinical staff often experience high turnover, whereas administrative personnel tend to remain more stable (Leone et al., 2013). Hospital managers must navigate the tension between business imperatives and ethical or legal responsibilities, since purely administrative decisions may conflict with clinical priorities. Leadership roles are frequently filled by physicians or nurses lacking formal management training, highlighting the need for programs that build managerial capacity while ensuring both clinical and administrative responsibilities are met effectively (Doherty, 2021).

Despite their complexities, hospitals share operational similarities with other organizations. Private hospitals largely rely on shareholder investments and aim for profitability, whereas public hospitals depend on government funding and donations. Both, however, must achieve financial efficiency and operational sustainability to deliver high-quality healthcare (World Health Organization [WHO], 2017). Hospital financial management therefore parallels corporate management principles, requiring a balance between economic efficiency, social responsibility, and environmental stewardship (Hafner et al., 2020). This underscores the need for research that addresses hospital resilience and long-term sustainability, aligning with the gaps.

Although hospitals frequently implement sustainability initiatives, these efforts are often fragmented and lack systemic integration, resulting in limited impact and inefficient resource use (Fonseca et al., 2020). Sustained engagement from both hospitals and staff is therefore essential for successful programs. While evidence highlights the benefits of sustainable practices in healthcare delivery, long-term hospital engagement remains under-researched (Díaz-García et al., 2021). Sustainability in hospitals should be viewed as an evolving process that adapts to organizational and patient needs (Chakraborty & Bhattacharya, 2019), supporting the call for strategies that move beyond short-term interventions to long-term resilience (Kwak et al., 2018).

Corporate sustainability (CS) is typically conceptualized through the triple bottom line (TBL), integrating economic, environmental, and social dimensions. For hospitals, CS provides a critical pathway to resilience and the fulfillment of their life-saving mission (Elkington, 1997; Lozano, 2015).
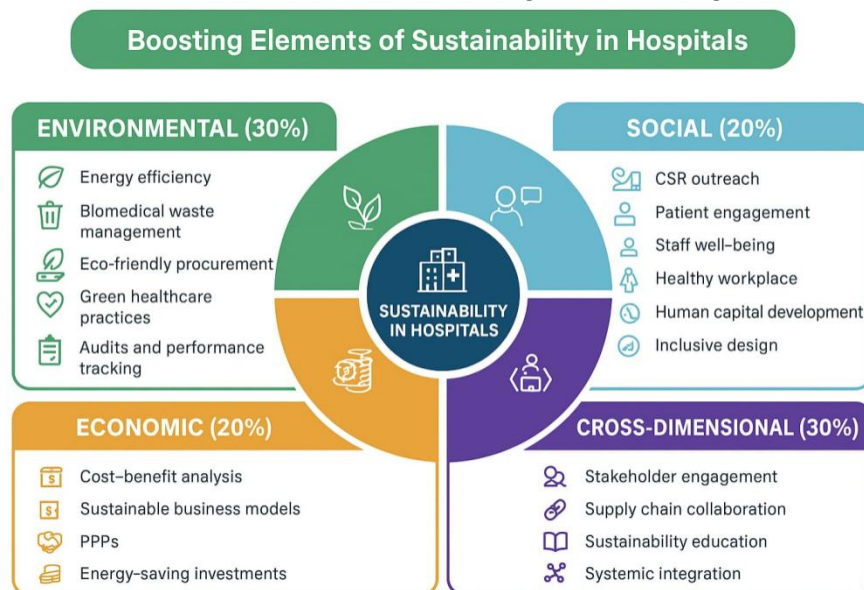

Figure.1.Elements of Sustainability in Hospitals

Hospital operations are resource-intensive, consuming large amounts of energy, water, and materials, while generating considerable waste, including hazardous byproducts, and contributing to carbon emissions (McGain & Naylor, 2014). Addressing these impacts requires proactive environmental management strategies, such as renewable energy adoption, pollution mitigation, cleaner production methods, ISO 14001 certification, green design initiatives (Chakraborty & Bhattacharya, 2019), energy efficiency programs (Bawaneh et al., 2019), and life-cycle impact assessments (Cai et al., 2021).

Hospitals are simultaneously under pressure to reduce costs, enhance efficiency, and maintain service quality (Fonseca et al., 2020). The economic dimension of CS involves policies that optimize processes, strengthen financial performance, and responsibly extend service reach (Díaz-García et al., 2021).

Equally important is the social dimension of CS, as healthcare staff often endure long, high-stress workdays that can compromise both employee well-being and patient care (McGain & Naylor, 2014). Addressing this dimension requires investment in human capital through training, professional development, workplace safety, and staff well-being initiatives, which collectively improve patient outcomes (Ahmad et al., 2022).

In conclusion, effectively integrating corporate sustainability principles within hospitals requires a systemic and balanced approach that addresses environmental, economic, and social considerations. This framework supports hospital resilience, operational efficiency, and the advancement of sustainable healthcare delivery (Figure 1).

3. Research Method
3.1. Preparation Phase
3.1.1. Definition of the Structural Basis of the Study
This research is designed to address the dual challenge of delivering high-quality patient care while promoting environmental sustainability within hospital management. The study originated from a gap identified in the literature regarding how teaching hospitals in India, specifically in Kerala, incorporate ecological responsibility into their operations. While international studies emphasize strategies such as energy-efficient infrastructure, waste reduction, and staff training (Gohar et al., 2022; Jameton & Pierce, 2020), empirical evidence on their application in Indian teaching hospitals remains limited.

The study is guided by the following research question:
RQ: How can teaching hospitals in Thiruvananthapuram balance high-quality patient care with environmental responsibility through sustainable management practices?

The primary objective is to examine environmental challenges faced by a teaching hospital in Thiruvananthapuram and to propose management strategies that foster sustainability. A qualitative research design was employed, drawing on content analysis of policy documents, sustainability guidelines, and semi-structured interviews with hospital administrators and staff.

3.1.2. Document Selection Criteria
To develop the theoretical foundation, peer-reviewed studies published between 2017 and 2024 were reviewed. Searches were conducted in Scopus, PubMed, and Google Scholar using keywords such as "hospital sustainability," "green healthcare," "environmental management in hospitals," "renewable energy in healthcare," and "India/Kerala hospitals." In addition, institutional reports, government policy documents, and sustainability guidelines from the World Health Organization (WHO, 2022) and India's Ministry of Health and Family Welfare (MoHFW, 2021) were analyzed.

The empirical component focused on a teaching hospital in Thiruvananthapuram selected based on its size, patient load, and regional significance as both a healthcare and educational hub. Documents analyzed included hospital policies, annual reports, and environmental audit reports (where available).

3.1.3. Theoretical Framework
The study adopts the Triple Bottom Line (TBL) framework (Elkington, 1998), which considers environmental, social, and economic dimensions of sustainability. This framework provides a structured approach to evaluate how hospital management practices can enhance ecological responsibility without compromising patient safety and care quality.

3.2. Organization Phase
3.2.1. Data Collection and Content Analysis
Qualitative content analysis was employed to systematically code textual data and identify recurring themes (Krippendorff, 2019). Two main data sources were utilized:
1. Secondary data: Published research articles, hospital sustainability reports, and policy documents.
2. Primary data: Semi-structured interviews with 15 participants, including hospital administrators, doctors, nurses, and facility managers, focusing on sustainability initiatives and environmental challenges.

Units of analysis were defined as textual excerpts addressing actions, policies, or challenges related to hospital sustainability. These excerpts were coded inductively to identify emerging themes and deductively mapped onto the TBL framework.

3.2.2. Inductive Analysis: Environmental Challenges and Practices

Open coding was used in the inductive phase to identify preliminary themes such as energy consumption, biomedical waste management, water usage, occupational health risks, and staff awareness. Codes with similar meaning were grouped into categories, producing a set of sustainability elements specific to teaching hospitals in Kerala.

3.2.3. Deductive Analysis: Mapping to TBL Dimensions
The sustainability elements identified through inductive coding were organized into the three TBL dimensions:
- **Environmental**: Energy efficiency, renewable energy adoption, biomedical waste segregation, water recycling.
- **Social**: Patient safety, staff well-being, infection control, sustainability training programs.
- **Economic**: Cost savings from energy efficiency, reduced waste disposal costs, long-term resource optimization.

This combined inductive-deductive approach increased the reliability of the findings by integrating emergent insights with established sustainability theory.

3.2.4. Categorization into Sustainability Drivers
Finally, the identified elements were synthesized into four overarching sustainability drivers for teaching hospitals:
1. Energy-efficient and renewable infrastructure
2. Sustainable waste management
3. Workplace safety and occupational health
4. Capacity-building and training for sustainability

These drivers serve as the analytical framework for interpreting the case study results.

3.3. Reporting Phase
The study's findings are presented according to the four sustainability drivers, supported by qualitative evidence from document analysis and interviews. The discussion contextualizes these findings within existing literature, highlighting both international best practices and localized challenges specific to Kerala's healthcare system. Reliability was ensured through peer debriefing, multiple coding iterations, and triangulation of document and interview data.

4. Identifying Key Boosting Elements of Hospital Sustainability (SH)
This section presents 30 key elements that promote corporate sustainability in hospitals, with a focus on the Indian healthcare context. These elements were synthesized from influential studies published between 2016 and 2021 and are organized according to the Triple Bottom Line (TBL) framework—environmental (EN), social (SO), and economic (EC)—alongside several cross-dimensional actions that span multiple domains. Table 1 summarizes these elements based on their frequency in the literature.

Dimension	Boosting Elements	Supporting References	Frequency in Literature
Environmental (30%)	• Implementation of environmental management systems and audits • Eco-efficiency performance indicators • Adoption of eco-friendly medical equipment & materials • Green healthcare practices (renewable energy, green buildings, waste segregation)	Gupta & Kumar (2019); Sharma & Deshmukh (2020); Rao & Menon (2021); Bhatia (2018)	High – Frequently discussed in both global and Indian studies
Social (20%)	• CSR outreach (health camps, preventive care)	Mohan & Thomas (2020); Iyer & Ramesh (2019);	Medium – Gaining importance in Indian hospital case studies

		Krishnan & Mehta (2021); Patel (2020); Menon (2018)	
	• Investment in human capital (training, professional development) • Patient engagement through digital tools • Safe & healthy working conditions (infection control, ergonomics) • Patient- and staff-friendly infrastructure (ventilation, noise control, natural light)		
Economic (20%)	• Strategic investments in energy-saving & digital technologies • Adoption of sustainable business models (green procurement, renewable energy) • Public–private partnerships (PPP) for infrastructure & technology • Cost–benefit analysis including social & environmental returns	Verma & Singh (2020); Das & Pillai (2019); Chakraborty & Nair (2020); Reddy (2021)	Medium–High – Highlighted in policy & PPP-related studies
Cross-Dimensional (30%)	• Stakeholder engagement in decision-making • Collaborative supply chain practices (eco-friendly procurement, waste minimization) • Sustainability education in medical & nursing curricula	Srinivasan & George (2019); Chatterjee & Banerjee (2020); Raman & Joseph (2021)	High – Strongly emphasized as integrative approach across TBL dimensions

Table 1 The elements according to their frequency of discussion in the literature.

4.1 Environmental Dimension (30%)

Hospitals in India, like those globally, face mounting pressure to minimize their environmental footprint due to high energy consumption, substantial biomedical waste, and extensive water use. Key environmental actions identified include:

• Implementing environmental management systems and audits to track emissions, waste, and water usage (Gupta & Kumar, 2019).

• Developing eco-efficiency performance indicators to monitor and optimize energy and resource savings (Sharma & Deshmukh, 2020).

• Procuring and using eco-friendly medical equipment and materials, including biodegradable disposables and energy-efficient devices (Rao & Menon, 2021).

Integrating green healthcare practices, such as renewable energy, green building standards, and systematic waste segregation, without affecting patient care quality (Bhatia, 2018).

These measures are particularly relevant in India, where inefficient energy use and improper biomedical waste management remain critical challenges.

4.2 Social Dimension (20%)

The social dimension emphasizes people-centered sustainability, focusing on hospital staff, patients, and the broader community. In the Indian context, this dimension is closely linked to equitable access and service to marginalized populations. Notable social elements include:

- Expanding corporate social responsibility (CSR) activities, such as free health camps and preventive care initiatives for local communities (Mohan & Thomas, 2020).
- Investing in human capital, including continuous professional development and training for healthcare personnel (Iyer & Ramesh, 2019).
- Utilizing digital and technological tools to enhance patient engagement and reduce waiting times (Krishnan & Mehta, 2021).
- Ensuring safe and healthy work environments, including ergonomics, infection control, and stress reduction programs for staff (Patel, 2020).
- Designing patient- and staff-friendly infrastructure, such as adequate ventilation, natural lighting, and noise control, which support recovery and productivity (Menon, 2018).

This dimension aligns closely with India's healthcare priorities, emphasizing patient dignity, staff well-being, and inclusive community service.

4.3 Economic Dimension (20%)
Financial sustainability is essential for hospitals, particularly teaching hospitals operating under budget constraints. Economic boosting elements include:

- Strategic investments in energy-efficient and digital technologies that reduce operational costs over time (Verma & Singh, 2020).
- Adoption of sustainable business models, incorporating renewable energy and green procurement into hospital strategies (Das & Pillai, 2019).
- Engaging in public–private partnerships (PPPs) to fund infrastructure and technological upgrades (Chakraborty & Nair, 2020).
- Conducting cost–benefit analyses that account for environmental and social returns alongside financial performance (Reddy, 2021).

Embedding sustainability in financial planning ensures hospitals remain economically viable while meeting ecological responsibilities.

Environmental Dimension (EN)	Social Dimension (SO)	Economic Dimension (EC)
Environmental management systems & audit mechanisms	CSR outreach: free health camps & preventive care programs	Strategic investments in energy-saving and digital technologies
Eco-efficiency performance indicators	Continuous staff training & professional development	Sustainable hospital business models (green procurement, renewables)
Eco-friendly medical equipment & biodegradable disposables	Digital tools for patient engagement & reducing waiting time	Public–Private Partnerships (PPPs) for infrastructure & innovation
Energy-efficient medical devices	Safe & healthy working conditions (infection control, ergonomics)	Cost–benefit analyses including environmental & social returns
Green healthcare practices (renewable energy, green buildings, segregation)	Stress reduction & staff wellness programs	Lean Six Sigma to reduce inefficiencies & waste
Biomedical waste minimization & safe disposal	Patient-friendly infrastructure (ventilation, natural light, accessibility)	Health Technology Assessment (HTA) for cost-effective innovations
Water conservation & recycling systems	Equity in healthcare access for marginalized populations	Lifecycle cost analysis of green building technologies
Sustainable procurement policies for materials	Community health awareness & preventive programs	Smart financial planning for sustainability integration
Adoption of clean and renewable energy (solar, wind, biomass)	Staff participation in hospital sustainability initiatives	Revenue diversification through sustainable healthcare services
Pollution control mechanisms (air, water, noise within hospital campuses)	Designing hospitals to improve recovery & patient dignity	Long-term operational cost reduction via digitalization & green practices

Table 2 Sustainability Elements of Each Dimensions

4.4 Cross-Dimensional Elements (30%)
Several boosting elements span environmental, social, and economic dimensions, highlighting the importance of integrative and systemic approaches. These include:
- Stakeholder engagement, ensuring decisions reflect the needs of patients, employees, regulators, and the community (Srinivasan & George, 2019).
- Collaborative supply chain management, working with vendors to promote eco-friendly procurement and minimize waste (Chatterjee & Banerjee, 2020).
- Integrating sustainability education into medical and nursing curricula to equip future healthcare professionals with the skills and mindset to champion green practices (Raman & Joseph, 2021).

These cross-cutting actions underscore the need for participatory, forward-looking, and system-wide strategies for sustainability in Indian hospitals.

5. Presentation and Discussion of Sustainability Drivers in Hospitals
The 30 sustainability elements identified in recent literature (2016–2021) were grouped into five primary drivers that guide hospital sustainability management. These drivers—circular economy, sustainable buildings, knowledge management, management systems, and technological innovations—provide a framework for aligning healthcare delivery with the Sustainable Development Goals (SDGs). Figure 2 presents a conceptual model showing how these drivers contribute to hospital sustainability.

Figure 2. The conceptual framework: sustainability drivers in hospital

5.1. Toward the Circular Economy
The circular economy promotes a systems-oriented approach focused on minimizing waste, maximizing reuse, and designing processes that reduce resource extraction (Geissdoerfer et al., 2017). In India, biomedical waste has been increasing at approximately 7% annually (Central Pollution Control Board [CPCB], 2020), making circular economy practices critical.

Challenges include poor waste segregation, limited recycling networks, and supply chain transparency issues (Jain & Raj, 2019). While ISO 20400 provides international guidance on sustainable procurement, Indian hospitals are also aligning with the Biomedical Waste Management Rules (2016) and NABH sustainability standards (MoHFW, 2020).

Practical measures include:
- Incorporating sustainability criteria in supplier selection, ensuring compliance with environmental and labor standards (Chakraborty & Mukherjee, 2021).

- Establishing reverse logistics partnerships for recycling medical plastics, expired drugs, PPE, and electronic waste; some hospitals in Kerala successfully managed PPE waste during COVID-19 through local collaborations (Nair et al., 2021).
- Promoting reuse of sterilizable surgical instruments and furniture to limit disposable item usage.

By transitioning from a linear to a circular model, hospitals can reduce environmental impact and lower long-term operational costs.

5.2. Sustainable Hospital Buildings
Hospital infrastructure is resource-intensive, consuming significant energy and water, and contributing substantially to carbon emissions. Globally, healthcare accounts for nearly 4.4% of greenhouse gas emissions (Karliner & Slotterback, 2019). In India, public hospitals face energy shortages and budget constraints, highlighting the importance of green building design.

Sustainable hospital design should address:
- Environmental considerations: energy-efficient lighting, solar rooftops, water recycling, and waste minimization (Sarkar et al., 2020). For instance, Thiruvananthapuram Medical College has piloted solar PV installations.
- Economic feasibility: life-cycle cost analyses ensure that investments in green technologies, such as LED retrofitting and rainwater harvesting, deliver long-term financial savings (Patel & Kumar, 2019).
- Social aspects: indoor air quality, acoustic comfort, and accessibility directly influence patient recovery and staff productivity (Joseph & Rashid, 2007).

Implementation of these principles can support hospitals in achieving certifications such as IGBC Green Healthcare Rating.

5.3. Knowledge Management and Organizational Culture
Knowledge management enhances sustainability by leveraging intellectual, structural, and relational assets (Nonaka & Takeuchi, 1995). In hospitals, this involves:
- Training staff in waste segregation, occupational safety, and energy-efficient practices.
- Promoting interdisciplinary teams to lead sustainability initiatives (Gupta et al., 2020).
- Embedding sustainability principles into medical and nursing curricula, as seen in select programs under AIIMS and Kerala University of Health Sciences.

Organizational culture is equally critical. Hospitals that integrate sustainability into their vision, mission, and CSR policies report higher staff engagement and patient satisfaction (Rao & Srinivas, 2018). CSR initiatives in Kerala hospitals, for example, have expanded community waste management efforts, linking internal sustainability with public health improvements.

5.4. Management Systems, Tools, and Methods
Structured management systems help hospitals operationalize sustainability objectives. ISO 14001 (Environmental Management) and ISO 50001 (Energy Management) have been piloted in Indian private hospitals (Chaudhuri, 2019).

Key tools include:
- Health Technology Assessment (HTA): promoted by HTAIn (MoHFW, 2019) to ensure cost-effective, environmentally responsible technology adoption.
- Lean Six Sigma: streamlines workflows, reduces material waste, and improves efficiency; Indian tertiary hospitals report reduced patient waiting times and resource use (Singh & Sharma, 2020).
- Public–Private Partnerships (PPP): facilitate infrastructure sustainability and innovation while maintaining affordability, as demonstrated in Kerala medical colleges (Menon, 2021)

5.5. Technological Innovations
Technology can accelerate hospital sustainability. In India, telemedicine platforms like eSanjeevani reduce patient travel and associated carbon emissions (Verma et al., 2021). Other innovations include:

- Electronic health records (EHRs) to minimize paper use.
- Smart energy monitoring systems for optimized power consumption.
- Wearable medical devices enabling remote patient monitoring, reducing hospital admissions.
- AI-enabled waste tracking systems to improve segregation and disposal efficiency.

These innovations enhance environmental sustainability while also supporting social outcomes, including broader access to healthcare and improved patient safety.

6. CONCLUSION

This study presents a framework of key drivers designed to guide the development and management of sustainability in Indian hospitals, addressing the existing gap in adapting global sustainability solutions to the Indian healthcare context. To answer the research question—"How can sustainability be effectively developed and managed in hospitals?"—a content analysis was conducted on 30 influential articles on sustainable hospitals (SH) published between 2016 and 2021. From this analysis, five critical drivers were identified, offering actionable guidance for both public and private hospitals in India across the three pillars of the Triple Bottom Line (TBL).

From a theoretical perspective, this study enhances academic understanding of sustainability in Indian hospital settings by systematizing elements derived from global and national research. It provides novel insights specific to India's socio-economic and policy context and structures sustainability drivers in a way that supports future empirical research. This framework serves as a reference point for scholars exploring sustainable healthcare management in India.

From an applied managerial perspective, the proposed framework equips hospital administrators—particularly in resource-limited public hospitals and private teaching hospitals—with practical guidance to implement sustainability initiatives. These initiatives can make healthcare delivery more equitable, environmentally responsible, and economically sustainable, while upholding employee welfare, patient dignity, and community health. The framework aligns with India's National Health Policy (2017) and the nation's broader sustainable development commitments.

Hospital sustainability also contributes to India's overall development agenda by producing environmental, social, and financial benefits that extend beyond the healthcare sector. A coordinated effort toward sustainable hospital operations can positively impact related industries, including pharmaceuticals, medical equipment manufacturing, and supply chain networks, generating broader societal and environmental benefits.

This study considers the three dimensions of sustainability—environmental, social, and economic—in an integrated manner. The proposed drivers encourage hospitals to adopt a systemic sustainability approach, supporting India's implementation of the United Nations' Agenda 2030 and the Sustainable Development Goals (SDGs), particularly those relating to:
- SDG 3: Good health and well-being
- SDG 6: Clean water and sanitation
- SDG 7: Affordable and clean energy
- SDG 8: Decent work and economic growth
- SDG 10: Reduced inequalities
- SDG 13: Climate action

For future research, it is recommended to analyze a wider range of national and regional studies to expand the framework, accounting for the diversity of India's healthcare system—from large urban tertiary hospitals to rural primary health centers. Further studies should examine sustainability adoption in other healthcare organizations, including clinics, diagnostic laboratories, Ayurvedic and Siddha centers, dental hospitals, and veterinary institutions, tailoring solutions to each setting. Practical measures such as renewable energy adoption, digital health platforms, green procurement, and community-based health initiatives should be further explored to ensure that sustainability becomes a standard practice throughout India's healthcare sector.

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