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Green Transformational Leadership, GHRM, and Pro-Environmental Behavior: Pathways to Sustainable Healthcare

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ABSTRACT

This study examines the impact of green transformational leadership, green human resource management, and pro-environmental behavior on sustainable performance. Despite the increasing emphasis on environmental sustainability, the mechanisms through which organizational practices translate into sustainable outcomes remain insufficiently understood. Employing a mixed-methods design, the study combines qualitative interviews with healthcare managers in Palestine and a quantitative survey analyzed using partial least squares structural equation modeling. The findings indicate that green transformational leadership has a direct positive effect on green human resource management, pro-environmental behavior, and sustainable performance. Furthermore, green transformational leadership enhances sustainable performance indirectly through a sequential mediation process: it promotes green human resource management practices, which encourage pro-environmental behavior, ultimately leading to improved sustainability outcomes. These results contribute to theory by demonstrating how leadership practices cascade through organizational systems to strengthen environmental performance, and they provide practical implications for advancing sustainability within the healthcare sector.

1 | Introduction

Since the early nineteenth century, globalization has intensified environmental concerns related to extensive resource utilization and rapid economic expansion (Tang et al. 2018; Thaher and Jaaron 2022). Contemporary research increasingly holds corporations accountable for climate change, emphasizing their substantial contributions to the release of environmentally harmful substances (Mousa et al. 2025b). According to the United Nations Foundation, observed global warming is largely attributable to human activities, as reflected in unprecedented atmospheric carbon dioxide concentrations—higher than at any point in at least the past two million years—which have led to rising global temperatures. With average global temperatures now exceeding one degree above preindustrial levels, the world

is experiencing heightened climatic uncertainty, increased frequency of extreme weather events, and growing threats to food security, underscoring the urgent need for coordinated action and cross-sectoral guidance (UN 2023).

In response, many nations have implemented environmental policies and regulatory frameworks to promote sustainable and circular development (Perez et al. 2023; Thaher et al. 2025). Scholars and environmental advocates increasingly emphasize that organizations must adopt sustainable practices, with leadership playing a pivotal role in driving these initiatives (Farrukh et al. 2022). Green transformational leadership (GTFL) has emerged as a critical mechanism for encouraging employees to think creatively, generate innovative solutions, and engage in proactive environmental initiatives—behaviors that are

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essential for fostering organizational innovation and achieving sustainability objectives (Abbasi et al. 2025). Similarly, employees' pro-environmental behaviors (PEBs) are vital to advancing sustainability, as they are driven by a sense of responsibility to address environmental challenges (Liu et al. 2023; Shoab et al. 2022). Complementing this perspective, empirical evidence demonstrates that green human resource management (GHRM) practices significantly enhance organizational environmental performance (EP). The design and effective implementation of GHRM initiatives—and the success of broader sustainability strategies—are fundamentally shaped by the collective knowledge, competencies, and attitudes of both management and employees (Jaaron et al. 2025).

Research further highlights that employees at all organizational levels play a critical role in shaping environmental outcomes (Song et al. 2021; Adu Sarfo et al. 2024; Mousa et al. 2025a; J. Luo et al. 2025). To respond effectively to stakeholder expectations and address sustainability challenges, organizations must leverage intangible resources such as GTFL and GHRM practices (Singh et al. 2020; Rimaldi et al. 2024). These practices foster internal capabilities, enhance employee competencies, and ultimately contribute to improved sustainable performance (Awan et al. 2023). Despite growing recognition of their importance, much of the existing literature has examined GTFL, PEBs, and GHRM in isolation, predominantly within manufacturing or small and medium-sized enterprise (SME) contexts. Consequently, there remains a significant paucity of empirical research examining their interrelationships, particularly within healthcare organizations (Niazi et al. 2023; Al-Hakimi et al. 2024; Le et al. 2024). To address this gap, the present study proposes and empirically tests an integrative framework that explains how GTFL, GHRM, and PEBs interact to achieve environmental objectives and enhance sustainability outcomes. Notably, no prior research has examined these constructs collectively within the healthcare sector of a developing-country context such as Palestine.

Integrating environmentally sustainable practices and GTFL within healthcare institutional frameworks represents an emerging area of scholarly inquiry that continues to gain increasing attention (Li et al. 2023; Mousa et al. 2025a). To address the complexity of this research domain, the present study adopts a sequential exploratory mixed-methods design, comprising an initial quantitative phase followed by a qualitative phase. This design is particularly well-suited for examining multifaceted organizational phenomena, as it enables researchers to establish generalizable relationships through quantitative analysis and subsequently deepen their understanding of the underlying mechanisms through qualitative inquiry (Creswell et al. 2004; Creswell and Clark 2017). The broader methodological literature emphasizes the value of mixed-methods approaches in overcoming the limitations inherent in single-method designs, highlighting their capacity to generate more comprehensive, nuanced, and valid insights (Tashakkori and Creswell 2007; Tashakkori and Teddlie 2010; Bryman and Bell 2011).

Within the fields of sustainability and GHRM, mixed-methods approaches have increasingly been employed to capture the complex interplay between organizational practices and employee behaviors that cannot be fully understood through quantitative

or qualitative methods alone. For example, Pham et al. (2019), Farrukh et al. (2024), Hajj Hussein and Bou Zakhem (2024), and Muñoz-Pascual et al. (2019) combined quantitative testing with qualitative exploration to examine how GHRM practices influence organizational citizenship behavior, creativity, knowledge sharing, and brand-related outcomes. Similarly, in healthcare and related service contexts, Mousa and Othman (2020) and Nguyen and Nguyen (2025) demonstrated the explanatory power of mixed-methods designs in linking green HRM practices to sustainable performance and innovation.

Despite these contributions, the application of sequential exploratory mixed-methods designs to the study of GTFL, PEB, and GHRM within healthcare institutions remains limited. Addressing this gap, the present study systematically integrates quantitative measurement with qualitative exploration, thereby enhancing both the robustness and contextual richness of the empirical findings. Accordingly, this research employs a sequential exploratory mixed-methods design adapted from Creswell and Clark (2017), characterized by an initial quantitative investigation to develop and test the study's conceptual model, followed by a complementary qualitative phase. Both phases are conducted within the context of Palestinian healthcare organizations.

The healthcare sector occupies a paradoxical position: it is entrusted with safeguarding public health while simultaneously contributing substantially to environmental degradation (Rahat et al. 2024). Healthcare operations generate hazardous and infectious waste that requires responsible management, including safe reuse, recovery, and recycling practices, without compromising health outcomes. Despite advances in sustainability scholarship, the healthcare sector remains relatively underexplored, particularly in developing countries where inadequate infrastructure and regulatory gaps exacerbate environmental risks (Pham et al. 2020). Globally, healthcare facilities are responsible for approximately 5% of total greenhouse gas emissions; however, the adoption of sustainable practices is frequently constrained by financial limitations and insufficient environmental awareness (Singh et al. 2022).

In developing regions such as Palestine, healthcare institutions face a range of distinctive challenges, including systemic inefficiencies, resource scarcity, and heightened environmental vulnerability. Waste management is particularly problematic, as inadequate segregation and reporting mechanisms often lead to the underestimation of hazardous waste generation (Mousa et al. 2025b). Hospitals in Palestine generate between 0.54 and 1.82 kg of hazardous waste per bed per day, underscoring the urgent need for sustainable waste management interventions (Al-Khatib et al. 2020). Beyond environmental pressures, the Palestinian healthcare system is further constrained by political instability, limited financial resources, and persistent shortages of medical supplies (Battat and Marie 2022). Since October 7, 2023, escalating regional tensions have placed severe strain on an already fragile healthcare system, prompting urgent intervention and support from the World Health Organization (WHO 2024).

Against this backdrop, the present study pursues four specific objectives:

1. To investigate the role of GTFL in influencing GHRM, PEBs, and sustainable performance.
2. To examine the direct and indirect effects of PEBs on sustainable performance.
3. To analyze the mediating role of GHRM in the relationship between GTFL and PEBs.
4. To test the mediating effects of PEBs in the relationship between GTFL and sustainable performance within healthcare organizations in Palestine.

This research makes several important contributions to the existing literature. First, it advances understanding of PEBs and sustainability within healthcare organizations, particularly in the context of a developing country. By empirically examining how GTFL and PEBs influence sustainable performance, the study provides meaningful insights into the drivers of sustainability in healthcare settings. Second, the research addresses a critical gap by analyzing the mediating roles of GHRM and PEBs—relationships that have been rarely explored within healthcare contexts in developing economies (Farrukh et al. 2022; Pham et al. 2020). Third, the study employs a sequential exploratory mixed-methods design, offering a comprehensive methodological approach to examining the complex interactions among GTFL, GHRM, PEBs, and sustainable performance. Finally, by focusing on Palestine, the research enhances the contextual relevance of sustainability scholarship and extends its applicability to other resource-constrained healthcare systems.

The remainder of the manuscript is organized as follows. Section 2 presents the exploratory study (qualitative phase). Section 3 outlines the theoretical background and develops the hypotheses. Section 4 describes the research methodology. Section 5 reports the empirical findings, and Section 6 discusses the implications, limitations, and directions for future research.

2 | Methodology

The methodological approach adopted in this research follows a two-phase sequential design that integrates qualitative and quantitative paradigms. The initial qualitative phase (Study 1) facilitates a systematic exploration of the research phenomena and supports the development of a theoretically grounded conceptual framework. This framework is subsequently subjected to empirical validation through quantitative hypothesis testing in the second phase (Study 2), thereby ensuring methodological rigor through sequential integration. Study 1 examines the effects of GTFL on GHRM, employees' PEBs, and sustainable performance, while also investigating the mediating roles of GHRM and employees' PEBs. Building on the theoretical insights generated in Study 1, Study 2 employs quantitative methods to empirically test the proposed conceptual framework.

2.1 | Study 1

The initial qualitative phase involved semi-structured interviews with leaders and subject-matter experts in human

resource management and environmental management within the healthcare sector. This phase aimed to generate in-depth insights, uncover practical linkages, and identify additional factors influencing sustainable performance in healthcare organizations. A total of 18 interviews were conducted with administrative managers, quality department managers, human resource managers, and domain experts drawn from a range of healthcare organizations, including governmental, private, military, and nonprofit institutions. All interviews were audio-recorded with participants' consent and transcribed verbatim shortly after completion.

An interview protocol, informed by Creswell et al. (2004), was employed to ensure that discussions remained focused on key constructs related to sustainable performance in healthcare. Illustrative interview questions included:

- How does GTFL contribute to your organization's sustainability efforts?
- What role do GHRM practices play in reinforcing sustainability within your healthcare organization?
- What are the primary challenges or barriers to implementing GHRM practices in the healthcare sector?

2.2 | Qualitative Data Analysis and Results

Semi-structured interviews were audio-recorded, transcribed, and analyzed using MAXQDA (2022). The software facilitated systematic coding, theme development, and cross-case comparison (MAXQDA 2022). Coding was conducted through iterative examination of words, sentences, and paragraphs, generating coded segments, matrices, and analytic memos that supported interpretation. Analysis identified four main GHRM themes: (1) green hiring, (2) green training and involvement, (3) green performance management and compensation, and (4) barriers to GHRM adoption.

Green hiring extended beyond traditional recruitment by integrating environmental criteria into selection processes. Organizations assessed candidates' environmental awareness and role-specific ecological responsibilities, particularly competencies related to medical waste segregation—reflecting the sector's environmental impact. These findings indicate that environmental stewardship is increasingly treated as a core competency.

Green training and involvement reflected the integration of environmental content into professional development. Participants emphasized linking environmental awareness to patient care and evaluating training effectiveness, suggesting that green training is approached as a strategic investment rather than a compliance requirement.

Green performance management and compensation revealed a paradigm shift toward nonfinancial and moral rewards, recognizing that environmental motivation transcends monetary incentives by tapping into intrinsic values and professional identity. Integrating environmental indicators into performance evaluations reconceptualizes healthcare excellence, positioning

clinical competency and environmental stewardship as complementary priorities.

Implementation barriers provided crucial insights into sustainability challenges in developing healthcare systems. Insufficient environmental legislation underscores regulatory frameworks' importance in shaping organizational behavior, revealing voluntary adoption limitations. Leadership and employee commitment emerged as dual challenges requiring buy-in at strategic and operational levels. Organizational infrastructure challenges—including resource constraints and capacity limitations—further complicate implementation. The West Bank's political situation adds unique contextual complexity, affecting resource allocation, institutional stability, and organizational priorities.

Figure 1 presents MAXQDA output and thematic analysis results, illustrating these subthemes within Palestinian healthcare organizations.

MAXQDA analysis identified three primary sustainable performance themes within Palestinian healthcare organizations: EP, economic performance (EcP), and social performance (SP) (Figure 2).

EP reflects comprehensive ecological stewardship addressing healthcare's environmental impact. Efficient resource utilization represents a fundamental shift from resource-intensive models toward sustainable consumption through optimized material usage, waste reduction, and conservation protocols maintaining clinical quality. Electronic systems integration reduces

energy consumption, demonstrating technological innovation's role in sustainability. Healthcare organizations leverage digital transformation as an environmental strategy, recognizing that digitization substantially reduces paper usage, streamlines operations, and minimizes energy-intensive manual tasks, aligning operational efficiency with environmental responsibility. Clean energy utilization, particularly solar panels, signifies proactive carbon footprint reduction, integrating environmental measures with sustainability objectives in resource-constrained settings. Medical waste segregation emerged as a critical environmental practice, addressing healthcare's significant ecological challenges. Proper waste separation reduces environmental contamination, ensures regulatory compliance, and demonstrates professional responsibility, underscoring that environmental stewardship requires systematic implementation across organizational levels.

EcP, particularly market share expansion, reflects deeper strategic sustainability implications. In Palestinian healthcare, where resources are limited and competition intense, market share growth indicates organizational resilience, community trust, and service accessibility. These findings challenge assumptions that sustainability efforts compromise economic outcomes, suggesting environmental and social responsibility function as competitive advantages attracting patients and stakeholders valuing sustainable practices.

SP exhibits comprehensive thematic development, reflecting healthcare's core social mission. Creating healthy work environments for employees and patients represents holistic wellness

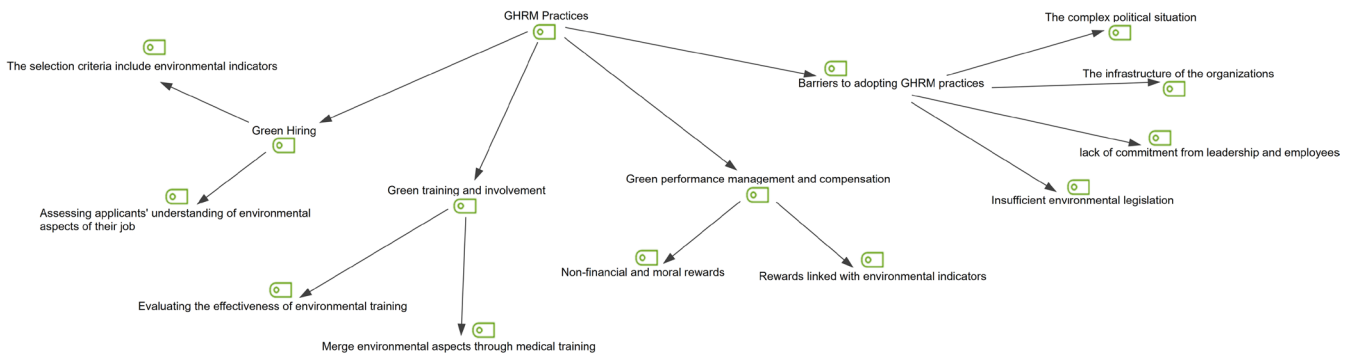


FIGURE 1 | The MAXQDA output and thematic analysis of GHRM practices.

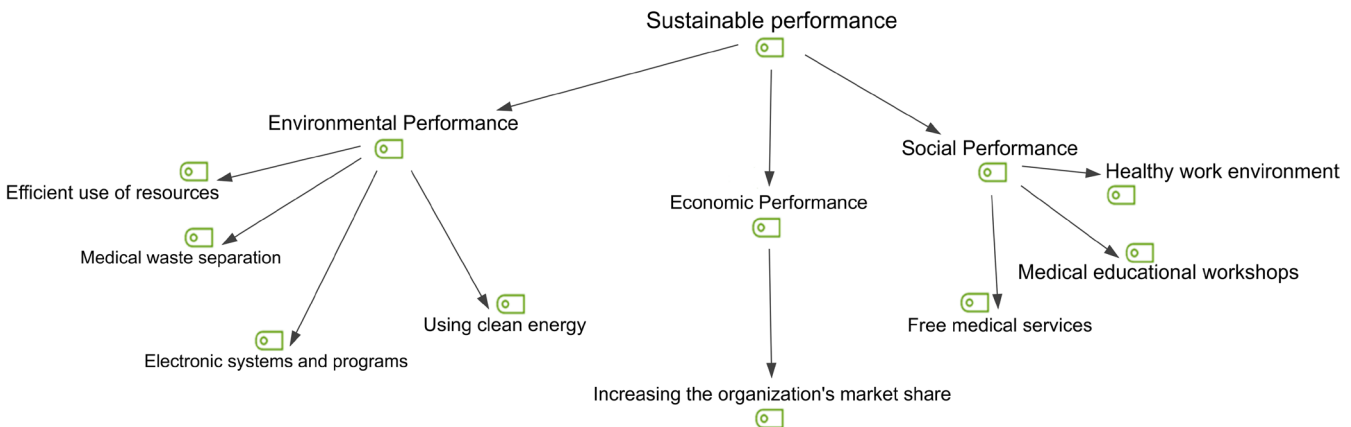


FIGURE 2 | The MAXQDA output and thematic analysis of sustainable performance.

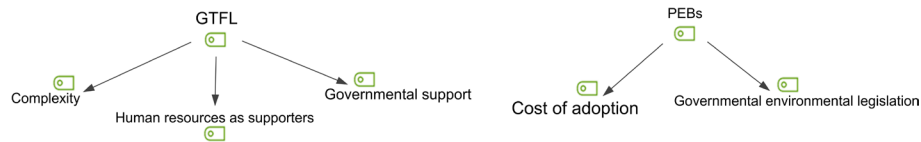


FIGURE 3 | The MAXQDA output and thematic analysis of GTFL and PEBs.

extending beyond clinical care, acknowledging that employee well-being directly influences patient care quality. Medical education workshops demonstrate commitment to knowledge dissemination and community empowerment, positioning organizations as educational resources promoting health literacy. Free medical services provision demonstrates social responsibility and healthcare equity commitment. In contexts where economic barriers limit care access, free services reflect social justice and community investment, underscoring that organizational sustainability must ensure healthcare accessibility for vulnerable populations.

MAXQDA analysis of GTFL within Palestinian healthcare organizations identified key themes (Figure 3): governmental support, human resources as enablers, and organizational complexity.

Insufficient governmental support extends beyond resource allocation, highlighting fundamental gaps in institutional infrastructure necessary for sustainable healthcare transformation. Healthcare organizations operate in policy vacuums where environmental sustainability lacks national prioritization, leaving institutions to navigate sustainability challenges without coordinated regulatory frameworks or guidance. This deficit manifests as absent environmental healthcare regulations, limited financial incentives for green practices, inadequate infrastructure, and lacking interorganizational coordination mechanisms. Healthcare leaders perceive insufficient governmental attention, indicating GTFL implementation occurs despite rather than because of systemic support.

Human resources as crucial supporters reflect a paradigmatic shift in HR roles within healthcare. Rather than administrative functions, HR professionals act as sustainability change agents, actively promoting, implementing, and sustaining GTFL practices, positioning HR as strategic transformation partners. HR professionals' "positive impact" suggests unique organizational influence, bridging leadership vision with employee implementation. Successful GTFL implementation requires HR professionals to understand both human dynamics and environmental sustainability principles.

Organizational complexity reveals GTFL implementation faces fundamental challenges regarding conceptual understanding and cultural acceptance. Healthcare professionals trained primarily in clinical excellence experience cognitive dissonance integrating environmental considerations into professional identity. This manifests as intellectual challenges understanding sustainability concepts and emotional resistance to change. Healthcare environments characterized by high-stakes decision-making and standardized protocols may resist innovations complicating established procedures or introducing additional performance criteria.

MAXQDA analysis of PEBs in Palestinian healthcare revealed two subthemes: governmental environmental legislation and cost of adoption.

2.2.1 | Governmental Environmental Legislation

Significant legislative gaps reflect a fundamental disconnect between environmental urgency and political prioritization. Healthcare organizations operate within regulatory vacuums where environmental considerations lack systematic governmental attention, leaving institutions without coordinated policy frameworks, standardized guidelines, or enforcement mechanisms. This manifests as absent healthcare-specific environmental standards, waste management protocols, energy efficiency requirements, pollution control regulations, and sustainable procurement guidelines. Healthcare leaders perceive regulatory absence as evidence that environmental issues remain peripheral to governmental priorities despite healthcare's substantial ecological footprint.

2.2.2 | Cost of Adoption

Economic barriers extend beyond budgetary constraints to encompass complex resource allocation decisions and competing priorities. Healthcare organizations acknowledge "high upfront costs" of green strategies while recognizing "long-term cost-effectiveness," creating economic paradoxes where financial logic supports environmental investment but operational realities constrain implementation. Economic complexity includes capital investments in green technologies, increased transition operational costs, training expenditures, infrastructure modifications, and opportunity costs from reallocating resources from immediate needs to long-term environmental investments.

Figure 3 presents MAXQDA results illustrating code themes and subthemes for GTFL and PEBs. Table 1 summarizes codes, themes, and subthemes from qualitative analysis.

2.3 | Discussion on Qualitative Findings

Based on qualitative interview insights, a conceptual framework was developed investigating GTFL's direct influence on GHRM, employees' PEBs, and sustainable performance, while examining potential mediating roles of GHRM and PEBs. Qualitative exploration illuminates employer and employee perceptions of GTFL and GHRM practices, revealing their influence on PEB engagement and sustainable performance attainment. The framework hypothesizes direct positive associations between GTFL and three organizational outcomes: GHRM, PEBs, and sustainable performance. Emergent themes indicate employees perceive GHRM practices as

TABLE 1 | Central themes, codes, and issues discussed.

Central theme	Issue(s) discussed	Theme
GTFL	The role of GTFL on sustainable performance Support from decision makers The role of the HR department The emerging concept of GTFL in healthcare organizations	Governmental support HR support Complexity
GHRM practices	<ul style="list-style-type: none"> – The hiring process and criteria for selection – The environmental training – The evaluations and compensation process – The obstacles and barriers to the adoption of GHRM 	<ul style="list-style-type: none"> – Green hiring: <ul style="list-style-type: none"> • The environmental criteria for selecting • Assessing the environmental aspects of the job – Green training and involvement: <ul style="list-style-type: none"> • Environmental aspects through medical training • Evaluation of environmental training – Green performance management and compensation: <ul style="list-style-type: none"> • Nonfinancial and rewards • Linked evaluating performance with environmental indicators – Barriers: <ul style="list-style-type: none"> • Environmental legislation • Commitment from leadership • The infrastructure of the healthcare organizations • Political situation
PEB	<ul style="list-style-type: none"> – The governmental environmental legislation – Resource for adoption environmental practices 	<ul style="list-style-type: none"> – The governmental environmental legislation – Cost of adoption
Sustainable performance	<ul style="list-style-type: none"> – Environmental practices. Economic practices – Practices for social 	<ul style="list-style-type: none"> – Environmental performance: <ul style="list-style-type: none"> • Efficient use of resources • Using clean energy • Medical waste separation – Economic performance: <ul style="list-style-type: none"> • Market share – Social performance: <ul style="list-style-type: none"> • Healthy work environment • Medical education workshops • Free medical services

organizational enablers promoting PEBs while enhancing sustainable performance. Participants reported that GTFL and GHRM implementation act as a motivational catalyst, stimulating innovative initiatives, reducing organizational environmental impact.

However, qualitative analysis suggests the GTFL-sustainable performance relationship operates through complex mediating pathways rather than direct causation. Findings indicate intermediary mechanisms—specifically GHRM practices and PEBs—mediate employee engagement in environmentally responsible behaviors and innovative environmental responses. Building on these insights, this study proposes that psychological empowerment moderates the GTFL-sustainable performance relationship, as participants consistently described experiencing empowerment from organizational support for sustainability engagement. Psychological empowerment emerges as an amplifying mechanism strengthening GTFL's sustainable performance impact. Additionally, qualitative findings reveal

that individuals with strong intrinsic environmental concern demonstrate greater empowerment propensity and increased personal accountability, promoting organizational sustainability. The conceptual framework integrating these qualitative insights and theoretical propositions is illustrated in Figure 4.

2.4 | Study 2

Upon completing the exploratory qualitative investigation, the research progressed to the quantitative phase, which involved hypothesis development and empirical testing of the conceptual framework. While conceptual frameworks provide a broad theoretical understanding of research constructs, formal hypotheses are necessary to generate precise, falsifiable predictions that can be empirically tested. Drawing on the resource-based view (RBV) and the ability-motivation-opportunity (AMO) theory as theoretical foundations, specific hypotheses were formulated

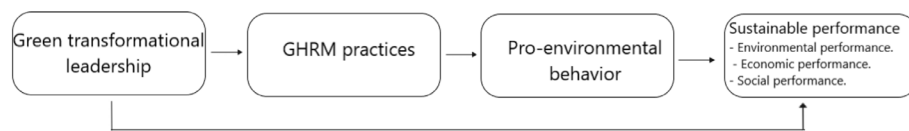


FIGURE 4 | The research theoretical framework.

to predict the nature and direction of relationships among the study's focal variables.

3 | Literature Review and Hypothesis Development

3.1 | Theoretical Background

This research employs a multi-theoretical framework grounded in the RBV and the AMO theory to examine the effects of GTFL, GHRM, and PEBs on sustainable performance outcomes. The theoretical model incorporates the mediating roles of GHRM practices and PEBs within these relationships. The primary objective is to analyze organizational sustainable performance within the context of the Palestinian healthcare sector. While the relationship between human capital and firm performance is well established, this study extends the existing literature on human resource management and strategic management (J. Barney 1991; Renwick et al. 2013).

RBV posits that organizational performance and competitive advantage arise from the strategic deployment of resources that are valuable, rare, and difficult for competitors to imitate. When strategic resources possess unique characteristics and are inaccessible to competitors for substitution or replication, organizations can achieve superior performance and establish a sustainable competitive advantage (T. Iftikar et al. 2022). Firms that structure their strategies around resources characterized by path dependency, causal ambiguity, social complexity, and intangibility often outperform those relying primarily on tangible assets. These principles, sometimes referred to as “resource-picking” strategies, emphasize leveraging assets and capabilities that are valuable, rare, and difficult to replicate, thereby generating economic rents and competitive advantage (J. B. Barney 2001). In the context of HRM-performance linkages, employees and leaders are considered critical organizational resources. The primary objective of GHRM is to develop, motivate, and provide opportunities for employees to exhibit superior behaviors, thereby enhancing green performance and sustaining competitive advantage (Singh et al. 2019). Human capital satisfies RBV conditions for cultivating and sustaining superior organizational performance due to its integration within complex social structures, ensuring unique capabilities that are difficult for competitors to replicate (Shahzad et al. 2023).

Complementing RBV, this study adopts the AMO theory (Appelbaum 2000), which posits that employee abilities, motivation, and opportunities collectively drive performance outcomes. The AMO framework offers an integrative perspective explaining how leadership and HRM practices enhance organizational performance and has gained considerable prominence in HRM research (T. Iftikar et al. 2022). According to AMO, promoting employee engagement, creating opportunities for participation, and developing organizational capabilities are essential

for improving performance. Previous research has applied AMO to investigate how GHRM practices shape employees' abilities, motivations, and opportunities, thereby influencing attitudes, behaviors, job performance, and EP (Al-Swidi et al. 2021; Sun et al. 2022).

In this study, we examine the effects of GTFL on the combined influence of GHRM and PEBs in fostering organizational sustainable performance. We argue that GTFL, GHRM, and PEBs collectively play a crucial role in enhancing sustainability outcomes and promoting environmentally responsible practices within healthcare organizations.

3.2 | Variables of the Research Study

3.2.1 | Green Transformational Leadership

GTFL has gained increasing scholarly attention due to its influence on employees' PEBs (Mansoor et al. 2021). GTFL refers to leadership behaviors that inspire and motivate employees to achieve organizational environmental goals by articulating a clear green vision and supporting environmentally responsible actions beyond formal requirements (Y. S. Chen and Chang 2013; T. Chen and Wu 2022).

Building on transformational leadership theory, Avolio and Bass (1988) identified four core dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. These dimensions have been extended to the environmental context (Farrukh et al. 2022). Green idealized influence reflects leaders' role-modeling of environmental values. Green inspirational motivation involves communicating a compelling environmental vision aligned with strategic objectives. Green intellectual stimulation encourages employees to develop innovative green solutions that enhance EP. Green individualized consideration emphasizes supportive leader-follower relationships that foster pro-environmental values and engagement (Sobaih et al. 2022). Overall, GTFL facilitates the acquisition of environmental knowledge (Hameed et al. 2022) and promotes eco-friendly products, services, and green process innovation, thereby improving organizational EP (Niazi et al. 2023).

3.2.2 | Green Human Resources Management

Human resource management has evolved considerably, with GHRM emerging prominently since the 1990s. HRM is increasingly recognized as a strategic partner in environmental management, contributing to organizational sustainability (Ahmad 2015). Growing global competition and escalating environmental challenges have compelled organizations to integrate environmental considerations into their policies and

systems (Sharma et al. 2022). Because environmental preservation ultimately depends on human awareness and action, organizations must cultivate eco-conscious practices (Joshi et al. 2023).

GHRM refers to HRM practices aligned with green management objectives, designed to influence organizational environmental outcomes and employees' PEBs (Gim et al. 2022). It supports environmental strategy by enhancing employee effectiveness, reducing resource waste, and strengthening EP (Adu Sarfo et al. 2024). Core practices include green recruitment and selection, environmental training, performance appraisal, and reward systems that foster ecological capabilities and motivation (Darvishmotevali and Altinay 2022). Through these mechanisms, GHRM facilitates the implementation of environmentally responsible initiatives and enables employees to address environmental challenges effectively. In this study, GHRM represents a central and evolving approach for promoting environmentally friendly workplaces and sustainable performance (Pham et al. 2020). Despite its growing relevance, it remains underexplored, warranting further empirical investigation (Tanova and Bayighomog 2022).

3.2.3 | Pro-Environmental Behaviors

In recent years, the pursuit of environmental preservation and sustainability has emerged as a critical objective within organizational frameworks, prompting companies to adopt business practices that comply with eco-friendly standards. One strategy for achieving environmental sustainability involves encouraging employees to engage in PEBs consistently and proactively (Farrukh et al. 2022). PEBs encompass responsible actions that support the organization's environmental goals and reflect employees' willingness to participate in sustainable initiatives (Perez et al. 2023). Examples include conserving water and energy, segregating waste, using duplex printing, promoting stair use over elevators, and sharing information on sustainability practices among staff (Liu et al. 2023).

The importance of PEBs has intensified, particularly following the COVID-19 pandemic, which disrupted global systems and prompted renewed scrutiny of the relationship between human activity and natural ecosystems (Omarova and Jo 2022). The success of organizational green initiatives depends heavily on employees' adoption of PEBs, which not only help preserve ecological systems but also enhance EP (Elshaer et al. 2021). Moreover, PEBs contribute to both the financial and nonfinancial success of organizations, reinforcing their strategic value (Farrukh et al. 2022).

3.2.4 | Sustainable Performance

The term *sustainable development* was first introduced in the World Conservation Strategy report by the International Union for the Conservation of Nature and Natural Resources (Brown et al. 1987). The central themes of sustainability are captured in the 3P framework—People, Planet, and Profits—devised by Elkington (2013), who initially explored the concept in 1994

and coined the term “triple bottom line” (Elkington 2013). Sustainable performance is understood as the fulfillment of stakeholders' expectations across three primary dimensions: environmental, economic, and social (Awwad Al-Shammari et al. 2022). It reflects organizations' commitment to achieving objectives in these domains for long-term growth, with particular emphasis on financial performance to meet shareholders' expectations (Roscoe et al. 2019).

Sustainable performance has emerged as a response to the environmental risks posed by economic activities, aiming to replace environmentally harmful practices with eco-friendly alternatives (Roscoe et al. 2019). Achieving sustainable performance requires organizations to integrate social and ecological considerations alongside economic goals through the adoption of sustainable, value-driven, and socially responsible management practices. Accordingly, sustainable performance encompasses a combination of EP, EcP, and SP (Santoyo-Castelazo and Azapagic 2014).

3.3 | Hypothesis Development

3.3.1 | GTFL and GHRM

GTFL fosters a culture of ethics, commitment, cohesion, and green innovation by articulating a compelling environmental vision that motivates employees to exceed EP expectations (Aftab et al. 2022; Sun et al. 2022). Through intellectual stimulation and role modeling, GTFL enhances creativity and innovation—key drivers of sustainable performance. Prior research shows that transformational leadership positively influences organizational outcomes such as performance management, efficiency, innovation, and talent development (Zhu et al. 2005; Jia et al. 2018).

GHRM represents a strategic HRM dimension aimed at promoting pro-environmental sustainability by developing and reinforcing environmentally responsible employee behaviors (Yong et al. 2020). Evidence suggests that GTFL strengthens GHRM practices—including green recruitment, training, appraisal, and compensation—by inspiring and guiding employees toward environmental objectives (Farrukh et al. 2022; Zhu et al. 2005). In this way, GTFL facilitates the effective implementation of GHRM functions that align employee behaviors with organizational environmental goals and enhance competencies, motivation, and engagement in pro-environmental activities (Alwali and Alwali 2025; Mousa et al. 2025a; J. Luo et al. 2025).

Drawing on AMO theory (Appelbaum 2000), this study posits that GTFL leverages GHRM practices to strengthen employees' abilities and motivation while creating opportunities for participation in environmental initiatives that support sustainable performance (Hameed et al. 2022; Perez et al. 2023). From a RBV perspective, GTFL constitutes a strategic organizational asset that enhances GHRM implementation by shaping employee skills and behaviors. In turn, GHRM policies build valuable capabilities that positively influence PEBs (Cahyadi et al. 2022). Accordingly, the following hypothesis is proposed:

H1. *GTFL positively influences GHRM practices.*

3.3.2 | GTFL and PEBs

Social psychology research suggests that employees develop behaviors by observing and imitating others, particularly influential figures within their work environment (Bandura 1976; Sobaih et al. 2022). Leadership, therefore, plays a critical role in fostering PEBs. When leaders demonstrate commitment to sustainability, cultivate eco-oriented cultures, and provide necessary resources, they create conditions that encourage environmentally responsible actions. Employees are more likely to adopt behaviors that are modeled, recognized, and rewarded by their leaders (Hasan et al. 2024).

GTFL enhances employees' ecological awareness, competencies, and motivation, thereby strengthening their capacity to engage in sustainable practices (T. Chen and Wu 2022). By exemplifying environmentally responsible decision-making and establishing strong leader–follower relationships, GTFL sets behavioral standards that employees are inclined to emulate (Y. S. Chen and Chang 2013). This modeling effect encourages voluntary participation in sustainability initiatives, including recycling, material reuse, eco-friendly product development, and pollution prevention (Liu et al. 2023).

Empirical evidence consistently demonstrates that environmental transformational leadership significantly influences employee outcomes, particularly PEBs (Sachdeva and Singh 2023). Through inspirational motivation and meaningful engagement, GTFL shapes employees' environmental attitudes and behavioral intentions (Sachdeva and Singh 2023; Ansari and Khan 2024). Furthermore, the core dimensions of GTFL—motivational inspiration, intellectual stimulation, and individualized consideration—strengthen leader–follower relationships and promote environmentally supportive behaviors (Omarova and Jo 2022). Accordingly, this study proposes a positive association between GTFL and employees' PEBs.

H2. *GTFL positively affects employees' PEBs.*

3.3.3 | GTFL and Sustainable Performance

GTFL reflects leaders' ability to inspire employees to pursue environmental objectives and exceed standard expectations in environmentally responsible behavior. It encompasses idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (T. Chen and Wu 2022). Empirical evidence indicates that GTFL promotes PEBs, enhances EP, and fosters sustainability-oriented organizational cultures (Sobaih et al. 2022).

Sustainable healthcare integrates environmental stewardship with the pursuit of long-term EP, EcP, and SP, while ensuring balanced outcomes across system components (Berniak-Woźny and Rataj 2023). Within this context, GTFL advances sustainable performance by shaping employees' PEBs and aligning individual values with organizational sustainability objectives (Weber and Kassab 2024). The growing emphasis

on environmental sustainability has accelerated green transformation across HRM and operations management (Mousa and Othman 2020; Malik et al. 2021). Sustainable performance is further strengthened through integration with complementary factors such as green innovation, environmental knowledge, green CSR, and green supply chain management (Imran et al. 2021; Munawar et al. 2022; Niazi et al. 2023; Kara et al. 2023; Kanan et al. 2023). In this framework, GTFL functions as a strategic driver of sustainable performance (Jia et al. 2018; Le et al. 2024).

Prior studies show that alignment between employee environmental initiatives and organizational sustainability policies enhances competencies, productivity, and long-term sustainability outcomes (Weber and Kassab 2024). Additionally, GHRM and GTFL jointly mitigate environmental and social impacts, thereby improving sustainable performance (Zhao and Huang 2022). However, empirical evidence on GTFL within healthcare organizations remains limited, contributing to insufficient awareness of the sector's environmental footprint and leadership-based solutions (Berniak-Woźny and Rataj 2023; Mousa et al. 2025a). Accordingly, this study proposes the following hypothesis:

H3. *GTFL practices have a positive impact on sustainable performance (EP, EcP, and SP).*

3.3.4 | GHRM Practices and PEBs

Human resource management plays a central role in advancing environmental sustainability through the adoption of GHRM. GHRM encompasses HR practices designed to enhance environmental outcomes and align employee behaviors with organizational environmental strategies (Ahmad 2015; Perez et al. 2023). Accordingly, it is closely associated with employees' PEBs and broader environmental management initiatives (Elshaer et al. 2021; Omarova and Jo 2022).

PEBs refer to workplace behaviors intended to generate positive environmental outcomes, such as energy conservation and resource efficiency. These behaviors may be task-related or discretionary and constitute a core component of organizational environmental management systems (Ozkan et al. 2024). Through structured policies and practices, GHRM fosters environmentally responsible behavior, benefiting employees, organizations, and society.

Empirical evidence consistently supports the positive relationship between GHRM and PEBs (Farrukh et al. 2022; Perez et al. 2023; Liu et al. 2023). Effective GHRM systems enhance employee motivation, engagement, and environmental attitudes, thereby increasing the adoption of both prescribed and voluntary PEBs. This relationship has been confirmed across diverse contexts, including manufacturing, SMEs, and hospitality (Farrukh et al. 2022; Al-Sabi et al. 2024). Furthermore, GHRM has been shown to mediate the relationship between GTFL and PEBs, reinforcing leadership's indirect influence on environmentally responsible behavior (T. Iftikar et al. 2022). Based on these arguments, it is proposed that:

H4. *GHRM has a positive effect on PEBs in healthcare organizations.*

3.3.5 | PEBs and Sustainable Performance

Environmental sustainability has become a strategic priority for organizations, leading to the integration of eco-friendly practices into managerial and operational activities (Perez et al. 2023). Among these efforts, employees' PEBs represent a critical mechanism for enhancing EP and advancing sustainable practices (Elshaer et al. 2021). Organizations that promote PEBs benefit from reduced costs, improved reputation, progress toward sustainability goals, and strengthened competitive advantage (Hasan et al. 2024).

PEBs include workplace actions such as energy efficiency, resource conservation, recycling, reduced printing, and responsible water use (Ozkan et al. 2024). Although environmental management has received substantial scholarly attention, the determinants of employees' PEBs remain underexplored despite increasing global concerns about climate change and resource scarcity (Liu et al. 2023).

Employees' PEBs act as catalysts for ecological transformation and often extend beyond formal role requirements, contributing to both organizational effectiveness and environmental well-being (Perez et al. 2023). The success of sustainability initiatives depends largely on employee engagement in such behaviors (Liu et al. 2023). However, integrating ecological sustainability into HRM strategies remains challenging, and limited research has systematically examined the drivers of PEBs.

Empirical evidence from healthcare and other service sectors indicates that PEBs positively influence environmental and sustainable performance (Abdelkareem et al. 2024; J. Luo et al. 2025; Nisar et al. 2021; Shoaib et al. 2022; Elshaer et al. 2023). Accordingly, it is proposed that:

H5. *PEBs have a positive effect on sustainable performance (EP, EcP, and SP) in healthcare organizations.*

3.3.6 | GTFL and Sustainable Performance: The Mediating Role of GHRM

GHRM has emerged as a strategic approach that integrates environmental management with sustainable performance to enhance organizational effectiveness (Joshi et al. 2023; Khan et al. 2023). GTFL complements this approach by addressing employees' needs and capabilities while embedding green practices within HRM systems to achieve environmental objectives (Singh et al. 2020; Rimaldi et al. 2024; J. Luo et al. 2025). In response to escalating environmental challenges, organizations increasingly rely on such strategies to reduce ecological impact and improve sustainable performance (Ahmad 2015; Naseer et al. 2023).

Leadership shapes influence processes that facilitate goal attainment, whereas GHRM operationalizes environmental management through structured HR practices. Their integration fosters

a climate conducive to green initiatives (Farrukh et al. 2022). Through targeted recruitment, training, and development, GHRM enhances environmental awareness and strengthens organizational reputation (Hameed et al. 2022; Niazi et al. 2023).

Sustainability is widely recognized as a source of long-term competitive advantage. By adopting GHRM practices, organizations enhance environmental, social, and EcP while aligning with stakeholder expectations (U. Iftikhar et al. 2021; Saunila et al. 2018; Li et al. 2022). HRM practices shape employee attitudes and behaviors that ultimately influence performance outcomes (Dumont et al. 2017). Empirical evidence confirms that GHRM positively affects the triple bottom line, strengthening competitive advantage (Awwad Al-Shammari et al. 2022; Shahzad et al. 2023; Zhao and Huang 2022). However, GHRM alone may be insufficient to sustain long-term green competitiveness (Malik et al. 2021; Shoaib et al. 2022).

Leadership therefore emerges as a critical antecedent of effective GHRM implementation. Executive support reinforces eco-friendly behaviors and facilitates the development of sustainable products and processes (Sun et al. 2022). Although GTFL positively influences employees' PEBs, its direct impact on sustainable performance may be limited (Shoaib et al. 2022). Evidence suggests that the combined implementation of GTFL and GHRM enhances PEBs, which subsequently improve sustainable performance.

Despite its relevance, empirical research on the integrated effects of GTFL and GHRM—particularly the mediating role of GHRM—remains limited (Singh et al. 2020; Sun et al. 2022; Mousa et al. 2025a). Accordingly, the following hypothesis is proposed:

H6. *GHRM mediates the relationship between GTFL and sustainable performance (EP, EcP, and SP).*

3.3.7 | GTFL and Sustainable Performance: The Mediating Role of PEBs

Effective leadership enhances employees' PEBs by fostering supportive organizational climates and promoting eco-friendly initiatives (Jia et al. 2018). Among leadership styles, GTFL has been identified as a key driver of organizational PEBs (Shoaib et al. 2022). Beyond improving EP, organizations must institutionalize environmental values, practices, and standards to cultivate a culture of sustainability (Al-Swidi et al. 2021).

PEBs refer to employees' voluntary engagement in environmentally responsible activities, such as energy conservation, waste reduction, recycling, and support for green initiatives. These behaviors significantly influence organizational EP (Liu et al. 2023). Drawing on observational learning theory, employees tend to emulate leaders who model sustainable practices. As role models, transformational leaders shape ecological values and align employee behaviors with organizational sustainability goals, thereby fostering PEBs (Perez et al. 2023).

Empirical evidence supports the positive relationship between employees' ecological behaviors and organizational sustainable

performance, including in healthcare settings (Mousa and Othman 2020). PEBs—such as conserving energy and materials and implementing green initiatives—directly enhance environmental outcomes (Elshaer et al. 2021). Related research also shows that Organizational Citizenship Behavior for the Environment (OCBE) positively affects EP (Pham et al. 2019). Furthermore, GTFL has been shown to strengthen employee engagement and motivation, facilitating PEBs and improving EP across sectors (Perez et al. 2023; Liu et al. 2023). Accordingly, the following hypothesis is proposed:

H7. *PEBs mediate the relationship between GTFL and sustainable performance (EP, EcP, and SP).*

4 | The Methodology of Research

4.1 | Sampling and Approach

While extant scholarship has examined the relationships between GTFL, environmental practices, and organizational sustainable performance (e.g., Singh et al. 2020; Begum et al. 2022), and healthcare organizations have increasingly recognized the strategic significance of PEB, organizational performance, and competitive positioning within sustainability frameworks (Berniak-Woźny and Rataj 2023; Mousa et al. 2025a; J. Luo et al. 2025; Owusu et al. 2025), important gaps remain. In particular, prior empirical research has not comprehensively unpacked the interactive effects among GTFL, GHRM practices, and PEB in shaping sustainable performance within healthcare organizations. Moreover, accumulating evidence suggests that the implementation of GTFL and its behavioral consequences vary across cultural and institutional contexts—an issue that is especially salient in developing economies, where resource constraints, institutional arrangements, and cultural norms may alter how leadership and HRM practices translate into PEB and performance outcomes (Pham et al. 2019). These gaps highlight the need not only for hypothesis testing but also for context-sensitive construct development and the identification of boundary conditions.

To address these gaps, this research adopts an exploratory sequential mixed-methods design. This design is appropriate because (a) the existing literature offers limited and fragmented theoretical and measurement-based insights into how GTFL, GHRM, and PEB jointly operate in healthcare settings, and (b) the phenomena under investigation are complex and highly context dependent. In an exploratory sequential approach, qualitative inquiry is conducted first to generate grounded, contextually valid insights and measurement content; these insights are subsequently used to develop and refine survey instruments and hypotheses, which are then tested quantitatively using a larger sample (Creswell 2014; Creswell and Clark 2017; Creswell and Creswell 2017). The sequential structure directly addresses the identified research gap: the qualitative phase uncovers underlying mechanisms, contextual moderators, and locally relevant dimensions of GTFL, GHRM, and PEB that may not be captured by existing scales, while the quantitative phase evaluates the generalizability and magnitude of the interacting effects identified.

Specifically, this study conducted 18 semi-structured interviews with administrative managers, quality managers, human resource managers, and sectoral experts across governmental, private, military, and nonprofit healthcare organizations. All interviews were audio-recorded, transcribed verbatim, and guided by a standardized interview protocol to ensure systematic coverage of core constructs and comparability across respondents (Creswell et al. 2004). Qualitative analysis followed a systematic coding process aimed at (i) clarifying how GTFL and GHRM are enacted within the local healthcare context, (ii) identifying behaviorally specific manifestations of PEB, and (iii) surfacing potential moderators—such as institutional pressures, resource constraints, and cultural attitudes—as well as omitted variables that may shape the relationships among the focal constructs. The outputs of this qualitative phase—contextually grounded construct definitions, candidate survey items, and theoretically refined hypotheses—served as the foundation for subsequent instrument development and pilot testing.

The subsequent quantitative phase employed a survey instrument refined on the basis of qualitative findings to test the hypothesized direct, mediating, and moderating relationships among GTFL, GHRM, PEB, and sustainable healthcare performance. This sequential integration enhances construct validity by grounding measurement items in participants' language and lived practices, improves internal and external validity through triangulation and scale refinement, and increases explanatory power when modeling complex interaction effects. Overall, the exploratory sequential mixed-methods design was deliberately selected to bridge theoretical and measurement gaps and to provide robust, context-sensitive evidence regarding how leadership, HRM practices, and employee behaviors jointly drive sustainability outcomes in healthcare organizations.

Following the qualitative phase, a quantitative survey was conducted to further examine and quantify the impact of GTFL, GHRM, and PEB on sustainable performance within the Palestinian healthcare sector. Participants included managers and employees from chief executive offices, administrative units, human resources departments, and quality management divisions, selected based on their comprehensive understanding of organizational performance and their involvement in strategic decision-making related to environmental practices. Respondents were employed across primary care centers, secondary care facilities (hospitals), tertiary care institutions (rehabilitation organizations), and central laboratories and blood banks affiliated with the Ministry of Health in the West Bank, Palestine. The survey instrument underwent expert review by a panel of nine healthcare and academic professionals, and feedback from pilot respondents was incorporated to enhance clarity and relevance. A rigorous translation-back-translation procedure was applied to ensure linguistic accuracy and conceptual equivalence between the original English questionnaire and the Arabic version. Each survey was accompanied by a cover letter explaining the study's objectives and assuring respondents of confidentiality.

Quantitative data were collected from healthcare organizations through surveys distributed both in person and via email. Of the

TABLE 2 | Demographic characteristics profile.

Demographic variables	Categories	Frequency	Percentage
Position	General manager/CEO	20	13%
	Human resources manager	60	38%
	Quality department	33	21%
	The administration department	43	28%
Level of education	Diploma	18	12%
	Bachelor	64	41%
	Master's degree	52	33%
	PhD	22	14%
Classification of organization according to the health system	Primary care centers	13	9%
	Secondary care center (hospitals)	135	86%
	Triple care center (rehabilitation centers)	5	3%
	Central laboratories and blood banks	3	2%
The sector	Government	47	30%
	Private sector	59	38%
	Nonprofit organizations	50	32%
Number of employees	1–9	4	2%
	10–19	21	14%
	20–49	27	17%
	50–99	25	16%
	100–249	23	15%
	Above 250	56	36%

180 questionnaires administered, 156 were returned, yielding an approximate response rate of 86%. Following comprehensive data screening and validation procedures, all 156 responses met the established criteria and were retained for subsequent analysis. The demographic characteristics of the study participants are presented in Table 2.

This methodological approach enables a robust exploration of the research topic, ensuring a detailed and contextually relevant understanding of the factors influencing sustainable performance in the Palestinian healthcare sector.

4.2 | Measures

In this study, data were collected on four variables: GTFL, GHRM, PEBs, and sustainable performance. Each variable was measured using a 5-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The survey items were developed based on an extensive review of the relevant literature. GTFL was measured using six items adapted from Y. S. Chen and Chang (2013), Hameed et al. (2022), and Singh et al. (2020); a sample item is: “My leader inspires organizational members with the environmental plans.” GHRM practices were measured using eight items adapted from Mousa

and Othman (2020), with sample items including: “The organization prefers to hire employees who possess environmental knowledge during the selection process.” PEBs were measured using a six-item scale developed by Sobaih et al. (2022); for example: “Employees discuss environmental issues in team meetings.” Finally, sustainable performance was assessed using a 15-item scale developed by Mousa and Othman (2020) and Al Kerday (2019), with a sample item: “Direct and indirect toxic emissions are reduced.”

5 | Data Analysis

5.1 | Quantitative Data Analysis and Results

This study employed partial least squares structural equation modeling (PLS-SEM 4) to examine the proposed research model. PLS-SEM is widely applied in management and organizational research to validate theoretical models through statistical estimation (Hair et al. 2019; Farrukh et al. 2022). The technique follows a two-stage estimation procedure that encompasses both the measurement and structural models. The measurement model, also referred to as the outer model, specifies the relationships between latent constructs and their associated indicators. In contrast, the structural model, or inner model, represents the

hypothesized relationships and causal paths among the latent constructs (Hair Jr et al. 2021).

PLS-SEM is particularly suitable for testing exploratory and early-stage theoretical models, which aligns well with the objectives of the present study. Although prior research has examined various determinants of sustainable performance—including environmental, economic, and social dimensions, empirical investigations into the interactive relationships among GTFL, GHRM, and PEB remain limited.

5.1.1 | Assessment of the Measurement Model

The measurement model was assessed to examine the relationships between each latent construct and its corresponding indicators by evaluating reliability, validity, and internal consistency. Item reliability was examined using factor loadings. According to Hair et al. (2019), standardized item loadings should not fall below 0.60. In the present study, all indicator loadings ranged from 0.633 to 0.933, indicating satisfactory item reliability. Internal consistency reliability of the constructs was assessed using composite reliability (CR). Hair et al. (2019) recommends CR values greater than 0.70; accordingly, the CR values obtained in this study ranged from 0.857 to 0.969, exceeding the recommended threshold and confirming adequate internal consistency across all constructs.

Convergent validity was evaluated using the average variance extracted (AVE), with values exceeding the recommended cut-off of 0.50 (Hair et al. 2019). All constructs demonstrated AVE values above 0.50, thereby satisfying the criterion for convergent validity. In addition, multicollinearity was assessed using the variance inflation factor (VIF). All VIF values were below the recommended threshold of 3, ranging from 1.413 to 2.886 (Hair et al. 2019), indicating that multicollinearity was not a concern in the research model (see Table 3 and Figure 5).

Discriminant validity was examined using both the Heterotrait-Monotrait (HTMT) ratio of correlations and the Fornell-Larcker criterion. Following Henseler et al. (2015), HTMT values below 0.90 indicate adequate discriminant validity. The results revealed that all HTMT values were below this threshold, confirming satisfactory discriminant validity. Additionally, the Fornell-Larcker criterion requires that the square root of each construct's AVE exceed its correlations with other constructs (Fornell and Larcker 1981). The findings show that this condition was met for all constructs, further confirming the absence of discriminant validity concerns, as presented in Table 4.

5.1.2 | Assessment of the Structural Model

In the second phase, we evaluated the structural model to examine both the direct and indirect hypotheses of the study. Various criteria were employed to assess the significance and appropriateness of our model. Initially, we used the coefficient of determination, denoted as R^2 , to measure the model's capacity to explain variance. R^2 indicates the extent to which changes in endogenous variables can be attributed to exogenous variables. The R^2 value ranges from 0 to 1, with higher values

suggesting greater predictive precision. Typically, R^2 values of 0.75, 0.50, and 0.25 for endogenous latent variables are considered high, moderate, or weak, respectively. Furthermore, we utilized Q^2 , also known as Stone-Geisser's Q^2 , to measure the predictive relevance within the structural model. A Q^2 value greater than zero for a given reflective endogenous latent variable indicates the model's predictive significance for that construct. According to Cohen (2013), Q^2 values of 0.02, 0.15, and 0.35 suggest predictive relevance of minor, medium, and large effect sizes, respectively. Additionally, effect size (f^2) measures the influence of removing a particular exogenous construct on the endogenous constructs. According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 correspond to small, medium, and large effects of the exogenous latent variable, respectively. The results demonstrate high effect sizes for the GTFL and moderate effect sizes for constructs PEB, with f^2 values of 0.49 and 0.267, respectively. Furthermore, the goodness of fit (GoF) for the study model was assessed, yielding a value of 0.655, which surpasses the threshold of 0.36, indicating a large fit. This outcome reflects the model's robust alignment with the data. The results of these evaluations are summarized in the provided table (see Table 5).

We formulated five direct hypotheses, and the results were obtained after employing the bootstrapping technique with 5000 resamples. The results indicate that GTFL is positively and significantly linked to GHRM practices ($\beta=0.286$, t -value=4.061, $p=0.00$), PEB ($\beta=0.693$, t -value=10.096, $p=0.000$), and sustainable performance ($\beta=0.212$, t -value=2.719, $p=0.007$), supporting the acceptance of the direct hypotheses H1, H2, and H3. Similarly, the results revealed that GHRM practices are positively and significantly linked with PEB H4 ($\beta=0.270$, t -value=3.363, $p=0.001$), and that PEB is positively and significantly associated with sustainable performance H5 ($\beta=0.234$, t -value=2.951, $p=0.003$). Therefore, our study accepted all five direct hypotheses, as shown in Table 5. Moreover, the result of the hypotheses for the indirect and total effects revealed that GTFL is positively and significantly associated with PEB ($\beta=0.222$, t -value=3.327, $p=0.001$) and with sustainable performance ($\beta=0.163$, t -value=2.748, $p=0.006$). Finally, GHRM practices have a significant and positive effect on sustainable performance ($\beta=0.183$, t -value=2.946, $p=0.003$). Hence, all indirect hypotheses were accepted. Table 6 summarizes the outcomes of these tests for both direct and indirect effects.

The mediation effect hypothesis was assessed using the SmartPLS 4 bootstrapping function. As recommended by Hair Jr et al. (2021), when both direct and indirect effects are significant and point in the same direction, it indicates the presence of partial mediation (complementary mediation). Bootstrapping does not make any assumptions about the form of the variable distribution or the sampling distribution of the statistics. The findings presented in Table 4 indicate that GTFL has a significant indirect effect on PEB through GHRM ($\beta=0.197$, t -value=2.996, $p=0.003$), providing evidence for the existence of complementary mediation by GHRM practices. Additionally, the results revealed the presence of complementary mediation by PEB between GTFL and sustainable performance ($\beta=0.177$, t -value=2.525, $p=0.012$), suggesting that H6 and H7 are supported (see Table 6).

TABLE 3 | Measurement model validity and reliability.

Items	Item loading	Variance inflation factor (VIF)	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
GHRM practices					
GHRM 1	0.781	2.209	0.918	0.933	0.636
GHRM 2	0.768	2.223			
GHRM 3	0.806	2.373			
GHRM 4	0.743	2.730			
GHRM 5	0.777	2.151			
GHRM 6	0.844	2.793			
GHRM 7	0.832	2.723			
GHRM 8	0.824	2.619			
GTFL					
GTFL 1	0.907	2.654	0.961	0.969	0.837
GTFL 2	0.906	2.072			
GTFL 3	0.923	2.710			
GTFL 4	0.932	2.645			
GTFL 5	0.933	2.779			
GTFL 6	0.888	2.418			
PEB					
PEB 1	0.671	1.798	0.793	0.857	0.547
PEB 2	0.721	1.485			
PEB 3	0.767	1.850			
PEB 4	0.859	2.337			
PEB 5	0.663	1.413			
Sustainable performance			0.844	0.874	0.544
Environmental performance (EP)					
EP1	0.902	2.886	0.871	0.912	0.723
EP2	0.897	1.915			
EP3	0.818	2.125			
EP4	0.779	1.915			
Economic performance (EcP)					
EcP1	0.763	1.642	0.865	0.908	0.713
EcP2	0.865	2.426			
EcP3	0.870	2.468			
EcP4	0.875	2.417			
Social performance (SP)					
SP1	0.794	2.093	0.901	0.924	0.669

(Continues)

TABLE 3 | (Continued)

Items	Item loading	Variance inflation factor (VIF)	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
SP2	0.860	2.766			
SP3	0.821	2.689			
SP4	0.862	2.724			
SP5	0.799	1.991			
SP6	0.765	2.188			

Additionally, the model's fit indices were comprehensively assessed using the normed fit index (NFI) and standardized root mean square residual (SRMR). The results show the model achieved an SRMR value of 0.045, demonstrating satisfactory fit quality, where the threshold value is less than 0.08 (Hair et al. 2019). The NFI, a frequently utilized model fit assessment tool, recorded a value of 0.966. This value surpassed the minimum acceptable benchmark of 0.90, confirming excellent model fit (Hu and Bentler 1999).

6 | Discussion and Implications

As organizational attention to environmental concerns intensifies, organizations are increasingly implementing environmental protection initiatives through strategic resource allocation, the formulation of comprehensive ecological strategies, and the execution of environmentally sustainable corrective interventions. Recent organizational developments include the adoption of GTFL, GHRM, and PEBs; collectively, these phenomena warrant further scholarly investigation (Sachdeva and Singh 2023; Weber and Kassab 2024; Ansari and Khan 2024). Existing literature has primarily examined these practices in isolation and assessed their respective effects on sustainable performance outcomes (Mousa and Othman 2020; Omarova and Jo 2022; Al-Hakimi et al. 2024). In contrast, the antecedents and underlying mechanisms shaping GTFL, GHRM, and PEB remain underexplored (Mousa et al. 2025a).

Drawing on the RBV and AMO theories, the present study investigates the mediating roles of GHRM and PEB in the relationship between GTFL and sustainable performance. This study provides valuable insights into the determinants of sustainable performance and the adoption of GTFL within the Palestinian healthcare sector. The findings indicate that GTFL positively influences GHRM, PEB, and sustainable performance. These results are consistent with and extend prior research demonstrating the role of GTFL in enhancing GHRM practices and organizational sustainability across manufacturing firms, SMEs, hotels, and healthcare organizations in Pakistan, the United Arab Emirates, and India (Singh et al. 2020; Farrukh et al. 2022; J. Luo et al. 2025).

Furthermore, the statistical analysis confirms a strong positive association between GTFL and PEB, supporting earlier findings by Sobaih et al. (2022) and Perez et al. (2023), and highlights the critical role of GTFL in driving sustainable performance, in line

with Zhao and Huang (2022) and Liu et al. (2023). Regarding the relationship between GTFL and GHRM practices, the initial hypothesis proposed that GTFL exerts a significant influence on GHRM. The empirical results support this hypothesis, revealing that GTFL has a statistically significant effect on GHRM practices, consistent with prior empirical studies (Cahyadi et al. 2022; Farrukh et al. 2022; Alwali and Alwali 2025). GTFL represents a critical organizational resource for the effective implementation of GHRM systems, which subsequently facilitate sustainable performance outcomes. By emphasizing employees' individual needs and values, GTFL supports the development and implementation of GHRM practices that inspire and motivate organizational members. Consequently, this study highlights the pivotal role of GTFL in advancing core human resource management functions—including recruitment and selection, training and development, performance appraisal and management, and compensation and reward systems—as strategic mechanisms for stimulating and motivating employees to achieve organizational sustainability objectives (Farrukh et al. 2022).

The second hypothesis examined the relationship between GTFL and PEB. The empirical analysis revealed a positive effect of GTFL on employees' PEB, with results consistent with prior empirical studies (Farrukh et al. 2022; Shoaib et al. 2022). PEB can be fostered through GTFL, which emphasizes the development of an environmental vision within the workforce. Specifically, leaders can encourage employees' engagement in PEB in the workplace through environmentally inspired motivation, environmental idealized influence, environmental individualized consideration, and environmental intellectual stimulation (Sachdeva and Singh 2023). Through their demonstrated passion and optimism, leaders motivate individuals to overcome psychological barriers and external constraints while cultivating enthusiasm for green innovation. Environmental leaders exhibit intellectual stimulation, inspirational motivation, individualized consideration, and idealized influence behaviors that promote PEB among employees (Liu et al. 2023). Moreover, GTFL establishes strong relational ties with followers, enabling leaders to persuade subordinates to engage voluntarily in pro-environmental workplace activities. Consequently, rather than perceiving such behaviors as coerced, employees are more likely to view them as meaningful and intrinsically valuable. As a result, employees inspired by GTFL are more inclined to encourage others to adopt green behaviors and support the implementation of pro-environmental policies (Ansari and Khan 2024).

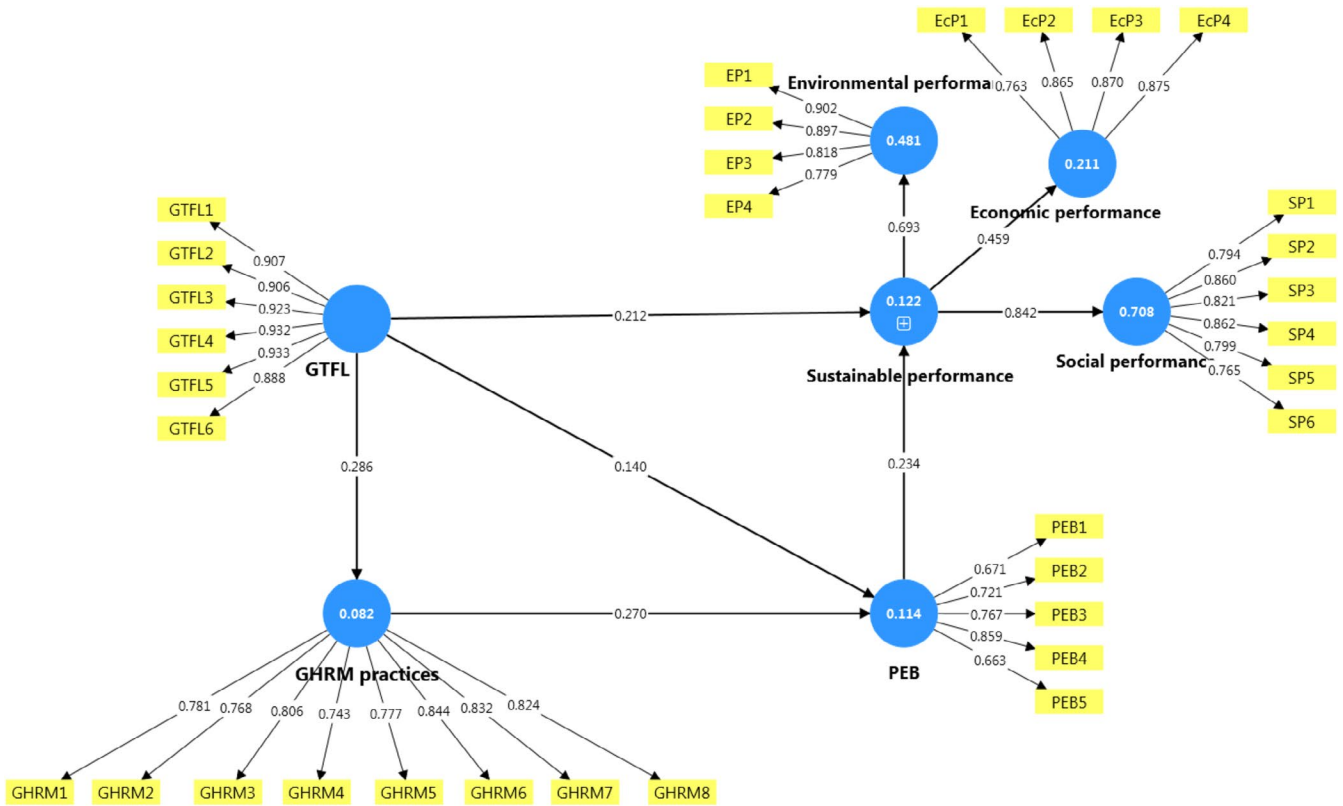


FIGURE 5 | The measurement model.

TABLE 4 | Discriminant validity.

	EP	EcP	GHRM practices	GTFL	PEB	SP
Heterotrait–Monotrait ratio (HTMT)						
EP						
EcP	0.704					
GHRM practices	0.451	0.523				
GTFL	0.657	0.605	0.776			
PEB	0.784	0.85	0.766	0.796		
SP	0.889	0.638	0.45	0.662	0.585	
Fornell–Larcker criterion						
EP	0.850					
EcP	0.611	0.804				
GHRM practices	0.277	0.456	0.796			
GTFL	0.51	0.637	0.629	0.851		
PEB	0.427	0.529	0.709	0.761	0.813	
SP	0.635	0.67	0.292	0.618	0.554	0.854

The third hypothesis examined the relationship between GTFL and sustainable performance. The empirical findings demonstrated a positive effect of GTFL on organizational sustainable performance, consistent with earlier empirical evidence (Berniak-Woźny and Rataj 2023; Weber and Kassab 2024). Leaders who actively engage in environmental sustainability initiatives inspire employees to emulate such behaviors and adopt green innovation

practices. Furthermore, GTFL motivates employees to think independently and critically evaluate conventional approaches to environmental management. By encouraging staff participation in green innovation initiatives and providing opportunities to challenge traditional paradigms, leaders foster an environment conducive to sustainability-oriented innovation. More broadly, GTFL emphasizes employee competence and contributions to ecological

TABLE 5 | R^2 , communality, and redundancy.

Construct	R^2	R^2 adjusted	Q^2 predict	f^2	
				GTFL	PEB
GTFL	—	—	—		
GHRM practices	0.550	0.547	0.526		
PEB	0.592	0.586	0.507		
Sustainable performance	0.528	0.518	0.425	0.49	0.267
EP	0.861	0.860	0.330		
EcP	0.584	0.582	0.266		
SP	0.878	0.878	0.526		

sustainability, thereby facilitating the development of environmental capabilities and guiding employees toward creative solutions to environmental challenges (Mousa et al. 2025a).

The fourth hypothesis examined the relationship between GHRM practices and PEB. The empirical findings indicate that GHRM practices exert a positive and significant influence on employees' PEB, consistent with prior empirical research (Farrukh et al. 2022; T. Iftikar et al. 2022; Al-Sabi et al. 2024). When organizations invest in and implement GHRM practices through systematic efforts to recruit, train, and motivate employees to engage in ecological initiatives, green performance is enhanced through employees' PEBs (Elshaer et al. 2021). Specifically, organizations that adopt green recruitment policies, environmental training programs, green-oriented performance appraisal systems, and environmentally linked reward mechanisms are more likely to foster PEB among employees (Farrukh et al. 2022).

Furthermore, the empirical results demonstrate that PEB has a significant and positive effect on sustainable performance, thereby supporting the fifth hypothesis. PEB functions as a critical mechanism for translating sustainable development strategies into organizational practices, with findings aligned with previous empirical studies (Elshaer et al. 2021; Hasan et al. 2024; Ozkan et al. 2024). Employees who exhibit environmentally conscious behaviors engage in actions that contribute to the achievement of long-term EP, EcP, and SP objectives. These behaviors positively influence waste reduction, conservation of water and energy resources, reductions in nonrenewable material consumption, overall cost efficiency, and improvements in organizational reputation and market positioning (Nisar et al. 2021; Elshaer et al. 2023). Accordingly, employee eco-friendly behavior plays a critical role in enhancing organizational EP. For example, when employees possess the requisite environmental knowledge and skills and operate within supportive organizational processes and procedures, they demonstrate a greater propensity to engage in PEB (Elshaer et al. 2021).

The mediating roles of GHRM and PEB provide deeper insights into the mechanisms underlying sustainability outcomes. The findings confirm that GHRM mediates the relationship between GTFL and PEB, underscoring the importance of HR practices in translating leadership influence into tangible employee

behaviors. Moreover, PEB mediates the relationship between GTFL and sustainable performance, reinforcing the notion that environmentally conscious organizational cultures drive collective sustainability-oriented actions (Sun et al. 2022). Leaders who model environmentally responsible behaviors inspire employees to adopt sustainable practices, thereby highlighting the pivotal role of GTFL in fostering PEB and enhancing sustainable performance (Sobaih et al. 2022).

The healthcare sector's dual role in addressing environmental challenges while simultaneously contributing to environmental degradation is particularly salient. The sector's generation of hazardous waste and carbon emissions necessitates the implementation of responsible waste management strategies, including reuse, recovery, and recycling, to mitigate health risks and environmental harm. Encouraging PEB among healthcare workers is therefore essential, as employees with stronger environmental values are more likely to engage in sustainable practices. This study underscores the importance of personal beliefs and leadership in fostering PEB, consistent with prior research (Al-Swidi et al. 2021; Sobaih et al. 2022; Perez et al. 2023; Hasan et al. 2024).

By integrating empirical evidence from Palestine, this research makes a distinctive contribution to the understanding of GTFL, GHRM, and PEB within the context of developing economies. The findings offer actionable insights for policymakers and organizational leaders, emphasizing the importance of transformational leadership and strategically aligned HR practices in enhancing sustainability performance within healthcare organizations.

6.1 | Theoretical Implications

This study offers several significant theoretical contributions, particularly for scholars examining green practices within the healthcare sector.

First, while the existing literature on GTFL has predominantly focused on its impact on employees' PEB and EP, this research uniquely investigates GTFL's role in enhancing sustainable performance within healthcare organizations. In doing so, it provides a distinct and meaningful contribution to the GTFL literature.

TABLE 6 | The results of direct and indirect relations.

	Hypothesis	Original sample (O)	Standard deviation (STDEV)	T statistics	p	BCI LL	BCI UL	Result
Direct relations								
GTFL → GHRM practices	H1	0.286	0.071	4.061	0.000	0.617	0.855	Accepted
GTFL → PEB	H2	0.693	0.069	10.096	0.000	0.187	0.763	Accepted
GTFL → Sustainable performance	H3	0.212	0.078	2.719	0.007	0.170	0.615	Accepted
GHRM practices → PEB	H4	0.270	0.080	3.363	0.001	0.28	0.633	Accepted
PEB → Sustainable performance	H5	0.234	0.079	2.951	0.003	0.119	0.617	Accepted
Indirect and total effects								
GTFL → PEB	—	0.222	0.067	3.327	0.001	0.132	0.413	Accepted
GTFL → Sustainable performance	—	0.163	0.059	2.748	0.006	0.051	0.356	Accepted
GHRM practices → Sustainable performance	—	0.183	0.062	2.946	0.003	0.085	0.405	Accepted
Specific indirect effects								
GTFL → GHRM practices → PEB	H6	0.197	0.066	2.996	0.003	0.020	0.504	Partial mediation (complementary)
GTFL → PEB → Sustainable performance	H7	0.177	0.031	2.525	0.012	0.043	0.379	Partial mediation (complementary)

Second, the study represents a pioneering addition to the emerging body of research on GTFL, GHRM practices, employee PEB, and sustainable performance in the healthcare context. It extends this literature by examining diverse healthcare settings, including secondary care centers (such as hospitals) and tertiary care centers (such as rehabilitation centers). Moreover, it offers novel insights into the interrelationships among GTFL, GHRM, workforce PEB, and sustainable healthcare performance, particularly within the Palestinian healthcare sector.

Third, this research advances the application of the RBV and AMO theories in healthcare settings. It demonstrates how GTFL, GHRM, and PEB function as critical organizational resources and capabilities that collectively drive sustainable performance. Furthermore, the study empirically validates the mediating role of GHRM in the relationship between GTFL and PEB, as well as the mediating role of PEB in the relationship between GTFL and sustainable performance, thereby constituting a novel theoretical contribution to the GTFL literature in healthcare.

Fourth, the adoption of a mixed-methods research design provides a robust methodological contribution by enriching the understanding of the determinants of sustainable performance in healthcare organizations. By integrating qualitative and quantitative approaches, this study addresses existing empirical gaps in mixed-methods research, particularly within the service sector and in developing-country contexts. The findings yield valuable empirical evidence on sustainable performance in the Palestinian healthcare system, thereby contributing to the broader literature on emerging economies.

Finally, this study acknowledges the complex political and institutional landscape in Palestine and its implications for healthcare systems, underscoring the urgent need for environmental conservation initiatives. Despite these contextual challenges, the research offers practical insights for healthcare practitioners and policymakers in Palestine and other developing countries. It highlights the critical role of GTFL, GHRM, and PEB in achieving sustainable performance, particularly in resource-constrained environments.

6.2 | Practical Implications

Healthcare leadership must prioritize green leadership by integrating environmental sustainability into organizational missions, visions, and strategic objectives. Leaders who emphasize environmental responsibility can PEB by demonstrating a strong commitment to environmental management systems and by fostering an organizational climate conducive to green initiatives. Healthcare organizations should establish clearly defined EP objectives and cultivate transparent communication cultures in which employees receive mentorship and supervisors obtain training to achieve environmental targets. Moreover, management should evaluate candidates' prior EP when recruiting new staff or promoting existing employees to senior positions. Assessments of environmental competencies should be formally incorporated into selection and promotion processes (Sobaih et al. 2022; Hasan et al. 2024).

The empirical findings identify GHRM practices as a fundamental mechanism for developing intellectual capital and promoting PEB. Accordingly, healthcare organizations should provide comprehensive environmental training programs focused on sustainable practices and environmental initiatives. In addition, employees must be given practical opportunities to apply the knowledge acquired through such training. These opportunities enhance employees' environmental competencies, knowledge, and capabilities, thereby strengthening intellectual capital, fostering PEBs, and ultimately improving organizational EP. Furthermore, this study assists managers by providing empirical evidence of the contribution of GHRM practices to sustainable performance outcomes (J. Luo et al. 2025).

Healthcare managers should further promote environmental awareness through targeted training programs, green initiatives, and awareness campaigns. Eco-friendly behaviors can be encouraged by emphasizing the importance of environmental issues and recognizing employees' contributions to environmental solutions. The implementation of training modules, seminars, and forums facilitates knowledge exchange related to sustainability. Promoting environmental knowledge within healthcare organizations is therefore essential for fostering sustainable performance among employees (T. Iftikar et al. 2022).

Furthermore, healthcare leaders and managers should integrate GHRM practices as a strategic resource to effectively leverage human capital in support of environmental management initiatives. The findings suggest that GHRM reflects an organization's strategic commitment to environmental sustainability and motivates employees to engage in behaviors that reduce environmental impact. Accordingly, senior leadership should align environmental objectives with GHRM policies to enhance sustainable organizational performance (Mousa et al. 2025b). Finally, measuring and tracking improvements in sustainable performance are essential for healthcare organizations to assess their current status. Managers should regularly evaluate organizational sustainable performance and examine the effects of GTFL, GHRM, and PEB. This evidence-based approach enables organizations to identify areas for improvement, monitor progress, and inform sustainability-related decisions. Recognizing individual differences in responses to green leadership initiatives is also critical. Managers should adopt diverse strategies and tailor interventions based on employee feedback obtained through surveys or interviews. Such a personalized approach enhances the effectiveness of GTFL in promoting sustainable performance (Singh et al. 2020; Farrukh et al. 2022).

6.3 | Limitations and Future Research

This research offers valuable practical and theoretical insights while also highlighting avenues for future investigation through its acknowledged limitations. Although the study's focus on the Palestinian healthcare sector provides rich contextual understanding, it inherently limits the generalizability of the findings to other sectors, such as manufacturing. To address this limitation, future studies are encouraged to test the proposed theoretical framework across diverse industries within Palestine and to extend it to other national contexts. Such extensions may reveal cultural, institutional, and industry-specific variations in

sustainable leadership practices. Another limitation arises from the organizational-level focus of the analysis, which primarily targeted departmental managers in healthcare administration, human resources, and quality management. Expanding the scope to include employees across multiple hierarchical levels may provide deeper insights into how GTFL cascades throughout organizations and influences sustainable behaviors at different organizational strata.

Future research may apply the current framework to the manufacturing sector or examine other service industries to facilitate comparative analyses. Moreover, the present study examined GHRM practices as a generalized construct. Future investigations could focus on specific GHRM dimensions—such as green recruitment and selection, green training and employee involvement, and green performance management and compensation—to better understand how these practices foster PEB. Given the multidimensional nature of GHRM, it is recommended that future studies examine the differential effects of individual GHRM dimensions on PEB and sustainable performance to identify which practices warrant greater managerial emphasis.

Although this research establishes GHRM and PEB as significant mediating mechanisms, the complexity of sustainable organizational behavior suggests the existence of additional, yet unexplored, mediating and moderating variables. Future studies may benefit from examining the role of employees' personal environmental beliefs, which could influence their responsiveness to green leadership initiatives. Likewise, investigating green knowledge-sharing mechanisms may shed light on how sustainable practices diffuse within organizations. External contextual factors—such as regulatory pressures, institutional constraints, and stakeholder expectations—may also moderate the relationships among GTFL, PEB, and sustainable performance, representing promising directions for further scholarly inquiry.

Ethics Statement

Although neither the affiliated university nor the host country currently operates a formal institutional ethics review mechanism, the authors undertook rigorous measures to ensure that the study adhered to internationally recognized ethical standards. Ethical integrity was upheld through a transparent, participant-centered research approach. Prior to participation, all individuals were provided with a comprehensive participant information sheet detailing the study's objectives, procedures, inclusion and exclusion criteria, confidentiality safeguards, and participants' rights, including the right to refuse participation or withdraw from the study at any stage without penalty. Informed consent was obtained through signed consent forms, and participants were assured that all collected data would be anonymized and treated with strict confidentiality. Collectively, these procedures were designed to uphold the ethical principles of voluntary participation, autonomy, and respect for persons, thereby ensuring that the research was conducted with full ethical accountability despite the absence of a formal institutional ethics committee.

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