National College of Ireland

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Project Submission Sheet

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Programme: Masters in Business Administration **Year:** 2023

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Lecturer:

Submission Due Date: 15 August 2925

Project Title: Integrating Sustainability into Irish Healthcare: An Examination of Strategies, Organisational Obstacles, and Exemplary Practices for Systemic Transformation

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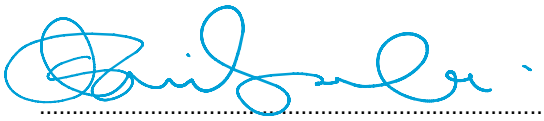
Signature: 

Date: 15 August 2025

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AI Acknowledgement Supplement

[Research Methods (MAHRM)]

[Integrating Sustainability into Irish Healthcare: An Examination of Strategies, Organisational Obstacles, and Exemplary Practices for Systemic Transformation]

Your Name/Student Number	Course	Date
Sibonile Chimbganda/ 23222646	MBA	15 /08/2025

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Tool Name	Brief Description	Link to tool
ChatGPT	Ideas and data analysis	https://chatgpt.com/c/6897a565-4ae4-8331-a0d2-0b7b8802d721
Quillbot	paraphrasing	https://quillbot.com/paraphrasing-tool

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This section provides a more detailed description of how the AI tools were used in the assignment. It includes information about the prompts given to the AI tool, the responses received, and how these responses were utilized or modified in the assignment. **One table should be used for each tool used**.

[Insert Tool Name]
[ChatGPT]

Using the attached 8 transcripts please can you do a thematic data analysis for my dissertation on sustainability in Irish healthcare	[Inse Awesome — I read through your eight transcripts and pulled out the recurring patterns using a Braun & Clarke–style thematic analysis (familiarisation → initial codes → theme development → review → naming). Below is a concise write-up you can drop into your Findings/Analysis chapter, with short, attributed quotes to evidence each theme. rt Sample response]

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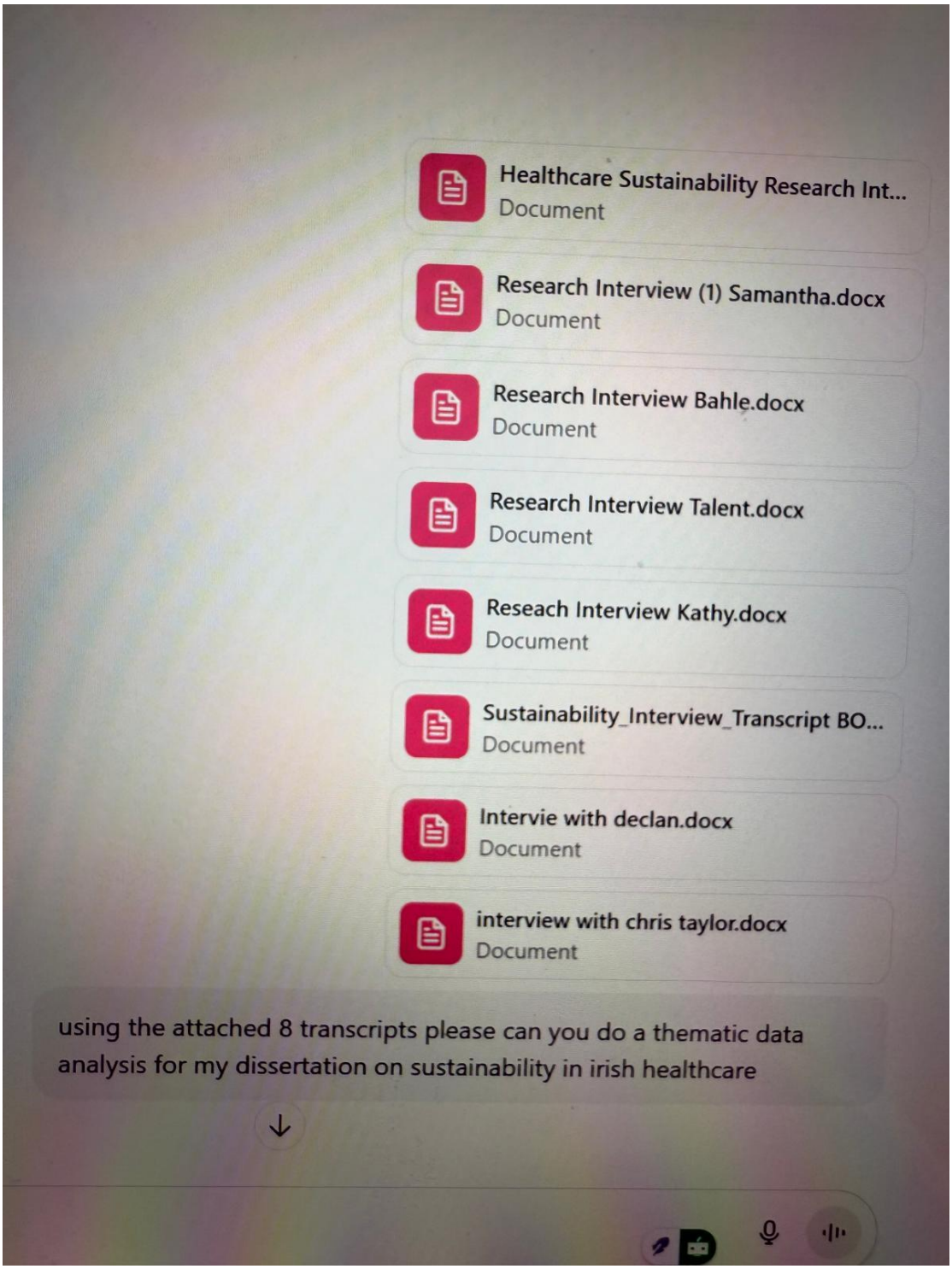
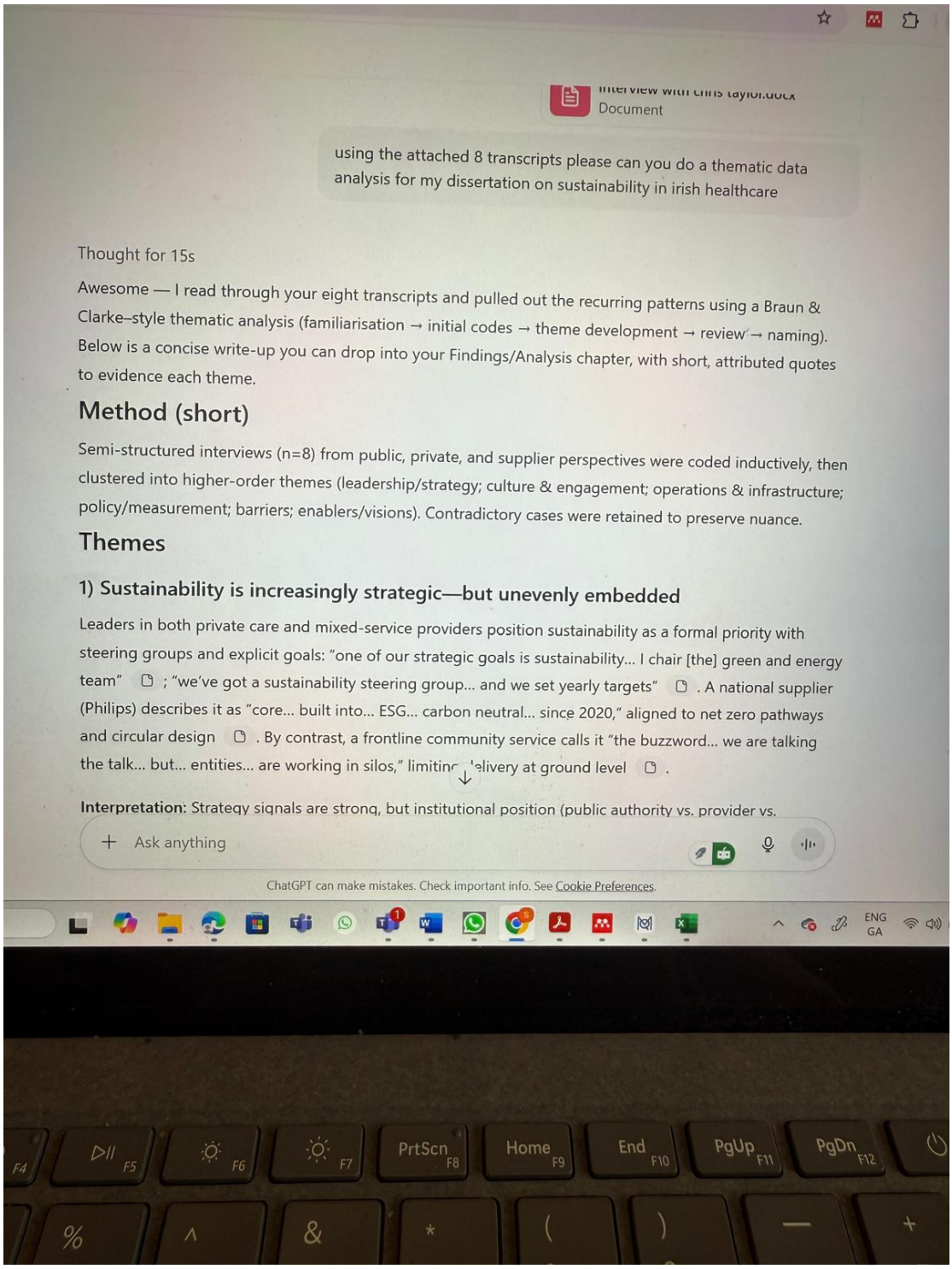
This section includes evidence of significant prompts and responses used or generated through the AI tool. It should provide a clear understanding of the extent to which the AI tool was used in the assignment. Evidence may be attached via screenshots or text.

Additional Evidence:

[Place evidence here]



Additional Evidence:



[Pl ace evidence here]

Title Page

Name: Sibonile Chimbganda

Student Number: 23222646

A qualitative study investigating Integrating Sustainability into Irish Healthcare: An Examination of Strategies, Organisational Obstacles, and Exemplary Practices for Systemic Transformation

Course: Master's in business administration (MBA 23)

Module: Research Methods (MAHRM)

Institution: National college of Ireland

Abstract

Sustainability in healthcare has transitioned from a marginal issue to a strategic necessity, caused by increasing climate responsibilities, surging operating costs, and the pressing demand for good health systems. In Ireland, these constraints are made worse by the structural intricacies of a dual public-private sector, old infrastructure, and limited long-term investment cycles. Although the Health Service Executive's (HSE) Climate Action Strategy 2022-2050 outlines ambitious decarbonisation and resource efficiency objectives, implementing these commitments into systemic practice is a significant challenge. This research critically analyses how Irish healthcare organisations conceptualise, integrate and maintain environmental and social responsibility within operational and therapeutic frameworks. This study employs a qualitative technique, including semi-structured interviews with hospital leaders, sustainability officers, and clinical stakeholders from both public and private sectors. The analysis integrates concepts from organisational behaviour, environmental science, and health policies to examine the relationship between leadership, workforce engagement, policy alignment, and infrastructure limitations. Findings indicates that although instances of innovation such as circular procurement, energy efficient infrastructure enhancements, and decreased gas emissions exhibit quantifiable advantages, widespread implementation is obstructed by limited finances, cultural resistance, and irregular policy enforcement. The study underscores the critical importance of transformative leadership and focused staff participation in integrating sustainability, as well as the need for comprehensive measurement frameworks that assess environmental, economic, social and health outcomes. The study indicates that attaining sustainable healthcare in Ireland necessitates a coordinated, multi-tiered plan that reconciles legislative aspirations with operational realities. Recommendations encompass, the integration of environmental key performance indicators into governance frameworks, the enhancement of sector-wide collaboration among public and commercial entities, and the alignment of procurement practices with EU green standards. The research emphasised the essential connection between public health and planetary health by positioning sustainability as fundamental to patient care promoting a proactive, evidence-based strategy for future healthcare reform.

Submission of Thesis and Dissertation Declaration

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

Name: ____Sibonile Chimbganda

_____

Student Number:

__23222646_____

Degree for which thesis is submitted: __MBA _____

Title of Thesis: _ A qualitative study investigating Integrating Sustainability into Irish Healthcare: An Examination of Strategies, Organisational Obstacles, and Exemplary Practices for Systemic Transformation

_____

Date: ____15 August 2025

_____

Material submitted for award

A. I declare that this work submitted has been composed by myself. ☐

B. I declare that all verbatim extracts contained in the thesis have been distinguished by quotation marks and the sources of information specifically acknowledged. ☐

C. I agree to my thesis being deposited in the NCI Library online open access repository NORMA. ☐

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Acknowledgements

I would like to thank all my lectures and my supervisor for helping me. I am grateful for all the lectures and guidance. Their support does not go unnoticed. All the questions I had on this dissertation were answered, even the silly ones.

I would like to thank all my participants who took their precious time to do the interviews with me.

I also want to thank my friends and family for all the support and help they give me, especially my children and my husband for cheering me on and for their understanding when I could be there for them due to my commitment to putting this piece of work together.

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List of Abbreviations

CEO: Chief Executive Officer

HSE: Health Services Executive

WHO: World Health Organisation

DON: Director of Nursing

SO: Sustainability Officer

KPI: Key Performance Indicators

ESG: Environmental, Social and Governance

MRI: Magnetic Resource Imaging

ISO: International Organisation for Standards

EU: European Union

GHG: Green House Gas

COVID-19: Corona Virus Disease 2019

EPA: Environmental Protection Agency

UK: United Kingdom

NHS; National Health Executive

SEAI: Sustainable Energy Authority of Ireland

GP: General Practitioner

HVAC: Heating, Ventilation and Air Conditioning

ICT: Information Communications and Technology

1. Introduction

The definition of sustainability is continually transforming in this swiftly changing society. The initial formal definition of sustainable development was presented in the Brundtland Report, released by the United Nations in 1987, which characterised sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This term is significantly subject to interpretation, complicating the establishment of a consensus on sustainability. (Molero et al., 2020)

The notion of sustainability in healthcare has evolved from a marginal issue to a strategic necessity for health systems worldwide. In Ireland, this transformation has become particularly urgent due to a confluence of internal and external pressures including rising climate requirements under national and EU frameworks, escalating operational costs, deteriorating infrastructure, and ongoing service inefficiencies. The Irish healthcare system, governed by the Health Service Executive (HSE), acknowledges that the necessity for sustainable transformation and integrating sustainability into policy, operations and culture continues to be a difficult and evolving challenge (HSE, 2022).

Sustainability in healthcare invoices not only environmental stewardship but also economic efficiency, social equity, and long-term resilience. The World Health Organisation (2017) underscores that ecologically sustainable health systems must mitigate environmental damage while preserving or improving service quality. This corresponds with the HSE's Climate Action Strategy 2022-2024 in Ireland, which pledged to decarbonise health services, integrate sustainability into procurement, and enhance waste and energy management (HSE,2022). Nonetheless, actualising these policy commitments has been challenging. The Environmental, Protection Agency (2021) indicates that numerous Irish hospitals persist in underperforming on critical environmental metrics, including energy efficiency and waste reduction, despite public funding and strategic planning efforts.

The Irish healthcare sector encounters distinct sustainability challenges. In contrast to most Western European nations, Ireland has not yet implemented universal access to primary care, and its dual

public-private approach intensifies disparities in service accessibility and resource allocation (Burke, 2018). The structural issues hinder the implementation of integrated, system-wide sustainability initiatives. Furthermore, the system functions within short-term budget cycles, providing restricted opportunities for the long-term investments necessary for infrastructural enhancements, workforce advancement, and technological innovation (Brick, Walsh & Keegan, 2020).

The ecological consequences of healthcare delivery in Ireland are substantial and increasing. Worldwide, healthcare contributes 4-5% of total greenhouse gas (GHG) emissions, chiefly attributable to energy usage, procurement, waste management, and transportation (Kaliner, 2020). Irish hospitals rank among the most energy-intensive public edifices, utilising substantial quantities of electricity and gas for heating, cooling, illumination and medical apparatus (EPA,2021) Moreover, the procurement activities of the HSE encompassing pharmaceuticals, medical devices, and consumables constitute a significant segment of its carbon footprint. While certain Irish institutions, including Cork University Hospital, have used successful circular procurement methods (EPA,2020), these instances are atypical rather than standard. Despite the ongoing efforts of exploring innovative approaches for enhancing health care delivery to address the growing diverse needs of patients, it has proven challenging to implement the requisite changes into sustainable and effective large-scale strategies. The COVID-19 pandemic caused significant challenges to global health service delivery, stretching systems beyond their capacity and exposing existing gaps in preventive and curative care. (Haileamlak, 2021) Many countries affected were most affected, particularly those with conventional health systems that have exhibited fundamental deficiencies in preparedness and prevention, resulting in economic and societal repercussions. This serves as a reminder for a fundamental re-evaluation of strategies for preparedness for emerging epidemics. Moreover, this serves as a call to all stakeholders engaged in decision-making and governance to address intricate issues with adaptable solutions in demanding environments, enabling continued advancement towards the Sustainable Development Goals (SDGs). The intricacy of the challenges posed by the 2030 Agenda necessitates a holistic perspective on the various facets of sustainable development (economic, environmental, and social), which are interdependent and must be harmonised, grounded in a meticulous assessment of their interconnections. With regards to the healthcare sector, the need to increase efficiency and improve the quality of service in recent years has led to an exponential growth the application of sustainable principles improvement of responsible healthcare organisations are among the most resource-intensive sectors worldwide,

considerably contributing to greenhouse gas emissions, energy consumption, waste generation, and environmental degradation (Eckelman & Sherman, 2016. Although their principal objective is to protect human health, the contradiction exists in that healthcare systems can adversely affect both population and planetary health. Sustainable healthcare has become a vital focus of research and practice, particularly due to increasing challenges from climate change, escalating operating costs, and public demands for environmentally responsible services.

The Health Service Executive of Ireland has recognised the imperative for environmental action within the healthcare sector. The HSE Climate Action Strategy 2022-2050 delineates a framework for integrating sustainability into both clinical and non-clinical operations (HSE, 2022). Translating these strategic commitments into actual practice poses intricate problems. Healthcare environments are fundamentally human-centred, highly regulated, and resistant to transformation, frequently limited by financial, cultural and structural constraints (Boyle, 2021; Kelly et al.,2024). Consequently, comprehending the efficient integration of sustainability into the operations of Irish healthcare organisations is both pertinent and essential. This dissertation examines the paths, obstacles, and facilitators of healthcare sustainability in Ireland, emphasising the conversation of policy objectives into concrete, systemic outcomes. The research employs an interdisciplinary approach, synthesising perspectives from public health, environmental science, organisational behaviour, and policy analysis. This perspective aims to comprehend how Irish healthcare institutions might transcend pilot projects and incremental enhancements to adopt a comprehensive, strategic vision for sustainable healthcare delivery.

This research aims to critically analyse how Irish healthcare organisations comprehend, incorporate, and maintain ecologically and socially responsible practices. It examines the obstacles, optimal strategies, and organisational dynamics that influence sustainability in Irish healthcare environments. Chapter 2 of this paper presents a thorough examination of the literature on healthcare sustainability, emphasising the Irish context and making comparisons with foreign systems. Chapter 3 delineates the research methodology encompassing data sources, analytical techniques and ethical considerations. Chapter 4 delineates the findings derived from primary data acquired through interviews. Chapter 5 examines the findings in the context of theoretical models and policy frameworks, resulting in actionable recommendations for legislators, healthcare administrators, and practitioners. The concluding chapter reflects on the future of stainable healthcare in Ireland and delineates critical areas for subsequent research. As Ireland approaches a pivotal moment in health

system reform, the consequences of inactivity are significant. In the absence of strategic investment, strong governance, and stakeholder involvement, the sustainability agenda is at risk of becoming marginalised. The advantages of a sustainable healthcare system including enhanced resilience, reduced environmental impact, lower operational costs and improved healthcare outcomes are too substantial to disregard. The research promotes a proactive, evidence-based, and collaborative strategy for integrating sustainability into the Irish healthcare system, acknowledging the intrinsic connection between public health and environmental well-being.

Literature Review

Introduction

Globally, sustainability in healthcare is becoming increasingly important strategic objective, and Ireland is not an exception to this trend. (HSE, 2023) The current transition in sustainability is based on a significant realisation. Companies across all industries are rapidly acknowledging that the take, make and waste industrial paradigm is no longer sustainable. The existing model is being supplanted by a new circular economy that presents substantial commercial opportunities by generating profit from trash (Hedstrom, 2018). Sustainability in healthcare is becoming a necessity rather than a choice due to increasing climate concerns and rising operational expenses. (Hickel, 2020) Healthcare systems, while ostensibly dedicated to health promotion, significantly contribute to environmental deterioration through resource use, carbon emissions and medical waste. (Healthcare without harm, 2019). People are now more aware of the link between planetary health and human health, and environmental damage is becoming more frequently recognised as a factor that affects health (Whitmee, 2015).

The global healthcare sector accounts for roughly 4.4% of total greenhouse gas emissions, significantly influenced by energy consumption, medical waste, transportation and procurement (Healthcare Without harm, 2019). In this setting, healthcare organisations are increasingly urged to include sustainability measures that mitigate environmental damage while preserving or improving

care quality. Nevertheless, the process of converting policy commitments into effective operational practices is fought with a variety of challenges, particularly in a system that is characterised by limited resources, organisational fragmentation, and competing policy priorities (Brick, 2020). Ireland's healthcare system is confronted with distinctive pressures to ensure that its implementation is in accordance with international sustainability objectives, such as the 2030 Agenda for Sustainable Development, while also addressing local constraints and demographic challenges, such as an aging population and increasing healthcare regulations.

There is a gap between policy goals and actual implementation in Ireland, even with high-level pledge. There has been uneven success in getting Irish healthcare organisations to make changes in hospitals and clinics that meet climate action goals. As shown by the fact that the health sector's carbon footprint has grown over the past few years, national leaders have acknowledged the crisis of climate change in healthcare. However, they have not been followed by very decisive action, according to recent position paper by the Royal College of Physicians of Ireland. Indeed, Irish officials have found that many hospitals still use inefficient energy systems and poor waste management methods, which shows that the HSE's sustainability measures are not being fully implemented. Ireland's dual public-private health system and fragmented government make application even harder.

This literature review looks at the different ways that Irish healthcare organisations can successfully make their operations more sustainable. It looks at the main problems that make it hard to put the plan into action, combines the best tactics from both local and foreign settings, and investigates the organisational factors that lead to success, such as leadership, culture, and working together across disciplines. This review tries to make it easier to understand and put into practice sustainable healthcare transformation in Ireland by using a range of academic sources, policy documents, and case studies. The key areas structuring the literature review are: Environmental Impact and Policy Frameworks, Governance and Leadership, Sustainable Procurement, Infrastructure and Energy, Organisational Dynamics and Workforce Challenges, Waste Management, Education and Training, Barriers to Implementation and Effective resource allocation. Together, these themes encapsulate the multifaceted challenge of greening healthcare. The review also identifies gaps in the existing literature, particularly concerning Ireland.

2.1 Healthcare Sustainability Concepts

The concept of sustainability emerged in theory, policy development, and management practice globally with the release of the "Our Common Future" report by the United Nations in 1987. The report defines sustainable development as progress that satisfies current demands without jeopardising the capacity of future generations to fulfil their own requirements (Mostepaniuk et al., 2023). Sustainability in healthcare includes environmental responsibility, economic feasibility, and social justice (World Health Organisation, 2017). Ecological sustainability pertains to the reduction of environmental damage, whereas the economic and social components include affordability and equal access. The triple bottom line (Elkington, 1997) concept is fundamental, positing that healthcare organisations must concurrently consider environmental, social, and financial performance. In their efforts to optimally address the patients' needs, healthcare institutions utilise substantial resources, which directly affect climate change and human health. Confronted with this circumstance, it is imperative to establish a balance between environmental and economic considerations, integrating the three essential factors which are quality of aid, appropriate fiscal financing and minimal environmental impact. WHO (2017) notes that attaining sustainable healthcare needs resource efficiency and cost management, especially in low- and middle-income countries is challenging. They argue that strategically applied environmental sustainability initiatives can decrease operational expenses. However, (Sherman et al., 2019) cautions that cost-reduction strategies frequently emphasise immediate benefits and abandons long-term environmental objectives.

In Ireland, the Health Service Executive (HSE) defines sustainable healthcare as providing health services in a way that has the least impact on the environment while improving the health of the people (HSE, 2022). This broad view shows how important it is to make sure that healthcare is in line with Ireland's Climate Action Plan 2023 and the Sustainable Development Goals (SDG) (Government of Ireland, 2023). But to make these goals a reality, institutions need to be able to do it, leaders need to be committed, and changes need to be made in each area. Even though there have been a lot of real-world, theoretical, and practical improvements in making and using new healthcare technologies, not enough attention has been paid to how long they will last. Many healthcare innovations that are needed are difficult to maintain. To help this situation for the better, it is

important to make the idea of innovation sustainability clearer. (Fleiszer et al., 2015) It has long been known that making healthcare better is a problem that must be solved. Even while definitions and impacts change from one publication to the next, there is one clear and compelling point: efforts must be well planned and thought about. If organisations don't handle this correctly, they risk wasting vital resources, missing out on important progress, and making patients' outcomes worse. (Lennox et al., 2018)

2.2 Policy Frameworks and Environmental Impact

The Irish government's policy framework is becoming increasingly focused on environmental issues. The Climate Action and Low Carbon Development Amendment Act 2021 says that the government must make sure that the country is carbon neutral by 2050 (Oireachtas, 2021). The HSE climate Action Strategy 2022-2024 says that healthcare facilities must meet decarbonisation goals. In addition to carbon emissions, hospitals and healthcare supply chains utilise significant quantities of water, energy, and raw materials, while producing substantial amounts of waste including hazardous and biological waste, which can contaminate air and water. The environmental impact paradoxically jeopardises public health.

An example of this is air pollution resulting from energy consumption and transportation in the health sector exacerbate respiratory and cardiovascular disorders. The literature emphasises a moral obligation: healthcare must do no harm not only to patients but also to the ecosystem that supports health. Healthcare organisations and associated businesses substantially benefit from their communities by offering a diverse array of services. They also account for a substantial proportion of pollution, which adversely affects health. Recent estimates indicate that at least 9 million deaths worldwide are directly linked to pollution, a figure that is probably an underestimation. (Rajagopalan et al., 2023). The Oireachtas (2021) and HSE Climate Action Strategy 2022-2024 both articulate policy mandates for environmental sustainability, with a focus on achieving carbon neutrality by 2050 and establishing sector-specific decarbonisation objectives. Their emphasis is normative and prescriptive, highlighting the desired outcomes for emissions reduction without explicitly measuring the direct health impacts of environmental deterioration. The framing predominantly focused on policy, with healthcare designated as a key entity accountable for fulfilling climate responsibilities.

In contrast, Rajagopalan et al. (2023) employ an empirical and impact-oriented approach, emphasising the substantial health burden of pollution, with approximately 9 million deaths per year linked to environmental contamination. Their approach positions pollution not merely as an environmental issue but as a primary factor in sickness and mortality, hence underscoring the necessity of incorporating environmental factors into healthcare practices.

There is a discrepancy between policy and practice despite Ireland's robust regulatory framework (Boyle, 2021; Rayan-Fogarty et al., 2016) indicates that implementation is slow in adoption in healthcare organisations caused by obsolete infrastructure and insufficient energy and waste management systems. This illustrates the established policy implementation gap in environmental health governance (Watts et al., 2018).

The way healthcare is delivered has a major effect on the environment. Healthcare systems have a big effect on the environment, including the release of carbon dioxide, the use of resources, and the creation of waste. Healthcare is thought to be responsible for about 4.4% of all greenhouse gas emissions around the world. Supply chain emissions (Scope 3) are the biggest source of these emissions. In a similar study published in Lancet Planetary Health, (Karliner et al., 2019) says that healthcare has a 1- 5% influence on the world, including greenhouse gasses, air pollution, and water use. They also warn against feedback loops in healthcare's own footprint harms human health. (Lenzen et al., 2020)

Different countries are trying to lessen these consequences in different ways, depending on their government's goals and available resources. (Ryan-Fogarty et al., 2016) Even though the strategy says it wants to use less energy, switch to renewable sources, and make sustainability a part of procurement (HSE, 2022), the plan is not being carried out on time. The Environmental Protection Agency (EPA) and SEAI have done audits that show that most hospitals are still not using energy and managing trash efficiently (EPA, 2021). Also, most of the time, HSE reporting techniques are more descriptive than evaluative, which makes it harder to be open and accountable. (Comptroller and Auditor General, 2022).

In Ireland, efforts such as the HSE Climate Action Strategy highlight the imperative of incorporating sustainability into hospital operations. The effectiveness of these frameworks depends on rectifying systemic inefficiencies and harmonising national regulations with global norms (Boyle, 2021). The literature emphasises the mismatch between policy objectives and practical execution, with research advocating for more detailed, sector-specific emissions reduction methods that do not jeopardise patient care.

2.3 Governance and Leadership

At the core of the development and preservation of resilient health systems are effective leadership and governance. In the aftermath of Covid-19, a multitude of issues were revealed, with the most significant being the necessity of establishing a resilience plan. Healthcare executives are compelled to consider a wide range of issues that impact operational viability considering the threats that are centred on climate, fiscal solvency, and emerging infectious diseases. (Greenhill, 2023) The ultimate competitive advantage may be achieved by organisations that integrate sustainability into their business models and corporate governance. The organisation's business and the environment can both benefit in the long-term investing in the development of robust sustainability strategy,
Good governance is always seen as the most important thing that makes sustainability integration possible (Berwick, 2020) Irish healthcare organisations with sustainability champions at the board level demonstrate elevated levels of innovation and compliance (HSE, 2022).
The sources concur that governance is fundamental to the integration of sustainability within healthcare organisations. Their divergence is in emphasis and framing. Greenhill (2023) underscores the importance of resilience planning in addressing multifaceted risks and positions sustainable integration as a competitive advantage. Berwick (2020) posits governance as a universal necessity for sustainability, devoid of contextualisation within operational or competitive frameworks. The Human Resource Development Agency (2022) presents definitive, sector evidence indicating that governance though sustainable leadership at the board level correlates with enhanced organisational performance in innovation and compliance. In summary, they theoretically aligned yet differ in scope. Greenhill presents strategic rationale, Berwick articulates a core principle, and HSE gives contextual proof.

The fragmentation of governance within Ireland's dual public-private health system hinders cohesive implementation. (Brick 2020). In contrast to other high-income countries and European context, Ireland is the sole Western European nation that does not provide universal primary care coverage. Most of the population, 60%, is required to pay an average of €52 for each GP visit, and two thirds of the population is required to pay up to €144 per month for drugs and other primary care services. (Burke et al., 2018) Strategic integration is impeded by short-term budget cycles, which offer limited incentives for investment in long-term sustainability infrastructure.

2.4 Sustainable Procurement

Procurement of healthcare products constitutes around 50% of the greenhouse gas emissions within the French healthcare sector. (Laviolle et al., 2024) Each country's health sector is responsible for the direct and indirect emission of greenhouse gases (GHG) through the consumption of energy, transportation, and the production utilisation and disposal of products, even though the volume of these emissions varies greatly. The health sector, on the other hand, has not been quantified as a coherent section of the global climate footprint until very recently. In the UK'S National Health Service (NHS), it is estimated that supply chain emissions from pharmaceuticals, medical devices, food, etc. constitute approximately 60% of NHS England's total carbon footprint. Until recently, the climate impact of healthcare procurement was not thoroughly assessed according to significant reports.

(Karliner et al., 2020) Not only will the healthcare industry be responsible for around 4 - 5% of the world's greenhouse gas emissions, but it also has a significant part to play in the mitigation efforts for climate change. These efforts will not only result in significant reduction in emissions, but they can also frequently contribute to improved patientcare, increased staff satisfaction, and cost savings. (Tennison et al., 2021) Circular procurement and local sourcing are two examples of innovations that have been tested at hospitals such as Cork University Hospital, which have resulted in economic savings as well as environmental benefits (EPA, 2020). On The other hand, these are exceptional instances. The education of suppliers and the alignment of polices with EU directives (European Commission, 2020) are both necessary for a more comprehensive transition.

Another optimal technique is including sustainability factors into tender and contract procedures. The HSE is formulating a Sustainable Procurement Code to guarantee that bidders consider

environmental conditions (energy efficiency, recyclability, supplier emissions, etc.) when awarding contracts. (hse.ie). The NHS Supply Chain in the UK has established a Net Zero Supplier Roadmap, mandating suppliers to quantify and disclose their emissions and to formulate decarbonisation strategies by certain deadlines, for example 2030 or face the potential loss of NHS contracts. The HSE in Ireland may utilise its purchasing power. As one of the nations, largest customers, to advocate for environmentally sustainable products and production techniques. The European Union promotes this through Green Public Procurement rules as an EU member; Ireland has access to a toolkit for incorporating sustainability in public tenders.

2.5 Infrastructure and Efficiency of Energy Use

The recent escalation in energy use and carbon dioxide emissions (CO2) is concerning. Some contend that the increasing population in metropolitan areas is the primary factor behind the increase, while others assert that the production of products and services may be the cause. Regardless of the circumstances, energy has become a fundamental determinant of sustainable development. Consequently, it is anticipated that energy consumption in the global industrial sector will increase to approximately 30% by 2050 (Zakari et al., 2022)

Hospitals, clinics, and labs are examples of healthcare centres that use a lot of resources. They are usually open 24 hours a day, seven days a week, and have strict needs for lights, medical equipment, HVAC, and ICT. Because of this, hospital equipment makes a big difference in healthcare's direct carbon footprint (Scope 1 and 2 emissions). So, one of the most important parts of sustainable healthcare is making healthcare facilities and systems use less energy.

Current challenges: Numerous hospitals, both in Ireland and world-wide, were constructed decades ago without consideration for energy efficiency. Obsolete infrastructure results in inefficiencies such as inadequate insulation, antiquated boilers, and single-pane windows. The increasing demand for healthcare and growing utilisation of advanced medical technologies have escalated energy usage throughout time.

Even though there are problems, many projects show that improving infrastructure is good for both the environment and the economy. The Mater Misericordiae University Hospital in Dublin is a great example. It worked with an energy services company to upgrade its energy infrastructure. Under the terms of a 15-year Energy Performance Contract, this project put in double-glazed windows spanning 2,600 m^2, 3,800 LED lights, and a 2 MW combined heat and power (CHP)

plantdistrictenergy.org. Because of this, the Mater Hospital has cut its use of power from the grid by 77% and is on track to achieve an over 50% improvement in energy efficiency by 2025, which is much higher than the previous national goal of 33%.

2.6 Organisational Dynamics and Workforce Challenges

The attitudes, involvement, and well-being of the healthcare workforce are crucial in facilitating or obstructing sustainability initiatives. Sheikh et al. (2011) and Grenhalgh et al. (2004) argue that human interactions and professional culture are the driving forces behind healthcare systems. If physicians, managers, nurses, caregivers and all healthcare support personnel do not actively participate in the implementation process, even the most technically sound policies have the potential to suffer failure. This section analyses the impact of labour dynamics and organisational culture on sustainable healthcare initiatives, emphasising both global perspectives and the Irish context**.**

Sustainable enhancement in healthcare is unattainable without transforming the organisational culture. (Berwick, 2020) Research highlights the significance of leadership in cultivating a sustainability culture and underscores the necessity for specialised education and training to prepare healthcare personnel with the requisite knowledge and skill for implementing sustainable practices (Hussain, 2022) In Ireland, where workforce shortages are an ongoing issue due to work life balance, engaging staff in sustainability initiatives requires careful balancing of workloads and clear communication of the long-term benefits of such efforts.

Research shows that healthcare organisations need to work hard to create a culture that lasts. Sustainability needs to be valued and understood at every level, from hospital administrators to field nurses to maintenance workers. When sustainability is part of the company culture, workers are more likely to see opportunities like turning off equipment that is not being used, reducing waste, or suggesting ways for departments to do things that are better for the environment. The atmosphere is set by leadership, and the culture is kept alive by peer pressure and shared ideals. Hussain et al. (2022) found that more green activities by hospital staff are linked to transformational leadership styles, which are marked by leaders who share a goal for sustainable healthcare and give staff more power. Education and raising knowledge are important tools for making things easier. Staff must know the importance of sustainability and know they can help with their daily tasks. Making simple

changes like choosing sustainability leaders for each ward, asking for green ideas, or including sustainability in staff goals, can help change the culture.

2.7 Waste management

The Joint Commission Environment of Care Standards say that hospitals lose money because of the costs of properly getting rid of medical waste. Basic changes to management can save 10% to 50% of costs (and lower pollution). There are many reasons why waste management systems need to be looked at again, such as stricter federal rules, public demand, and rising costs. One of the main reasons to rethink how we handle waste is that many of the current waste separation systems are not cost-effective. (Carrie, 2018).

The literature on green manufacturing and green healthcare indicates a lack of green operational methods, as most of the prior research has concentrated on the green practices within supply chain management. Various eco-friendly ideas and procedures can produce products or systems that utilise fewer materials and energy by elimination of unnecessary input materials, minimising undesirable output, and transforming outcomes into inputs (recycling). This demotes the vocabulary of green manufacturing (Deif, 2011)

There is a scarcity of research that has examined the most effective practices in the field of green operation strategies (Migddadi, 2016; Migdadi and Elzzqaibeh, 2018). Manufacturing organisations may be classified into three categories, as indicated by these studies. The three strategic groups are: a lean environment strategy, a custodian environment strategy, and an agile environment strategy. The agility strategic group exhibits moderate to high performance, while the other two groups exhibit moderate to low performance (Migdadi and Elzzqaidbeh, 2018) The first strategic group (agile) was the most effective in terms of solid waste management, while the second (caretaker) was the most effective in terms of managing hazardous material. However, the third strategic group lean) was the most effective in terms of managing both hazardous material and solid waste (Magdadi, 2016)

2.8 Barriers to Implementation:

Implementation obstacles, including financial limitations, labour opposition, and infrastructural deficiencies, are prevalent issues in sustainability research. (Watts et al., 2018). The Irish healthcare sector reflects these problems, especially in public healthcare organisations where resource

distribution and financial limitations hinder long-term investment in sustainable technologies (O'Connor, 2020). Moreover, organisational inertia and conflicting interests frequently hinder the implementation of environmentally sustainable practices, highlighting the necessity for leadership-driven transformation. The two authors share an understanding of the structural barriers to implementing sustainable practices, particularly financial and organisational challenges. Nevertheless, their evaluations differ in scope and focus, (Watts, 2018) offers a thorough generalised perspective, whereas O'Connor, (2020) provides a sector-specific and localised examination, emphasising leadership as a remedy. These perspectives provide a comprehensive overview of the challenges to sustainability, including global trends and context-specific insights.

2.9 Effective Resource Allocation:

The Sustainability in Health care by Allocating Resources Effectively (SHARE) framework emphasises disinvestment in low-value clinical practices to optimise resource use (Harris et al., 2017). The SHARE program's conceptual framework promotes a shift from cost-cutting to evidence-based resource allocation. For example, systematic evaluations of clinical practices can identify opportunities to phase out outdated technologies and reinvest savings into high-value services. Irish healthcare has unique resource allocation and organisational structures, hence there is no real-world evidence on how to solve its difficulties. Most people in Ireland who don't have a medical card have to pay out of pocket for their doctor visits. This is different from other developed countries Brick, A. *et al.* (2010)

More than one-third of the Irish population resides in rural areas. Only one-fifth of Irish general practices are situated in rural areas, and persistent challenges such as proximity to other health services, professional isolation, and the recruitment and retention of rural healthcare workers threaten the sustainability of rural general practice (Homeniuk et al., 2023) Seven students, whilst on work placement accompanied by seven experts, convened regularly online to engage in comprehensive discussions, exchange insights to carry out research on rural access to services. Anchored in a socioeconomic determinant of health framework, the objective of the investigation was to illuminate challenges faced by marginalised populations, their access to services, and to examine these challenges across three distinct cultural and geographical contexts. The principal themes identified were: 1) the intricacies of accessing rural services; 2) the benefits and drawbacks of rural connectivity; and 3) the influence of these benefits and drawbacks on rural social work

practitioners. McLaughlin, A., Pascoe, E., Lawson, J (2024) discusses the absence of sufficient general practices in rural Irish communities. The seven students, concur with this assertion, however, they also investigate the advantages and disadvantages of rural connectives and the impact of these advantages and disadvantages.

2.10 Education: Communicating clinical sustainability

The lack of information and skills that many health professionals have is the primary obstacle that prevents them from practicing environmental stewardship in the workplace. (Molero et al., 2020b) It is important to re-think unlearn
and re-learn. Presently, healthcare pollution is inflicting indirect public health harm and escalating the need for healthcare services. A transformative vision is essential for attaining a sustainable healthcare system and achieving the ambitious objectives established by the Intergovernmental Panel on Climate Change.

2.11 Literature review conclusion

The literature review has highlighted that the subject of sustainability in healthcare is no longer just a desired objective but an operational imperative, both globally and in the Irish context. The evidence indicates that the existing “take, make, waste” paradigm (Hedstrom, 2018) is incompatible with climate objectives and public health goals, necessitating a shift towards a circular economy that optimises resource efficiency, reduces waste, and aligns healthcare delivery with environmental stewardship, Worldwide, healthcare accounts for roughly 4.4% of greenhouse gas emissions (Karliner et al., 2019), and Ireland mirrors this trend, as the HSE acknowledges the necessity of incorporating sustainability into all facets of healthcare delivery (HSE,2022).
Despite ambitious policy frameworks, such as Ireland’s Climate Action Plan 2023 (Government of Ireland, 2023) and the HSE Climate Action Strategy 2022-2024 (HSE, 2022), a continual gap persists between strategic pledges and operational results. Inefficiencies in energy use, outdated infrastructure, inadequate waste management, and the disjointed structure of Ireland’s dual public-private healthcare system persist in obstructing advancement. The literature indicates that systemic transformation necessitates more than just policy statements, it requires effective governance, dedicated leadership, and a pervasive culture of sustainability throughout all organisational tiers (Berwic, 2020; Hussain, 2022).

Worldwide best practices such as the NHS Net Zero Supplier Roadmap and circular procurement models provide significant advice (Tennison et al. 2021), nonetheless, Ireland's adoption is inconsistent, characterised by discrete achievements (EPA, 2020) as opposed to comprehensive change. Primary obstacles encompass budgetary limitations (O'Connor, 2020), workforce deficiencies, conflicting priorities, and inadequate training for healthcare workers to incorporate concepts of sustainability into routine practice. Confronting these problems requires focused investment in infrastructure modernisation. Procurement reform, staff engagement, and comprehensive evaluation procedures that transcend descriptive reporting to facilitate measurable effect assessment.

The literature emphasises the ethical and strategic necessity for healthcare to do no harm to both patients and the ecosystems that support human health (Healthcare Without Harm, 2019). This requires the alignment of Ireland's healthcare sector with the sustainable Development Goals and the obligations of the Paris Agreement, while also tackling distinct Irish challenges such as rural service delivery and unequal access to care. Subsequent research must emphasise evidence-based frameworks for sustainable innovation in healthcare, construction on flexibility, cost-efficiency, and cultural assimilation within Irish organisational settings.

Ultimately, attaining sustainable healthcare in Ireland requires a coordinated, cross-sectoral strategy that amalgamates policy aspirations with operational proficiency, informed by principles of environmental stewardship, economic viability, and social equality (World Health Organisation, 2017). In the absence of decisive measures, the industry jeopardises the continuation of a cycle in which healthcare's environmental impact compromises the health results it aims to enhance.

Research Question

This research seeks to address the question: How can Irish healthcare organisations effectively integrate sustainability practices into their operations, and what are the key barriers, best practices, and organisational dynamics influencing this process?

This subject is crucial due to the pressing requirement to integrate healthcare service with environmental sustainability requirements. Worldwide, healthcare systems substantially contribute to greenhouse gas emissions, resource depletion, and waste production (Karliner et al., 2019). In Ireland, policy initiatives like the HSE Climate Action Strategy underscore the incorporation of

sustainable practices within healthcare operations. However, executing these ideas involves complicated obstacles, including infrastructural limitations and cultural as well as institutional obstacles, rendering this a vital topic for exploration.

This question is vital for enhancing both academic and practical comprehension of sustainability in healthcare. This research explores the interaction of leadership, policy alignment, and staff participation in the development of sustainable healthcare systems. It enhances the literature on change management and organisational behaviour in high risks, safety context. The study elucidates impediments, best practices, and organisational dynamics, guiding policy makers and practitioners in integrating sustainability into operational frameworks.

Hypothesis

The integration of sustainability in Irish healthcare is shaped by national policy frameworks and leadership commitment, although its effective implementation is hindered by resource constraints, infrastructural obstacles, and differing degrees of cultural participation. Organisations with solid leadership endorsement, well-defined governance frameworks, and ingrained cultural advocates are more likely to attain effective and enduring sustainability results.

Research Aims

The purpose of this study is to investigate the methods that Irish healthcare organisations should employ to incorporate sustainability into their operations. Determining the organisational cultural, and infrastructural obstacles that stand in the way of the adoption of sustainable practices is yet another aim for this study. Investigating the most effective strategies and enablers that make sustainable healthcare delivery possible is aimed at and looking into investigating the organisational dynamics that play a role in the integration of sustainability, including leadership, culture, and stakeholder engagement.

Research objectives

Identify and contextualise the most effective practices:

Based on recorded success in lowering environmental impacts while preserving service quality, the purpose of the study is to identify evidence-based sustainability measures that are currently being adopted in both international and Irish healthcare systems (Karliner et al., 2019; Tennison et., 2021). Furthermore, it intends to investigate the ways in which such methods can be adapted to the specific structural, regulatory, and cultural aspects of the Irish healthcare setting. This should be done in recognition of the fact that effective translation frequently necessitates the implementation of localised innovation. (Lozano, 2013).

Check for Obstacles in the way of Implementation: The analysis of the financial, operational, and infrastructural obstacles that impede the integration of sustainable practices in the Irish healthcare organisations is a crucial objective that must be accomplished. It is important to consider factors such as constraints on capital investment, dependency on supply chains, and clinical safety regulations, all of which commonly serve as structural barriers to the adoption of sustainable practices (Burke et al., 2018; Sheran e al., 2020).

Perform an Organisational Dynamic Analysis: Regarding the adoption of sustainability initiatives, this objective seeks to study the impact that organisational culture, leadership commitment, and staff engagement have in shaping the acceptance of these efforts. Workforce-related issues, such as staffing shortages, workload pressures, and reluctance to change, will be evaluated to determine the extent to which they have an impact on the success or failure of environmental interventions (Ham, 2022) Furthermore, the research will determine the cultural and managerial drivers that either support or hinder the transformation of organisations towards sustainability (Doppelt and McDonough, 2019)

Evaluate the alignment of policies and strategies: Specifically, the research investigates the degree to which sustainability initiatives within the Irish healthcare system are in accordance with national policy instruments, the most notable of which is the Health and Safety Executives' Climate Action Strategy 2023 – 2050, as well as pertinent international frameworks, such as the World Health Organisation's Operational Framework for Climate Resilient Health Systems. (World Health Organisation, 2015). It will also investigate the gap that exists between the aims of strategic policy

and the practical realisation of those intentions, which is a problem that is frequently mentioned in the literature on sustainability.

Create Recommendations for implementation:

To incorporating sustainability into the operations of Irish healthcare facilities, the goal is to develop techniques that are both evidence-based and feasible. These suggestions will be developed with the intention of bringing together environmental imperatives with the ethical and clinical requirement to provide high quality, patient centred care. This will ensure that ecological responsibility is complementary to, rather than in competition with, excellence in healthcare. (Whitmee et al., 2015)

Methodology

This part of the research delineates the methodological methodology employed in this study, which investigates the effective integration of sustainability principles into the operations of Irish healthcare organisations. The chapter delineates the research design, data collection techniques, participant selection criteria, ethical considerations, and methodology for data analysis. This study employed a qualitative research methodology, utilising semi-structured interviews as the principal technique of data collecting. This methodology facilitates comprehensive insights into the perceptions and implementations of sustainable practices by healthcare practitioners and sustainability experts in Ireland. (Kavle & Brinkman, 2009).

According to Farrell et al. (2016) research paradigms stem from the viewpoints of the two principal analytical frameworks: qualitative and quantitative research. The qualitative approaches entail the examination of language (interpreting the rationale), while quantitative methods focus on numerical analysis (determining the facts). This research employed a qualitative approach because qualitative analysis facilitates a deeper comprehension of research objectives. It uses language to uncover significance and elucidate the "why" behind the "what" of quantitative research. Qualitative research seeks to identify relational pattens within categories, referred to as themes, and utilises extensive data to gain insight into participants perceptions and interpretations of the world. Qualitative research is not a simpler alternative to quantitative methods, despite the allure of its absence of numerical data. Substantial time and effort will be essential to execute the process meticulously, to arrange interview appointments, to collect data, to transcribe it if required, to perform coding procedures, and ultimately to do the analysis.

To conduct an in-depth investigation into the how and why of incorporating sustainability into Irish healthcare, this research made use of a qualitative research design. Because we are dealing with complicated processes, perspectives, and organisational contexts that are not easily reducible to numbers, a qualitative approach was well-suited for our goals because it made way for a better understanding to these aspects.

The study methodology utilised to address the research issue employed a qualitative approach, underpinned by the following rationale: Sustainability in healthcare involves complex experienced

organisational practices not easily reduced to quantitative metrics. Exploratory Characteristics of the Research: The research is exploratory in nature, seeking to examine the methods and reasons for the integration of sustainable practices with Irish healthcare organisations. Qualitative methods are adept at offering profound insights into intricate processes, experiences, and contextual elements that quantitative approaches may fail to sufficiently capture. Qualitative approaches are essential for elucidating phenomena that resit quantification. Dźwigoł, H. (2024). Flexible data collection: Qualitative approaches provide considerable flexibility in data gathering, allowing or the modification of questions to investigate emerging themes or areas of interest that surface during interviews or focus groups. Unanticipated concepts or problems may be recognised that a tight quantitative framework could overlook. Constraints of Quantitative Methods: Quantitative research including surveys and statistical analysis, is less effective in addressing how and why issues. It may overlook vital stakeholders, diverse perspectives and experiences, which are critical for comprehending sustainability challenges, best practices and organisational dynamics. The research employed qualitative research methodologies consisting of multiple stages to fulfil its objectives, as indicated by Farrell et al. (2016)

4.1 Pilot Study

The researcher conducted a pilot study before executing the interviews. Pilot studies provide an opportunity to resolve potential practical concerns, facilitate adjustments to questions, aid in finding problems or restriction in the inquiries, and offer the researcher an opportunity to modify the questions or methodology of data gathering as required. (In, 2017) Pilot studies furnish researchers involve in grounded theory research with ideas on conceptualising the study, prioritising significant data, and sampling theoretically. (Nunes et al., 2010)

4.2 Sampling

Recruitment of participants began with purposive sampling of professionals directly involved in sustainability and climate action within public and private Irish healthcare organisations including director of nurses, senior clinicians, representatives of private hospital groups and sustainability officers. Initial participants were identified. The researcher started by contacting an investment

director who was running Healthcare sustainability summit through email to request for contacts of potential research participants. Snowball sampling strategy was used to identify additional participants after initial contacts were made. Snowball sampling is a frequently used sampling technique in qualitative research. (Kirchherr and Charles, 2018) This sampling approach was chosen due to the relatively niche and specialised nature of sustainability roles in Irish healthcare and has precedent in similar Irish qualitative studies. Purposive sampling is commonly employed in quantitative research to locate and choose information- rich examples for optimal resource usage. This is the identification and selection of individuals or groups who are knowledgeable and skilled regarding specific topics of interest. Alongside knowledge and experience, it is essential to emphasise the significance of availability, willingness to engage and the capacity to convey experiences and viewpoints articulately, expressively and reflectively. (Etikan, 2016) Convenience sampling could have been used by research by contacting clients in healthcare leadership positions, but this idea was not pursued due to the bias nature of convenience sampling. (Isaac, 2023)

4.2.1 **Demographics of participants**

2 of the participants were director of nurses in different nursing homes in Dublin. Out of 9 participants 4 were males. 3 where CEOs, TWO were CEOs of private Hospitals, and one was a CEO of a semi-public hospital which is partly funded by the HSE. 2 participants were Clinical nurse managers. The other 2 were senior positions in sustainability companies.

See below **Fig. 1** showing the table for participant demographics

Participants	**Gender**	**Position**	**Years in role**	**age**
P 1	Female	CEO	5	63
P 2	Female	CNM	4	40
P 3	Female	DON	2	39
P 4	Female	CNM	6	50
P 5	Female	PHO	5	48
P 6	Male	SO	5	60
P 7	Male	SO	4	59

P 8	Male	CEO	10	64
P9	Male	CEO	9	65

Fig.1

4.3 Data Collection

Semi-structured Interviews was the method used to collect primary data from participants. The participants where those with the ability to convey comprehensive, context-specific observations while ensuring consistency across interviews. (Kvale, 2011) The interviews were conducted with a sample of stakeholders who are either participating in or knowledgeable about sustainability activities in the healthcare industry. The interview questions were semi-structured. The researcher obtained rich, first- hand insights into experiences, motives, barriers, and ideas, using the method of qualitative interviews, which was in line with the exploratory nature of our research questions.
The interview questions were designed based on essential themes from the literature, encompassing organisational dynamics, sustainability in healthcare, leadership and implementation obstacles (Berwick, 2003: Kaplan et al., 2010: Sheikh et al., 2011). They were additionally informed by previous research employing analogous qualitative methodologies within the Irish setting.
The guide had 10 semi structured questions categorised into categories including organisational leadership, staff participation, current sustainability practices, policy influence, and implementation challenges follow-up inquiries were employed if necessary to obtain more profound responses.
Participants were chosen through purposive sampling to encompass professionals knowledgeable about or accountable for sustainability in Irish healthcare organisations, including managers, directors and operational leaders. Interviews were conducted using Microsoft Teams video conference meetings to facilitate participation across different parts of the country without travel. Each interview lasted 30 to 40 minutes. The interviews were audio-recoded with consent to facilitate transcription which made it easier for data analysis

4.4 Ethical considerations

Ethical permission was obtained from participants ahead of interviews. All participants were given a consent form to read though and confirm that they agree to participate willingly by signing. Participation was voluntary, with the option to withdraw at any time without penalty. Anonymity

and confidentiality were assured by ensuring that only the participants were coded such as P1 to P9. Only the researcher had password for access to the data collected. The research complied with the Declaration of EU General Data Protection Regulation (EU-GDPR, 2018)

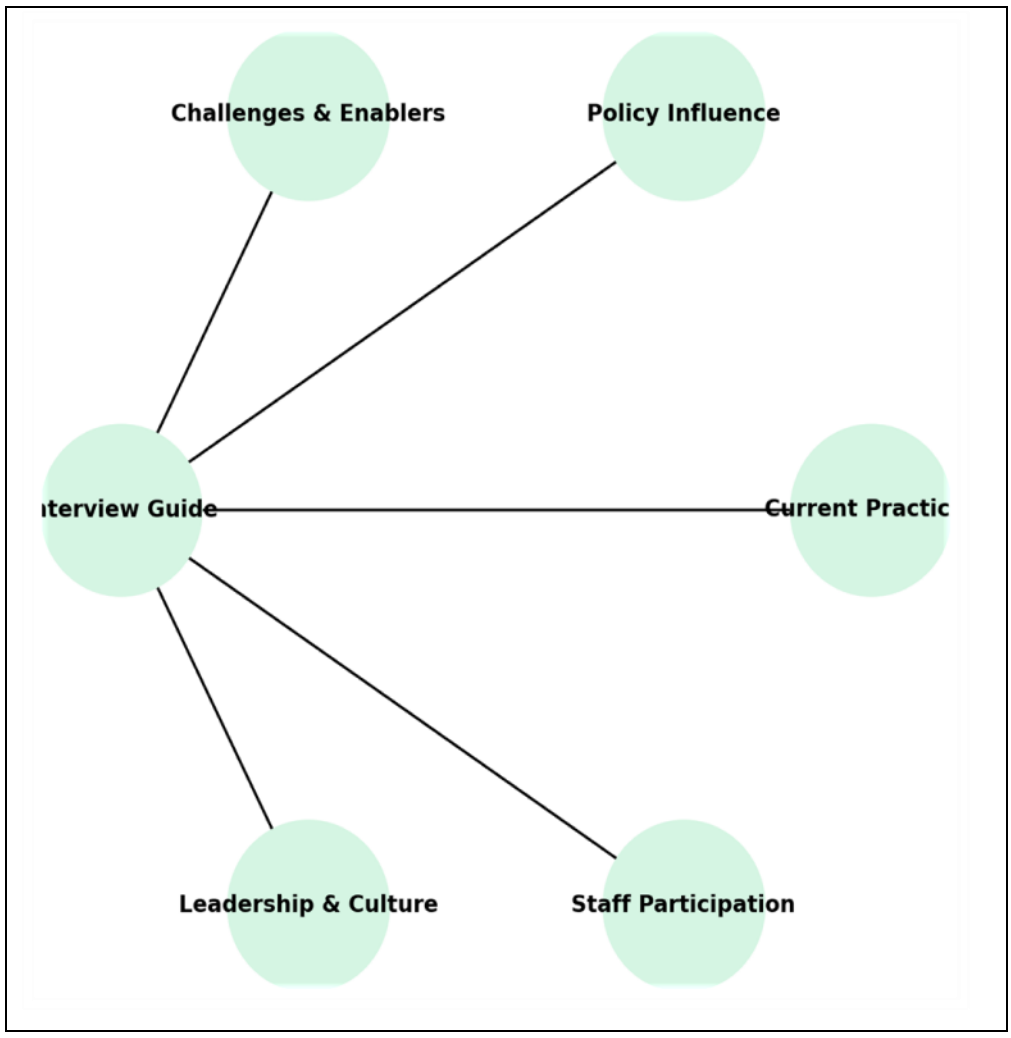

Fig 2. Structure of the interview guide

Above **Fig 2**. shows the structure of the interview guide consisting of 10 open ended questions formulated from literature regarding sustainability in healthcare and organisational change (Berwick et al., 2003; Kaplan et al., 2010; Sheikh et al., 2011; Khurshid et al., 2023; Loftus et al., 2023). Topics encompassed: Organisational leadership and culture, employee engagement and awareness, Contemporary sustainability techniques. Impact of policies and law; Challenges and facilitators of implementation.

5 Findings and Analysis

5.1 Introduction

Thematic analysis was employed to discern reoccurring patterns and themes within the data. The rationale for this decision was because; Braun and Clarke released their initial work about thematic

analysis for methodology in 2006 and since then it has undoubtedly been one of the most comprehensively articulated techniques for performing theme analysis.(Byrne, 2022) The procedure entailed: familiarisation with data, creation of preliminary codes, categorisation of codes into potential themes, evaluation of and refinement of themes, definition and designation of themes. ChatGPT was used to analyse primary data, putting into themes and anonymising the participants. Use of AI use was declared as per requirement in AI use declaration form. This chapter presents the findings from eight semi-structured interviews with healthcare professionals, and policy influencers engaged in sustainability in Irish healthcare. Using Braun and Clarke's (2006) thematic analysis approach, six key themes emerged from the data: (1) Strategic Integration of Sustainability, (2) Culture, Champions, and Behavior, (3) Operations and Infrastructure, (4) Policy Alignment and Measurement, (5) Barriers to Implementation, and (6) Enablers and Future Directions. Participants are anonymized and coded as follows: - P1: Semiprivate hospital CEO, P2: Senior manager (addiction center), P3: Director of Nursing, P4: Clinical Nurse Manager, P5: Public health officer, P6: National energy authority representative, P7: Sustainability officer, P8: CEO, P9: CEO

5.2 Strategic Integration of Sustainability

The practical implication is that incorporating sustainability objectives into corporate governance processes can guarantee long-term organisational responsibility and resource distribution. This conclusion is consistent with Ham (2022). Who contends that leadership vision and governance frameworks are essential for integrating sustainability into healthcare organisations. The formalisation of champion roles across various hospital departments can enhance staff engagement. The function of champions aligns with Hussain et al. (2022), who emphasises the influence of local advocates in the cultural adoption of environmental initiatives.

Practical implications: Prioritising retrofits that offer rapid return on investment, such as LED upgrades, can optimise both economic and environmental advantages. The operational measures align with Tennison al. (2021), who recognised infrastructure retrofits and improvements to healthcare practices as significant strategies for carbon reduction. Practical implications: Implementing uniform KPI reporting among public and private healthcare providers can bridge the policy practice divide. This aligns with O'Connor (2020), who discovered that policy alignment affects adoption even in voluntary circumstances.

Government sponsored finance or specific grants may alleviate capital constraints. The obstacles outline herein reflect those seen by Burke et al. (2018), specifically regarding capital expenditures and infection control limitations, The practical implication is that collaborative procurement frameworks among hospitals may lower expenses and enhance collaborative procurement frameworks among hospitals may lower expenses and enhance access to sustainable items. This embodies the European Commission's (2020) proposals on utilising collaborative procurement and knowledge dissemination.

One of the interviewees reported that a transition from informal initiatives to formal sustainability governance. P1 disclosed a three-to-five-year organisational strategy, overseen by a green energy sustainability team chaired by the CEO. P8 mentioned a sustainability steering group overseen by top leadership with annual objectives. Sustainability supplier viewpoints affirmed this dedication, with P7 highlighting a net zero strategy and the incorporation of sustainability into ESG frameworks. P2 identified a discrepancy wherein alignment with national strategies is present, although lacks formal assessment or specific KPIs. P9 characterised sustainability as an increasingly integrated component of their healthcare organisation’s operations. They underscored that recent initiatives such as the shift to LED lighting, improved waste segregation, and the reduction of single use plastics demonstrate a purposeful effort to align operational activities with overarching environmental objectives. Despite being a private institution, they demonstrated a deliberate commitment to conforming to the HSE Climate Action Strategy and national objectives, perceiving sustainability as an ethical imperative rather than merely a legislative necessity. This corresponds with Boyle (2021), who emphasises the significance of strategic integration in promoting resilience and comprehensive sector transformation.

5.3 Culture Champions and Behaviour

Cultural adoption was consistently associated with frontline engagement. P8 underscored the necessity of elucidating the “why” to obtain support and buy in, whereas P1 and P3 articulated the significance of local advocates. Behavioural nudges, including centralised waste sites, were found to enhance compliance. P7 emphasised the importance of education rather than enforcement in altering attitudes. P9 emphasised the essential role of frontline personnel especially nurses and clinicians as champions for sustainability initiatives. Their instance of effectively implementing reusable surgical instruments illustrates how behavioural change is propelled by transparent explanation of the rational

underlying actions. They observed that cultural transformation in healthcare is intrinsically incremental, as patient safety in paramount. This conclusion aligns with Lozano (2013), who contends that cultural adaptation is crucial for integrating sustainability into organisational norms.

5.4 Operations and Infrastructure

Participants outlined many practical remedies, including upgrades to LED lighting (P2, P4) and sophisticated clinical modifications such as substituting anaesthetic gases with alternatives that have reduced global warming potential (P8). The discussion encompassed biodiversity and the integration of renewable resources, with P1 citing the planting of 4,500 trees and the installation of heat pumps. P7 outlined circular product design from the supplier perspective shown by MRI systems with diminished helium requirements. These operational interventions yielded quantifiable and documented advantages, consistent with international best practices. P9 said operational enhancements were showcased as concrete achievements, with significant instances compromising the implementation of energy efficient heating and ventilation systems and the diminution of anaesthetic gas emissions. The infrastructural modifications not only diminished energy usage but also substantially decreased the organisation's carbon footprint. This illustrates the operational emphasis articulated by Sherman et al. (2019), wherein infrastructure enhancements serve as crucial catalysts for quantifiable environmental improvements.

5.5 Policy Alignment and Measurement

Private sector participants also aligned with public-sector goals, notably the HSE Climate Action Strategy. P1 and P8 indicated the incorporation of procurement sustainability criteria, whilst P6 emphasised national standards (ISO 50001) and educational platforms (energy, academy). Measurement methodologies were strongest in acute settings (energy, waste, water KPIs) but less developed in community care. (P2). This illustrates the disparity between policy and practice identified in the literature.

P9 indicated that the hospital, although not officially mandated, strictly adheres to the HSE Climate Action Strategy and complies with building energy rules for new projects. Sustainability measures,

including energy, trash and water use, are monitored quarterly, and project-specific outcomes are assessed to illustrate return on investment.

5.6 Barriers to Implementation

P9 pointed out that cost proved to be the primary obstacle, as sustainable solutions frequently necessitate considerable initial expenditure. The participant also emphasised that infection control is a constraint in the adoption of reusable alternatives, along with supply chain difficulties in procuring sustainable products.

The most prominent barrier was the capital cost of green infrastructure. P8 noted that upfront investment remains a challenge, compounded by infection prevention constraints that limit reuse options. P1 and P4 discussed the difficulties of retrofitting legacy estates, including temporary energy spikes during renovations. P5 identified siloed governance as a systemic barrier to integrated sustainability deliver.

5.7 Enablers and Future Directions

Training, procurement reform, and teamwork surfaced as essential facilitators. P6.'s depiction of national training platforms aligns with P1 and P7's advocacy for procurement criteria that incorporate sustainability at the supplier level. Participants advocated for enhanced fiscal incentives for capital improvements and intersectoral coordination to expedite implementation. P9 envisioned enhanced collaboration between public and private hospitals, improved sustainability in supply chains, and increased incentives for green investment as essential facilitators of future advancement. This forward-thinking viewpoint corresponds with Ham's (2022) advocacy for leadership-driven, cross-sector sustainability strategies in healthcare.

5.8 Summary

A sector that is engaged in sustainability at varied levels of maturity is revealed by the findings. While acute providers and big suppliers demonstrate established governance and key performance indicator tracking, community services are confronted with capacity and resource restitutions. For the purposes of accomplishing national and pertaining to leadership culture and financial resources.

Theme	Subcodes	Key Insights	Participants
Strategic Integration of Sustainability	Leadership structures; Sectoral positioning	Formal governance via steering groups; strategy alignment with national policy; higher maturity in acute and supplier sectors.	P1, P2, P7, P8, P9
Culture, Champions, and Behaviour	Local champions; Behavioural nudges	Staff engagement through champions; small changes (waste stations, reusable items) improve compliance.	P1, P3, P7, P8, P9
Operations and Infrastructure	Energy efficiency; Clinical interventions	LED/sensor retrofits, heat pumps, tree planting; low-GWP anaesthetic gases; supplier circular design innovations.	P1, P2, P4, P7, P8, P9
Policy Alignment and Measurement	Alignment with HSE; KPI tracking	Adoption of HSE Climate Action Strategy; use of KPIs (energy, waste, water); procurement sustainability criteria.	P1, P2, P6, P8, P9
Barriers to Implementation	Capital costs; IPC constraints; Legacy estates	High upfront investment; infection prevention rules limiting reuse; governance fragmentation.	P1, P4, P5, P8, P9
Enablers and Future Directions	Training platforms; Collaborative procurement	National training academies; embedding sustainability in tenders; cross-sector collaboration.	P1, P6, P7

Fig 3, Summary of key findings

Discussion

6.1 Introduction

This chapter looks at a critical look at the findings that were presented in Chapter 5, and interpret those findings in relation to the primary research question, which is as follows: " How can Irish healthcare Organisations effectively integrate sustainability practices into their operations, and what are the key barriers, best practices, and organisational dynamics that influence this process?" The purpose of this discussion is to emphasise areas of convergence and divergence, draw theoretical and practical consequences, and contextualise the results within broader discussions on sustainable healthcare systems. This is accomplished by relating the emerging themes to the current literature. As the chapter ends, a consideration is given to the constraints of the research as well as the possibilities for additional research.

6.2 Strategic Integration of Sustainability

The findings suggest that Irish healthcare organisations are moving away from ad hoc, fragmented approaches to sustainability and towards an approach that is more structured and strategically integrated. Ham's (2022) argument that says, governance frameworks are vital in achieving systemic change in healthcare is shown in the leadership commitment that has been demonstrated by sustainability steering groups and the embedding of annual targets. Lazano (2013) argues that policy alignment, even when it is not necessary, can produce a normative effect that changes the behaviour of organisations. The voluntary alignment of private hospitals with the HSE Climate Action Strategy lends support to this claim. The fact that some participants have detected a gap in key performance indicators tracking, on the other hand, implies that strategic commitment does not always convert into strong and effective measurement. This conclusion is like the findings that O'Connor (2020) found regarding the recurring policy practice gap.

6.3 Culture, Champions, and Behaviour.

Both the presence of sustainability "champion" and the importance that organisational culture plays in promoting adoption were recurring themes throughout the discussion. According to Hussain et al. (2022), who discovered that lower levels of resistance, this is consistent with their findings. The participants emphasis on "explaining the why" is reminiscent of Thaler and Sunstein's (2008) nudge theory which proposes that behaviour is influenced by subtle cues that are relevant to the context in

which they are implemented. The findings of this study contribute to the existing body of research by demonstrating that cultural interventions of this kind are especially effective in healthcare settings, where concerns about patient safety can ordinarily slow down innovation.

6.4 Operations and Infrastructure

To be consistent with Tennison et al.'s (2021) identification of infrastructure retrofits as high-yield interventions in decarbonising healthcare, operational steps such as upgrading to LED lighting, optimising HVAC systems, and replacing anaesthetic gases with a high potential for global warming are being implemented. It is further demonstrated by Karliner et al. (2019) that operational sustainability can coexist with patient care environments and even improve them. This is demonstrated by the integration of biodiversity programs with renewable technologies.

6.5 Policy Alignment and Measurement

There appears to be a growing understanding regarding the significance of sustainability in the healthcare industry, as evidenced by the commitment of both public and private organisations to the aims of national policy, particularly the Heathy Scotland Environment Climate Action Strategy. On the other hand, as O'Connor (2020) points out policy alignment is insufficient if there are not appropriate measuring frameworks established. The findings of this study demonstrate that key performance indicator (KPI) tracking is most advanced in acute care, but community services are lagging, highlighting the necessity of capacity building across the entire sector.

6.6 Barriers to Implementation

Like the obstacles that Burke et al. (2018) and Sherman et al. (2020) highlighted, the most significant obstacles are the restraint on infection prevention, the limitations of the supply chain, and the cost of capital. Even though many interventions produce long-term financial returns, the initial investment hurdle continues to be prohibitive in the absence of targeted funding or incentives, according to the experiences of the participants. The scope of reusable product adoption may be mistakenly restricted by infection control regulations, even though these restrictions are vital for patient safety.

6.7 Enablers and Future Directions

National training platforms, procurement reform, and cross-sector collaboration are some of the key enablers that were identified in the research. These are in line with the suggestions made by the European Commission (2020) about the utilisation of procurement to influence the behaviour of suppliers and the development of capacity among various professional groups. Among the various methods that have emerged as potentially effective in lowering prices and enhancing access to environmentally friendly items is collaborative procurement.

6.8 Theoretical Implications

The findings provide support for the idea of organisational change, namely the concept of that a successful transformation necessitates alignment between the commitment of leadership, the readiness of the culture, and the structural supports (Doppel, 2017). Institutional theory is also relevant because the voluntary alignment with national policy frameworks demonstrates the effect of normative influences in changing organisational behaviour, even in the absence of regulatory mandates. This is the evidence that suggests the relevance of institutional theory.

6.9 Practical Implications.

The incorporation of sustainability into governance structures, the appointment of departmental champions, and the prioritisation of retrofits that may generate a high return on investment are all important measures for leaders in the healthcare industry. To speed up advancement, policymakers ought to take into consideration the consideration of targeted financial incentives, support for collaborative procurement, and uniform KPI reporting requirements across both public and private sectors.

6.10 Obstacles and Suggestions for Future Research

This was a qualitative study that was based on a purposive sample, the findings are peculiar to the contest and are not intended to be generalised, statistically speaking. In the future, research could make use of mixed methods approaches to quantify the influence that interventions have on the environment, while simultaneously conducting more in-depth investigations into the cultural and organisational dynamics.

7.1 Recommendations

There is not much talk about healthcare sustainability continuous learning in the literature above. University hospitals and other institutions must now come up with diplomas or even degrees on Sustainability considering the need of meeting Sustainability Developmental Goals (SDGs). The reason why it is important to create courses in this area is for the professionals such as sustainability officers and managers to have the necessary qualifications and deeper understanding of the subject topic. Sustainability education is critical for the future of healthcare organisations in Ireland and around the world.

7.2 Conclusion

This research was to examine how Irish healthcare organisations can effectively integrate sustainability practices into their operations, with particular attention to the barriers, best practices, and organisational dynamics shaping this process. The findings provided compelling evidence that while sustainability is increasingly recognised as an organisational priority, its successful implementation requires the convergence of strategic leadership, operational adaptation, cultural engagement, and policy alignment.

The research established that strategic integration incorporating sustainability into long-term planning, procurement, and capital projects is vital for achieving quantifiable and enduring environmental enhancements (Boyle, 2021; Ham, 2022). Leadership commitment proved to be a critical aspect, with sustainability advocates at top levels facilitating resource allocation and interdepartmental collaboration (Greenhalgh et al., 2004). However, these organisational aspirations must be bolstered by a conducive culture, wherein employees at all levels comprehend the justification for change and are enabled to engage (Lozano, 2013).

Infrastructure enhancements, including LED retrofits, energy-efficient HVAC systems, and low emission anaesthetic gases, have effectively diminished environmental footprints, reflecting the technological measures emphasised by Sharman et al. (2019). Nonetheless, enduring obstacles persist especially financial limitations, infection control mandates, and supply chain constraints that

frequently hinder or impede the implementation of more sustainable options. (Mostepaniuk, 2023).

Policy alignment serves a 2-fold purpose: it provides direction through frameworks like the HSE Climate Action Strategy (HSE, 2022), while discrepancies between policy objectives and actual execution remain evident. Evaluating outcomes and reporting performance, as implemented by participating organisations, facilitates the closure of this gab by evidencing concrete returns on sustainable investments.

This research highlighted that attaining sustainability in Irish healthcare is a complex challenge necessitating strategic foresight, operational proficiency, cultural evolvement, and conducive policy frameworks. Future advancement will rely on synchronised efforts between public and private sectors, enhanced investment incentives, and a more sustainable healthcare supply chain ensuring that environmental stewardship is integral to providing high quality patient care.

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Appendices

Consent form

Title: Integrating Sustainability into Irish Healthcare: An Examination of Strategies, Organisational Obstacles, and Exemplary Practices for Systemic Transformation

Consent to take part in research

- I .....voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that I will not benefit directly from participating in this research.
- I agree to my interview being audio-recorded.

- I understand that all the information I provide for this study will be treated confidentially.
- I understand that in any report on the results of this research my identity will remain anonymous.
- I understand that disguised extracts from my interview may be quoted in the data collection section of the research.

- I understand that if I inform the researcher that I or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.

- I understand that signed consent forms and original audio recordings will be retained in a safe place until the exam board confirms the results of the dissertation

- I understand that a transcript of my interview in which all identifying information has been removed will be retained for two years from the date of the exam board.

- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.

- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Names, degrees, affiliations and contact details of researchers (and academic supervisors when relevant).

Signature of research participant

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Signature of participant **Date**

Signature of researcher

I believe the participant is giving informed consent to participate in this study

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Signature of researcher Date