

Construction Research Development Assignment 2-Dissertation

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Assessing the Impact of Sustainable
Construction Practices on Cost in Irish
and UK Building Projects

FINAL SUBMISSION

30/04/2026

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Abstract

The construction industry is one of the biggest contributors to global carbon emissions. This dissertation looks at cost premiums coming from adopting sustainable building practices in Ireland and the United Kingdom, and whether those extra costs are worth it in the long run. A survey of fourteen senior construction professionals across both countries found that sustainable construction typically costs around 10% more upfront. However, when the full lifetime of a building is considered, the financial returns are better, analysis for this shows the UK are advancing in Life-cycle assessment considerations. What can be done to avoid the perceived cost burden which agreed to make contractors reluctant to adopt sustainable practices.

1 An Assessment into the Cost Implications of Sustainable Building Practices in Ireland & The United Kingdom

1.1 Introduction

The construction industry sits among the worst offenders when it comes to global carbon emissions, consuming vast amounts of resources and pumping out emissions at every stage of a buildings life, from the materials used to build it right to how it operates day to day. Evidence from recent analyses show the construction and buildings sectors together contribute a substantial proportion of global CO₂ footprints. (Li et al., 2025) Research shows that the global carbon footprint of the construction sector has doubled over the last 30 years and is expected to more than double again by 2050. In 2022, over half of the construction industry's carbon emissions came from “cementitious materials, bricks, and metals, while

glass, plastics, chemicals, and bio-based materials contributed 6%, and the remaining 37% arose from transport, services, machinery, and on-site activities.”

As Ireland and the UK move to meet legally-binding and policy targets for deep decarbonisation (including national Climate Action Plans and the UK Heat & Buildings Strategy), sustainable construction practices from reducing embodied carbon to improving operational energy performance and material circularity, these have become central to industry regulation, procurement and design guidance (Gov.ie., 2025). Despite growing policy momentum and expanding technical solutions, many clients and practitioners still perceive sustainability measures as increasing project capital costs, a perception that is frequently cited in the literature as a barrier to wider adoption (Dwaikat and Ali, 2016).

This literature study will analyse the relationship between sustainable construction practices and project costs in Irish and UK building projects, combining and comparing cost-premium evidence, lifecycle cost and benefit studies, and policy drivers to determine whether and when long-term benefits outweigh initial financial implications.

1.2 Background

Sustainability within construction can include energy-efficient designs, renewable energy integration, low-carbon materials, waste minimisation, and life-cycle cost analysis. In both Ireland and the UK, governments have introduced building regulations and initiatives such as Nearly Zero Energy Buildings (NZEB) in Ireland and the UK’s Future Homes Standard, aiming to reduce environmental impacts.

While sustainability is widely acknowledged as a priority across the construction sector, but the reality is that the upfront costs remain to be a significant barrier. Factors like specialist labour, new technologies, and sourcing the right materials all add to the initial price tag. That said, there is a growing body of evidence suggesting that once you look at the bigger picture lower running costs, better energy performance, and a building that holds its value sustainable construction starts to make a lot more financial sense (Vijayan *et al.*, 2025)

1.3 Rationale

The rationale for this study is two-fold:

Industry Relevance: Clients, contractors, and policymakers require clarity on whether sustainable practices increase or decrease the overall financial burden across a building’s lifecycle.

Research Gap: While studies have been carried out in the UK, fewer comparisons exist between Ireland and the UK despite their similar but distinct regulatory frameworks and market conditions.

This research will therefore provide valuable insights into how sustainable practices

affect costs in both regions, contributing to informed decision-making within the construction sector.

1.4 Aim

‘To critically assess the cost implications of sustainable construction practices in Irish and UK building projects.’

Objectives

- To examine current sustainable construction practices in Ireland and the UK.
- To investigate the initial capital cost implications of adopting sustainable methods.
- To assess long-term operational and life-cycle cost impacts.
- To compare Irish and UK approaches, highlighting regulatory, economic, and market-driven differences.
- To provide recommendations for improving sustainable construction adoption

1.5 Hypothesis

‘Sustainable construction practices do not significantly increase overall costs and may provide long-term economic benefits when life cycle costs are considered.’

2 To critically assess the cost implications of sustainable construction practices in Irish and UK building projects

2.1 Sustainable Construction Practices

For both Ireland and the United Kingdom, Sustainable construction practices are now a main part of regulation, technical guidance requirements and procurement criteria's. These practices typically encompass energy-efficient design, renewable energy systems, low-carbon materials, waste reduction and life cycle costs assessments (Goggins et al.,2016).

In Ireland, sustainability initiatives are guided by Nearly Zero Energy Building (NZEB) regulations introduced under the European Energy performance of Buildings Directive (EPBD). NZEB requirements have redefined design and performance standards, reducing

operational energy demand by up to 70% compared with pre- 2010 buildings (Goggins *et al.*, 2016). while recent EPBD revisions now extend to embodied-carbon reporting for new buildings (Irish Green Building Council, 2023). Supporting this shift, whole-life carbon frameworks such as the IGBC's Whole Life Carbon and Circularity handbook and the EPA's CIRCULAR life project provide tools for assessing embodied carbon and encouraging material reuse in Irish construction (IGBC, 2023; EPA 2024).

In the United Kingdom, frameworks such as BREEAM and the Future Homes Standard act as the primary drivers of sustainable practice. Updated BREEAM New Construction criteria now integrate life-cycle assessment and embodied-carbon targets, strengthening the link between certification and measurable carbon reduction (BREEAM, 2024). The Future Homes Standard similarly aims to lower operational emissions and is evolving toward whole-life carbon considerations in line with the UK's net-zero commitments (UK Government, 2021). While BREEAM-certified buildings demonstrate improvements in operational efficiency, occupant health and long-term value, increased initial costs with design integration requirements remain a recurring challenge, which was found through a case study of a healthcare building in St Georges University Hospital London (Cui, Zhao and Zhang, 2025).

Digitalisation and Modern Methods of Construction (MMC) have also been key enablers of sustainable construction practices in both contexts. (O'Hegarty *et al.*, 2025) found that modular and offsite construction can reduce embodied carbon by 10-30%, while improving productivity and cost certainty. MMC adoption is further supported by national bodies such as Engineers Ireland and the UK Government's Net Zero design guidance, both of which highlight MMC's role in improving productivity, predictability and carbon performance (EI 2025; UK Government, 2024). Despite these advancements, barriers such as limited supplier availability and slow regulatory uptake continue to prevent widespread implementation (Ewuga and Adesi, 2023).

2.2 Initial Capital Cost Implications of Sustainable Methods

Empirical evidence has shown that sustainable construction projects tend to have higher initial capital costs compared with conventional builds. (Dwaikat and Ali, 2016) reviewed over 50 global case studies and concluded that green buildings typically incur a 0-18% cost premium, primarily due to technology integration, design complexity, and certification requirements. Similarly, (Zainul Abidin, 2010) identified higher early-stage costs as a key barrier to sustainable construction uptake, particularly in developing and mid-transition markets where supply chains are still maturing.

One of the main barriers holding back the use of low-carbon materials in construction is the belief that they will significantly increase costs. Research has shown by (Giesekeam *et al.*, 2016) that contractors and clients tend to assume sustainable materials come with a much

higher price tag, this assumption alone is believed to be a deterrent to adoption before any cost comparison is even done.

In Ireland, the department of housing (Gov.ie 2019) estimated that compliance adds between 0.7% to 4.2% to residential construction costs, with renewable energy systems and improved insulation contributing most to the premium. (Savills, 2023) reported that meeting the UK's Future Homes Standard could increase initial construction costs by 4%-8% and an additional cost of 10% to 14% to meet net zero home.

However, evidence suggests this gap is closing. (World green Building Council, 2013) found that, there has been an overall trend towards the reduction in design and construction costs associated with green building as building codes around the world become stricter, supply chains for green materials and technologies mature and the industry becomes more skilled at delivering green buildings.

Furthermore, digital tools and Modern Methods of Construction (MMC) are increasingly associated with cost reductions over traditional sustainable builds. (O'Hegarty et al. 2025) showed that digital modelling and modular construction can offset initial costs by reducing waste, shortening programme durations, and optimising material efficiency, while the UK's (Construction Leadership Council, 2022) observed that MMC-enabled net-zero homes show decreasing cost premiums year-on-year. These trends suggest that as markets continue to scale, the capital cost barriers traditionally associated with sustainable construction will continue to erode.

2.3 Long-Term Operational and Lifecycle Cost Impacts

While sustainable buildings may incur higher upfront costs, they tend to offer greater long-term financial performance. (The World Green Building Council, 2013) reports that green buildings deliver up to 10% average reductions in operational costs, alongside lower maintenance and increased occupant satisfaction.

(Azhar *et al.*, 2011) found that operational savings in energy and water use can offset capital cost premiums within 5-15 years, though it should be noted that this range is broad and depends on building type, occupancy guidance and energy prices at a reasonable price. Similarly, (Goggins *et al.*, 2016) demonstrated that NZEB dwellings in Ireland achieve positive net present value after ten years due to lower running costs and reduced carbon penalties.

International evidence reinforces these projections. A study by (Newsham et al. 2009) found that LEED-certified buildings recorded 18-39% lower energy use compared to conventional equivalents. (Eichholtz, Kok and Quigley, 2010) also identified strong financial performance

in lifecycle terms, with green-certified commercial properties achieving lower vacancy rates and higher effective rents relative to the wider market.

(World Green Building Council, 2013) highlighted an emerging market premium, with energy- efficient buildings in the United States and Australia attracted rental rates of up to 17.3% higher than the average rental property, these findings reinforce that when considered through a life cycle assessment, sustainable construction is economically advantageous. Collectively, these findings show that when examined through a life-cycle cost assessment, sustainable construction is not only environmentally responsible but also economically advantageous, offering ongoing operational savings, increased asset value, and long-term financial returns.

2.4 Comparison between Irish and United Kingdom Approaches

Ireland and the United Kingdom are both trying to pursue the goal of achieving net-zero emissions by 2050, though their regulatory pathways and market conditions have diverged. Ireland's sustainability agenda is strongly aligned with EU policy, particularly through the Energy Performance of Buildings Directive (EPBD), which established the Nearly Zero Energy Building (NZEB) standard as a mandatory requirement for all new buildings from 2019 onward (Moran et al., 2017). This framework places emphasis on high-performance building envelopes, renewable heat systems and stringent operational energy targets. As a result, Irish construction increasingly prioritises fabric-first design and integration of technologies such as heat pumps and solar PV.

The UK's sustainability trajectory has become oriented following Brexit. Key policies include the Future Homes Standard, aimed at reducing carbon emissions from new homes by 75-80% by 2025, and the Net Zero Carbon Buildings Standard, which seeks to combine carbon reporting and performance standards across the industry (GOV.UK, 2021). The UK also retains strong reliance on voluntary market-driven systems such as BREEAM, which continue to influence design and procurement through well-established rating frameworks and supply chain familiarity.

Ireland's construction sector faces a significant challenge in meeting its sustainability ambitions. (IGBC, 2023) highlighted that the sector will require the recruitment of 100,000 plus of additional skilled construction workers and the re-skilling majority existing workers by 2030 to deliver on Ireland's combined housing and climate targets. Ireland's regulatory framework is being assisted by the European Union, the Energy Performance of Buildings directive reshaped how Ireland buildings are designed to move toward NZEB standards (Goggins et al, 2016). The NZEB standard has been mandatory for all new buildings in Ireland occupied after the 31st of December 2020, with 31st of December 2018 applying

public sector, The legislation helps all EU member states achieve their short and long-term energy goals.

The UK benefits from a more mature and competitive sustainability market. Research by (Rafa and Khalid, 2024) found that UK firms have broader access to low-carbon technologies, better developed certification markets and more extensive experience with modern methods of construction (MMC), contributing to improved cost predictability by UK Governments 2016 BIM level 2 mandate. Additional studies have shown that UK local authorities and private developers benefit from well-established financial incentives, such as green loans, tax allowances with energy-efficiency grants, further supporting sustainable practice adoption (Osmani and O'Reilly, 2009).

The UK's regulatory landscape has also been criticised for inconsistency. The withdrawal of the 2016 Zero Carbon Homes policy and later policy reversals have created uncertainty in the housing sector (O'Neill and Gibbs, 2020), whereas Ireland's EU-driven framework has been comparatively stable and more stringent, ensuring consistent progress toward high-performance building standards. (Watson et al. 2012) focused on the UK construction sector to assess the problems affecting the utilization of non-traditional construction materials. Findings of the study suggest that poor knowledge of the client and high costs were the most crucial problems.

Overall, while both countries are progressing toward net-zero goals, the Irish approach is more regulatory and EU-focused, emphasising mandatory performance standards, whereas the UK approach is more market-driven, supported by established certification schemes, financial incentives and a more mature sustainability supply chain. These differences shape cost structures, contractor capability, supply chain efficiency and ultimately, the pace of sustainable construction adoption in each region.

2.5 Recommendations for Improving sustainable practices adoption

Despite increasing global emphasis on sustainability, adoption levels within the Architecture, Engineering and Construction (AEC) sector remain comparatively low. (Ewuga and Adesi, 2023) argue that one of the key barriers is the limited disclosure of sustainability performance among firms. Transparent reporting enables organisations to demonstrate responsible practice, enhance market reputation, and create competitive advantage, yet many companies fail to implement structured disclosure frameworks. This lack of visibility reduces client confidence and weakens the business case for sustainable project delivery.

(Singh et al. 2025) found that "IPD-BIM workflows consistently outperformed traditional delivery models, with projects using 55-75% less operational energy, completing 12% faster, and finishing approximately 6% under budget, while reducing punch-list items by 25%.

These outcomes were attributed to early-stage collaboration, model-based coordination, and shared accountability embedded in the IPD-BIM process”.(Karasu, Aaltonen and Haapasalo, 2023) State “Integrated project delivery (IPD) and building information modeling (BIM) have both been advanced as solutions that enhance integration and collaboration by supporting early involvement of key parties, transparent financials, shared risks and rewards, joint decision making and collaborative multiparty agreement”. Some countries have a relatively more established history in IPD and BIM. For example, framework arrangements have been employed by local councils in the UK for many years, alongside the government’s goal of implementing Level 2 BIM across all centrally funded projects.

At the project planning stage, (Dwaikat and Ali, 2016) highlight the value of embedding Life-Cycle Assessment (LCA) and Whole-Life Costing (WLC) strategies. These tools allow project teams to evaluate long-term operational expenditure, carbon impacts and maintenance cycles. While in some cases the alternative materials may cost very high, often, the costs escalate due to the influence of other related barriers. This concern about escalation can be effectively reduced by establishing a business case around life cycle costing as well as pushing for an early evaluation of alternative designs.(Sodangi and Alotaibi, 2025)

At the policy level, the (World Green Building Council, 2021) advocates for strengthening green finance mechanisms which include financial benefit from lower operating costs, tax benefits (through EU taxonomy), Social Value responsibility, to accelerate market uptake. Evidence from market analyses indicates that financial incentives and ESGs (Environmental, Social and Governance reporting) significantly reduce the perceived cost premium associated with sustainable construction and encourage transparency on socially responsible practices and encourage private-sector participation.

Workforce capability remains a critical constraint. The construction Industry Federation estimates a shortfall of 50,000 skilled workers, with wage inflation averaging 6.3% in 2024 reflecting strong competition for talent.

“The construction industry will require the recruitment of up to 120,000 additional skilled construction workers and the re-skilling of 164,000 construction workers by 2030 to deliver on Ireland’s housing and climate targets”

(IGBC,2023)

The literature suggests that improving cost efficiency is not depending on one thing but a larger array of innovations and strategies. Strengthening these areas can reduce the upfront cost premium of sustainable construction and support more widespread adoption across both Ireland and the UK.

2.6 Conclusion

What this literature makes clear is that sustainable construction is no longer an optional extra, it has become a main part of how buildings are designed, constructed and evaluated in both Ireland and the United Kingdom. The evidence demonstrates that sustainable construction carries a higher initial premium, depending on what you are building and where, the evidence shows that puts a premium somewhere between 0-18%. Evidence has shown that the gap is closing as supply chains mature and the industry gets more experience with these methods. The drivers of these shifts were from mandating higher performance levels, in Ireland we have NZEB and in the United Kingdom they have the Future homes standard.

Studies show clear reductions in energy consumption, maintenance expenditure and long-term carbon-related costs, with many green buildings achieving cost payback within 5-15 years. An Australian study showed market-based benefits, including enhanced rental performance, reduced vacancy rates and increased asset value, further reinforce the long-term economic case for sustainability.

A comparative assessment of Ireland and the UK reveal a similar end goal with different methods to reach that goal. Ireland's EU-aligned regulatory model drives mandatory energy performance and whole-life carbon reporting, while the UK approach is more market-driven, supported by established certification schemes, financial incentives and a more developed sustainability supply chain. These structural differences indicate differences in cost outcomes, contractor capability and market options. Irish firms continue to face challenges relating to skill shortages and supply chain, while the UK benefits from a more mature sustainability market.

The literature looks at how improving the cost efficiency of sustainable construction requires coordinated action across multiple fronts. Early stage integrated design, increased adoption of LCA and WLC methods, transparent sustainability reporting, and significant investment in workforce capability. Modern Methods of Construction (MMC) and digitalisation (i.e. BIM) represent additional opportunities to reduce capital costs and carbon intensity simultaneously.

Overall, the evidence from this literature turns to the fact that current sustainable construction practices cost a bit more upfront but deliver better financial returns over a whole life cost analysis.

3: Methodology

Flanagan (2013) claims that the scientific methodology is the most powerful tool for

discovering truths about the world, explore new theories and perform their empirical validation.

The methodology outlines the research design, data collection, and analysis procedures used in this study, and provides justification for why these methods are appropriate for addressing the research objectives. This section of the paper focuses on the methodology adopted for the study and addresses issues such as initial cost premiums, life-cycle assessments and whole life costing associated with sustainability in the construction industry in Ireland and the United Kingdom. With that, this study also aims to find out how regulatory drivers such as Ireland's NZEB standard, and the UK's Future Homes Standard have accelerated a shift in adopting these relatively new sustainable technologies.

3.1 Aims

This study aims compare the UK and Irelands approach to sustainability in the construction Industry and the financial burden they may oppose on a contractor or client. Here are the questions that will be answered in this methodology study.

- To what extent do sustainable building practices incur a cost premium compared to traditional construction methods
- Has the government propelled sustainability in the construction industry due to regulatory requirements.
- Are Life-cycle cost assessments used to measure a recovery of their initial cost premiums and how is that long does that take on average?
- Do contractors avoid sustainability in construction stages due to the extra costs that the contractor may incur.
- Has the supply chain of sustainable materials in your industry grown in recent times?
- To evaluate the extent to which skill shortages in Ireland and the UK influence the cost and adoption of sustainable construction technologies

3.2 Research Philosophy

3.2.1 Positivism

Positivist research shows that knowledge exists independently of the subject being studied. It holds that research should be conducted objectively, without including opinions or personal perspectives. The role of the researcher is limited to observation rather than interpretation.

“Positivism also maintains that there is a single, objective reality, and that meanings are uniform and consistent across different individuals”. (Phair et al,2025).

3.2.2 Interpretivism

Interpretivism looks at how the society and culture someone grows up in can affect the way they think and act. Rather than looking at people on their own, this philosophy considers the social background that influences what people believe and how they behave. Because of this, the researcher cannot just sit back and watch from the sidelines they need to get involved and engage with the people they are studying to get a full picture of their experiences (Phair et al,2025).

This active involvement is a key part of interpretivist research. The researcher tries to understand not just what people do, but why they do it and what it means to them. (Scotland, 2012) States “Participants autonomy and privacy can be compromised as the methods of interpretive research are more intimate and open-ended than scientific research”. That close connection is hard to represent on paper as the researcher is the primary recipient of the information in its raw form.

3.2.3 Pragmatism

The approach most associated with mixed methods research, although clearly not the only one, is pragmatism, which offers an alternative worldview to those of positivism & interpretivism and focuses on the problem to be researched and the consequences of the research. Pragmatists like John Dewey argue that knowledge is developed through the interaction between individuals and their environment. This knowledge is not fixed but constantly evolving, shaped by experience and its effects on human life. Dewey also suggests that human experiences such as fears and hopes are grounded in nature, with nature and experience being closely connected and mutually reflective (Elgeddawy and Abouraia, 2024).

3.2.4 Adopted Philosophy

After researching the three philosophical positions, Pragmatism is the most appropriate as the aim of this research is to answer a practical question “do sustainable construction practices incur a cost premium” “how contractors respond to those premiums” as Elgeddawy and Abouria (2024) note, pragmatism focuses on the consequences of research and the benefits from knowledge, what this research is trying to address is the research gap and clarity on that research gap.

3.3 Data Collection

3.3.1 Qualitative research

Qualitative research refers to when research is often verbally described in relation to a topic. For instance, there are two forms of Qualitative Research these are, Exploratory and Attitudinal Research. Exploratory research is used when you have a limited amount of knowledge of your topic, and an interview is taken from multiple sources to gain raw data of what exactly people have said on a topic in a broader view. Attitudinal research is used to

evaluate what a person's opinion is on a subject, this is done by providing a subjective statement and getting the interviewee to state whether they agree or disagree (Naoum, 2007).

3.3.2 Quantitative research

Quantitative research is a systematic investigation that focuses on numerical data, statistical analysis, and measurable variables. Its goal is to test hypotheses, identify patterns, make predictions, and generalise findings to larger populations. Quantitative studies typically use structured tools such as surveys, experiments, or existing numerical datasets, and rely on statistical techniques to ensure objectivity, reliability, and validity (Queirós et al, 2017).

3.4 Methods of Data Collection

3.4.1 Interview

The research collection method of interviewing involves a direct, structured or semi-structured dialogue between the researcher and a participant with relevant knowledge or experience on the subject being studied. For this research, it would be best practice to have an interview with a prepared set of questions while still leaving room to explore relevant points which may stray from the expected answers. This flexibility allows the topic to be deeply analysed as personal experiences and attitudes could vary between the UK and Irish Industries (Naoum, 2007). Interviews would be conducted with a targeted selection of professionals from the Irish and UK construction sectors. Target interviewees will include Quantity Surveyors, Project Managers, sustainable material manufacturers and other construction professionals alike. The intention is to conduct a minimum of four interviews per industry to apply cross comparison between the two. Digital platforms like zoom and Microsoft teams will be the two tools used for video calling, in person meetings would be hard as it would be financially unfeasible to conduct meetings in person between two countries. Due to the fact cost must be considered, this study will try to avoid using construction professionals that may not have cost as a major consideration in their day to day.

3.4.2 Surveying

Interviews generate high quality, in-depth qualitative data but is often found to be very time consuming and limit the number of perspectives that can be gathered within the timeframe of this study. (Woolf and Edwards, 2021) noted that questionnaires have been one of the most common methods of data collection across the sciences as the design of a questionnaire holds more structure than an interview and can be comparatively assessed with clarity. A digital self-completion questionnaire could be selected as the primary data collection instrument for this study. This decision to use a survey/questionnaire would be driven by the need to explore a larger population within the two industries being comparatively assessed, all within a relatively short timeframe.

The design of the survey/questionnaire would involve 3 types of questions, open-ended to promote thinking within the answers to provide information rich results, close-ended these are the yes or no questions that will either support or deny the results of the literature review, for the final question style Likert-scale questions, Likert-scale questions will capture the respondents view on a statement giving a more nuanced answer to the typical yes or no by saying whether they Agree, disagree or neither.

A key consideration in the design process was the minimisation of non-responses, As (Woolf and Edwards, 2021) would agree that high levels of non-responses can cause biases in the research, having long surveys can be overly time consuming for a respondent, limitations to the amount of questions should be within the 15-20 range to mitigate the likelihood of respondent fatigue.

3.5 Data Collection Method

3.5.1 Multiple Case Study Design- Qualitative

The multiple case study design is referring to the two industries that information is being collected from over a large range of features to achieve a single goal, which is their attitudes towards the potential cost premiums of sustainability in the construction industry. The two “case studies” in question are The United Kingdom and Ireland.

(Bryman et al, 2004) mentions the term “case study” often carries assumptions about the type of data involved and how they are analysed, it suggests the use of unstructured data and qualitative methods of analysis, though this is not always the case. This relates to the question of the purpose of this research, asking what this research is going to achieve. There is often an argument on what the primary purpose should be to capture the case in its own terms, what makes it distinctive, like comparing a world industry leader like the UK with Ireland discredits Irelands slow but gradual movement to sustainable adaptations to its construction industry by comparison. It doesn’t eliminate the desire to draw conclusions, but it suggests that conclusions should emerge from examining the cases themselves, rather than choosing cases specifically to test a hypothesis.

Qualitative research is the most suitable route for this methodology study as this research is concerned with multiple variables contributing to sustainability being a financial burden in the construction industry rather than a singular quantifiable variable. The listed aims focus on questions such as whether contractors avoid sustainability due to extra costs, whether life-cycle costing is considered in material selection, and how skills shortages shape adoption of sustainable technologies. These are fundamentally “why” and “how” questions about attitudes, motivations, and organisational practices, which are best explored through interviews, focus groups or open-ended questionnaires rather than purely numerical surveys. (Chatterjee et al. 2023) used qualitative methods to identify major barriers to sustainable

innovation in manufacturing, including production constraints, quality standards, costs, social conservatism, and notably education and skills shortages, emphasizing why contractors may hesitate with sustainable technology adoption due to perceived or actual financial burdens and skills gaps.

Considerations for using quantitative research methods were assessed when deciding on the data collection method for this section in the study. Observations like cost premiums narrowing because of supply chain maturity & extra costs that may incur when using sustainable building materials over standard building materials are quantifiable but due to the timeframe of this study being within 8 months these values cannot be accurately curated. The information that can be accurately displayed are people's honest opinions on the financial burdens of sustainability in the construction industry.

3.5.2 Digital Surveying Method

As interviews are time consuming and difficult to arrange, the number of people who are willing to take time out of their day and take an interview are often low. A way to get a larger amount of information about your topic from people in the industry in a short amount of time is by sending out surveys. This involves creating a questionnaire based on research from the literature review. Questionnaires are widely used in surveys because they ask the questions in the same way of each person and thus provide a simple and efficient way of constructing a structured data set. There are three main forms of survey questions these are open-ended (the respondent answers in their own words) and closed-ended (Yes or No answers) in conjunction to closed-ended questions the nuanced approach of Likert-style questions will be involved. For this study there will be both forms of questions used in the survey. Data grids are used to compare the answers from these surveys, rows in data grids will represent a country and the figures on those lines will represent people. (Naoum, 2007)

Another feature of surveys is how the data is analysed. One method of survey analysis is to describe the feature of a set of cases. A variable-by-case grid, where the same type of information is gathered for each case, makes the task of description easier. A variable-by-case grid or also known as a Survey Data Matrix is a display of columns of each respondent (Horizontal) and questions asked (Vertical), every respondent answers the same questions, creating a uniform, comparable dataset that can be statistically analysed to identify patterns. However, researchers are typically also interested in a report in identifying causes. This is achieved by examining variation in the dependent variable (Ireland's lack of sustainability adoption) and selecting an independent variable (Celtic Tiger Crash 2008) that might be responsible for this variation. Analysis involves testing to see if variation in the dependent variable (Ireland's lack of sustainability adoption) is systematically linked to variation in the independent variable (Celtic Tiger Crash 2008). (Bryman et al, 2004)

“A review of a top social psychology journal found that over 91% of empirical studies published in the second half of 2017 used some form of questionnaire”

(Woolf and Edwards, 2021).

As stated, before Interviews are difficult to arrange, conclusions to a question come from analysing actual evidence and not having to think on the spot. (Bowling, 2005) demonstrated empirically that postal surveys achieved significantly shorter data collection periods because all questionnaires are distributed simultaneously rather than requiring individual appointments. This paper is based on a comparative review of two different industries, to achieve a comparison between the “Cost Implications of Sustainable Building Practices in Ireland and the United Kingdom” questions must be structured in a way that both industries can answer the same question and from that the comparison can take place. The method of data collection will not have an impact on the output quality of data, but it has been proven that questionnaire methods have resulted in swifter attainment of data.

3.5.3 Selective Sampling

Selective sampling (purposeful sampling) is a non-probability strategy where you define clear inclusion criteria (e.g., status, role, exposure to said topic) and then recruit participants who fit these criteria and can provide information dense responses. Being familiar with the population under study is also important in ascertaining the inclusion/exclusion criteria that will address the research question. Narrowly defined selection criteria can negatively affect recruitment (Kristensen and Ravn, 2015). Potential participants can be contacted in several ways. They may be invited through written notices posted online or in print media, or through brochures handed out in public locations. Another option is to approach individuals in person in places like streets, cafes, universities, or via online platforms and forums. For this more direct strategy to be efficient, the researcher usually relies on predefined recruitment criteria that can be inferred from people’s visible characteristics or are closely tied to a particular activity, look, or setting (Kristensen & Ravn, 2015). Defining the target population is very important in creating the divide in information from the Irish construction industry and United Kingdom construction industry.

3.5.4 Ethical Considerations

Obtaining of research from people carries ethical responsibilities. To ensure that this research is conducted within the guidelines of a student’s academic integrity, for these surveys there will be a terms and conditions inscribed under the heading of the survey to inform the participant that the purpose of the survey is being used for research purposes. Informed consent forms will be attached to the emails sent to participants. All data collected will be stored securely and used solely for the purpose of this dissertation. The question will be asked for the participant to whether they want to be identified by name or not, if yes, their consent forms will be submitted into the appendix section of this dissertation.

3.5.5 Limitations

The most significant limitation of this study is sample size, I will not be able to obtain feedback from every corner of the UK and Ireland as a whole, target population would be 10 from each sector. The views gathered reflect the experiences of a small number of the industries population, but with that aiming at professionals who understand the impact of sustainability in the industry and have seen sustainable building practices take shape. The views gathered are not enough to create a conclusive study but an indicative study suggesting the issues.

The population of this study could in theory be respondents who have strong views about the positive or negative effects of cost implications of the sustainable building practices, As (Woolf and Edwards, 2021) note, non-response can introduce bias if certain types of respondents consistently opt-out keeping a certain party overrepresented in the study.

The survey relies on self-reported figures giving insight into what they believe the premium of sustainable building materials are on projects, some respondents may be more accurate than others, other respondents could be overestimating or underestimating. There is no independent verification of the figures or attitudes provided.

3.6 First Thought Questions

A thorough review of the literature study is required to ensure all questions stem from previously touched on subjects. This task is to provide a rough draft of questions that will be furthered edited and ordered in the actual survey.

3.6.1 Demographical questions

The reason for these questions is to provide key insights to the validity of the information we are receiving, in other words flush out the outliers.

- In which country do you primarily work? {Ireland/United Kingdom/Both}
- What is your Professional role in the construction industry? {STATE}
- How many years of experience do you have in construction? {3-5 years/ 6-10 years/ 10+ years}
- What type of projects do you work on {STATE}

3.6.2 Literature Study Questions

- What Sustainable building practices have you been exposed to? {STATE}
- What are the main drivers for adopting sustainable building practices? {STATE}
- Do you believe adoption of sustainable building practices incur a cost premium compared to traditional methods? {YES or NO}

- If yes, what would the typical cost premium be for the sustainable building practice you have mentioned in question 1? {STATE %}
- Has the cost premium decreased over the past 5 years? {Agree/ Disagree/Don't know}
- Do you agree or disagree with the statement “Supply chain maturity for sustainable materials has improved over the past 5 years”? {Agree or disagree} {State why?}
- What supply chain challenges does your industry face? {State}
- How have the regulations (NZEB/Future Homes standard) influenced your adoption of sustainable practices.? {STATE}
- Do you feel current regulations in your country are sufficient to drive sustainable construction adoption? {Yes or no}
- In your opinion, what regulatory changes do you think would most improve sustainable construction adoption in your country? {STATE}
- Are Life-cycle cost assessments carried out on projects.? {State}
- “When life cycle costs are considered, sustainable construction provides better financial returns”.? {Agree or disagree}
- In your experience, within how many years do sustainable buildings typically recover their initial cost premium through operational savings? {Under 5 years/ 5-10 years/ 10-15 years/ 15+ years/ Unknown}
- Are contractors reluctant to adopt sustainable construction practices due to cost concerns? {Agree or disagree}
- What do you believe to be the biggest financial barrier preventing contractors from adopting sustainable construction practices? {STATE}
- Do Modern Methods of Construction (MMC) help reduce cost premiums associated with sustainable construction? {Yes or no} {State why}

4.0 Survey Administration

4.1 Introduction

Chapter 4 details the process by which the primary research for this dissertation was carried out. The findings and analysis of the results gathered will be represented in Chapter 5. This chapter focuses primarily on how the survey was built, how it was distributed and what the experience of conducting primary research within the real constraints of a dissertation looks like. Construction professionals are busy people; the nature of the industry means that the people best placed to answer questions about cost implications of sustainable construction are often the same people running projects worth tens of millions of Euros/pounds. Getting them to stop and answer questions is not as straightforward as it sounds. A Project Manager 2 weeks out from practical completion has bigger things on their mind than a dissertation survey.

(Baruch and Holton, 2008) Created a study regarding response rate levels and trends in organizational research out of 1,607 surveys published in the years 2000 and 2005, what was observed was that 35.7 percent of surveys submitted were responded. In studies of organizational level criteria, researchers who approach top managers to obtain data may face even lower response rates than the response rates of a lower-level employee. On that note (Fenton and O'Creevy, 1996) found that researchers observed that companies have explicit policies against providing company-level data to external parties. To carry out a survey, students depend on the willingness of people to respond to these questionnaires, a 100% response rate of the target population is rarely achieved (Rogelberg & Stanton, 2007).

4.2 Evidence Overview

The aims stated in 1.4 was the benchmark of assessment in two methods of data collection in this study. A critical review of literature regarding “Cost Implications of Sustainable building practices” was conducted initially, secondary sources were obtained from scientific journal websites and governmental publications to critically evaluate these two industries from a literature point of view, this was to test whether the hypothesis of this study either supported or contradicted. The MTU library, Elsevier and Sage Journals were the reputable websites used for secondary data adoption.

The survey method was a digital questionnaire created using the Google Forms Tool. Respondents were obtained using LinkedIn, Company Websites and fellow industry contacts obtained from experience. The Google Forms Tool was selected for several practical reasons, it allowed for ease of display of respondents as a excel file, ease of distribution of surveys using a https link this eliminates the scheduling restraint that arises with other methods of data collection i.e. Interviews

4.3 Primary Data Collection

The target population of administered surveys was decided upon as 60 senior level construction professionals (30 Per Country); senior level employees are important as these cost considerations apply to pre-contract level design which fall under senior level roles in construction projects. Each questionnaire was accompanied by a consent form that outlined if they agreed to take part in the study, due to agreements concerning participants place of work, some participants asked to remain anonymous. The distribution of responses is as follows: 60 Senior Level Professionals messaged with a response rate of 17%, Graduate to mid-level employees 12 were messaged with a response rate of 33%, this amounts to 14 respondents from 72 recipients of the survey.

The Questionnaire consists of nineteen questions; the first question was to determine whether the respondent is Irish or UK based with the three following uncovering their level of

expertise of the industry. Questions five to nineteen delves into uncovering truths from the literature in relation to the aims.

Q1	Q2
In which country do you primarily work? *Select One* United Kingdom Ireland Both	What is your Professional Role In the Construction Industry? State Role:

Q3	Q4
How many years of experience do you have? *Select one* 1-5 6-10 10+	What type of projects have you been exposed to ? State:

Q5	Q6
What sustainable Building Practices have you been exposed to? State:	What were the main drivers for adopting stated *sustainable practice* ? State:

Q7	Q8
Do you believe adoption of sustainable building practices incur a cost premium compared to traditional building methods? *Select one* Yes No	If yes, what would the typical cost premium be for the sustainable building practice you have mentioned ? State an average % increase:

Q9	Q10
How do you feel about the statement "Sustainable cost premiums have decreased over the past 5 years"? *Select one* Agree Disagree Don't Know	Is it common for projects to have specialist subcontractors from different countries, due to a "skill gap" in your region? *Select One* Yes No

Q11	Q12
If "yes" or "no" could you state why you believe the industry has or has not struggled to be self sustaining? State:	Do you believe supply chain maturity for sustainable materials has improved over the past 5 years? State:
Q13	Q14
What supply chain challenges does the construction industry face? State:	How have governmental regulations like (NZEB/Future Homes Standard) influenced the adoption of sustainable practices State:
Q15	Q16
Do you feel current governmental regulations are sufficient to drive sustainable construction adoptions? *Select one* Yes No	What regulatory changes in your country would improve sustainable construction adoption in your country? State:
Q17	Q18
Have Life-Cycle cost assessments been carried out on projects you have been exposed to? *Select one* Yes No	In your experience, within how many years do sustainable buildings typically recover their initial cost premium through operational savings? *Select one* Under 5 years 5-10 years 10+ years Unknown
Q19	
Are contractors reluctant to adopt sustainable practices due to cost concerns? *Select one* Agree Disagree	

Fig 4.1- Survey Questions

4.4 Secondary Data Collection

The formation of Chapter 2 came from an in-depth analysis of secondary data sources, The process of finding these sources started with diving into the objectives of the analysis of cost implications on sustainable building practices; examination of current sustainable construction practices in Ireland and UK; Initial cost implications; life cycle cost impacts; The comparison to UK and Irish approaches; and recommendations of improving cost efficiency. Then searching for academic papers and industry publications that directly

addressed these aims in the context of both industries, the research gap was evident there was not any studies of the comparison of the contrasting industries in this context.

The MTU library database was the starting point for most of the academic papers used. Elsevier, Sage Journals and Research Gate were the most consistently used platforms as they provided reliable, highly cited peer-reviewed construction research that was all accessible through the MTU email login. Google Scholar was used to find papers that had been cited in other papers, which was a useful way to expand some of the literature without starting from scratch every time. Abstracts of papers were very useful when analysing whether a paper was informative regarding the topic, every study used in this paper came from an information rich abstract that had caught the eye of the researcher.

Government publications were not considered initially, until some studies had been referencing very important information in relation to this study, government publications were then adopted along with industry body reports like for example The World Green Building Council and the Irish Green Building council, these reports were accessed directly through their respective websites. These papers are not academically approved but these are indicative to the direction these two industries are moving toward, by displaying future goals and past accomplishments in pursuit of those goals.

To manage the volume of references gathered across the literature review and methodology chapters, a referencing tool called Zotero was used as a folder to hold all these peer reviewed studies and publications. Zotero is a free, reference management tool that allows you to save sources directly from the browser using the DOI provided on the website, for this dissertation, Zotero was set to Harvard referencing style, which is the format used. The main benefit of this referencing tool is so that it reduces the likelihood of making referencing errors, by implementing this tool into Microsoft word citations and references appear by the click of a button.

Citation	Title of Publication	Website
Ewuga & Adesi, 2023	Integrating Sustainability practices into the Irish construction Supply Chain	LJMU Open Research
Singh et al, 2025	A Sustainable Future: Leveraging IPD and BIM for green construction success	Research Gate
Karasu et al, 2023	The Interplay of IPD and Bim: A systemic literature review	ProQuest
Dwaikat and Ali, 2016	Green Buildings cost premium: A review of emperical evidence	Elsevier
Sodangi and Alotaibi, 2025	Examining the challenges impeding the utilization of construction materials with lower embodied carbon in the construction sector	Taylor and Francis Online
World Green Building Council, 2021	Why you can't afford NOT to invest in a sustainable built enviroment	WorldGBC.org
IGBC, 2023	Implementation of Circularity, Whole Carbon and Life cycle Costing	IGBG.org
Goggins et al, 2016	Lifecycle environmental and economic performance of nearly zero energy buildings	Elsevier
EPA, 2024	Closing the loop on construction Life Cycle Analysis- Project Report	EPA.ie
BREEAM, 2024	BREEAM New Construction Version 7	BREEAM Webstie
UK Government, 2024	Sustainability and Net Zero Annex	Gov.uk
Cui, Zhao and Zhang, 2025	Approaching zero-carbon development through modular construction: A case study of healthcare buildings in london	Sage Journals
O'Hegarty et al, 2025	Understanding the embodied carbon credentials of modern methods of construction	Research Gate
EI, 2025	Building industry ready to decarbonise- IGBC Report	Engineersireland.ie
Zainul Abidin, 2010	Investigating the awareness and application of sustainable construction concept by malaysian developers	Elsevier
Gov.ie 2019	A nearly zero energy buildings (NZEB) future - Minister English reminds construction sector to be prepared for new building regulations on energy efficiency	Gov.ie
Savills, 2023	The Cost and Premium for new eco-homes	Savills Research
Giesekam, 2016	Construction Sector Views on Low Carbon Building Materials	Taylor And Francis Online
Azhar et al, 2011	Building information modeling for sustainable design and LEED rating analysis	Elsevier
Newsham et al, 2009	Do LEED-certified buildings save energy?, Yes, but..	Elsevier
Eichholtz, Kok and Quigley, 2010	Doing Well by Doing Good? Green Office Buildings	Research Gate
Moran et al, 2017	Super-insulate or use renewable technology? Life Cycle cost, energy and Global warming potential analysis of NZEB in temperature oceanic climate	Elsevier
Rafa and Khalid, 2024	Modern Methods of Construction (MMC) for net zero housing: Implications from the social sciences and humanities	ResearchGate
Osmani and O'Reilly, 2009	Feasibility of zero carbon homes in england by 2016: a house builders perspective	Elsevier
O'Neill and Gibbs, 2020	Sustainability transitions and policy dismantling: Zero Carbon Housing in the UK	Elsevier
Watson et al, 2012	Evaluating the Barriers to Entry for Non-conventional Building Material	ResearchGate

Fig 4.2- Literature Study Research Publications

5.0 Analysis of Results

5.1 Introduction

This Chapter presents the findings gathered from the primary research conducted in chapter 4 and compares them against the evidence established in the literature review in chapter 2. The

main aim of this chapter is not to report what respondents said but look for correlations between the secondary and primary data to draw meaning from it. Seeing whether what is happening in the industry reflects the academic and industry literature studied.

The findings agree with (Baruch & Holding 2008) observations regarding the response rates of the surveys with high level employees having a 17% response rate and the mid to low level employees having a 33% response rate. The survey was distributed out to 72 recipients; 14 responses were received 7 from the Irish industry and 7 from the United Kingdom. While the sample size is low, the reality of the response rate was expected when reaching out to the high-level industry professionals (Baruch & Holding 2008).

The respondents represent a strong dispersion of both industries; the respondent roles are as follows.

Ireland

- **Property Developer & Quantity Surveyor**
- **QS Consultant Vice President**
- **Structural Engineer**
- **Director of Construction Company**
- **Associate Director of a QS Consultant**
- **Engineer**
- **Senior Quantity Surveyor**

United Kingdom

- **Senior Quality Manager for Contractor**
- **Programme Director**
- **2 x Senior Quantity Surveyor's**
- **Commercial Manager of Contractor**
- **Manufacturing Modular Buildings Factory**
- **Project Manager**

Nine of the respondents hold 10+ years of experience, which gives a mature weight behind the answers throughout the survey. Three respondents hold 1-5 years of experience which gives a newly educated opinion towards the industry and two of the final recipients were in the 6–10-year category to ensure all career stages had their opportunity to provide opinion in this survey.

With nineteen questions asked in relation to the findings with the literature study this chapter delves into points of alignment, points of recent unstudied impacts and points of divergence from the literature. All of which hold value to the study.

Timestamp	In which country do you primarily work?	What is your professional role in the construction industry?	How many years of experience do you have in the construction industry?
01/04/2026 14:40:37	Ireland	Quantity Surveyor/ Property Developer	10+
04/04/2026 17:20:20	United Kingdom	Senior Quality Manager	6-10
04/04/2026 21:08:04	United Kingdom	Programme Director	10+
05/04/2026 16:34:52	United Kingdom	Senior Quantity Surveyor	10+
07/04/2026 17:58:29	Ireland	Vice President	10+
08/04/2026 11:22:39	Ireland	Structural Engineer	1-5
08/04/2026 14:45:21	United Kingdom	Commercial manager	10+
09/04/2026 09:01:00	Ireland	Director of construction company	10+
09/04/2026 15:06:09	Ireland	Associate Director (Cost Management)	10+
16/04/2026 11:58:18	United Kingdom	Manufacturing modular buildings	1-5
20/04/2026 10:06:14	Ireland	Engineer	1-5
20/04/2026 18:54:33	Ireland	Senior Quantity Surveyor	10+
21/04/2026 10:30:36	United Kingdom	Senior Quantity Surveyor	6-10
22/04/2026 13:22:44	United Kingdom	Project manager	10+

Fig 5.1 Respondents

5.2 Summary of Findings

5.2.1 Sustainable building Practices

When respondents were asked what sustainable building practices they had been exposed to, the answered varied because of the diversity of the sectors represented in the respondent population. BREEAM certification was the most cited UK sustainable building practice, mentioned three times by respondents who all had been exposed to commercial and

residential builds, in contrast LEED certification promoted by the USGBC was referenced by two Irish respondents, both working on large-scale data centre and infrastructure projects. Solar PV, heat pump, deep retrofit, water recycling, passive building standards, material recycling, adopting zero carbon materials, material efficiency maximisation and optimizing local labour where all individual sustainable interventions specified by respondents. The United Kingdom Programme director discussed the use of CEEQUAL which is an evidence-based sustainability assessment according to the BRE website it was the predecessor to the sustainable assessment of BREEAM and lead the way to become a part of the BREEAM infrastructure, CEEQUAL applies to all civil and infrastructure projects while BREEAM applies to all buildings (BREGROUP, 2018).

The range of information that came back is consistent with what the literature review found in chapter 2, where in chapter 2.1 (Goggins, et al 2016) described sustainable construction as covering energy-efficient design, renewable energy systems, low carbon materials and waste reduction. The survey displays a real-world picture of how prominent these practices are on projects in both industries. (Goggins, et al 2016) Also, stated how NZEB requirements have redefined design and performance standards in chapter 2.1, these sustainable interventions mentioned in the survey back up these claims.

When the survey asked the respondents the question of “what were the main drivers for adopting stated *sustainable practice*?” the results were varied but fell under five categories; Client requests, reduced costs, policy and regulation, whole life costing and financial incentives like tax abatements. None of which discussed the true meaning of sustainability which the (UCLA Sustainability Charter, 2016) coined the definition as “the integration of environmental health, social equity and economic vitality in order to create thriving, healthy, diverse and resilient communities for this generation and generations to come.” Every answer had a more corporate mindset to these adoptions in closer regard to the hypothesis stated at the start of this study rather than the aim of sustainability as a goal to cater for the planet’s future.

5.2.2 Cost Premiums of Sustainable Building materials

This topic is at the core of this dissertations hypothesis and was carefully assessed with a series of questions in the survey to couple the findings found in the literature in chapter 2.2.

The questions were stated as follows;

- Q7 Do you believe adoption of sustainable building practices incur a cost premium compared to traditional building methods?
- Q8 If “Yes”, what would the typical cost premium be for the sustainable building practice you have mentioned? (State an average % increase)
- Q9 How do you feel about the statement “Sustainable cost premiums have decreased over the past 5 years?”

- Q19 Are contractors reluctant to adopt sustainable practices due to cost concern?

On Q7, twelve of the fourteen respondents believed that sustainable building practices do incur a cost premium compared to traditional methods, The respondents who said no were one Irish professional working with material recycling and one UK respondent who worked on a timber bridge project, both contexts were there sustainable options, one produced cost savings due to material recycling and the UK option can be argued the timber bridge although classed as a sustainable material can be argued it was an aesthetic design rather than a sustainable design. This bi-country agreement that a premium exists aligns directly with the literature in chapter 2.2, where (Dwaikat and Ali, 2016) reviewed over fifty global case studies and confirmed that green buildings typically carry a cost premium, in relation to Ireland alone this backs up the department of housing (Gov.ie,2019) findings as compliance with NZEB standards carry cost premiums and the same applies for the UK with (Savills, 2023) Future homes standards increase construction costs.

Question 8 asked respondents to put a % figure on the cost premium they had experienced. The UK respondents had a wide range of answers. The programme director working with zero carbon techniques put it at 20-30% or more, which is above the 0-18% range that (Dwaikat and Ali, 2016) established in the literature. The senior quantity surveyor working on CEEQUAL came in at 5-10%, the BREEAM respondents gave 10% & 15%, no % given by another UK senior Quantity surveyor and 20% given by the modular build manufacturer.

Question 9 asked how do you feel about the statement “Sustainable cost premiums have decreased over the past 5 years?” 5 of the UK respondents disagreed, 5 in Ireland stated disagree or don’t know. Which backs up the respondents answers in question 8 but shows no clear difference in both industries as they are both addressing the same issue.

The Irish industry seems to indicate similar findings. The Vice president gave an answer of 5-10%, with no opinion from the QS/ Property developer, 20% from both a director of a construction company and structural engineer, the other engineer gave a 10/15% view from their short experience thus far in the industry but the associate director expanded his views by stating “hard to put percentage. Perhaps guessimate you are paying 15% upfront but overtime you are saving money”, which the statement is very true as without context on a project specific it is very difficult to throw out a figure with confidence. Arguably this is higher than what the Irish government department of housing have been reporting (Gov.ie,2019) put NZEB compliance costs between 0.7% and 4.2% for residential construction, the lowest figure from a residential professional was 20% by the director of a construction company who only do residential projects.

Question 19, “Are contractors reluctant to adopt sustainable practices due to cost concerns” showed a clear answer in relation to the hypothesis of this project. The industry has adopted the idea that there is a perceived cost premium with sustainable practices

adoption. The most prominent answer was “Agree” with 12 answers and “Disagree” with only 2 answers both 2 answers coming from the Irish Construction industry. The two respondents who disagreed were the engineer with 1-5 years of experience and one with 10+ years of experience which was the Vice President of a consultancy cost management firm. The UK respondents all agree with the statement.

5.2.3 Life-Cycle Cost Impacts

(Azhar *et al.*, 2011) “found that operational savings in energy and water use can offset capital cost premiums within 5-15 years” question 18 was put together to test whether this statement is true, “In your experience, within how many years do sustainable buildings typically recover their initial cost premium through operational savings?” the respondents were given four choices, under 5 years, 5-10 years, 10+ years and unknown. The associate director that specialized in data centres claimed it takes less than 5 years in Ireland. Three Irish respondents claimed it is unknown how fast or long it takes to recover the premium, this indicates life cycle assessments aren’t as prominent in the Irish industry as all the UK respondents had given an experienced answer in relation to their findings, 3 respondents found it takes 10+ years to recover the cost premium, with the remaining 4 claiming it takes 5-10 years, this shows that the smaller distribution in the UK answers allow us to believe that the BREEAM plays a role in integrating LCA assessment methods into real projects across the UK, these answers back up Azhar’s findings which was United States based on LEED standards which is a competitor to BREEAM but both provide similar LCA adoption.

Question 17 “Have Life cycle cost assessments been carried out on projects you have been exposed to?” backed up our findings with all seven UK respondents stating “Yes” and 5 out of seven stating “yes” from the Irish respondents with the “No’s” coming from two professionals with over 10+ years of experience, as they have a wide range of experience and one being a vice president of a company the Irish industry’s Life-cycle cost views have been quite a bit behind from the ever-expanding UK industry.

5.2.4 Comparison between Irish and United Kingdom Construction Industries

Chapter 2.4 discussed that while Ireland and the United Kingdom share the same long term plans of net zero emissions by 2050, the Irish industry was established as having a more regulatory view for sustainability adoption promoted by the European Performance Buildings Directive with the United Kingdom being categorized by having a more multi-faceted approach with its own regulatory system coupled with as (Rafa and Khalid, 2024) would put it that UK firms have broader access to low-carbon technologies, better developed

certification markets and more extensive experience with modern methods of construction (MMC), contributing to improved cost predictability by the governments 2016 BIM level 2 mandates.

This was assessed in the survey, four questions were asked in relation to this;

- Q14 Have governmental regulations like (NZEB/FUTURE HOMES STANDARD) influenced the adoption of sustainable practices?
- Q15, Do you feel current governmental regulations are sufficient to drive sustainable construction adoptions?
- Q12 Do you believe supply chain maturity for sustainable materials has improved over the past 5 years?
- Q13 What supply chain challenges does the construction industry face?

The Q14 answers had shown a clear differential between the two industries, the results from the Irish industry showed that four of the seven respondents said “yes” with three being “unsure” and zero said “no” or “disagreed”. Contrary to a majority of “yes” in the Irish industry the United Kingdom’s answers were more dispersed with four of the seven showing forms of disagreement with two “No”, one “Not effectively at this moment” and one “they have not”. There was only one “N/A” answer from the UK and two answers stating, “Accelerated the adoption” and “increased adoption”.

Surprisingly the Irish and the United Kingdom respondents had similar views in relation to Q15 with both prevailing with five “Yes” and two “No” over the 14 respondents.

Q12 had a direct correlation to what was found in the literature by (Rafa and Khalid, 2024), out of the UK industry five out of seven respondents had agreed that supply chain maturity has been improving in the past 5 years, with one stating “not in the last five years, pre covid it has a lot of growth” and another stating “Not Quite”. In comparison the Irish industry had three “yes”, three “No” and one “Unsure” which doesn’t give this research a definitive answer to the current status of the sustainable material supply chain, but when assessing the answers with projects the respondents had been exposed to it shows all respondents exposed to residential stated “yes” with one adding “have witnessed ICF walls being used on a lot of projects” with the “no” and “unsure” answers coming from infrastructure and capital project professionals.

Q13 asked the respondents to explain their supply chain challenges currently being faced in the construction industry, what was found was a new theme emerging between both industries that shows how the magnitude of this current problem has been sudden and not yet observed when the literature study was taking place, it had been unfolding as the questionnaires had been sent out. Four of the open-ended answers had the same theme one UK respondent stated “volatility in material costs due to geopolitical events” another UK respondent stated “pandemic and war” with the final UK respondent saying “The current fuel crisis” and an Irish input was given “political events” all a similar theme that was not present in the

literature but ongoing war in the middle east that has unfolded in the first quarter of 2026 has proved to be costly for both industries. A variable that was not considered in the establishment of this study but represents the importance of keeping a steady supply chain to provide for both industry's and how detrimental one war in a resource dense region of the world like the current Iranian war can pose as a huge worldwide risk.

(IGBC, 2023) highlighted that the sector will require the recruitment of 100,000 plus of additional skilled construction workers. These constraints can represent major issues for project completions. An Irish Vice President directly named "trade uncertainty/ labour shortage", this is the most credible response that directly correlates with the literature.

The comparison between the Irish and United Kingdom construction industries that were shown in the survey findings agree with what was found in the literature in chapter 2.4. Ireland's mandatory, European regulatory policies have driven a high level of consistency for the residential sector, producing a supply chain that is maturing even if it remains underdeveloped in other areas of the industry i.e. the hyper-scale level. The UK's consistently growing supply chain offers a broader supply chain across various areas within the construction industry.

5.2.5 Methods of Improving Sustainable Construction Adoption

This discusses the literature in chapter 2 its correlation to the answers provided in question Q16 "What regulatory changes in your country would improve sustainable construction adoption in your country?"

The literature review outlined a set of recommendations to improve cost efficiency and improving sustainable construction adoption across Ireland and the UK, These covered five main areas in the literature transparent reporting from contractors, Integrated Project delivery- Building information management systems, Life cycle assessment methods and upskilling methods. All of which were assumed to be addressed in question 16 "what regulatory changes in your country would improve sustainable construction adoption in your country?" what was found in the respondent's answers strayed away from the literature completely. Twelve out of fourteen respondents gave an answer for this section, given as open-ended so the respondents could answer with anything they wanted, The Irish director of the construction company added "everything is over regulated at present" which was not elaborated on which doesn't give much to this section, possibly wanting a more relaxed system, the word "incentives and subsidies" were thrown around a lot for similar circumstances all relating back to early adoption of low-carbon materials. A point was made by an Irish respondent that "SEAI grants need reformed as the cost of materials have gone up while the grant amounts have stayed the same" ties back into the new political tensions in the world causing material price increase which is currently unfolding and can't be currently quantified.

A Irish director of a construction consultancy stated “I believe Ireland needs a state body which drives construction of large projects and implements sustainable construction adoption” ties back in to findings found in chapter 2.1 “Supporting this shift, whole-life carbon frameworks such as the IGBC’s Whole Life Carbon and Circularity handbook and the EPA’s CIRCULAR life project provide tools for assessing embodied carbon and encouraging material reuse in Irish construction (IGBC, 2023; EPA 2024).”

In chapter 2.5 the (World Green Building Council, 2021) report was discussed as it advocates for strengthening green finance mechanisms which include financial benefit from lower operating costs, tax benefits (through EU taxonomy), Social Value responsibility, to accelerate market uptake. Evidence from market analyses indicates that financial incentives and ESGs (Environmental, Social and Governance reporting) significantly reduce the perceived cost premium associated with sustainable construction and encourage transparency on socially responsible practices and encourage private-sector participation. All of which is an idyllic industry view, but in reality contractors are not worried about “Social Value responsibility” if it’s providing a financial strain or as answers in Q16 show “Green Finance Mechanisms” haven’t been strong enough in both of these industry’s as the top answers from both countries showed, “more subsidies from government” “low carbon material incentives” “incentives like x amount of annual carbon credit offsets” “incentives for early adoption of low-carbon materials” are all answers provided from both the UK and Irish industries from senior professionals all 10+ years in the industry, which challenges the WGBC’s claims, showing the inaccuracy of the industries attitude to sustainable building costs.

Other literature from chapter 2.5 was challenging to back up, (Singh et al. 2025) & ”.(Karasu, Aaltonen and Haapasalo, 2023) findings on Integrated project delivery by the use of BIM was something that was aimed to be covered in the questionnaire but had never been mentioned as a sustainable practice in the questionnaire’s by any of the recipients.

5.2.6 Skill Shortages affecting Sustainability adoption

Chapter 2.5 highlighted that the workforce in Ireland is a constraint on the adoption of sustainable construction methods, with the (IGBC, 2023) warning that Ireland’s construction sector will require the recruitment of over 120,000 additional workers and the re-skilling of 164,000 existing workers by 2030 to meet its combined housing and climate targets. In contrast, (Rafa and Khalid, 2024) Implied that the United Kingdom as benefitting from more experience with modern methods of construction and a more developed labour pool for sustainable methods. The primary research gathered through Q10 and Q11 of the survey has indicated that it challenges this literature.

Q10 asked respondents whether it is common for projects in their region to rely on specialist subcontractors due to a skill gap. The split that was assessed in the literature wasn’t found in the questionnaire answers, with similarities from both regions with the Irish stating five “no’s” and two “yes’s” and the UK stating 4 “no’s” and 3 “yes’s”.

Q11 Asked respondents to explain why they believed the industry had or had not struggled to be self-sustaining. The response from the UK modular manufacturer identified the “relative newness of the sustainable construction market as the core issue, that it has not had time to build the required level of expertise” another UK response contrasts that as a Senior Quantity Surveyor states that “The UK market has a large range of specialist contractors for majority of areas” with this a UK project manager also backs the senior quantity surveyors statement by saying “Array of specialist contractors within the industry”. Q11 wasn’t answered with high quality by the Irish industry, with only the Vice President of the construction consultancy stating that “Advanced MEP installation” are the reason that is common to have specialist contractors from different countries operating in Ireland, which backs up the skill gap issue addressed by the (IGBC, 2023).

6.0 Conclusion

6.1 Introduction

This dissertation was created to critically assess the cost implications of sustainable construction practices in Irish and UK building projects, with the hypothesis “Sustainable construction practices do not significantly increase overall costs and may provide long-term economic benefits when life cycle costs are considered”. Having carried out an in-depth analysis of publications relating to the topic in chapter 2 and discussed the considered methods of primary data collection in chapter 3, along with carrying out of chosen methods in chapter 4 and 5, the findings from this research allowed the independent analysis to provide a conclusion in relation to the hypothesis.

6.2 Main Findings

The reasons for the sustainable practices adoption in the questionnaire agreed accurately with the findings of the literature with many of the respondents from the Irish industry claiming the reasons where due to different sort of governmental initiatives that benefitted the project, Irish answers that agreed with the literature saying the industry has been aided by a governmental push for sustainable adoptions were the Vice president stating “permitting approval/ tax abatements”, the structural engineer claiming “seai grants” and the Engineer said “policy”. In contrast not a single UK respondent mentioned a government initiative being a “main driver” in the adoption of the sustainable building practices they had mentioned.

The evidence gathered from both the literature review and the primary research supports this hypothesis broadly, with important caveats that this study cannot ignore. On the objective of

upfront cost premiums, the answer from both the literature and the survey is obvious; it has been proven that a cost premium exists by twelve out of fourteen respondents with the mean value of the twelve respondents who gave a figure to be at 10% with the range being from 5%-30%. These sit at the upper end of what was reported in Ireland of “0.7% to 4.2% for NZEB residential compliance” stated by the government of Ireland, with the lowest Irish residential respondent stating 20%. (Savills, 2023) reported that meeting the UK’s Future Homes Standard could increase initial construction costs by 4%-8% and an additional cost of 10% to 14% to meet net zero home, arguably Savills are there to sell there product through real estate, not an entirely reliable source but its findings were far more accurate than the contrasting literature coming out of Ireland.

A caveat to the literature that reported on the operational savings or life cycle cost assessments in chapter 2.3, (Azhar *et al.*, 2011) & (Goggins *et al.*, 2016) all gave literature that aided in the making of question 18, but what was not considered was the fact these were both over 10 years old and gave figures that adhered to the price of energy (electricity, gas, etc) at those times of publication, that now could be considered as volatile due to the geopolitical events the questionnaire announced was affecting the supply chain.

On lifecycle costs, the literature and the UK primary data align. All seven of UK respondents confirmed lifecycle assessments had been carried out on their projects, with a quite small distribution of answers with only being 5-10 years and 10+ years being the payback periods through operational savings which is quite a consistent answer from the seven respondents allowing the research to show that the United Kingdom is ahead of the Irish industry with its clarity of answers, in contrast the Irish industry wasn’t as advanced, with two “no’s” of LCAs being conducted from professionals with 10+ years of experience with that the Irish answered with a large distribution (Ireland had three “Unknown”, One “Under 5 years”, three “5-10 years”) which makes the research look more favourably at the United Kingdom to the more accurate representation.

6.3 Readdress the hypothesis

The hypothesis from this research has only been partially agreed upon, from the evidence gathered it is shown that the United Kingdom’s industry can agree on the hypothesis of this study’s hypothesis “*Sustainable construction practices do not significantly increase overall costs and may provide long-term economic benefits when life cycle costs are considered*” its coherent and transparent reporting from all seven respondents from this country showed that life cycle costs have been a consideration for this industry for quite a while, although the respondents came from all different corners of the industry the distribution of answers showed how they all were within a very close margin from one another.

6.4 Readdress the Aims and Objectives

The aim for this dissertation was “to critically assess the cost implications of sustainable construction practices in Irish and UK building projects”. The five objectives stated in chapter 1 have each been addressed across the entire research.

Objectives

- To examine current sustainable construction practices in Ireland and the UK.
- To investigate the initial capital cost implications of adopting sustainable methods.
- To assess long-term operational and life-cycle cost impacts.
- To compare Irish and UK approaches, highlighting regulatory, economic, and market-driven differences.
- To provide recommendations for improving sustainable construction adoption

Objective 1, was examining current sustainable construction practices in Ireland and the UK, was addressed in Chapter 2.1 and supported by the survey findings in Chapter 5.2.1. Both industries are involved with a wide range of sustainable practices including BREEAM certification, NZEB compliance, solar PV, Heat pumps, LEED and MMC's. The United Kingdom show's more certification frameworks for sustainable adoption, while Ireland is driven by regulatory compliance. The difference between the reasons of sustainable adoption also answered objective 4, as they had different reasons for adoption to work toward reaching “net zero by 2050”. The “market-driven” differences which was confirmed with the UK showing more favourably to the question “Do you believe supply chain maturity for sustainable materials has improved over the past 5 years?”

Objective 2, to investigate initial capital cost implications, was examined in chapter 2.2 and chapter 5.2.2. From the literature and survey respondents it was concluded that both industries agree that cost premiums exist with adoption of sustainable building methods on projects.

The third objective, assessing long-term operational and life-cycle cost impacts, in relation with the hypothesis, this was addressed in Chapters 2.3 and 5.2.3. UK primary data showed it was more accurate in relation to the literature with the Irish respondents providing a wider spread of answers, all UK respondents had LCA's in place on projects, not all Irish respondents experienced this.

Objective 5, provide recommendations for improving sustainable construction adoption, the literature represented a gap between the survey, which is seen by chapter 2.5 and chapter

5.2.5, the literature showed practices showing full disclosure of benefits when the respondents wanted “incentives”, “grant reform” and “subsidies”.

6.5 Limitations

The main limitation of this study is the sample size. Fourteen responses from seventy-two recipients are a low return, while a low return of senior members of the industry was expected. Seven and Seven split from both industry’s has given an information dense return as the researcher found, but it is not enough to provide a conclusive finding, it must be considered as an indicative result.

The survey relied on self-reported answers and estimates. When respondents were asked to put a percentage figure on cost premiums, some gave confident answers, while others proceeded with caution as the Irish Associate director (cost manager) put it “hard to put percentage. Perhaps guestimate you are paying 15% upfront but overtime you are saving money” There was no way to verify any of the figures provided, so the numbers should be treated as estimates from experience rather than hard data.

A literature lag was captured by the research found, the literature was assessed in a stable economic climate of the final Quarter of 2025, were when the questionnaires were being carried out there had been quite a noticeable disruption due to the US, Isreal and Iran conflict affecting oil emerging from the strait of Hormuz, which had a quite noticeable impact on answers from Q13 “What supply chain challenges does the construction industry face”?.

6.6 Recommendations

There are many to mention in regard of both industry’s

The Irish industry, the finding which showed clear contrast from the UK was that there needs to be more awareness around Life Cycle Assessments, they need to be integrated into the pre-contract stage. Closing that gap would allow Irish professionals make more informed decisions about long-term value of sustainable investments rather than having a negative reaction to the upfront cost premiums. Government grant schemes such as SEAI should be reviewed and updated to reflect current material costs.

For the UK, (O’Neill and Gibbs, 2020) addressed the issues found by the failure of the zero carbon homes agenda, a genuine literature backed criticism of the UK approach. Future policies should learn from this UK failure as all the UK respondents didn’t mention any UK policy as a “main driver”. As Ireland has shown glimpses of their regulatory success in this research, the United Kingdom should consider following.

This research showed clear signs of a potential issues with both industries, a larger sample size of respondents would have shown a greater significance. There is also an opportunity to figure out what these current geopolitical disruptions are currently causing on supply chains and are these issues raised here subject to far more scrutiny if a major disruption were to cause even more damage to the supply chain?

With reference to Chapter 5.2.1, the industry has failed to acknowledge the morality of sustainable building practices, what is the end goal for all these policies and increased adoption of methods?. The research shows that sustainability provides a premium which in turn leaves a contingent of the industry priced out in attaining, with supply chain maturity indicating a improvement in the last 5 years, prices are still showing an average 10% increase, to work toward a healthy planet for the next generation it needs to be accessible to all!.

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7 Appendices

7.1 Fig Table

Fig 4.1- Survey Questions

Fig 4.2- Literature Study Research Publications

Fig 5.1 Respondents

Fig SR.1

Fig SR.2

Fig SR.3

Fig SR.4

Fig SR.5

Fig SR.6

Fig SR.7

7.2 Survey Respondents

Timestamp	In which country do you primarily work?	What is your professional role in the construction industry?	How many years of experience do you have in the construction industry?
4/1/2026 14:40:37	Ireland	Quantity Sureveyor	10+
4/4/2026 17:20:20	United Kingdom	Senior Quality Manager	6-10
4/4/2026 21:08:04	United Kingdom	Programme Director	10+
4/5/2026 16:34:52	United Kingdom	Senior Quantity Surveyor	10+
4/7/2026 17:58:29	Ireland	Vice President	10+
4/8/2026 11:22:39	Ireland	Structural Engineer	1-5
4/8/2026 14:45:21	United Kingdom	Commercial manager	10+
4/9/2026 9:01:00	Ireland	Director of construction company	10+
4/9/2026 15:06:09	Ireland	Associate Director (Cost Management)	10+
4/16/2026 11:58:18	United Kingdom	Manufacturing modular buildings	1-5
4/20/2026 10:06:14	Ireland	Engineer	1-5
20/04/2026 18:54:33	Ireland	Senior Quantity Surveyor	10+
4/21/2026 10:30:36	United Kingdom	Senior Quantity Surveyor	6-10
4/22/2026 13:22:44	United Kingdom	Project manager	10+

Fig SR.1

What type of projects have you been exposed too?	What sustainable building practices have you been exposed too?	What were the main drivers for adopting stated "sustainable practice" ?
Comercial and residential mainly	Recycling of all building materials like timber and concrete and plastic	reduced cost of waste disposal and clients instructions
Major Projects: i.e. High Speed Train, Nuclear Power Plant, Steel Production	Zero Carbon, Minimum transportation, use local ways of working were a few to	I was one of the contributors.
Water and Infrastructure	Water recycling and CEEQUAL	Whole life costing
Infrastructure	Ekki (wooden) bridge	Aesthetics and cost
Infrastructure and capital projects - Data Centre's	LEED certification	Permitting approval /Tax abatement
Industrial facilities and Infrastructure	Solar PV	SEAI grant
Railway, civil, commercial	BREEAM	Premium residential classification
Domestic house building	Installation of PV / solar / Heat pumps / deep retro fits	Client requested
Public works, Pharma, Semi-Conductors and primarily Data Centres	Less adverse to this area. Hyperscalers are definitely more conscious. worked with one client who had abundant power from data centre and this actually helped power the swimming pool for Paris Olympics due to it being adjacent.	This day and age growing impact of AI and the awareness regarding global warming etc
Building and operating factories to produce components for modular prefabricated buildings	Using sustainable building materials, and passive buildings standards	Lowering our carbon footprint and reduced costs
Infrastructure	Max utilization of material during design	Policy
Data Centre, infrastructure	LEED	Client Multinational Company request
Commercial	BREEAM	Whole life costing
Commercial and residential	BREEAM	Investor criteria

Fig SR.2

Do you believe adoption of sustainable building practices incur a cost premium compared to traditional building methods?	If yes, what would the typical cost premium be for the sustainable building practice you have mentioned? (State an average % increase)	How do you feel about the statement "Sustainable cost premiums have decreased over the past 5 years?"
No		Agree
Yes	By experience 20-30% if not more	Disagree
Yes	5-10%	Disagree
No	N/A	Agree
Yes	5-10%	Disagree
Yes	20%	Agree
Yes	0-10% but can exceed depending on sustainable methods	Disagree
Yes	20%	Disagree
Yes	hard to put percentage. Perhaps guessimate you are paying 15% upfront but overtime you are saving money	Don't Know
Yes	20%	Agree
Yes	10/15%?	Don't Know
Yes	10%	Disagree
Yes	10%	Disagree
Yes	15%	Disagree

Fig SR.3

Is it common for projects to have specialist subcontractors from different countries, due to a "skill gap" in your region.	If "yes" or "no" could you state why you believe the industry has or has not struggled to be self sustaining.
No	
Yes	It is not self sustaining due to conflicting scheules of projects in the world. i.e. every country looking fir nuclear expertise since 2021 and not easy to sustain. this also increases the coat
Yes	No succession
No	Lots of foreign labour from agencies. Young people are not entering into construction trades. Construction seems to have had bad publicity, it is also seen as hard work.
Yes	Advanced MEP installations
No	Ireland's skill shortage doesnt apply to most infrastructure/ Civil contractors
No	
No	
No	
Yes	The market is new and has not had time to build the required level of expertise
No	Projects I work on personally generally don't require specialist contractors unavailable in Ireland
Yes	EU-procurement regulation/ Advanced industry elsewhere
No	The UK Market has a large range of specialist contractors for majority of areas
No	Array of specialist contractors within the industry

Fig SR.4

Do you believe supply chain maturity for sustainable materials has improved over the past 5 years?	What supply chain challenges does the construction industry face?	How have governmental regulations like (NZEB/FUTURE HOMES STANDARD) influenced the adoption of sustainable practices?
yes	rising energy costs will cause significant inflation on high energy high carbon materials like concrete	yes
Not quite	Energy hikes, transportation regulations	Not effectively in this moment
Yes	High demand	N/a
Yes	Lack of production in the UK, meaning alot of materials are imported, seeing subject to exchange rates and delayed deliveries.	They have not.
No	trade uncertainty /labor shortage	N/A
Yes, have witnessed ICF walls being used on alot of projects helping. This highly insulated method provides long term energy savings	Timber shortage	yes
Yes	Lead time delays due to recent political events	No
Yes	None at present	Yes
No	Lead times for materials.	Unsure
Yes	Volatility in material costs due to geopolitical events	Accelerated the adoption
Unsure	Volume of material being used by larger countries	Unsure
No	Political events	Yes
Not in last 5 years, pre covid it had alot of growth	Pandemic and war	Increased adoption
Yes	Current fuel crisis	No

Fig SR.5

Do you feel current governmental regulations are sufficient to drive sustainable construction adoptions?	What regulatory changes in your country would improve sustainable construction adoption in your country?	Have Life-Cycle cost assessments been carried out on projects you have been exposed to?
Yes	more grants for commercail buildings like residential SEAI Grants	No
No	Tax exemption and incentivising	Yes
Yes	More subsidies from government	Yes
No	Increased standards for new Holmes.	Yes
Yes	Incentives for early adoption of low-carbon materials	No
Yes	SEAI grant reform, cost of materials have gone up while grant amount hasnt changed.	Yes
Yes	Unknown	Yes
Yes	Everything is over regulated at present	Yes
No	I believe Ireland needs a state body which drives construction of large projects and implements the above also.	Yes
Yes	Ease planning restrictions to accelerate growth of domestic sustainable construction industry	Yes
No	Unsure	Yes
Yes	Incentives like "x" amount of annual Carbon Credit Offsets doe contractors	Yes
Yes	Low carbon material incentives	Yes
Yes	Embodied Carbon Assessments	Yes

Fig SR.6

In your experience, within how many years do sustainable buildings typically recover their initial cost premium through operational savings?	Are contractors reluctant to adopt sustainable practices due to cost concerns?
5-10 years	Agree
10+ years	Agree
10+ years	Agree
10+ years	Agree
5-10 years	Disagree
Unknown	Agree
10+ years	Agree
Unknown	Agree
Under 5 years	Agree
5-10 years	Agree
Unknown	Disagree
5-10 years	Agree
5-10 years	Agree
5-10 years	Agree

Fig SR.7

7.3 Acknowledgements of respondents

I would like to express my sincere gratitude to all the construction industry professionals from Ireland and the United Kingdom who took the time to respond to the questionnaire for this research. Your willingness to share your expertise and professional experience, despite the demands of busy schedules, was invaluable to this study and is greatly appreciated.

Respondent names have been removed from this web version to protect participants' privacy. Responses are reported by role only.

All respondents were asked whether they consented to their information being used for research purposes, with three agreeing to remain anonymous due to employer policy but gave permission to use their surveyed information.