Skillnet CLIMATE READY ACADEMY

The Green Skills Driving Competitiveness in Irish Enterprises:

Insights from the Pharmaceutical, Manufacturing and Technology Sectors

December 2025

20FIFTY PARTNERS

About the Skillnet Climate Ready Academy

The Skillnet Climate Ready Academy is the national training initiative focused on Green Skills and Climate Resilience.

Funded by Skillnet Ireland and delivered by 20FIFTY Partners, the Academy equips businesses with the skills and capabilities required to build resilience and sustain competitive advantage in a changing world.

It offers accredited, practical learning pathways focused on mitigation and adaptation to enable businesses to respond to climate risk, regulatory change, and market disruption.

December 2025

Research collaborators:

Skillnet CLIMATE READY ACADEMY

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Glossary

CAP	Climate Action Plan
DMA	Double Materiality Assessment
ESG	Environmental, Social, and Governance
ESRS	European Sustainability Reporting Standards
EU	European Union
ILO	International Labour Organisation
SCRA	Skillnet Climate Ready Academy
SDG	Sustainable Development Goals
SLP	Sustainability Leaders Programme
UN	United Nations
WEF	World Economic Forum

Key Insights From Sustainability Capability And Competency Maturity Assessment Across Irish Enterprises

Key Insights

01	**Irish enterprise has strong sustainability ambition, but an implementation capability gap exists in converting sustainable goals into practical impact for both business and environment**	Across all sectors, organisations self-report high maturity in Mission & Vision (strong sustainability purpose) and Strategy (clear goals and intent). However, Irish enterprise reported less capability maturity in Execution (i.e. implementing sustainability plans) and Value Creation (i.e. turning sustainability into business outcomes) activities.
02	**Tighter integration between sustainability strategy and business alignment identified by enterprise as enabler of reduction in the implementation capability gap**	Irish enterprises identified a number of key areas of capability development to closing the gap from strategy to execution including: • Development of KPIs to support sustainability strategy • Setting clearly defined strategy execution steps, • Ensuring operational alignment of sustainability actions
03	**Environmental competency maturity is uneven. Emissions & Pollution management competencies are relatively mature compared to water, biodiversity and resource efficiency competencies**	Enterprises report higher capability in environmental areas that are: • Highly regulated • Financially material • Already mature (e.g., pollution, emissions)
04	**Half of organisations involved in this study had yet to carry out a comprehensive environmental impact, risk and opportunity assessment to identify the impact of climate on their continued business operations**	50% of organisations report that they haven't completed a double materiality assessment, a process of prioritising a company's key Environmental, Social and Governance (ESG) impacts and risks.
05	**Sectoral analysis of three sectors shows a considerable spectrum of sustainability capability and competency maturity across each sector**	• **Pharmaceuticals** – this sector has the most advanced sustainability maturity profile of the 3 sectors analysed in this report. • **Manufacturing** – this sector has selective strengths. Manufacturing is mature in compliance-driven areas but fragmented elsewhere. • **Technology** – High ambition but low operationalisation: The tech sector exhibits the widest gap between ambition and operational capability.
06	**Climate change and pollution identified as posing the greatest risk to Irish enterprise organisations**	• Climate change was identified by the participants as the environmental domain posing the greatest risk to Irish organisations, with 51% of respondents rating it as either 'High risk' or 'Very high risk'. • Pollution was rated as the second highest risk to Irish organisations, with 48% of respondents selecting either 'High Risk' or 'Very high Risk'.

Executive Summary

Executive Summary

Irish enterprises are undergoing a significant transformation to align with sustainability goals driven by regulatory mandates, market expectations, societal pressures and global climate commitments. A changing EU and national sustainability reporting landscape are reshaping business practices, requiring robust sustainability capabilities and competencies.

This report provides an in-depth exploration of sustainability capabilities and competencies required for Irish businesses to thrive in a low-carbon economy. It situates Ireland within broader European and global sustainability contexts and highlights emerging trends that will shape workforce and enterprise needs by 2030. Drawing upon a comprehensive desk review and two perception-based organisational surveys, the study explores how organisations across three key sectors — pharmaceuticals, manufacturing, and technology — evaluate their own sustainability capability and environmental-related competency maturity.

Key takeaways include:

- **Strategic ambition is strong, but operational capability to deliver sustainable change lags:** Irish enterprises report high maturity in mission & vision, and sustainability strategy. However, execution and value creation capabilities lag, as well as the competencies such as analysis, monitoring and implementation skills needed to translate strategy into measurable impacts.
- **Sustainability skills alone aren't sufficient—capabilities need to grow alongside them:** When capability systems—, such as purpose, strategy, data, governance, and processes—are aligned with workforce sustainability competencies (technical and transversal), organisational sustainability maturity advances (as seen in the Pharma sector). When misaligned, progress slows (as observed in the Technology sector).
- **Biodiversity, circularity and water are underdeveloped competencies across all sectors**: Environmental competencies across enterprise is strongest in Climate Change and Pollution where baselining and analysis capabilities (such as risk recognition, mapping, measuring and data analysis) are progressed and enhances ability to implement and monitor sustainability initiatives.
- **Sectoral differences are pronounced: The** Pharma sector has more mature sustainability capability and competency levels, Manufacturing is mixed, and Technology shows the widest ambition–execution capability and competency gap.
- **Sustainability capability–competency interplay determines maturity mode:** Findings from this research identified three sustainability maturity modes:
  - Pharma → Mature (aligned capability and skills)
  - Manufacturing → Selectively Proactive (strong in some domains, weak in others)
  - Technology → Aspirational/Reactive (ambition ahead of execution capability and competency)

  This indicates that achieving sustainability maturity requires investing in both strategic capability and workforce skillsets.

1 Introduction

1. Introduction

1.1. Towards a Green Skills Transition

A worldwide shift toward a green transition is underway with growth in demand for workers with green skills outpacing current supply (WEF, 2023; LinkedIn, 2025). The transition towards a low-carbon, resource-efficient, and climate-resilient economy is fundamentally a **skills transition** (ILO, 2019 although the potential exists for large scale job creation globally if effective policy measures and investment are made (ILO, 2024).

The development of green skills — defined as knowledge, abilities, values, and attitudes necessary to support a sustainable and resource-efficient society— has emerged as a cornerstone of this transformation (ILO, 2019).

There are four main groups of interlinked factors stimulating the growth of skills for green jobs: the changing environment; policy and regulation; green technology and innovation; and green markets (ILO, 2019).

Globally, the demand for sustainability competencies has accelerated in response to regulatory frameworks such as the European Green Deal, the UN Sustainable Development Goals (SDGs), and national-level climate action strategies.

For Ireland, this transition holds particular urgency. The country has committed to net-zero greenhouse gas emissions by 2050, supported by the Climate Action Plan (CAP) 2025 (Government of Ireland, 2025). Achieving this target requires not only technological innovation but as noted in Principle 2 of CAP25, workers need to be equipped with the skills to both participate in and benefit from the future net zero economy (Government of Ireland, 2025).

1.2. "Organisational sustainability capability _ competency development interplay" framework

Green transformation will require organisational capabilities in place to enable green skills to flourish and allow organisations to deal with emerging macro trends. Organisational capabilities and sustainability/green skills development are mutually reinforcing. Strengthening one aspect naturally strengthens the other, creating a cycle of continuous improvement and growth (Microsoft, 2022).

Figure 1: Interplay between organisational sustainability capability and competency development - adapted from Microsoft (2022).

Having strong green skills amongst the workforce is not an advantage without the organisational infrastructure in place to support the workforce to deliver an active transition, design new products and services, support business model transformation, implement climate action projects and deliver impactful change.

Interplay between organisational capability and sustainability competency development becomes closely aligned as organisations grow in sustainability maturity (Microsoft, 2022).

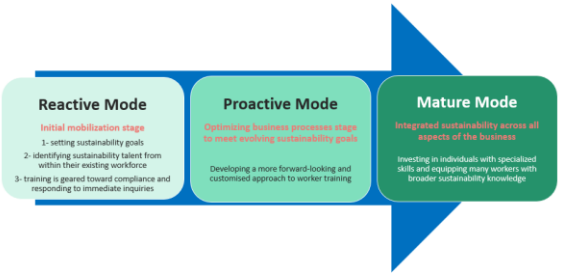

Figure 2: Organisational Sustainability Transition Journey and Talent Development (Microsoft, 2022)

1. Introduction

1.3. Why a Skills-Centred Green Transition Matters

The importance of focusing on sustainability competencies extends beyond compliance with climate goals. A skills-centred transition represents a strategic opportunity for Ireland to enhance, attract foreign direct investment, and foster inclusive growth (EY, 2022; Deloitte, 2024).

Firms increasingly demand workers who not only understand sustainability within their own domain but can also collaborate across supply chains, integrate ESG standards into business models, and leverage digital technologies for environmental solutions (Microsoft, 2022; WEF, 2023).

Moreover, embedding sustainability competencies—such as systems thinking, innovation, and change management—into education and training ensures that workers and organisations can adapt to fast-changing environmental, social, and regulatory landscapes.

Research Questions:

The study seeks to answer three overarching questions:

1. What are the current international and national trends in green and sustainability skills development?
2. How do Irish organisations perceive their sustainability capability & environmental competency maturity?
3. What implications do these perceptions hold for policy, capability development, and future research?

1. Introduction

1.4. Research Design and Scope

To address these questions, the research adopted a mixed-method, two-phase design:

1. Comprehensive Desk Review

An extensive desk review of academic and policy literature on green skills, sustainability capabilities, and workforce transformation to identify key green skills trends, policies and challenges. The desk review contextualised the international and Irish green skills agenda and informed the conceptual structure of the sustainability capability maturity assessments.

2. Organisational Level Sustainability Capability Maturity Assessment Surveys

Two structured perception-based surveys were conducted among 100+ respondents from 67 organisations across several sectors in Ireland.

1) Organisational-Level Business-Related Sustainability Capability Maturity Assessment

2) Organisational-Level Environmental-Related Sustainability Competency Maturity Assessment

Respondents rated their organisations across key business pillars (mission, strategy, execution, value creation) and environmental domains (climate, resource use, pollution, water, biodiversity, and ESG-related activities), generating perception-based maturity profiles for each sector.

The analysis, therefore, reflects self-assessed organisational perceptions rather than externally validated performance data. This approach captures how organisations see themselves in relation to sustainability maturity, offering insights into awareness, readiness, and perceived capability and competency gaps.

A total **of 147 responses from 67 organisations were received** from December 2023 to June 2024**.** For a full breakdown of demographic data, please see section 3.

1.5. Structure of the Report

The remainder of this report is structured as follows:

- **Section 2:** Analyses key trends and policies in green and sustainability skills at international and national levels.
- **Section 3**: Presents results from the organisational-level self-assessment surveys on sustainability capabilities in Ireland.
- **Section 4:** Inspects organisational-level business-related capability and environmental-related sustainability competency maturity across three key Irish sectors, including Pharmaceuticals, Manufacturing, and Technology.
- **Section 5:** Concludes with lessons and challenges and offers practical recommendations.

2

Key Trends In Green Skills (Looking Towards 2030)

2. Key Trends In Green Skills

2.1. Global Trends Shaping Green Skills Demand

Globally, there are four key trends shaping the demand for green skills.

1.Rapid Growth in Demand:

2.The global demand for green and sustainability-related skills is accelerating rapidly. According to LinkedIn's Global Green Skills Report (2023), the share of workers with at least one green skill on their profile grew by 12.3% annually between 2022 and 2023, but job postings requiring green skills rose almost twice as fast — by a median of 22.4%. This widening gap suggests that labour markets are struggling to keep pace with the transition. To keep pace with future demand, the green talent pool must be doubled by 2050. Without strategic and large-scale upskilling, nearly half of the jobs in the green economy could remain unfilled (LinkedIn, 2024).

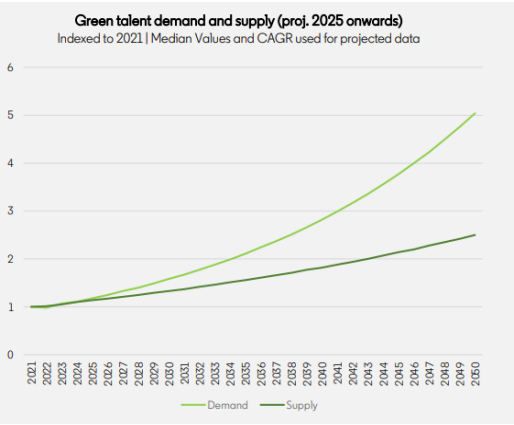

Figure 3: Global Green Talend demand and supply

2. Convergence of Green and Digital Transitions:

Digital transformation is increasingly recognised as a critical driver of the green transition, resulting in what CEDEFOP (2021, 2023) terms a 'twin transition' in skills demand. This concept captures the dual and interlinked pressures of digitalisation and decarbonisation on labour markets.

The shift to a low-carbon economy generates demand for specialised green skills in areas such as renewable energy, sustainable production, and circular economy. practices, while digitalisation is simultaneously transforming industries through automation, artificial intelligence, and data-driven innovation.

Together, these processes reinforce one another, reshaping the nature of work and the capabilities required across sectors. This highlights the importance of integrated skills policies that address both digital and green competencies to support competitiveness, resilience, and inclusivity in the European labour market.

3. The Green Transition as a Human Capital Transformation:

International research shows that the transition will not only create new green jobs but also fundamentally reshape existing occupations. The ILO (2019) argues that most jobs will undergo task greening, where existing functions are modified to include environmental standards, rather than being replaced outright. This has profound implications for education and training systems, which must now prepare learners for a world where sustainability is embedded into every role.

The World Economic Forum's Future of Jobs Report 2025 (WEF, 2025) notes that sustainability, climate adaptation, and environmental management are now among the fastest-growing skill clusters across industries, extending far beyond traditional "green" sectors. These trends underline the urgent need for reskilling and upskilling strategies to ensure that workforces can keep pace with evolving sustainability demands.

4. Expansion of Transversal and Cross-Sectoral Competences:

Beyond technical expertise, transversal green skills such as systems thinking, stakeholder engagement, and innovation for sustainability are becoming central to organisational transformation. LinkedIn's Global Green Skills Report 2024 highlights that demand for green skills is outpacing supply in nearly all regions, with sustainability knowledge increasingly embedded into roles such as project management, operations, and finance.

2. Key Trends In Green Skills

2.2. National Trends in Ireland's Green Skills Landscape

Outlined below are four key national trends in Ireland's green skills landscape.

1. Rapid Growth in Demand

Demand for green skills in Ireland grew by **22.1% in 2024**, nearly double the global average of **11.6%.** Between 2021–2024, Ireland's growth rate was **11.9% vs 6% globally** (IDA Ireland, 2024).

In recent years, green jobs in Ireland have grown faster than non-green jobs. While it remains unclear whether green roles are the main drivers of this growth, the trend indicates a rising demand for green skills.

Ireland is among the top countries worldwide for green skill demand, with 12.4% of jobs—one in eight—requiring at least one such skill (IDA Ireland, 2024).

According to SOLAS (2025), by 2024, roughly three-quarters of the workforce in Ireland was engaged in positions that required green skills to some extent, signalling a shift from niche roles to widespread adoption across industries.

2. Green Employment Surge

Approximately **400,000 people** (14% of the workforce) are in green employment, with annual growth of **6.4%**, outpacing overall employment growth (3.4%) (ithy, 2025).

3. High-Demand Skills

Environmental impact assessment, operational efficiency, sustainable supply chain management, and renewable energy expertise are among the fastest-growing skill areas according to the IDA's most recent Labor Market Pulse (IDA, 2024) while Skillnet Ireland's 2024 Talent Landscape Report identified Energy Efficiency, Innovation & Creative and Policy & Regulation as the top 3 climate action an sustainability skills that have the potential to grow an organisation's' business in the coming years. (Skillnet Ireland, 2024)

Green skills are thriving in Utilities, Construction, and Manufacturing, with Environmental Impact Assessment and Operational Efficiency topping the growth charts. However, demand for skills in sustainable supply chains, pollution prevention, and renewable energy is rapidly expanding into professional, financial, and technology sectors (IDA Ireland, 2024).

4. Upskilling Initiatives

To support this need Skillnet Ireland's Ireland Talent Landscape 2024 report highlights that over 59% of businesses see upskilling in sustainability as critical to their future success. Green skills development is not only vital for environmental goals but also serves as a key driver for economic growth, innovation, and job creation.

Skillnet Ireland, the national talent development agency of Ireland, supported 7,720 workers in green economy training in 2024, and its Talent Landscape report emphasizes sustainability skills as critical for competitiveness (Skillnet Ireland, 2025).

Ireland has positioned the development of green and sustainable skills as a central policy priority, recognising that the success of its climate transition hinges on the capabilities of its workforce.

In Ireland, the Climate Action Plan 2025 outlines ambitious targets in renewable energy, retrofitting, and decarbonization of transport (Government of Ireland, 2025). Meeting these targets requires significant investment in workforce development.

The national strategy landscape demonstrates strong alignment among climate objectives, skills strategy, and education reform, as outlined in Table 1.

Green Skills Objective, Policy and Strategy		Main Focus
National Climate Objectives	Climate Action Plan 2025	Reduce fossil fuel demand in Industry b 10% by 2030, achieve 70-75% share of carbon neutral heating in industry by 2030 (Government of Ireland, 2025).
	Circular Economy Act 2022	Resource efficiency, waste reduction, and sustainable production (Government of Ireland, 2022).
	National Biodiversity Action Plan 2023–2030	Protection and restoration of ecosystems.
Skills and Education Strategies	Green Skills 2030 (SOLAS, 2024)	First national FET strategy on green transition; focuses on embedding sustainability skills across all training and apprenticeships; focus on micro-credentials and industry partnerships.
	National Skills Strategy 2025 and Future Jobs Ireland (2019)	Recognise green skills as essential for competitiveness, innovation, and preparing the workforce for a low-carbon economy
	ESD to 2030 (Education for Sustainable Development)	Embeds sustainability into all levels of education
Sectoral and Labour Market Focus	Skills for Zero Carbon (EGFSN, 2021)	Identifies workforce needs for retrofitting, renewable energy, and EV deployment.
	Housing for All (2021) & National Retrofit Plan (2021)	Construction and housing as priority upskilling areas.
	Offshore Wind Industrial Strategy (2024)	large-scale job growth in renewables; requires early pipeline investment.

Table 1: Ireland's Green Skills Objectives, Policies and Strategies – adapted from SOLAS (2024)

3

Research Findings:

Sustainability Capability And Competency Maturity Assessment Across Irish Enterprise

3. Research Findings

Overview: Sustainability Capability and Competency Maturity Assessment Across Irish Enterprises

This section presents and critically interprets the overall self-reported findings from the organisational-level sustainability capability maturity assessments.

The analysis draws on both strands of the primary research:

1. the Organisational-Level **Business-Related** Sustainability Capability Maturity Assessment and
2. the Organisational-Level **Environmental-Related** Competency Maturity Assessment.

It is important to emphasise that all results reflect **participants' self-reported perceptions** of their organisations' business-related and environmental-related sustainability competency maturity levels.

These findings, therefore, provide insight into **organisational awareness, self-perceived readiness, and internal prioritisation** rather than externally validated measures of performance or impact. In this context, the self-reported data are best interpreted as a diagnostic of internal awareness and capability perception, providing a useful foundation for identifying where organisations feel confident and where they acknowledge developmental needs.

In total, 90 sustainability professionals from 63 companies participated in survey 1 and 57 sustainability professionals from 39 companies participated in survey 2. All participants have taken part in the Skillnet Climate Ready Academy's Sustainability Leaders Programme (SLP). Data collection took place between December 2023 and June 2024.

3. Research Findings

3.1. Business-Related Sustainability Capability

3.1.1. Objective:

Survey 1 assessed organisational-level business-related sustainability capability maturity across four key business pillars:

1. **Mission and Vision** (alignment of sustainability with organisational purpose)
2. **Strategy** (integration of sustainability into planning and objectives)
3. **Execution** (operationalisation of sustainability initiatives)
4. **Value Creation** (ability to generate business value through sustainability)

3.1.2. Instrument Design:

Each dimension included a set of quantitative maturity indicators, rated on a five-point Likert scale (1-5). *Sample items included:*

- "We have a sustainability strategy that clearly articulates our key strategic sustainability goals."
- "Our organisation regularly monitors our sustainability activities."

Overall, ***90 professionals, including senior managers, sustainability officers, HR and training leads, and operational experts across 63 companies*** (all either IDA or Enterprise Ireland clients) participated in survey 1. Respondents self-rated their organisations' business-related sustainability capabilities maturity level on a five-point Likert scale (1-5) from Reactive through Mature mode.

3.1.3. Demographic Breakdown:

Small and medium-sized enterprises – between 10 and 250 employees - were the largest demographic within the respondents to survey 1, representing 52% of the total sample combined. Large organisations – defined as employing 250 or more individuals – were also strongly represented at 48%. 10 different sectors were represented among the respondents to survey 1. Pharmaceuticals & chemical manufacturers were most frequent at 26%, followed by Manufacturing (14%), Technology (13%), and Medtech (12%).

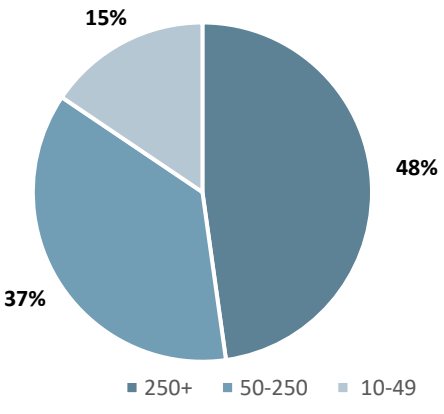

Figure 4: Breakdown of respondents to survey 1 by size of participating organisation

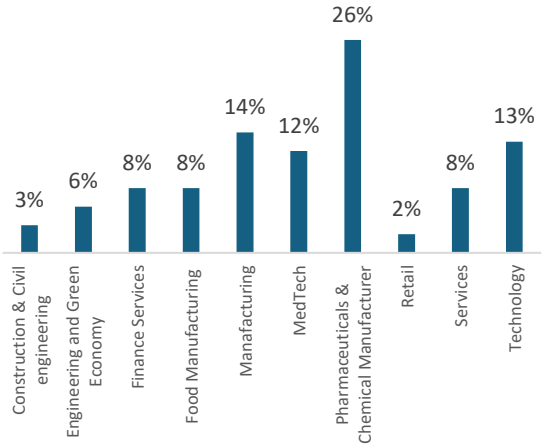

Figure 5: Sectoral breakdown of survey 1's participants

3. Research Findings

3.1. Business-Related Sustainability Capability

3.1.4. Self-reported maturity scores:

Participants self-rated their organisations' maturity across four key business pillars. Figure 6 and Table 2 outline the findings which identify a proactive cohort of organisations but who report a drop-off in capability in an organisation's ability to execute and derive value from their sustainability strategy. Respondents generally perceive that sustainability is *well-articulated* at the mission and strategy levels but *less embedded* in execution and measurable value delivery. Figure 7 reveals that most organisations are proactive across the four business pillars with a minority reporting mature sustainability capability, ranging from 11% in Value Creation to 28% in Mission and Vision.

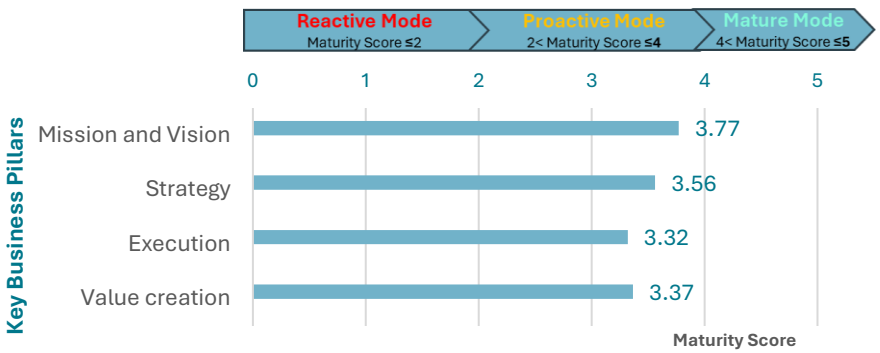

Figure 6: Business-Related Sustainability Capability Maturity Assessment

Business Pillar	Average Score (1-5)	Summary Analysis of detailed findings by pillar: Highest average maturity scores	Summary Analysis of detailed findings by pillar: Lowest average maturity scores
Mission & Vision	3.77	Clarity on business mission or purpose (4.19), mission presents a clear sense of direction (3.93)	Articulated sustainability vision (3.56), balance between short / medium term goals with long-term sustainability ambition (3.59),
Strategy	3.56	Understanding of environmental consequences of business activities (3.99), willingness to learn about emerging sustainability practices (3.82)	Development of KPIs to support sustainability strategy (3.17), alignment of sustainability strategy with national climate targets (3.26),
Execution	3.32	Ability of operations to adapt to sustainable practice (3.71), sustainable culture (3.70)	Clearly defined strategy execution steps (3.03), ambitious targets (3.08), operational alignment (3.08)
Value Creation	3.37	Aim to improve reputational gain (4.06), aim to foster new business ventures (4.01)	Surpass competitors with existing capabilities (2.89), surpass competitors with better risk management (2.97)

Table 2: Analysis of Business-Related Sustainability Capability Maturity Assessment Results

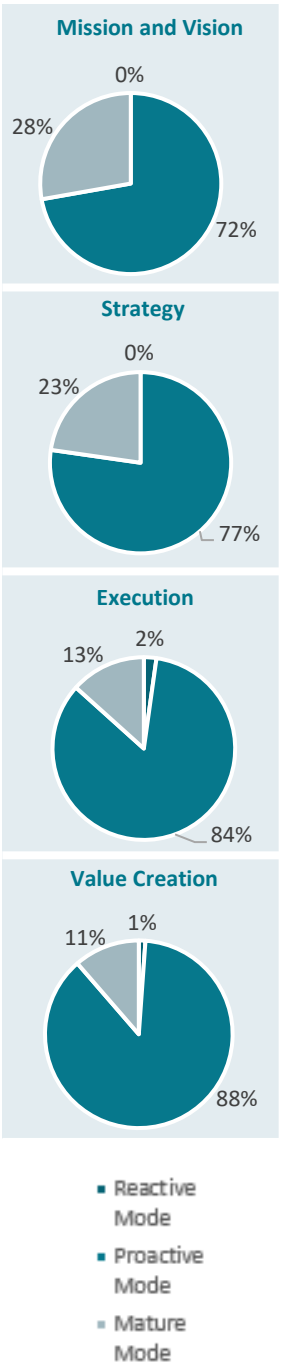

Figure 7: Business-Related Sustainability Capability Maturity Mode Organisational Breakdown

3.2.1 Objective:

The second survey focused on organisational-level environmental-related sustainability capabilities, measuring maturity across six pillars, the first five of which align with the environment pillars of CSRD and a sixth pillar which represents broader environmental governance and management-related activities:

1. Pollution
2. Climate change
3. Water stewardship and marine resources
4. Resource use and circular economy
5. Biodiversity and ecosystems
6. Environmental-related activities

3.2.2. Instrument Design:

Similar to the first survey, organisations rated their perceived maturity across detailed sub-items using a five-point Likert scale. A step-by-step approach to the Organisational Level Environmental-Related Competency Maturity Assessment is integral to ensuring that the organisation has a clear framework for managing its environmental-related activities, both internally and across its value chain. The most efficient organisations will reach a high maturity score (>4) in one step (e.g. mapping) before reaching a similarly high maturity score in the next step (e.g. monitoring).

Similar to the first survey, each dimension included a set of quantitative maturity indicators, rated on a five-point Likert scale (1-5). *Sample items included:*

- "We measure our facilities and transport energy use and GHG emissions."
- "We implement policies, programmes and/or projects to prevent or mitigate impacts to biodiversity and ecosystems and restore biodiversity and ecosystems."

Overall, ***57 professionals across 39 companies*** (all either IDA or Enterprise Ireland clients) participated in survey 2. Respondents self-rated their organisations' environmental-related sustainability capabilities maturity level from Reactive through Mature mode. Data were analysed at both sectoral and aggregate levels, providing insights into cross-sectoral variation in environmental competency maturity (see section 4).

Figure 8: A step-by-step approach to the Environmental-Related Competency Maturity Assessment

As highlighted in Figure 8 above, the Environmental-Related Competency Maturity Assessment followed a step by-step approach to assess maturity:

Step 1: Recognise the environmental pillar-related risks and relevance

Step 2: Map (Organisation's operations)

Step 3: Map (Organisation's value chain)

Step 4: Measure (Organisation's operations)

Step 5: Measure (Organisation's value chain)

Step 6: Analyse data from mapping and measuring activities

Step 7: Strategise to explore options and/or opportunities to prevent, mitigate or remediate adverse impacts

Step 8: Implement policies, programmes and/or projects to prevent, mitigate or remediate adverse impacts

Step 9: Monitor the efficacy of policies, programmes and/or projects that have been implemented by the company to address the environmental issues

Step 10: Respond to post-implementation analysis and feedback as well as changing conditions

3.2.4. Demographic Breakdown:

SMEs– between 1 and 250 employees - were the largest demographic within the respondents to survey 2, representing 56% of the total sample combined. Large organisations were also strongly represented at 44%. Most responses to survey 2 came from Pharmaceuticals & chemical manufacturers (26%), followed by Manufacturing (18%), Technology (14%), Medtech (9%), and Services (9%).

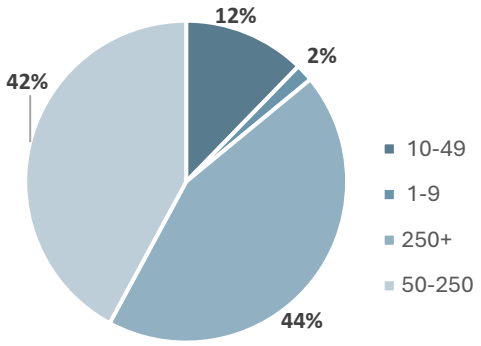

Figure 9: Breakdown of respondents to survey 2 by size of participating organisation

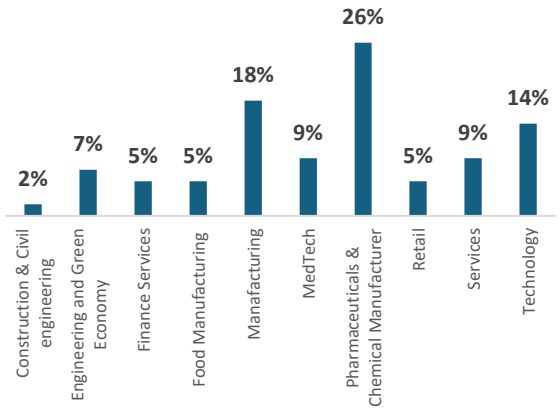

Figure 10: Sectoral breakdown of survey 2's participants

3. Research Findings

3.2. Environmental-Related Sustainability Capability

3.2.5. Self-reported maturity scores[1:]

Participants self-rated their organisations' maturity across six environmental domains. At an aggregate level, average maturity scores were highest across the areas of Climate and Change and Pollution as seen in Figure 11 and Table 3. Figure 12 presents an organisational breakdown of maturity mode by environmental domain. More organisations self-report as 'mature' in Pollution (26% of respondents) than any other domain. The most notable difference in scoring between Figures 11 and 12 is in the Water Stewardship domain where although on average scoring, it ranks second lowest at 3.08, it has the third highest number of organisations (14%) who identify as having mature competencies.

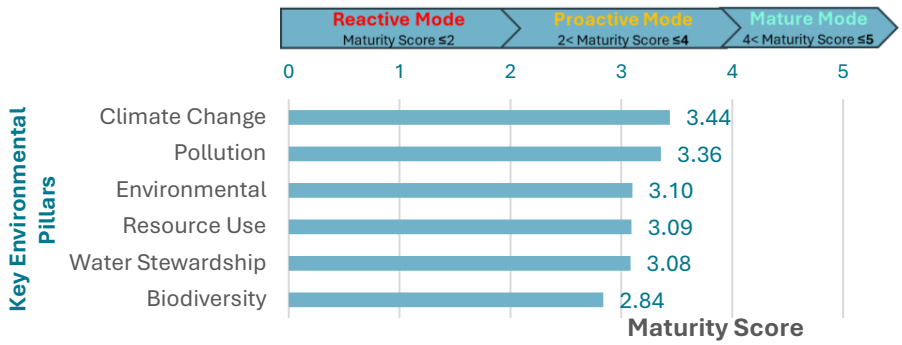

Figure 11: Environmental-Related Sustainability Competency Maturity Assessment

Environmental Domain	Average Score (1-5)	Summary analysis of detailed findings by domain: Highest average maturity scores	Summary analysis of detailed findings by domain: Lowest average maturity scores
Climate Change	3.44	Risk Recognition (4.21), Scope 1 and 2 emissions mapping (3.72), Implementation of action plans (3.67)	Scope 3 emissions mapping (2.98) and measurement (3.02)
Pollution	3.36	Risk Recognition (4.21), Pollution risk mapping (3.71), Implementation of pollution mitigation plans (3.66)	Mapping (2.78) and measuring (2.62) of pollution-related impact outside side boundaries
Environmental-Related	3.10	Understanding of mandatory ESG reporting requirements (3.61), familiarity with national climate policies (3.46)	Lack of assessment of skills needs for ESG reporting (2.74,) incorporation of ESG-related risks into business functions (2.75),
Resource Use	3.09	Recognition of importance of resources to company's value chain (3.91), resource inflow mapping (3.20)	Measurement (2.82) of resources in value chain, implementation monitoring (2.90), data analysis (2.90)
Water Stewardship	3.08	Water risk recognition (3.89), water mapping at site level (3.39)	Water footprint analysis at value chain level (2.59), water mapping at value chain level (2.67),
Biodiversity	2.84	Biodiversity and eco-system-related risk recognition (3.72), impact mapping (3.02), action implementation (3.02)	Mapping (2.60) and measuring (2.52) of supply chain impacts,

Table 3: Analysis of Environmental-Related Sustainability Competency Maturity Assessment

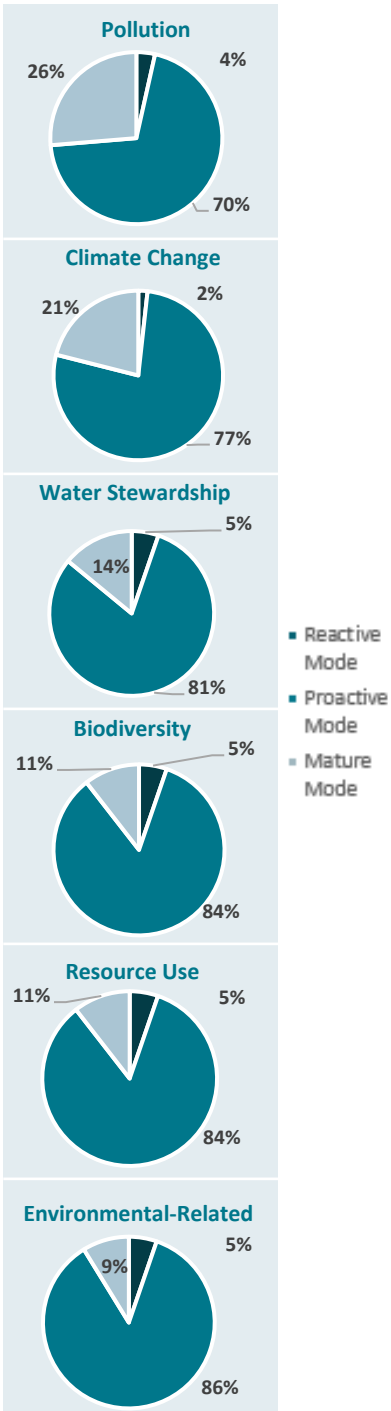

Figure 12: Environmental Competency Maturity Mode Organisational Breakdown

Note 1: *These findings are self-assessed, reflecting participants' perceptions and internal awareness of sustainability maturity rather than externally validated performance data.*

3. Research Findings

3.3. Environmental Risk Analysis & Double Materiality Assessment

3.3.1. Environmental Risk Perception:

As part of survey 2, participants were asked to self-assess the perceived risk of not addressing each environmental domain**.**

- **Climate change** was identified by the participants as the environmental domain posing the **greatest risk** to Irish organisations, with 51% of respondents rating it as either 'High risk' or 'Very high risk'.
- **Pollution** was rated as the **second highest risk** to Irish organisations, with 48% of respondents selecting either 'High Risk' or 'Very high Risk'.
- **Resource use** received the **third highest risk** rating, with 35% of participants rating it as either 'High risk' or 'Very high Risk'.
- Perceptions of **Biodiversity risk is highly polarised**, with 30% of Irish organisations rating the domain as either 'High risk' or 'Very high risk', and 30% of respondents rating the domain as 'Low risk' or 'Very low risk'.

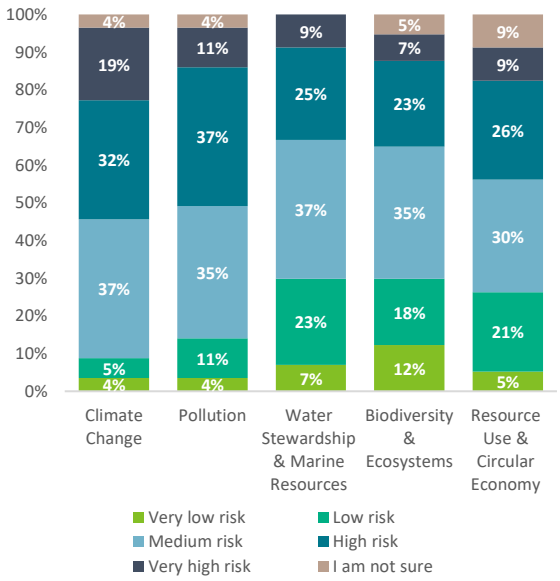

Figure 13: The risk of not addressing environmental challenges on Irish organisations' ability to operate

- Participant perceptions of **water risk is also polarised**, with 34% of respondents selecting either 'High risk' or 'Very high risk', and 30% of respondents selecting either 'Low risk' or 'Very low risk'.

3.3.1.1. Advanced Statistical Testing:

- A significant correlation**, albeit weak, was identified where respondents reporting higher capability in the domains of pollution (r_s = .446) and biodiversity (r_s = .381), are more likely to perceive these domains as higher business risks. However, no significant relationship was identified between capability and risk perception for climate change, water or resource use.
- Participants from the Pharmaceutical sector (mean risk score = 4.1) perceive pollution risk to be significantly* higher than participants from the Technology sector (mean risk score = 3.0).
- Participants from the Pharmaceuticals sector (mean risk score = 3.7) perceive water risk to be significantly* higher than those in Manufacturing (mean risk score = 2.7) and Technology industries (mean risk score = 2.3).

3.3.1.2. Interpretation:

- The risk of inaction in the areas of climate change and pollution are key concerns for this sample of Irish businesses, with the pharmaceutical industry contributing to the high rating for pollution.
- Whilst the strength of the correlation between capability and risk ratings for pollution is limited, future studies with a larger sample may have the potential to identify a stronger relationship between perceived capabilities and risk for pollution and biodiversity. For example, there is the potential that existing capabilities in pollution shape how businesses perceive pollution risk, or visa versa, the perceived level of risk that pollution poses to a company is linked to the capabilities that it fosters within this area.

*** p < .001 result in Spearman's Rho Correlation Test*

** p <.05 result in Mann-Whitney U Test*

3.3.2. Double Materiality

Double materiality assessment, a process of prioritising a company's key Environmental, Social and Governance (ESG) impacts and risks from a outside-in (financial) perspective and an inside-out (impact) perspective. Figures 14 and 15 present findings from both outside-in and inside-out perspectives.

Around half of organisations have **not yet completed double materiality assessments**, which limits their capacity to evaluate sustainability risks and opportunities comprehensively. This aligns with self-reported lower maturity in execution and measurement, suggesting that **strategic ambition is not yet fully supported by impact assessment capability**.

3.3.2.1. Outside-In Materiality (External impacts and risks affecting an organisation):

Participants were asked whether they have conducted an assessment to determine if and environmental sustainability policies and/or activities present material risks or opportunities to their company. Figure 14 presents the findings

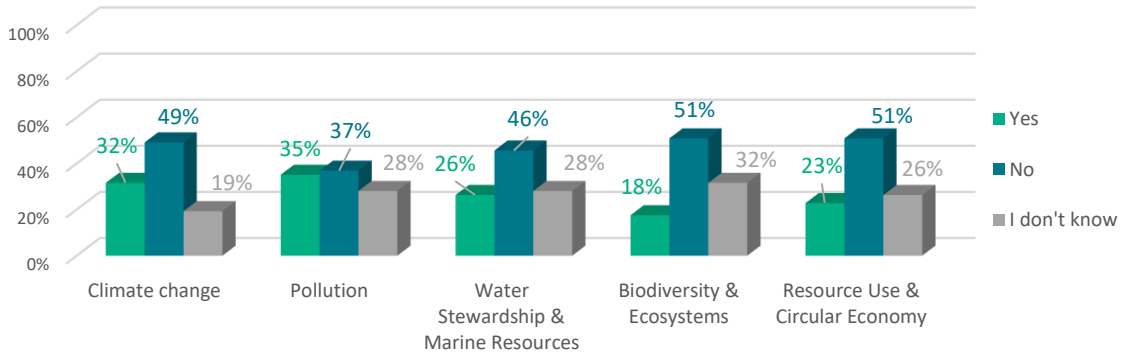

Figure 14: Outside-in materiality assessment

3.3.2.2. Inside-Out Materiality (Organisational impact on environment):

Participants were asked whether they had conducted an assessment to determine whether their organisation's environmental sustainability policies and/or activities materially impact (positively or negatively) people or the environment. Figure 15 presents the findings.

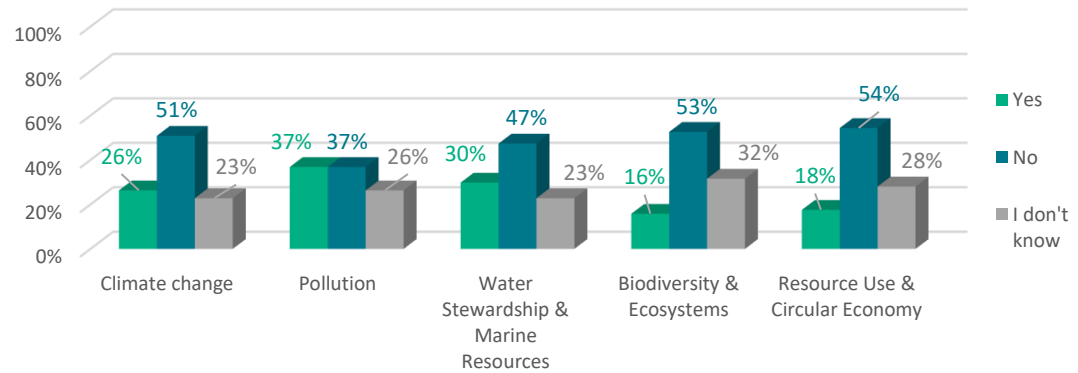

Figure 15: Inside-out materiality assessment

4

Sectoral Case Studies Analysis And Discussion

4. Sectoral Case Studies Analysis And Discussion

4.1. Cross-Sector Benchmarking Insights

Table 6 provides a summary of the results of both survey 1 and 2 across three of Ireland's key business sectors: pharmaceuticals, manufacturing and technology.

Capability / Competency Area	Pharma Sector (Perceived)	Manufacturing Sector (Perceived)	Technology Sector (Perceived)	Cross-Sector Average	Maturity Mode	Cross-Sector Interpretation (Self-Reported)
Survey 1 Sample	n = 23	n = 13	n = 12	n = 48		
Mission & Vision	4.12	3.47	3.88	3.82	Proactive (Mature)	Respondents, particularly in the pharmaceutical sector, report strong alignment between sustainability purpose and organisational vision. Manufacturing and technology firms show growing awareness but less embedded purpose.
Strategy	3.86	3.61	3.58	3.68	Proactive	All sectors self-report progress in Integrating sustainability into planning, though gaps remain in translating strategic intent into measurable objectives. Pharma capabilities are higher than the average.
Execution	3.76	3.16	3.24	3.39	Proactive	Implementation remains inconsistent across sectors. Respondents perceive active initiatives, but limited coordination and performance tracking suggest that strategy-to-action conversion is still evolving.
Value Creation	3.69	3.37	3.24	3.43	Proactive	The ability to link sustainability to tangible business value is emerging. Firms recognise its importance but self-report limited evidence of outcomes beyond compliance or brand positioning.
Survey 2 Sample	n = 15	n = 10	n = 8	n = 33		
Pollution	4.01	3.35	2.90	3.42	Proactive	Pollution control viewed as relatively advanced, especially in regulated sectors (pharma). Tech reports more nascent systems.
Climate Change	3.91	3.15	3.10	3.39	Proactive	All sectors self-report proactive climate strategies, though pharmaceuticals see greater integration of climate goals into business decisions compared to technology and manufacturing.
Resource Use & Circular Economy	3.52	3.42	2.44	3.13	Proactive	Self-reported circular economy and resource efficiency practices are developing, particularly in pharma and manufacturing; technology firms report early-stage engagement.
Water Stewardship	3.54	3.21	2.50	3.08	Proactive (Low)	Water management awareness is moderate across sectors, with pharma leading due to regulatory standards; technology sector reports limited operational integration.
Biodiversity	3.32	2.81	2.49	2.87	Proactive (Lowest)	Lowest overall maturity; limited focus and action across all sectors, highlighting a neglected sustainability domain, with pharma showing slightly higher awareness.
Environmental-Related Activities	3.61	2.75	3.08	3.15	Proactive (Low)	Self-reported engagement in environmental initiatives is positive but fragmented, suggesting awareness outpaces integration.

Table 6: *Cross-Sector Benchmarking Insights– Sustainability Capability / Competency Maturity Snapshot*

4. Sectoral Case Studies Analysis And Discussion

4.2. Cross-Survey Insights

4.2.1. Through the Sustainability Capability–Competency Interplay Lens

This section links Survey 1 (business capability) and Survey 2 (environmental competency). Table 7 provides a mapping and comparison of findings across the key steps in Survey 1 and Survey 2:

- **Mission & Vision** → Step 1 (Recognise)
- **Strategy** → Steps 2–7 (Map operations, Map value chain, Measure operations, Measure value chain, Analyse data, Strategise)
- **Execution** → Steps 6–9 (Analyse data, Strategise, Implement, Monitor)
- **Value Creation** → Steps 9–10 (Monitor, Respond) + ESG pillar

Survey 1 Dimension & Linked Survey 2 Steps	Pharmaceuticals Sector	Manufacturing Sector	Technology Sector
Mission & Vision ↔ Step 1 – Recognise	**Strong alignment** – very high mission score matched by consistently strong recognition of environmental risks across all pillars.	**Partial alignment** – moderate mission score; strong recognition for climate/pollution but weaker for biodiversity, water, circularity.	**Loose alignment** – strong sustainability mission but moderate recognition; high on climate and pollution, low on biodiversity and water.
Strategy ↔ Steps 2–7 – Map operations & value chain, Measure operations & value chain, Analyse, Strategise	**Broadly reinforcing** – good mapping and measurement of operations; value-chain gaps remain, but analysis and strategising are strong and compliance-driven.	**Inconsistent & pillar-dependent** – strategy maturity exceeds mapping/measurement; stronger for pollution and water, weaker for biodiversity and circularity.	**Misaligned** – strategy scores higher than capabilities; mapping/measurement and analysis are immature.
Execution ↔ Steps 6–9 – Analyse, Strategise, Implement, Monitor	**Systematic execution** – robust implementation and monitoring, especially for climate and pollution; near "closed loop" from analysis to monitoring.	**Mixed execution** – Implementation is strong in pollution, climate, and water. Monitoring is weakest in biodiversity	**Fragmented execution** – Implementation for water, biodiversity, and circularity is weak. Monitoring is inconsistent due to limited systems/data maturity; execution capability lags self-perception.
Value Creation & ESG ↔ Steps 9–10 – Monitor, Respond + ESG Pillar	**Credible value capture** – monitoring and response mechanisms, plus relatively strong ESG processes, support risk reduction and reputational/efficiency gains.	**Aspirational value** – value creation ambitions ahead of capability; monitoring, response and ESG systems are underdeveloped.	**Emerging value potential**– brand/innovation messaging outpaces evidence; ESG and feedback loops are still emerging. Weak monitoring undermines evidence-based performance
Overall Profile	• Mature–Proactive • Most Mature & aligned Pharma = High ambition + high capability → the most advanced maturity pattern	• Proactive but fragmented • Partial alignment ↔ mixed maturity Manufacturing = Compliance is strong, but gaps in biodiversity & circularity domains	• Largest strategy–execution gap • Misaligned → Under-operationalised Technology = High ambition, but the weakest environmental capability foundation

Table 7: Cross-Survey Insights – Sustainability Capability–Competency Alignment Snapshot

4.3.1. Through the Sustainability Capability–Competency Interplay Lens

This section explicitly links the cross-survey results to the "Organisational Sustainability Capability_ Competency Interplay Framework" and the maturity modes (Reactive → Proactive → Mature):

Across all three sectors, the cross-survey analysis reinforces the conceptual argument that organisational sustainability maturity emerges from the interplay between sustainability competency development (Survey 2) and strategic business intent and capability (Survey 1).

- **Pharmaceuticals** demonstrate a tightly coupled pattern—high strategic clarity and strong recognition of environmental risks (Mission & Vision ↔ Step 1, Recognition), reinforced by robust environmental operational insights (Steps 2–7) and consistent implementation–monitoring loops (Steps 8–10). This coherence places Pharma firmly in the Proactive Mature zone of the framework, where organisational business-related sustainability capability and environmental-related competency reinforce each other in a closed feedback cycle.
- **Manufacturing** occupies a Proactive but uneven maturity mode: strategy and execution are most developed in regulated domains (climate, pollution), yet competency gaps remain in biodiversity, water and circularity, where organisations recognise risks but lack consistent mapping, measurement and monitoring. Here, organisational business-related sustainability capability and environmental-related competency are partialy aligned.
- **Technology,** by contrast, this illustrates the Emerging–Proactive mode: strategic intent is strong, but environmental competencies, particularly mapping, measurement and monitoring action lag. This produces a strategy–execution loose alignment, where strategic capabilities (e.g., vision, ambition) run ahead of execution maturity, limiting the ability to translate sustainability intention into value creation.

Together, the three sector profiles validate the framework's central proposition: the rate and depth of sustainability transformation depend not on organisational sustainability capabilities or sustainability competencies alone but on the strength of the feedback cycle between them—from recognising risks, to generating intelligence, to executing and responding. Where that loop is tight (Pharma), maturity accelerates; where the loop is fragmented (Manufacturing, Technology), progress is partial and domain-specific rather than systemic.

5

Conclusions And Recommendations

5. Conclusion and Recommendations

5.1. Conclusion

Irish enterprises are progressing in their sustainability journeys, but sustainability capability and competency development remain uneven across sectors and environmental domains.

While most organisations demonstrate strong awareness of climate and pollution risks, and many articulate ambitious sustainability visions, operational maturity—in areas such as environmental data mapping, measurement, circularity, biodiversity, and monitoring—lags behind.

Pharmaceuticals show coherent, integrated maturity, whereas Manufacturing exhibits selective capability strength, and the Technology sector displays the largest gap between ambition and execution.

Overall, the evidence indicates that Ireland's competitiveness in the green transition will depend on strengthening the alignment between organisational capability systems and workforce sustainability skills, ensuring enterprises can translate ambition into action, compliance into value creation, and sustainability activity into measurable performance.

Taken together, the findings confirm the core thesis of this report: sustainable enterprise transformation is governed by the interplay between organisational capability systems and workforce sustainability competencies. Skills alone are insufficient without robust data systems, governance frameworks, and monitoring mechanisms; equally, advanced capability systems require a workforce that can collect, interpret, and act on environmental information.

Where both evolve interactively—such as in Pharmaceuticals—organisations approach mature sustainability performance. Where they diverge—such as in Technology—progress remains aspirational rather than embedded.

Strategic Takeaway for Skillnet Climate Ready Academy:

Irish enterprises are ambitious about sustainability, but the pathway to sustainable competitiveness depends on strengthening the organisational capability – sustainability skills alignment loop. Strong ambition alone will not deliver measurable impact unless businesses strengthen their governance, data, and execution systems and invest in both technical and transversal sustainability skills across every role.

Simultaneous development of organisational sustainability capability and workforce competency by addressing the capability and competency gap between sustainability strategy and execution will allow enterprises not only to meet regulatory expectations but also to unlock new forms of value creation, innovation, and resilience in a rapidly evolving global green economy.

5. Conclusion and Recommendations

5.2. Recommendations for SCRA

Finding	Recommendation
1 **Organisations have strong sustainability ambition, but need to improve implementation skillsets**	**Support organisations to build Sustainability Capability and Competencies in tandem to capitalise on opportunities**
Enterprises across all sectors report high maturity for Mission & Vision (Maturity Score - 3.77) and Strategy (3.56), but lower maturity for Execution (3.32) and Value Creation (3.37). Capabilities related to KPI development (3.17), developing clearly strategy execution steps (3.03) and ensuring operational alignment (3.08) are amongst the lowest maturity score and point to challenges in organisations' ability to convert strategic plans into measurable outcomes.	Develop initiatives that support organisations to: • Develop execution-oriented capabilities (governance, data, KPIs, internal reporting) beginning with leadership competence development • Pair organisational capability building with targeted competency development (e.g. implementation and monitoring of sustainability initiatives). • Ensure that strategy, systems, and skills evolve in tandem to close the gap between Strategy and Execution.
2 **Environmental competency maturity is uneven across sectors**	**Enable organisations to determine the material impact of their operations and align sustainability competency plans accordingly**
Enterprises across all sectors report higher maturity in emissions (3.44) and pollution (3.56), and weaker existing capability in areas such as biodiversity (2.83). When assessing capability against areas of business risk, a significant correlation *($p < .001$)* , albeit weak, was identified where respondents reporting higher capability in the domains of pollution ($r_s = .446$) and biodiversity ($r_s = .381$), were more likely to perceive these domains as higher business risks.	Develop initiatives that support organisations to: • Complete double materiality assessments to ensure that environmental domain capability aligns with material business impacts. This will enable organisations to undertake comprehensive risk and impact analysis and capitalise on opportunities for sustainability-related value creation
3 **Misalignment between sector-specific capability development and workforce competency maturity slows value creation potential from sustainability**	**Engage with national enterprise agencies on sector-specific capability and competency development**
Sectoral analysis of three sectors shows a considerable spectrum of sustainability capability and competency maturity across the three sectors analysed (Pharmaceuticals, Manufacturing and Technology) with higher capabilities in strategy and execution leading to higher business value creation capability.	Work with national agencies to provide targeted sector-specific pathway programmes to provide organisations with the capability and competency requirements of most material importance to ensuring Ireland retains strong sectoral competitiveness globally while in parallel Irish organisations continue to deliver a sustainable transition.
4 **Organisations are less mature in building the transversal competencies that support competitiveness and resilience**	**Engage Industry in Systemic, Transdisciplinary Skills Programmes**
Cross-cutting environmental capabilities in areas such as data analysis, mapping and measurement of both catchment and supply-level impacts consistently rank among the least mature across the environment domains. Cross-cutting environmental competencies in areas such as assessing skills needs for ESG reporting (2.74) and incorporation of ESG-related risks into business functions (2.75) rank as the lowest.	• Transdisciplinary skills development programmes can equip both sustainability and non-sustainability professionals with building the key technical and transversal skills required for supporting organisational climate resilience. • Competency development interventions should equip organisations with the skills needed to create and measure impact (e.g. data analysis, supply chain and catchment analysis) and the skills that support organisations to embed ESG reporting and ESG risk management into operations.

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Appendices

Appendix A

Cross-Sector Benchmarking Insights (Detailed Version)

1) Business-Related Sustainability Capability

Pharmaceutical Sector

Respondents from the **pharmaceutical sector** generally reported **moderate to high levels of perceived maturity** in sustainability strategy and leadership alignment.

Across the four business pillars — Mission & Vision, Strategy, Execution, and Value Creation— respondents expressed **confidence in their organisational commitment and direction**, particularly around sustainability vision and policy alignment.

However, self-assessments indicate a **decline in perceived capability maturity when moving from strategic intent to implementation and value creation.** While organisations rated themselves highly on having a defined sustainability mission (average scores above 4.0 on a 5-point scale), scores fell notably in the Execution and Value Creation pillars, suggesting that **respondents acknowledge a gap between strategic ambition and operational delivery.**

This self-reported trend could reflect **organisational optimism bias**, where participants overestimate alignment and underestimate execution challenges. Nonetheless, it offers useful insights into **perceived readiness and capability gaps** that merit further exploration through qualitative or external evaluation.

Manufacturing Sector

In the **manufacturing sector**, respondents described their organisations as being at an **intermediate stage of sustainability integration.** Self-ratings showed steady, moderate maturity levels across all pillars, with particularly higher perceived strengths in Strategy and Mission & Vision compared with Execution and Value Creation.

This pattern echoes the pharmaceutical sector, suggesting that **many organisations view sustainability as strategically important but still in transition from commitment to practice.** Respondents' self-reported gaps in implementation may reflect challenges such as resource constraints, limited internal expertise, or competing business priorities.

Compared to other sectors, manufacturing respondents were somewhat more conservative in their self-assessments, perhaps reflecting greater operational complexity and regulatory pressures. These self-reported perceptions highlight a conscious awareness of ongoing capability building, though not yet fully realised in practice.

Technology Sector

Respondents from the **technology sector** self-reported **relatively high perceived maturity** across sustainability pillars, particularly in Mission, Vision and Strategy. This may stem from strong corporate commitments to ESG goals, digital innovation, and stakeholder visibility.

Nevertheless, Execution and Value Creation again showed lower self-rated scores, indicating perceived challenges in translating sustainability intentions into consistent operational results.

Notably, technology respondents rated their organisations as stronger in innovation-driven sustainability than in structured reporting or resource management — suggesting that perceived strengths lie in creative solutioning and culture, rather than standardised sustainability measurement systems.

While these findings are based on self-perception, they highlight an important insight: the technology sector perceives itself as a frontrunner in sustainable innovation, yet recognises the need to consolidate execution mechanisms to sustain impact.

Appendix A

Cross-Sector Benchmarking Insights (Detailed Version)

2) Environmental-Related Sustainability Competency

Pharmaceuticals Sector

In the environmental domain, pharmaceutical respondents self-reported strong awareness but uneven maturity across capability areas.

Scores were highest in pollution and climate action planning, while biodiversity and circular economy received more modest ratings.

Respondents tended to perceive their organisations as proactive in environmental reporting and compliance but less advanced in circular economy initiatives and biodiversity.

These self-assessments highlight perceived strengths in policy-driven areas and perceived gaps in new and innovation-led domains.

Manufacturing Sector

Manufacturing respondents self-rated their organisations as mature in pollution and waste reduction, reflecting operational focus on compliance and cost control.

However, self-reported scores were lower in biodiversity, water management, and broader ESG integration, suggesting perceived limitations in holistic environmental governance.

Given the high resource intensity of manufacturing, these self-reported patterns align with ongoing sectoral efforts to decarbonise supply chains and enhance transparency.

Technology Sector

Technology respondents reported moderate to high perceived maturity in climate-related actions (e.g., energy optimisation, carbon tracking) but lower ratings in resource circularity and pollution prevention.

As with sustainability capability, self-rated maturity in the technology sector reflects strong awareness and innovation intent, though many respondents perceive a need to strengthen cross-functional accountability for environmental outcomes.

Appendix B

Cross-Survey Insights (Detailed Version)

1) Pharmaceuticals

This section links Survey 1 (business capability) and Survey 2 (environmental capability).

A) Mission & Vision ↔ Step 1 (Recognise)

Survey 1 shows very high self-reported maturity for Mission & Vision (**4.12**).

In Survey 2, Step 1 (Recognise) scores across environmental pillars are **3.93–4.67** (consistently high).

Interpretation:

Pharma's strong sustainability purpose is fully supported by early-stage environmental competencies.

Recognition is:

- deep (high scores across all pillars),
- consistent with regulated industry norms,
- aligned with long-standing safety and compliance cultures.

Pharma shows the strongest alignment between mission clarity and awareness of environmental materiality among all sectors.

B) Strategy ↔ Steps 2–7 (Mapping, Measuring, Analysing, Strategising)

Survey 1: Strategy maturity (**3.86**) is high but slightly below Mission & Vision.

Survey 2 results show the following pattern:

- **Mapping operations (Step 2):** 3.60–4.33
- **Mapping value chain (Step 3):** 3.14–3.69
- **Measurement operations (Step 4):** 3.53–4.53
- **Measurement value chain (Step 5):** 2.92–3.69 (weaker)
- **Analyse data (Step 6):** 3.21–4.08
- **Strategise options (Step 7):** 3.62-4.20

Interpretation:

Strategic capability is coherent in Pharma:

- Mapping and measurement of direct operations are strong.
- Measurement of value-chain impacts is weaker but still maturing.
- Analytical capability is relatively inconsistent.
- Strategising (Step 7) is consistently high due to compliance-driven planning cycles.

C) Execution ↔ Steps 6–9 (Analyse Strategise, Implement, Monitor)

Survey 1: Execution (**3.76**) sits slightly below strategy

Survey 2 execution-linked steps:

- **Analyse (Step 6):** 3.21–4.08
- **Strategise (Step 7):** 3.62-4.20
- **Implement (Step 8):** 3.42–4.20
- **Monitor (Step 9):** 3.40–4.20

Interpretation:

Execution capability is strong and systematic, especially around climate action, and pollution.

Monitoring is a major strength (driven by regulatory auditing norms).

The linkage between planning and delivery is stable and sequenced, with no major collapse between strategy and execution.

Pharma is the only sector showing a nearly "closed loop" (analyse → strategise → implement → monitor).

D) Value Creation ↔ Steps 9–10 + ESG pillar

Survey 1: Value Creation maturity (**3.69**) is slightly lower than Execution.

Survey 2 results:

- **Monitor (Step 9):** 3.40–4.20
- **Respond (Step 10):** 3.38–4.13
- **ESG-related activities:** 3.61 (highest among all sectors)

Interpretation:

Pharma is turning sustainability maturity into:

- regulatory resilience
- market legitimacy
- operational efficiency

Pharma demonstrates the strongest sustainability capability–value alignment of all three sectors.

Appendix B

Cross-Survey Insights (Detailed Version)

2) Manufacturing

Mission & Vision ↔ Step 1 (Recognise)

Survey 1 score: **3.47**

Survey 2 Step 1 results across pillars: **4.10–4.50**

Interpretation:

Manufacturing has moderate sustainability purpose clarity, but recognition is:

- strong for climate and pollution (≈4.30–4.50)
- weaker for biodiversity, water and circularity (≈4.10–4.20)

This indicates selective materiality awareness:

✓ High where compliance and business risk are immediate

✗ Low where impacts are indirect or require supply-chain visibility

B) Strategy ↔ Steps 2–7 (Mapping, Measuring, Analysing, Strategising)

Survey 1 score: **3.61**

Survey 2 Step-scores:

- **Mapping operations (Step 2):** 2.80–3.70
- **Mapping value chain (Step 3):** 2.30–3.30
- **Measurement operations (Step 4):** 2.70–3.60
- **Measurement value chain (Step 5):** 2.20–2.80
- **Analyse (Step 6):** 2.70–3.30
- **Strategise (Step 7):** 3.00–3.60

Interpretation:

Strategy is declared but not yet fully evidence-based:

- Mapping of operations is moderate
- Mapping of the value chain is moderate.
- Measurement is uneven
- Analytical capabilities are moderate
- Strategy is strong only for pollution and water

In manufacturing, self-reported strategy maturity depends on the pillar's regulatory visibility.

C) Execution ↔ Steps 6–9 (Analyse → Monitor)

Survey 1 score: **3.16**

Survey 2 Step 6–9 results:

- **Analyse (Step 6):** 2.70–3.30
- **Strategise (Step 7):** 3.00–3.60
- **Implement (Step 8):** 2.90–3.50
- **Monitor (Step 9):** 2.70–3.40

Interpretation:

Execution capability is functional but inconsistent:

- Implementation is strong in pollution, climate, and water
- Monitoring is weakest in biodiversity
- Analyse exists but is not standardised across all environmental areas

Execution maturity mirrors operational exposure:
visible impacts → higher maturity;
indirect impacts → low maturity.
Overall, execution struggles with scalability and standardisation.

D) Value Creation ↔ Steps 9–10 + ESG pillar

Survey 1 score: **3.37**

Survey 2 results:

- **Monitor (Step 9):** 2.70–3.40
- **Respond (Step 10):** 2.70–3.50
- **ESG-related activities:** 2.75 (lowest of all sectors)

Interpretation:

Manufacturing's value creation narrative is aspirational rather than realised:

- Monitoring systems and responding mechanisms are weak
- ESG processes exist but lack integration and maturity

This results in a limited ability to transform environmental action into measurable business value.

Appendix B

Cross-Survey Insights (Detailed Version)

3) Technology

Mission & Vision ↔ Step 1 (Recognise)

Survey 1 score: **3.88**

Survey 2 Step 1 results across pillars: **3.38–4.25**

Interpretation:

Tech companies articulate a strong sustainability purpose but incomplete risk recognition:

✓ High awareness for climate & pollution & circularity

✗ Low recognition for water, biodiversity

Overall, purpose does not yet translate into comprehensive environmental materiality awareness.

B) Strategy ↔ Steps 2–7 (Mapping, Measuring, Analysing, Strategising)

Survey 1 score: **3.58**

Survey 2 Step-scores:

- **Mapping operations (Step 2):** 2.75–4.00
- **Mapping value chain (Step 3):** 2.00–2.38
- **Measurement operations (Step 4):** 2.38–4.00
- **Measurement value chain (Step 5):** 1.86–2.57
- **Analyse data (Step 6):** 2.14–3.13
- **Strategise options (Step 7):** 2.63–3.50

Interpretation:

Tech shows the weakest strategic foundations among sectors:

- Mapping lacks consistency and is immature in most pillars (especially value-chain)
- Measurement lacks consistency
- Analytical capability is still developing
- Strategising is moderate but not evidence-driven
- The strategy–capability gap is very pronounced:
- High ambition, low operational insights.

C) Execution ↔ Steps 6–9 (Analyse → Monitor)

Survey 1 score: **3.24**

Survey 2 Step 6–9 results:

- **Analyse (Step 6):** 2.14–3.13
- **Strategise (Step 7):** 2.63–3.50
- **Implement (Step 8):** 2.38–3.50
- **Monitor (Step 9):** 2.14–2.75

Interpretation:

Execution capability is fragmented:

- Implementation for water, biodiversity, and circularity is weak
- Monitoring is inconsistent due to limited systems/data maturity

D) Value Creation ↔ Steps 9–10 + ESG pillar

Survey 1 score: **3.24**

Survey 2 results:

- **Monitor (Step 9):** 2.14–2.75
- **Respond (Step 10):** 2.13–2.88
- **ESG-related activities:** 3.08

Interpretation:

Tech's value-creation narrative is largely aspirational:

- Weak monitoring undermines evidence-based performance
- Response maturity is low, limiting adaptive management
- ESG practices exist but are less formalised than in Pharma or Manufacturing

Value creation depends heavily on brand rather than operational proof.

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