

A Sectoral Study on Artificial Intelligence in Enterprise in Ireland

**Impacts, opportunities, barriers
and potential interventions**

October 2026

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Executive summary

Commissioned by the Department of Enterprise, Tourism and Employment, this study provides an evidence base for Ireland's sector-focused AI strategy for enterprise. It covers four broad sectors—manufacturing, tourism, construction and information and communications technology (ICT) services—and examines how the implications of AI differ across them.

Part 1 examines AI adoption in manufacturing, tourism and construction. It asks where AI can create value for firms in Ireland, what prevents enterprises from adopting and scaling it and where existing or potential policy intervention could help. The analysis considers how opportunities and barriers differ by sector and firm size.

Part 2 examines AI-driven structural change in ICT services. It considers software-as-a-service (SaaS) and ICT-enabled services separately, answering how firms in Ireland can adapt as AI reshapes products, service delivery, business models, pricing, sources of differentiation and competition.

The study focuses on AI capabilities and uses that can be evidenced today. We mapped more than 500 global AI use cases across sector value chains, interviewed more than 30 stakeholders, gathered 272 responses through an online enterprise consultation and brought together 175 participants in four sector workshops. We combined this evidence with official statistics, supplementary data analysis and a review of the supports available to enterprises in Ireland. The report considers workforce issues where they affect enterprise adoption, but broader economy-wide impacts on jobs and employment sit outside its scope.

This executive summary provides a concise view of the main findings and potential implications for policy intervention identified through the research and analysis.

The executive summary is followed by the following chapters that provide the more detailed evidence base:

- Introduction: Sets out the scope and overall research approach for the study
- Part 1: Increasing AI Adoption in manufacturing, tourism and construction:
 - The cross sectoral framework and summary findings set out the common framework for Part 1, capturing recurring patterns in where firms are applying AI, how those applications create value, the barriers firms face and the interventions that could help overcome them.
 - The sector deep dives provide detailed underlying analysis for each of the sectors in Part 1.
- Part 2: Adapting to AI-driven transformation in ICT services, is focused on how ICT firms in Ireland can adapt to an AI-driven restructuring of their markets. It identifies opportunities, barriers and potential interventions that could help them.
- The methodological appendices provide detail on the research approach undertaken and the underpinning evidence base for the study.

Part 1

Increasing AI Adoption in manufacturing, tourism and construction

Key opportunities for enterprises in Ireland from AI adoption

What do we mean by AI adoption?

The term “AI adoption” covers a wide range of possible activity, from an employee using a general-purpose assistant, to a predictive model deployed on the factory floor. This study is concerned with how AI can be used meaningfully and productively by firms. For this reason, it distinguishes between breadth of adoption (whether and how many firms are using AI at all), and depth (whether AI is embedded in workflows and systems).

Our focus is on how AI can best be adopted, and what stops that from happening. The study is therefore grounded in use cases – drawn from global evidence of value-creating AI adoption activities – and on the clear opportunities that AI adoption would unlock.

Where this report draws on data on levels of AI adoption, however, it applies the definitions and criteria used by the original source or dataset. An example of this is the CSO data that is cited extensively in the report, and which typically captures what proportion of companies in a sector are using any form of AI anywhere in their business. Please see the [cross-sector chapter](#) for more discussion on this.

AI adoption is growing quickly, but remains uneven and shallow

Ireland starts from strong digital foundations. In 2025, 83% of people aged 16–74 had at least basic digital skills, the second-highest proportion in the EU,¹ while 80% of enterprises with at least 10 people met the basic digital-intensity threshold.² These foundations could help Ireland become a leading centre for AI-driven growth.

AI use in Ireland is increasing rapidly. Among enterprises with at least 10 people, the share reporting AI use more than doubled from 8% in 2023 to 20% in 2025.³ A separate Accenture employee survey provides a different but consistent signal: 22% of workers in Ireland reported using generative AI daily at work in 2026, up from 8% in 2024.⁴

But adoption remains uneven. AI use is high among large enterprises (58% reported using it in 2025) but remains much more limited across Ireland’s small businesses.⁵ More than nine in 10 enterprises employ fewer than 10 people. In a separate survey of micro enterprises, 93% of construction firms and 83% of manufacturing firms reported no AI use during 2022–2024.⁶

Use also remains concentrated more heavily in individual tasks than in integrated workflows. In the enterprise consultation we ran, half of respondents described task-level organisational use, compared with 15% reporting a pilot or embedded workflow and 10% a scaled or AI-native operating model.⁷ Central Statistics Office (CSO) data similarly show that workflow automation, decision support and more autonomous applications remain much less common than general AI use.⁸

The challenge for Ireland is therefore twofold: enable more firms, particularly smaller enterprises, to take a credible first step; and help firms already using AI move from isolated tools and pilots into repeatable operational use and measurable business value.

From global use cases to opportunities relevant to Ireland

Our analysis of more than 500 global AI use cases identified five recurring sources of business value: revenue growth and customer engagement; innovation and solution design; operational and workforce productivity; cost, cash and capital efficiency; and risk, quality, resilience and compliance. We then tested the opportunities for each sector against evidence from enterprises and stakeholders in Ireland, focusing on where firms have both a meaningful source of value and a credible route to implementation. The resulting priorities are summarised in Figure 1.

Figure 1. Key opportunities for enterprises in Ireland, by sector and source of value

Sector	Revenue uplift		Cost takeout and value protection		
	Revenue growth and CX	Innovation and solution design	Operational and workforce productivity	Cost, cash and capital efficiency	Risk, quality, resilience and compliance
Manufacturing					
Chemicals and pharmaceuticals		Process development and validation: accelerate tech transfer and scale-up	Technical and regulatory work: faster, audit-ready evidence Workforce productivity: multiply scarce expertise	Production planning and yield: detect drift early Maintenance and asset reliability: plan by condition	
Medical devices	Product lifecycle value: use field data to improve service and performance		Workforce productivity: augment skilled work Technical and regulatory work: lighter documentation load		Process and product quality: machine vision first Supplier and sourcing risk: protect continuity
Computer and electronics		Electronic systems design: accelerate design, firmware and customisation	Workforce and engineering productivity: raise output in time-sensitive work	Production planning and yield: digital twins to de-risk process change	Process and product quality: make quality and yield visible
Food and beverages		Product, formulation and packaging design: test more ideas with the same capacity	Workforce productivity: better scheduling releases scarce capacity	Production planning and yield: protect throughput and margin Inventory and working capital: forecasts that change stock	Process and product quality: inspect continuously, before waste

Sector	Revenue uplift		Cost takeout and value protection		
	Revenue growth and CX	Innovation and solution design	Operational and workforce productivity	Cost, cash and capital efficiency	Risk, quality, resilience and compliance
Engineering	Product lifecycle value: use product data to build aftermarket value	Process development and validation: engineering, CNC and documentation	Technical and knowledge work: connect data around critical decisions	Maintenance and asset reliability: shift from response to reliability	Process and product quality: make performance visible early
Tourism					
	Digital acquisition and conversion: visible in AI discovery Personalisation and loyalty: a more personal, authentic offer	Product design: analyse behaviour to develop tourism products, itineraries and packages	Booking and services automation: automate the admin Platforms, data and integration: a shared layer, built once	Demand forecasting and planning: match capacity, price and staffing	
Construction					
	Estimating, bidding and pipeline conversion: winning work		Programme, progress and project knowledge: finish on time and on budget	Pre-construction design and contract risk: usable project knowledge Project cost and cash control	Site safety, quality and assurance: monitor for safety Site, field and workforce execution: monitor for efficiency

What the opportunities have in common

Several themes cut across these sector priorities.

Operations are the near-term centre of gravity.

Much of the opportunity comes from improving decisions firms already make every day: forecasting demand, planning production and labour, identifying defects or problems earlier, maintaining assets, managing inventory and keeping projects on track.

The opportunity is much broader than labour productivity. AI can reduce administrative effort, but in many sectors the larger value sits elsewhere. Manufacturers can protect yield, quality and uptime; construction firms can reduce delay, rework and delivery risk; and tourism businesses can introduce variable pricing to improve conversion and utilisation

of perishable capacity. AI can therefore affect revenue, margins, working capital, asset performance, quality and resilience as well as employee productivity.

The priorities reflect the economics and structure of each sector. In pharmaceuticals and medical devices, much of the opportunity sits in production, quality, regulatory work, validation and technology transfer rather than the earliest stages of discovery. In food and engineering, the emphasis is on throughput, waste, quality, maintenance and making scarce technical expertise go further. Construction is about making fragmented project information usable and improving coordination across clients, designers, main contractors and specialist trades. Tourism's key opportunity is to combine improvements in operating efficiency with protecting access to the customer as travel discovery and distribution become more AI-mediated.

AI adoption can also spread through value chains. Large manufacturers can raise data, quality and traceability standards across suppliers. Clients and main contractors can extend digital project systems across construction supply chains. In tourism, national and destination bodies, local authorities, platforms and larger operators can improve the information and digital infrastructure available to smaller businesses. Realising these benefits will require common standards, shared infrastructure and coordinated adoption.

The strongest near-term opportunities do not require every firm to deploy frontier technology. Established predictive and analytical AI can address many of the priority opportunities identified in this study. Newer capabilities can extend what firms are able to do. Generative and multimodal AI can bring a wider range of documents, images, speech and

technical information into workflows, while AI agents can increasingly complete sequences of tasks across systems. As these capabilities become more advanced, however, firms will need stronger technical and organisational foundations, including reliable data, connected systems, clear permissions, governance and assurance, and the ability to redesign and manage the surrounding process.⁹

Solutions should be aligned to the business problem. The newest or most capable model will not always provide the best answer. A simpler model or an AI capability already embedded in existing software may achieve the required outcome with lower cost, complexity, resource use and dependence on external providers. More advanced approaches make sense where the additional capability creates enough value to justify the additional requirements and risk.

Common barriers to AI adoption

The technology itself is rarely the main constraint to AI adoption. The greater challenge usually relates to non-technical factors within the organisation – such as giving people clear ownership and enough capacity to integrate AI into existing systems and redesign the work around it.

In general, firms face four groups of barriers to AI adoption:

- deciding where to act and whether it will pay;
- finding the skills, leadership and capacity to implement it;
- strengthening data and systems; and
- managing safety, security and trust.

The same four barrier groups appear across sectors, but their importance varies. Figure 2 shows the barrier groups and specific barriers within them. Data and digital foundations are a common challenge. As set out in the cross-sectoral chapter, other barriers are more sector-specific: limited understanding is more prominent in less digitally mature sectors; skills and capabilities matter more in parts of manufacturing and construction; and regulation and compliance are greater concerns in pharmaceuticals and medical devices. Dependence on platforms and supply-chain partners is a particular challenge in computer and electronics, tourism and construction.

Figure 2. Common barriers to AI adoption fall into four clusters
 Firm-level: within a company's control

 Sector-level: needs collective or policy action

Strategy And Financial Where should the firm act, who owns it and will it pay?	Organisational Does the firm have the skills, time and support to change the work?	Technology And Ecosystem Are the data, systems and wider value chain ready?	Safety, Security And Trust Can the firm trust the system and remain accountable?
Understanding  Firms cannot identify the right use case, judge what good looks like or connect AI to business value.	Skills and capability   Firms lack applied AI literacy and people who combine technical capability with sector and business knowledge.	Data and digital foundations  Information is incomplete or poorly governed, while manual processes and legacy systems keep AI outside daytoday operations.	Trust, reliability and governance   Firms need confidence in accuracy, security, human oversight, monitoring and responsibility for decisions.
Navigating and accessing support  Firms struggle to find the right route through the support system .	Time and management bandwidth  Day-to-day delivery leaves little protected time to assess, learn, implement or improve.	Platform and supply-chain dynamics  Customers, suppliers, platforms, contracts and shared standards determine what firms can adopt and exchange.	Identifying credible suppliers  Firms struggle to find impartial advice and credible suppliers.
Leadership, strategy and ownership  AI remains a technology experiment when no senior leader defines the AI strategy, owns it as a priority or sets a route to scale.	Leadership and change management  Without leadership through implementation, weak communication, workforce concerns and limited buy-in can stop staff using an otherwise viable solution.	Provider and compute dependency  Firms face lock-in, changing prices, continuity risk, data-sovereignty concerns and uneven access to secure infrastructure.	Regulation and compliance  Uncertainty over validation, traceability, liability and regulatory treatment slows higher-consequence applications.
Cost, funding and uncertain returns   Full implementation costs and payback are unclear, while time, cofunding and capital compete with other priorities.	Organisational redesign  AI is added to existing processes instead of changing tasks, roles, handoffs and decision rights.		
Principled or values-based resistance  Some firms object to AI on employment, ethical, environmental, brand or authenticity grounds.			
"Understanding how it works, where it fits and how best to implement. As well as understanding the costs."	"While pilot projects are often successful, scaling AI across a diverse, multi-site organisation remains the greatest challenge."	"You can't use AI if you don't have the right data sets ... they just don't have the data."	"They need traceability. Many of these models ... [are] not traceable at all."

Strategy and financial: deciding where to act, who owns it and whether it will pay

The first difficulty within this barrier group is often **understanding** – or knowing where to act. Firms struggle to identify valuable applications or judge what a good result looks like. Those that do identify a promising application then face the question of where to go for help, with participants describing difficulty **navigating and accessing support** in a system dispersed across several agencies and programmes and with eligibility sometimes unclear to them. A third difficulty is **leadership, strategy and ownership**, with AI often remaining a technology experiment without senior backing or prioritisation. This can mean initiatives stall or have no route to scale.

A further barrier is **cost, funding and uncertain returns**. The cost of AI can extend well beyond a licence or pilot. Firms may need to prepare data, integrate systems, redesign workflows, release staff for implementation, complete legal and cybersecurity reviews and fund ongoing model, software, monitoring and support costs. Operating costs can also rise as firms deploy AI more extensively or use workflows that require repeated model calls, data retrieval and orchestration across multiple steps.¹⁰ The business case therefore needs to reflect the full cost of implementation and operation, not simply the initial technology purchase.

A final barrier relates to **principled or values-based resistance**. This barrier tends to be less widely visible, but often arises in the tourism sector, where some firms were unwilling to let AI substitute for local knowledge or unique, personalised services.

The challenges differ by sector. Limited understanding is most prominent in the less digitally mature parts of the enterprise base. In pharmaceuticals and medical devices, much of the cost can come after a successful pilot, when firms need to validate the application, manage changes through controlled processes and provide evidence suitable for regulated production. In construction, the firm paying for AI may not capture all of the resulting productivity gain because value is shared through project contracts. In tourism, management time can be as important as access to investment: owner-managers often have the least capacity to change systems during the periods when better forecasting, pricing and staffing could create the most value. In food and beverages, thin margins make a clear link to outcomes such as yield, waste, quality or working capital particularly important.

Organisational: creating the capacity to change

Firms across the interviews, consultation and workshops consistently identified **skills and capability**, and implementation capacity, as barriers, but the requirement is not simply for more AI specialists. Leaders need enough understanding to set priorities and hold delivery to account; operational users need to know how to use and challenge outputs; technical teams need to integrate and monitor systems; and legal, quality, regulatory and cybersecurity teams need to understand the controls required.

Time and management bandwidth is often as scarce as skill, and pilots can stall because the people who understand the process are already occupied with day-to-day delivery.

Organisational redesign is a further requirement that is easily overlooked: moving AI into normal operations means changing tasks, hand-offs, roles and decision rights, and where AI is simply added to existing processes it becomes another tool that does not change how work gets done. **Leadership and change management** is part of the same challenge, since it depends on leaders staying involved throughout implementation, and not stopping at the approval stage. Weak communication can leave concerns about job security or professional judgement can be left unaddressed, which in turn can stop staff from exploring or using viable AI solutions. Firms need to explain how work will change, where human judgement remains essential and how AI will support rather than simply remove tasks.¹¹

Sector structures make this harder in different ways. In regulated manufacturing, operations, engineering and quality teams need to be involved early because a technically successful application may not be usable if it does not fit established compliance processes. Construction's project-based model makes redesign more difficult because no single organisation controls the whole workflow or the roles and decision rights that might need to change; construction professionals also need to preserve the judgement developed through experience. In tourism, small firms and seasonal workforces make dedicated AI roles and lengthy training unrealistic, increasing the need for short, practical support linked to live tasks. In engineering, the small and medium-sized enterprise (SME)-heavy enterprise base means many firms cannot maintain all of the specialist expertise needed to move from proof of concept into normal operation.

Technology and ecosystem: connecting data, systems and value chains

AI depends on usable information and systems that can exchange it. Firms described fragmented **data**, legacy technology and disconnected platforms that limit what AI can do. Having data is not enough if the information sits in incompatible systems or cannot be accessed reliably at the point where a decision is made – the lack of proper **digital foundations** is therefore also a regular challenge.

Some of these constraints sit outside the firm and are driven by **platform and supply-chain dynamics**. Businesses increasingly depend on suppliers, customers, project partners, software platforms, cloud providers and AI model providers. This raises questions about **provider and compute dependency** – and with it, issues of interoperability, pricing, continuity, data location, confidentiality, intellectual property, secure infrastructure access and the ability to switch to someone else's offering.

The form of the problem varies by sector. In manufacturing, higher-value applications often require firms to connect enterprise IT with production equipment, sensors, controllers, laboratories and quality systems installed over many years. In computer and electronics, sophisticated plants may still face difficult brownfield integration and decisions on architecture or vendors that sit elsewhere in a multinational group. Construction has a cross-company data problem: clients, designers, contractors and specialist trades create information in different systems and formats, meaning even a digitally advanced firm cannot solve the problem alone. In tourism, businesses depend heavily on property-management

systems, booking engines, online travel agents, search platforms and increasingly AI-mediated discovery, over which individual firms have little control.

Safety, security and trust: proportionate safeguards and trustworthy advice

The principal issue here relates to **trust, reliability and governance**. Firms need confidence that AI is reliable enough for the task for which it is used. The required safeguards should therefore reflect the consequence of error. Drafting an internal document, recommending a room price, identifying a possible defect, changing a production parameter and informing a safety-critical decision should not be governed in the same way.

Across sectors, the same common requirements tend to recur: these include approved tools, clear treatment of personal and proprietary data, vendor checks, human oversight, testing, documentation, monitoring and an incident process. Some of this is firm-level good practice; other parts stem from **regulation and compliance**, relating, for example, to data protection or cybersecurity rules. More consequential applications need ongoing assurance after deployment because models, data, suppliers and operating conditions can change. Where the regulatory position is unclear, however, firms are likely to defer higher-consequence applications rather than proceed on an uncertain basis. Firms may also need fallback processes or retained

human capability where an AI or cloud service becomes unavailable. And trust extends beyond the technology itself, with firms often reporting difficulty in **identifying credible suppliers** who can provide impartial advice.

Again, the implications differ by sector. Pharmaceuticals and medical devices face the strongest requirements around validation, traceability, change control and monitoring for changes in model performance. Construction needs clarity around professional responsibility, liability and insurance when AI contributes to design, safety or site decisions. Tourism has an additional issue of authenticity: AI can reduce administrative work, but overuse of AI to generate content can weaken consumer access to the local knowledge, and personal, distinctive interactions that form part of the visitor experience.

Firm size changes the significance of the barriers

Firm size changes the nature of the barriers (Figure 3), but not in a simple progression from small and unready to large and advanced. Smaller firms often have fewer systems and approval layers, but much less management capacity and specialist expertise. Medium-sized firms can face much of the complexity of large organisations without equivalent resources. Large firms have greater capability but also more legacy technology, governance and organisational complexity. In multinational operations, local teams may additionally lack authority over key technology and investment decisions.

Figure 3. How firm size shapes the barriers to adoption

Firm type	Typical strengths	Barriers	Implication for support
Micro and small	Fewer systems and approval layers; focused commercial software can deliver value quickly.	Owner-manager time is often a constraint. Firms may lack basic digital foundations, specialist expertise and purchasing power, making it difficult to identify the right use case, assess suppliers, prepare data or put proportionate controls in place. A poor technology choice can be relatively costly.	A simple entry point, one practical use case, trusted advice and demonstrators, AI built into familiar software, and low-burden implementation support.
Medium	Enough scale for AI to create material value; some functional and technical capability.	The “squeezed middle”: systems integration, governance, process redesign and specialist skills become substantial requirements, but firms often lack dedicated transformation teams or the financial capacity of large enterprises. An affordable pilot can reveal a much larger cost of operational deployment.	Continuity of advice, a practical roadmap, cross-functional implementation support, deeper integration and governance assistance, and finance that bridges pilot to scale.
Large	More data, capital and specialist capability; greater ability to test multiple applications.	Legacy systems, multiple sites and functions, procurement, cybersecurity, legal, quality and regulatory requirements make scaling complex. The challenge is often coordinating the organisation and moving successful pilots into routine use rather than accessing the technology itself.	Support focused on complex integration, common architectures and assurance, organisation-wide change and collaborative demonstrators rather than basic adoption.
Large multinational operations	Access to global platforms, expertise and investment.	Irish operations may have a strong use case and technical capability but lack decision rights over architecture, vendors, data or investment. They may also need to satisfy global quality, procurement and governance requirements before scaling locally.	Evidence and assurance that strengthen the Irish site’s case for group investment, alongside support for strategically important implementation and integration where appropriate.

Moving from pilot to scale raises new demands

The four barrier groups are closely connected and become more demanding as firms move from experimentation into operational use. A pilot can rely on a limited dataset, a small team and manual workarounds. Putting the same application into day-to-day use can require live-system integration, redesigned workflows, clear ownership, training, security and assurance, and a sustained investment case.

The priorities therefore change along the adoption journey. Early on, firms need to identify a valuable problem and establish

whether they are ready. During testing, they need to prove value and validate performance. Implementation requires live data, integration, process change and user adoption. At scale, firms need continuing ownership, monitoring and the ability to extend the application across sites, functions or partners.

This helps explain why a successful pilot does not automatically lead to business value. Firms need support to experiment with AI and to meet the organisational, technical, financial and assurance requirements of embedding it in normal operations.

Potential interventions

One theme runs through the evidence: firms are adopting AI faster than they are embedding it in their operations. General-purpose AI assistants are becoming more common, but most firms have yet to integrate AI with the data, systems, workflows and decisions that drive performance. Ireland's challenge is therefore not simply increasing AI adoption, but also enabling firms to translate AI into productivity, competitiveness and value creation. Firms of different sizes face different barriers along this journey, from taking a credible first step, to embedding AI in operational workflows, to scaling successful applications across enterprises, supply chains and wider ecosystems.

Ireland already has many of the instruments, research centres, networks and sources of expertise that are needed to support AI adoption. Workshop participants generally favoured making better use of them: improving visibility where support already exists, connecting complementary offers more effectively and extending provision where gaps remain. The research identifies nine potential interventions: six that address common barriers across manufacturing, tourism and construction, and three tailored to the needs of individual sectors.

These are potential areas for coordinated action by government, enterprise agencies, sector bodies and other relevant delivery organisations. The appropriate lead would vary according to existing mandates and the nature of the intervention. In many cases, the most practical route would be to connect or extend existing provision, subject to agency mandates, eligibility requirements and State Aid rules.

The six cross-sectoral interventions are intended principally to address three recurring gaps in the current support system: visibility, where firms struggle to understand how they might use AI, where to start and what support is available; depth, where support becomes less consistent as firms move from awareness and experimentation into implementation and scale; and foundations, where progress depends on stronger data, systems, assurance or coordination across firms (Figure 4). Visibility and depth are mainly about helping individual firms act; foundations is different in kind. The first two interventions address visibility and navigation; the third and fourth address depth by strengthening implementation capability; and the final two address the shared data, technical and assurance foundations that firms cannot build effectively on their own. The three sector-specific interventions are also largely collective in nature: test and validation pathways in manufacturing; procurement, contract and liability arrangements in construction; and AI-mediated discovery in tourism all concern conditions that individual firms cannot set alone. Figure 2 indicates which barriers sit primarily within a firm's control and which depend on a wider, system-level response.

Awareness, trusted advice and practical demonstrations are particularly important for smaller firms; implementation funding, integration and organisational change become more important as firms move beyond pilots; and data, assurance and governance requirements become more demanding as applications become more integrated or consequential.

Figure 4. Potential interventions

Significance **C** Critical **H** High **M** Moderate **L** LowBarrier cluster **S** Strategy and financial **O** Organisational **T** Technology and ecosystem **Sa** Safety, security and trust

	Sector			Firm size					
	Mfg	Tourism	Constr.	Large	Medium	Small			
Intervention								Barrier addressed	How it is addressed
Gap 1 - Visibility									
1. Launch a national AI awareness & engagement campaign A clear national message through trusted sector and local channels.	H	C	M	L	M	C	■	Understanding: Firms may struggle to see which AI applications are relevant to their business.	Uses practical sector examples and peer evidence to make potential applications and starting points concrete.
							■	Leadership, strategy and ownership: Leaders may lack confidence to decide where to start.	Gives leaders practical evidence on what adoption involves, including costs and realised value.
							■	Navigating and accessing support: Firms may not know where to turn once they want to take the next step.	Connects awareness activity to routes into diagnosis, advice, training or funding.
							■	Principled or values-based resistance: Concerns about AI may rest on misconceptions about what the technology does.	Sets out realistic capabilities and limits, and addresses concerns about work and quality.
2. Create a managed pathway from diagnosis to scale A common diagnostic and adviser-supported route into the right support.	M	H	H	L	C	C	■	Understanding: General interest in AI may not translate into a defined business problem or use case.	Uses a structured diagnostic to identify the problem, desired outcome and viable use case.
							■	Leadership, strategy and ownership: Projects may lack a clear business case, owner or decision on who leads delivery.	Establishes expected outcomes, ownership and the case for proceeding before implementation begins.
							■	Navigating and accessing support: Firms may face multiple programmes without a clear sequence between them.	Provides continuity of advice and directs firms to the appropriate next stage of support.
							■	Leadership and change management: Firms may underestimate the workforce changes adoption requires.	Builds workforce and change requirements into the roadmap from the outset.
							■	Organisational redesign: Existing roles, processes and decision rights may not fit the new way of working.	Identifies the organisational changes needed before the use case is scaled.
							■	Identifying credible suppliers: Firms may struggle to find impartial advice or judge which suppliers are credible.	Advisers give independent guidance and help firms specify requirements and assess suppliers.

Significance C Critical H High M Moderate L Low

Barrier cluster ■ Strategy and financial ■ Organisational ■ Technology and ecosystem ■ Safety, security and trust

	Sector						Firm size			
	Mfg	Tourism	Constr.	Large	Medium	Small			Barrier addressed	How it is addressed
Gap 2 – Depth										
3. Fund the full work of implementation and scale Stage-gated support that closes the gap between a successful pilot and day-to-day use.	C	H	M	M	C	H	■		Cost, funding and uncertain returns: The cost of operational deployment can rise sharply after a successful pilot.	Releases support in stages as evidence of value and readiness increases.
								■	Time and management bandwidth: Implementation competes with day-to-day work for scarce staff time.	Allows implementation effort, staff time and backfill to form part of the supported project.
								■	Data and digital foundations: Pilots may succeed without the data and integration work live operation requires.	Extends eligible work to migration, interfaces and integration.
								■	Trust, reliability and governance: Assurance requirements can add substantial cost before an application can go live.	Treats testing, cybersecurity and independent assurance as part of implementation.
4. Build training around real work Role-specific capability built around live use cases, with time and backfill where needed.	H	C	H	M	H	H	■		Leadership, strategy and ownership: Leaders may lack capability to make informed choices on AI priorities and investment.	Builds leadership capability through live use cases rather than generic training.
								■	Skills and capability: Firms may lack people who combine AI knowledge with operational and sector expertise.	Develops role-specific capability around the processes where AI will be used.
								■	Leadership and change management: People affected by adoption may be involved too late or lack time to participate.	Brings affected teams into live implementation with capacity to participate.
								■	Organisational redesign: Introducing AI can change roles, hand-offs and human oversight of decisions.	Uses live workflows to redesign these arrangements as part of implementation.
Gap 2 - Foundations										
5. Treat data and shared foundations as part of adoption Firm-level data and integration work, plus shared standards where problems cross organisational boundaries.	C	M	C	H	H	L	■		Data and digital foundations: Data may be fragmented, inconsistent or inaccessible across the systems where it is needed.	Provides practical data engineering and integration to make information usable in operational workflows.
							■		Platform and supply-chain dynamics: Incompatible systems, formats and standards can prevent information moving across organisations.	Develops shared definitions, interfaces and standards where interoperability depends on collective action.
							■		Provider and compute dependency: Firms may become locked into a small number of model, platform or compute providers.	Portability, common standards and access to alternative compute reduce reliance on any one provider.
6. Make governance & assurance usable and proportionate Practical templates and shared assurance matched to the consequence of the use case.	H	M	C	C	H	M	■		Trust, reliability and governance: Firms may be unsure what level of testing, oversight and monitoring a use case requires.	Provides proportionate templates and methods matched to the consequences of the application.
							■		Regulation and compliance: Legal and sector requirements can be difficult to translate into day-to-day controls.	Turns those requirements into practical controls and routes to specialist or independent assurance.

Significance C Critical H High M Moderate L Low

Barrier cluster ■ Strategy and financial ■ Organisational ■ Technology and ecosystem ■ Safety, security and trust

Intervention	Barrier addressed	How it is addressed
Sector-specific – Structural Challenges		
7. Manufacturing Develop test, validation and acceptance pathways Representative test environments and common validation methods, with a formal route where required.	■ Data and digital foundations: Testing against realistic production data and conditions can be difficult without disrupting operations.	Provides shared environments in which applications can be tested against representative conditions before deployment.
	■ Trust, reliability and governance: Technical performance in a pilot may not demonstrate reliability under operational conditions.	Applies common evaluation and validation methods before an application is accepted for use.
	■ Regulation and compliance: Regulated and safety-critical uses may require formal evidence before operational acceptance.	Creates a recognised route for firms and relevant assurance or regulatory bodies to review that evidence.
8. Construction Adapt procurement, contracts and liability arrangements for AI-enabled delivery Standard contractual arrangements, clearer accountability and common information requirements.	■ Cost, funding and uncertain returns: The party funding adoption may not capture all of the resulting productivity gains.	Uses contracting and procurement arrangements to clarify how costs and benefits are shared.
	■ Platform and supply-chain dynamics: Project participants often use different systems and information formats.	Sets common information requirements and encourages interoperability across the project lifecycle.
	■ Trust, reliability and governance: Accountability may be unclear when AI informs technical or safety-related decisions.	Clarifies responsibility, audit rights and insurance through standard clauses and guidance.
	■ Regulation and compliance: Existing professional and legal duties may not be reflected clearly in AI-enabled delivery.	Embeds those duties in procurement requirements, contract terms and acceptance criteria.
9. Tourism Strengthen Ireland's position in AI-mediated discovery and distribution Improve shared tourism information and engage the platforms increasingly shaping discovery and booking.	■ Data and digital foundations: Tourism information may be incomplete, inconsistent or poorly structured for AI-mediated discovery.	Improves the availability of accurate, machine-readable destination and product information.
	■ Platform and supply-chain dynamics: Individual firms have little influence over how the platforms that shape discovery and booking present them.	Enables tourism bodies to engage those platforms collectively on how Irish businesses are represented.
	■ Provider and compute dependency: The sector depends on a few global providers, so a change in terms or ranking affects many firms at once.	Monitors provider terms and market concentration so the sector can anticipate change and respond collectively.

Cross-sectoral interventions

1. Launch a national AI awareness and engagement campaign

Rationale and barriers addressed. Many firms still do not know where AI could create value for them, what a sensible first step looks like or where to obtain trusted help. For small and medium-sized firms in particular, the first hurdle may be uncertainty rather than finance. An owner-manager may reasonably ask: Who like me has done this successfully, can I see it working, what did it cost, what resources were required and what value did it produce?

What it could involve. A national campaign could show where AI creates business value, what responsible adoption involves and how a firm can move into practical support. Content should focus on familiar problems—for example scheduling, quality, tendering, pricing or administration—rather than explain AI in the abstract.

The campaign should be supported by Irish SME demonstrator or reference firms across the sectors examined. These firms could provide practical case studies and, where appropriate, allow other businesses to visit implementations, attend demonstration days or see them through virtual walkthroughs. Firms should be able to understand what changed, what implementation required, what it cost, what difficulties arose and what value was achieved. Direct engagement with peers can reduce perceived risk in a way that generic promotional material cannot.

Build on existing provision. The campaign could build on existing national and agency resources rather than create a separate information layer. Enterprise Ireland's new Make AI Work pathway provides its clients with an AI opportunity check, Irish business case studies and webinars that a campaign could draw on directly. AIReady.ie and the National Enterprise Hub provide further national entry points, alongside the reach of Local Enterprise Offices, IDA Ireland, Fáilte Ireland, Skillnet, sector and professional bodies and other established intermediaries. Minister-led AI "roadshows" provide a platform for direct engagement with firms.

Tailoring and success. Enterprise agencies, Local Enterprise Offices, sector bodies and other delivery partners should reach micro and small firms through channels embedded in their day-to-day working lives, using short, practical and mobile-friendly material and providing a clear route to peer examples and the next source of support. Medium-sized firms are likely to need more detailed reference cases showing integration, internal resource requirements, governance, costs and realised returns, alongside opportunities to speak directly to firms that have moved beyond pilots. Large firms require less mass communication and more direct engagement with senior decision-makers and peer networks.

The key measure should be whether firms progress into peer engagement, diagnosis, training, testing or implementation, rather than campaign impressions alone.

2. Create a managed pathway from diagnosis to scale

Rationale and barriers addressed. Firms can encounter multiple agencies, programmes and technical organisations without a clear sequence between them. A diagnostic may produce a roadmap but no implementation; a course may not lead to a project; a successful pilot may have no obvious route into scale.

What it could involve. Enterprise agencies, sector bodies and other organisations involved in delivering AI and digital supports could align existing diagnostics and pathways around a common set of questions covering the business problem, expected outcome, digital and data starting point, capability, likely cost and risk, and the ownership and organisational changes required to implement and scale. Advisers working through these pathways could then direct firms to the appropriate next step: digital foundations, skills, independent advice, a test facility, finance, assurance or a defined implementation project.

When several organisations support a firm at different stages, they should share relevant information, so the firm does not have to repeat the assessment. Firms also need evidence from comparable businesses and clear disclosure of any commercial relationships with technology providers.

Build on existing provision. Enterprise Ireland's new Make AI Work pathway now provides its clients with a structured route from exploring AI and testing an idea to implementation and scale. It connects firms to diagnostics, advice, funding, skills, EDIHs, Technology Centres and Technology Gateways according to their stage of adoption.

Other agency and sector routes—including Local Enterprise Office (LEO) Digital for Business, IDA diagnostics, Fáilte Ireland supports and the EDIHs—provide further foundations. The opportunity is therefore to build on these routes rather than create a parallel pathway: make progression between complementary supports clearer, reduce repetition where firms move between organisations and apply a stronger sector lens so that diagnostics, examples and onward support reflect the different requirements of manufacturing, tourism and construction.

Tailoring and success. A micro or small firm may need one defined use case, a simple readiness and risk assessment, a clear owner and one practical next step, preferably using systems it already has. Where adoption begins to broaden, the firm may also need a simple roadmap covering priorities, responsibilities and basic governance.

A medium-sized firm needs a deeper assessment of the integration, capability, governance and investment required to move beyond a pilot, together with a practical roadmap covering priorities, ownership and the organisational changes needed to scale. Continuity of advice is particularly valuable where the firm lacks specialist teams to coordinate these elements internally.

A large or regulated firm may require architecture, assurance and organisation-wide change to be considered from the start. Multinational operations may also need help navigating group-level technology, procurement, quality and investment requirements.

Success is progression through the journey, not completion of a diagnostic.

3. Fund the full work of implementation and scale

Rationale and barriers addressed. Funding a licence or proof of concept does not necessarily fund adoption. The difficult and expensive work often begins after a pilot succeeds.

What it could involve. Relevant enterprise agencies could adapt or combine existing funding instruments, within their mandates and State Aid rules, so that eligible support recognises the full cost of implementation rather than only software or a proof of concept.

Support could be stage-gated. A firm with a credible business case would first receive support for a bounded proof of concept with agreed outcomes. A larger implementation stage would follow only when the first stage demonstrates value and the firm has a viable plan to embed the application in its operations.

Funding could cover four components:

- data and integration, including preparation, cleaning, migration, interfaces and connectivity;
- technical infrastructure and assurance, including cybersecurity, testing and independent validation;
- organisational implementation, including staff time, backfill, training and workflow redesign; and
- deployment and early operation, including relevant software, equipment, services, subscriptions and initial recurring costs.

Build on existing provision. LEO, Enterprise Ireland and IDA instruments already fund parts of this journey, and innovation, capital, digitalisation and RD&I programmes can support eligible work. The gap is not that no funding exists, but that established software integration and organisational deployment can fall between a small voucher and R&D funding designed for technical uncertainty.

Tailoring and success. Micro firms need low-burden, proportionate support. Medium firms are likely to face the largest jump from affordable experimentation to full deployment. Large firms generally have more capacity to buy routine technology, so public support is more likely to add value around difficult integration, assurance or collaborative demonstrators. For multinational sites, a strong pilot can also provide the evidence needed to win internal investment.

4. Build training around real work

Rationale and barriers addressed. Ireland already has substantial publicly supported, sector-led and education-based AI and digital training provision. The recurring gap is between learning about AI and being able to change a live business process.

What it could involve. Training could be organised around real use cases and roles. Within participating firms, senior leaders would define priorities and ownership; operational users would learn to apply and challenge AI; technical employees would integrate and monitor it; and legal, quality, cybersecurity and governance teams would address the relevant controls. Ideally, the firm would finish with a redesigned workflow and implementation plan, not simply a set of course certificates.

Training should continue into implementation where possible. The first encounter with a real system often reveals the most important data, process and governance questions.

Build on existing provision. Skillnet already provides general and sector-specific learning. SOLAS and Education and Training Boards provide accredited AI micro-qualifications through Skills to Advance. Enterprise Ireland, IDA and Fáilte Ireland provide training and capability supports, while LEOs and further- and higher-education providers provide additional routes.

Tailoring and success. Short practical formats are important for owner-managers and seasonal tourism businesses. Manufacturing programmes need to combine AI with process, engineering, quality and regulatory knowledge. Construction should integrate AI into design, estimating, planning, site management, apprenticeships and further education while retaining professional judgement. Wage, backfill or project-capacity support, mentors, graduate placements and shared specialists could help firms release the people who need to participate.

5. Treat data and shared foundations as part of adoption

Rationale and barriers addressed. Firms are often told they need better data before adopting AI without being given a route to improve it. Some data and interoperability problems also span entire value chains and cannot be resolved by individual firms acting alone.

What it could involve. A diagnostic should be able to lead directly into data audits, cleaning, classification, migration, access controls and integration. Technical support could help firms connect existing systems and equipment rather than assume wholesale replacement.

At sector level, public bodies, industry organisations, large customers and technical organisations could help develop shared foundations where several firms face the same constraint. Common definitions, interoperable information structures, reference architectures and joint projects could reduce the cost of solving the same technical problem repeatedly. Large customers and public procurement can encourage common standards, provided smaller suppliers receive practical help to comply.

Build on existing provision. The European Digital Innovation Hubs (CeADAR, Data2Sustain, ENTIRE and FactoryxChange), together with Technology Centres, Technology Gateways, Digital Manufacturing Ireland and other research infrastructure, provide expertise and test environments that firms could be routed into more systematically. These organisations could also support shared technical challenges that require compatible approaches across several firms or organisations.

Tailoring and success. Manufacturing requires practical integration across enterprise IT, production equipment, sensors, laboratories and quality systems. Where data need to move between different equipment, suppliers or systems, common interfaces and interoperable standards can also reduce integration costs. Construction faces a more significant cross-company challenge: clients, designers, contractors and trades often use different systems and formats, so shared information

structures and interoperable systems are needed for data to move reliably across a project. Tourism needs accurate, consistent, machine-readable information that can be used across national and local tourism bodies, destination management organisations and businesses, covering destinations, products, accessibility, availability and booking, alongside shared digital infrastructure such as wayfinding and visitor-flow systems.

Success should be judged by whether firms can access and use reliable data in the systems and workflows where decisions are made. In sectors where value depends on several organisations working together, this also means being able to exchange information consistently across customers, suppliers and other partners.

6. Make governance and assurance usable and proportionate

Rationale and barriers addressed. Generic responsible-AI principles do not tell a business what evidence it needs for a specific application. Requiring the same process for every application would also make low-risk adoption unnecessarily burdensome.

What it could involve. A common service could help firms classify applications according to consequence and apply proportionate controls. Practical templates could cover:

- approved tools and treatment of personal, commercial and intellectual-property data;
- vendor assessment, human oversight, testing, validation, documentation and traceability; and

- continuing monitoring of performance and value, incident response and relevant AI, data-protection and cybersecurity obligations.

Higher-consequence applications could have access to independent technical assurance and relevant regulatory, standards or professional expertise.

Proportionality should also inform solution design. Firms should assess whether the application's complexity, infrastructure requirements, ongoing cost and dependence on technology providers are justified by the expected business value. Where material, they should also consider the energy and wider sustainability implications of different deployment options.

Build on existing provision. The approach should use existing regulatory, quality, standards, cybersecurity and advisory structures rather than create a parallel regime. It should align with the AI Office of Ireland and relevant sector regulators.

Tailoring and success. Small firms need simple packs answering basic questions. Medium firms need reusable vendor, testing and incident processes without building a large assurance function from scratch. Large firms benefit from common methods and sector-specific acceptance criteria that can be deployed consistently across business units and sites.

Success is safer, maintainable operational deployment, not more paperwork.

Sector-specific interventions

The interventions above address needs that recur across manufacturing, tourism and construction. The sector analysis also identified constraints arising from the structure of particular industries that require a more tailored response. These do not replace the cross-sectoral interventions; they complement them where shared supports alone are unlikely to resolve the underlying issue.

In manufacturing, the additional challenge is moving AI safely from technical testing into operational environments where errors can affect production, quality, safety or regulatory compliance. In construction, adoption takes place across temporary networks of clients, designers, contractors and specialist trades, creating distinct issues around contracts, liability and incentives. In tourism, individual firms have limited influence over the global platforms increasingly shaping how visitors discover and book destinations.

7. Manufacturing: develop test, validation and acceptance pathways

Rationale and barriers addressed.

Manufacturing firms need a recognised route for AI applications in which errors can affect production, quality, safety or regulatory compliance. A technically successful pilot does not establish that the application is fit for operational use.

What it could involve. Shared test environments could provide common evaluation and validation methods, representative data and operating conditions, reference technical architectures and independent assurance.

Firms would have clearer expectations for evidence, monitoring and the circumstances in which changes to a model, data or operating conditions require further validation.

Build on existing provision. The route could draw on EDIHs, Technology Centres, Digital Manufacturing Ireland and other existing research infrastructure, and the test and pilot-line capability being developed by Irish Manufacturing Research.

Tailoring and success. Pharmaceuticals and medical devices require the most formal route. Regulators, standards bodies, industry and technical experts could develop controlled test environments, described by participants as regulatory “sandboxes” or an “AI Airlock”, where firms and relevant assurance or regulatory bodies can examine the evidence before approving full operational use. Pharmaceutical applications would need to fit established Good Manufacturing Practice and change-control processes. Medical devices require a clear distinction between AI used within manufacturing and quality operations and AI that forms part of the device. Food and beverage firms need proportionate assurance for applications affecting food safety, quality and release. Engineering and electronics firms need it for machinery, inspection, maintenance and process control.

The common goal is a credible route from technical demonstration to assured operational use.

8. Construction: adapt procurement, contracts and liability arrangements for AI-enabled delivery

Rationale and barriers addressed. Construction AI is deployed within projects involving multiple independent firms. Data rights, professional responsibility, liability and the allocation of benefits can therefore block adoption even when the technology works.

What it could involve. Public clients, industry and professional bodies, insurers and legal specialists could develop practical arrangements including standard clauses for data and intellectual property, supplier obligations, audit rights and liability; guidance on professional accountability and insurance; and standard questions for procuring AI providers.

Procurement can also improve the underlying digital environment by setting more consistent, machine-readable information requirements and encouraging interoperability across the asset lifecycle. Demonstrators could show how information and responsibility move from design through construction into operation and how AI-supported decisions are governed.

Build on existing provision. Construct Innovate, Built to Innovate, Build Digital, existing public and private procurement structures, industry bodies and professional institutions provide starting points alongside the wider enterprise and EDIH support system.

Tailoring and success. Requirements should be introduced with support for SMEs and specialist trades rather than becoming another compliance burden. Contracting models could also examine whether the party investing in productivity is able to retain a fair share of the resulting benefit.

Success would be more repeatable, interoperable AI-enabled projects with clearer accountability and incentives.

9. Tourism: strengthen Ireland's position in AI-mediated discovery and distribution

Rationale and barriers addressed. AI is becoming another intermediary between visitors and businesses. Individual firms have limited power over how global search providers, online travel agents, model providers and emerging AI agents rank, describe or transact with them.

What it could involve. Relevant national tourism bodies, destination management organisations and local authorities could monitor how Ireland, its regions and individual products appear through AI-enabled travel discovery. This could identify gaps in whether regional and off-peak experiences are surfaced and establish what information businesses need to remain discoverable and bookable. Tourism bodies could engage major search, distribution and AI providers directly to determine these requirements.

Build on existing provision. The intervention should build on the shared tourism information described under Intervention 5 and on national owned channels such as discoverireland.ie and visitdublin.com. Fáilte Ireland, DMOs and local authorities already hold or commission much of the information required.

Tailoring and success. Pilots could test whether making accurate, structured destination and product information more accessible leads to better visibility, itinerary inclusion and routes to booking through AI-enabled services. This is particularly important for small firms, which cannot individually influence global platform rules. The objective is not to guarantee rankings, but to improve the conditions under which Irish tourism products can be found and transacted with as discovery changes.

Part 2

AI is changing the ICT market itself

For SaaS and ICT-enabled services, internal AI adoption is only part of the story. A SaaS company or ICT services provider could become very effective at using AI internally and still lose ground if its product becomes less relevant, its pricing model is undermined, or another provider takes control of the customer relationship.

ICT-enabled services: from selling effort to selling capability

Trends impacting the sector

The ICT-enabled services segment includes technology consultancies, systems integrators, cloud and data implementation firms, managed-service providers, cybersecurity providers and application-support businesses.

Historically, much of the commercial model has been tied to people, project effort or managed capacity. AI puts pressure on that model by reducing the human effort required for coding, testing, support, analysis and other routine activities. Clients may also choose to bring some of these tasks in-house.

External services are therefore likely to focus more on work that clients find difficult to perform alone. This includes integrating AI with existing systems, redesigning processes, managing cybersecurity and governance, and leading more complex transformation. ICT-enabled services firms can also turn expertise developed through client projects into reusable

assets, such as proprietary tools, agents and standardised delivery components that can be used across multiple clients.

This changes the economics of the ICT-enabled services firm. Instead of selling the same expertise repeatedly through bespoke projects, a firm can invest once in an asset and use it across multiple engagements. That can support more scalable and recurring revenue, but it requires upfront investment before a specific customer contract exists and raises questions about ownership of the resulting intellectual property (IP).

Time-and-materials and fixed-fee contracts will remain relevant, but AI weakens the link between hours worked and value delivered. Recurring fees may suit managed AI and governance services, while usage or transaction models may work where consumption is measurable. Outcome-based approaches may be appropriate where the provider can establish a credible baseline, clear requirements, and has enough control over the delivery and results.

Providers must also account for variable model and computing costs. The cost each time an AI model processes information—often described as inference cost—can vary with usage and technical design. Pricing an outcome without understanding those costs can put margins at risk.

Growth opportunities

The report identifies four areas in which ICT-enabled services firms in Ireland could compete as AI adoption expands:

- **Trusted and governed AI services.** Providers can help regulated and data-sensitive clients deploy AI with appropriate data controls, security, monitoring, human oversight and continuity.
- **Reusable sector-specific tools and services.** Firms with expertise in financial services, life sciences, pharmaceuticals,

medical devices and other complex sectors can codify that knowledge into agents, assurance frameworks and managed services that can be used across multiple customers.

- **International AI deployment from Ireland.** Ireland can provide a base for adapting global technology to European regulatory, data and operating requirements.
- **Managed AI and agent operations.** As firms deploy larger numbers of models and agents, there is an ongoing need for ongoing services to keep them secure, reliable, well-governed and cost-effective.

Capturing these opportunities will require providers to rethink how they create and capture value, build the capabilities to deliver it and adapt their operating models. The five potential interventions below address the common conditions needed to pursue the four growth positions.

Potential interventions for ICT-enabled services

1. Help firms redesign the service model, pricing and value capture

The central commercial challenge is converting AI productivity into sustainable revenue rather than simply reducing billable hours.

Enterprise Ireland's Digital Discovery Voucher, EDIH, IDA digitalisation, LEO and innovation supports, including Technology Centres and other RD&I infrastructure can help firms assess

technology and experiment. The remaining gap is a transition programme tailored to ICT-enabled services firms, combining commercial-model redesign, reusable IP, workforce change, governed delivery and evidence from customers.

Consultees proposed that enterprise support agencies, working with relevant industry bodies, technical organisations and specialist advisers, could provide a more coordinated pathway.

Specialist advisers could support diagnostics and pricing; enterprise agencies could provide financial support for time-limited projects with clients, first paid deployments (i.e. where a firm deploys an AI-enabled service with a paying customer for the first time) and the development of reusable tools and service components; and EDIHs, technology centres or industry bodies could support the development of shared demonstrators, benchmarks and technical expertise. ICT-enabled services firms would use this support to redesign their services, test them with customers and build offerings that can be used across multiple clients.

A first paid deployment is particularly important for smaller ICT-enabled services firms because enterprise buyers often need evidence from a real customer before adopting a new service, while the ICT-enabled services firm may need to fund integration, security and assurance before meaningful revenue arrives.

2. Build hybrid technical, domain and commercial capability

The skills constraint is not principally basic AI literacy.

ICT providers need enterprise architecture, cloud, data engineering, cybersecurity and governance capability combined with knowledge of the client's industry and business process. Commercial teams also need to understand what can be delivered safely and profitably.

Ireland already has broad training and talent supports through Skillnet, Enterprise Ireland, IDA, CeADAR, EDIHs and the education system. The gap is depth, domain fit and application in the workplace.

Potential responses include advanced short-form micro-credentials, structured workplace learning, stronger university-industry alignment, co-funded specialist hires and talent-attraction and retention measures.

3. Support providers to redesign their own leadership and operating models

AI changes ICT-enabled services firms' own delivery teams, roles, career paths and decision rights, as well as the services they provide to clients.

Senior leaders need enough understanding of architecture, infrastructure and governance to make informed investment decisions. Delivery organisations need to redesign roles and career pathways as routine execution requires fewer people and higher-value work.

Existing leadership programmes – such as Key Manager and Spotlight on Skills from Enterprise Ireland, Skillnet's AI Capability Accelerator, or IDA's Lean/Digitalisation programmes and Training Grant – provide a foundation. The remaining gap is not leadership development in general, but support that helps management teams translate AI into concrete operating-model decisions: who owns the transformation, how leaders prioritise investment and maintain accountability, and how delivery teams and roles change as AI becomes embedded across the business.

Participants proposed whole-leadership programmes focused on real decisions, organisational diagnostics clarifying roles and accountability and peer examples showing how providers have changed their operating model.

4. Create repeatable data, trust and operational-governance approaches

An ICT-enabled services firm's AI deployment can fail because of conditions inside the customer organisation: poor data, legacy systems, weak access controls or uncertainty about accountability.

Existing data, digitalisation, cybersecurity, EDIH and R&D supports each address parts of the problem – covering foundations, cybersecurity architectures, technical experimentation, or skills. The gap is a consistent, repeatable approach to ongoing AI assurance, covering data quality and access rights, controls, and monitoring, that providers can apply across different customer environments rather than developing bespoke arrangements for each one.

Consultee suggestions include firm-customer pilots supported by shared tools and frameworks; templates for data access, assurance and regulation; secure test environments; and common guidance for accuracy, human oversight, monitoring and changing model performance.

This is also an area in which Ireland can turn governance from a compliance burden into an exportable service capability.

5. Manage technology provider dependency and regulatory coordination

ICT-enabled services firms rely on global cloud providers, enterprise software vendors, AI platforms and foundation model providers. These dependencies create risks around pricing, continuity, control and ownership.

The role of policy is not to prevent that dependence, but to help firms and their customers manage its consequences.

Potential responses include access to EU-resident or sovereign (i.e. onshore) deployment options, where that requirement is justified by regulation or contractual obligation; secure shared testing and compute (partially addressed through Ireland's AI Factory Antenna, led by ICHEC with CeADAR, which provides access to European AI-optimised computing and secure testing environments); support for the development of private or smaller domain models; practical requirements around portability (i.e. the ability to move between providers) and service continuity (i.e. to ensure firms and customers are not stranded if a platform withdraws); and clearer coordination where several regulatory regimes (with potentially different obligations and compliance demands) apply.

For smaller ICT-enabled services firms, affordable access to infrastructure and practical guidance on managing provider dependency are particularly important because they have less negotiating power with major platforms. Medium-sized providers may benefit from support to work across more than one provider, while larger firms are more likely to benefit from standards and regulatory coordination across markets.

The desired position is a market in which providers can use the best global technology while retaining credible control over sensitive data, critical services and their own differentiated IP.

SaaS: redefine what remains valuable when software can do more of the work

Trends impacting the sector

SaaS companies face a related but distinct transition.

Traditional SaaS products provide applications through which human users perform tasks. AI agents can increasingly complete parts of those tasks themselves and across multiple applications. The interface may therefore become less important as the customer pays more attention to the outcome.

AI-assisted software development also lowers the cost and time required to reproduce some functionality. Features that once created meaningful differentiation can become easier for competitors to build.

At the same time, adding AI changes the cost base. Traditional SaaS benefited from relatively predictable incremental delivery costs. AI products introduce variable model costs that rise with usage. Product architecture, model choice and controls over consumption therefore become commercial questions as well as technical ones.

As AI changes how customers use and value software, three conventions that underpin the SaaS model may weaken:

- Per-seat pricing may become less relevant. Fewer human users may be required as agents execute more of the workflow.

- Features alone may provide less durable differentiation. Advantage may increasingly come from domain expertise, proprietary or rights-cleared data, deep integration into customer workflows and systems and trusted operation.
- The SaaS interface may no longer control the customer relationship. An AI agent or assistant may become the customer's primary point of interaction while the SaaS application continues to operate in the background.

Growth opportunities

For SaaS firms in Ireland, the most credible opportunities are concentrated AI-enabled applications and services rather than in competing directly with global foundation-model or hyperscale infrastructure providers.

The report identifies four areas in which SaaS firms in Ireland could compete as AI adoption expands:

- **Specialised AI applications for sectors and workflows.** SaaS firms can build AI-enabled products around industries and business processes where they have strong customer knowledge, sector expertise, proprietary or rights-cleared data and deep integration into established workflows.

- **Trusted and governed AI products.** Firms serving enterprise and regulated customers can develop software that helps organisations monitor, govern and assure AI systems, including **tools for** security, compliance, evaluation and ongoing monitoring.
- **Specialised AI agents and workflow integration.** Firms can develop agents for particular sectors and workflows and connect them to the business systems, data and processes they already understand through their products and customer relationships, rather than competing directly with general-purpose AI platforms.
- **International scaling through Ireland's technology ecosystem.** Indigenous SaaS

firms can use Ireland's concentration of global technology and cloud companies to access expertise, infrastructure, partnerships and international distribution channels, while retaining control over strategically important customer relationships, data and intellectual property.

Capturing these opportunities will require SaaS firms to adapt their products and commercial models, build the skills and assurance capabilities needed to scale, and manage their dependence on external AI technology providers while retaining control of important assets. The interventions below address the main barriers firms may face in pursuing these growth opportunities.

Potential interventions for SaaS

1. Rethink what is sold, how it is priced and what it costs to deliver

Workshop participants identified business- and revenue-model disruption as the leading SaaS barrier.

Firms need to decide what they are selling as agents perform more work: access to software, usage, a completed task, an outcome, a managed service or a combination. They also need to understand what customers will pay, the variable cost of delivering it and which elements remain differentiated.

Existing Enterprise Ireland, LEO and IDA strategy, innovation, transformation, R&D and finance measures cover many individual components.

The gap is a continuous route that combines product design, commercial models, delivery economics and routes to market.

Participants proposed a structured transition pathway with specialist product and commercial advisers, peer learning, repeated business-model experiments, modelling of AI cost-to-serve and help securing a paid first deployment. Additional suggestions included clearer treatment of AI development within the R&D tax system and access to finance between first deployment and commercial scale.

The proposed success measures are significant: deployed products, retained intellectual property and export revenue rather than the number of pilots alone.

Firm size changes the challenge. Start-ups can pivot rapidly but have limited runway and credibility with enterprise buyers. Medium firms must change an established product and installed customer base while funding the transition. Large incumbents have more resources but may need to cannibalise established revenues and coordinate change across a portfolio.

2. Develop multidisciplinary transformation capacity

SaaS transformation requires AI engineers, but also product leadership, architecture, data, security, commercial expertise and domain knowledge.

Existing training programmes from agencies such as Enterprise Ireland, IDA, and Skillnet provide substantial building blocks.

The remaining challenge is assembling and applying these capabilities as one team. Participants proposed shorter technical deep-dives and micro-credentials, specialist hires, whole-leadership-team programmes, closer university-industry collaboration, vetted advisers and practical transition examples.

For medium firms in particular, the requirement is not a standalone AI team but enough cross-functional capacity to change product, engineering, commercial and governance models simultaneously.

3. Establish a repeatable product-assurance route

For enterprise SaaS, a working feature is not the same as a product a customer will trust in a real-world environment.

Customers may require evidence on data governance, security, model behaviour, reliability, human oversight and ongoing monitoring. These costs can be substantial before the vendor earns revenue.

CeADAR, Digital Discovery, Data2Sustain, DataSMART, ENTIRE, cybersecurity supports, Technology Gateways, Innovation Partnerships and relevant R&D routes address pieces of the problem. The remaining gap is a more coordinated and repeatable approach to product assurance.

Participants proposed secure environments for pre-production testing; independent testing for weaknesses, security risks and unintended behaviour; common methods for assessing performance and reliability; and practical templates for data rights, human oversight and continuing monitoring.

A reusable assurance approach is particularly valuable for smaller firms that otherwise need to recreate evidence for every prospective enterprise customer.

4. Translate requirements into approvals and paid adoption

SaaS firms need to navigate the EU AI Act, data protection, cybersecurity, intellectual property, liability and enterprise supplier requirements at the same time.

The problem is partly regulatory translation and partly commercial. An innovative product can satisfy its technical test and still fail to reach a paying customer because procurement and assurance requirements are unclear or disproportionate.

AIReady.ie, the AI and Digital Pathfinder, Digital Discovery, enterprise-agency advice, IP supports and CeADAR provide useful routes into parts of the issue. The AI Office of Ireland now partly addresses participants' call for a more coordinated regulatory interface by acting as the single point of contact and central coordinating authority for implementation of the EU AI Act.

Further potential measures include practical self-assessment tools, model contractual clauses covering data, IP, liability and audit, support to meet relevant standards and procurement approaches proportionate to the risk and maturity of the supplier.

A particularly important objective is to create a clearer progression from demonstration to paid deployment and reference customer. For an early-stage vendor, a credible first enterprise customer can be as important to commercialisation as technical development funding.

5. Retain control while relying on AI platforms, models and cloud infrastructure

SaaS firms benefit from global cloud, AI model and platform providers because they gain capabilities that would be impossible to build independently. That relationship varies: some firms rely on third-party AI platforms to access models, development tools and deployment infrastructure, while others build their own orchestration layers or agents to maintain tighter control. Either way, the relationship creates exposure to provider pricing, model availability, data location, continuity and lock-in.

The study does not support the conclusion that Ireland should attempt to compete directly in a hyperscale infrastructure or foundation

model race. The opportunity is in differentiated products and services, while maintaining sufficient control and resilience around the infrastructure (i.e. the cloud, model and AI platform providers) on which they rely.

The existing support landscape is stronger than a simple "compute gap" narrative suggests. Enterprise Ireland, LEO, IDA, EDIHs, Technology Centres and Technology Gateways support qualifying equipment, experimentation and R&D. Ireland's AI Factory Antenna, led by ICHEC with CeADAR as a core partner, gives firms access to AI-optimised computing, secure testing environments and technical expertise. The Irish Centre for High-End Computing (ICHEC), which serves as Ireland's national high-performance computing centre, also supports industry access to advanced computing.

The residual issue is therefore primarily access and strategic control, rather than a universal shortage of infrastructure. Participant proposals include better access to secure European test and deployment environments, open-source and smaller domain-specific models where appropriate, shared expertise and compute for smaller firms, and practical guidance on designing products that can use or move between more than one provider.

Portability, interoperability and provider continuity have a system dimension: one small vendor cannot create standards on its own. The aim is to avoid excessive dependence for SaaS firms on any one cloud, AI platform or foundation model provider by maintaining portability and interoperability, while continuing to benefit from the capabilities, scale and innovation offered by these technology providers.

Across the sectors examined, Ireland’s opportunity lies in turning AI capability into sustained enterprise value. That requires firms to focus on applications grounded in their own economics, build the organisational and technical capacity to embed them in operations and adapt as AI reshapes markets and sources of advantage. Policy can accelerate that transition by making the route from opportunity to implementation clearer, more practical and more proportionate to the needs of different firms and sectors.

Introduction

AI is not a single technology, and it does not pose the same challenge in every part of the economy. For many enterprises, the immediate question is practical: where can AI improve what they do, what is required to adopt it and what gets in the way? In other sectors, AI is also changing the economics of the market itself, reshaping products, services, pricing and competition.

This report provides an evidence base for Ireland's sector-focused AI strategy for enterprise. It examines where AI is creating value, which opportunities are most relevant to firms in Ireland, what prevents them from acting and where policy intervention could help. The focus throughout is on practical opportunities, the conditions needed to realise them and how those conditions differ across firms and sectors.

Sector scope

The study covers four broad sectors: manufacturing, construction, tourism and ICT services. The core scope of each is defined using NACE Rev. 2.0, the European Union's standard classification of economic activities.

Sector	Core NACE Rev. 2.0 scope
Manufacturing	Five subsectors: chemicals and pharmaceuticals (C20 and C21); medical devices (C32.5); computer and electronics (C26); food and beverages (C10 and C11); and engineering (C22, C24, C25, C27, C28 and C33).
Tourism	Accommodation (I55.1-I55.3); food and beverage services (I56.1 and I56.3); passenger transport and motor-vehicle rental (H49.1, H49.32, H49.39, H50.1, H50.3, H51.1 and N77.1); travel agencies and tour operators (N79); cultural activities (R90 and R91); and sports and recreation (R93 and N77.2). The tourism scope follows the tourism characteristic industries commonly used in international tourism statistics and Tourism Satellite Account methodologies. Organisation of conventions and trade shows (N82.30) is outside this core scope; this reflects the study's methodological boundary rather than the importance of business events to the wider tourism economy. Many of the AI opportunities identified are also likely to be relevant to event organisers.
Construction	Construction of buildings (F41); civil engineering (F42); and specialised construction activities (F43).
ICT services	Computer programming, consultancy and related activities under J62. The study distinguishes product-based Software-as-a-Service, or SaaS (J62.01), from ICT-enabled and managed digital services (J62.02, J62.03 and J62.09).

For manufacturing, tourism and construction, the analysis follows the value chain: upstream research, development and design; suppliers and other inputs; operations, production and service delivery; downstream distribution, customer experience and aftercare; and enabling functions such as finance, workforce management, data and technology. It also considers clients, suppliers, platforms, research organisations and public bodies where

they affect AI adoption or value creation. Opportunities, barriers and policy needs are also assessed by firm size:

- Micro enterprises: fewer than 10 persons employed or engaged.
- Small enterprises: 10–49.
- Medium-sized enterprises: 50–249.
- Large enterprises: 250 or more.

Questions addressed

Part 1 examines AI adoption in manufacturing, tourism and construction. It asks how firms can use AI to improve what they do, what prevents them from adopting it and what policy interventions could help. The analysis examines how AI is being used globally, identifies the opportunities most relevant to enterprises in Ireland and assesses the barriers to adoption. It then reviews current policy provision and develops options to support adoption, diffusion and scaling across firms of different sizes.

Part 2 examines AI-driven structural change in ICT services. Here, AI is not only a technology firms can adopt; it is also changing the market in which they compete. The study considers

SaaS and ICT-enabled services separately, examining how AI is reshaping business models, sources of differentiation, pricing, service delivery and firms' positions within global technology ecosystems. It asks how firms in Ireland can adapt and capture value as these changes unfold.

Both parts consider workforce issues where they affect enterprise adoption, including skills, leadership, organisational redesign, employee acceptance and change management. The broader question of how AI may affect jobs, occupations and employment across the economy sits outside the scope of this report and is addressed through separate work.

Timeframe

The study focuses on AI capabilities and use cases that can be evidenced today. It covers predictive and analytical AI, assistive systems, generative and multimodal AI, and agentic and physical applications where there is evidence of current deployment.

The analysis does not assume that anticipated advances will materialise. More emergent applications are considered where relevant but are distinguished clearly from opportunities already accessible to enterprises.

Evidence and approach

We used desk research to identify and structure global evidence on how AI is affecting the sectors in scope. For manufacturing, tourism and construction, we mapped use cases to value-chain activities and assessed each according to the AI capability involved, how it creates value, its likely impact, its relevance to different firm sizes and the prerequisites for adoption. For ICT services, the analysis instead examined how AI is changing business models, value creation, competitive dynamics and firms' positions within global technology ecosystems.

An online enterprise consultation and stakeholder interviews tested and enriched the emerging findings in Ireland. They provided evidence on firms' experience of AI, the opportunities they see, the barriers they face and the support they may need, including how these issues differ by firm size and subsector. Responses to the consultation were self-selected and unweighted.

Four sector-focused workshops brought together 175 participants from enterprises and the wider policy, industry, education and research ecosystem. We used the workshops to challenge and refine the emerging findings. In manufacturing, tourism and construction, participants reviewed the opportunity and barrier analysis, identified omissions, tested priorities and examined what firms would need to act. The ICT workshop focused instead on emerging AI-driven changes to the sector and their implications for Ireland. The workshops were evidence-validation exercises rather than representative votes or consensus-building exercises.

Supplementary data analysis provided context on sector structure, digital maturity and AI adoption. We used official statistics and other quantitative datasets to examine enterprise and firm-size profiles and, where suitable data were available, digital and AI adoption. Policy compendiums supplied by the Department of Enterprise, Tourism and Employment (DETE) were analysed to identify existing supports, assess which parts of the adoption process they address and map them against the barriers identified through the research.

The findings were triangulated across these sources. No single use case, interview, consultation response, workshop discussion or statistical measure was treated as sufficient on its own. Areas of convergence strengthened conclusions; material differences were examined to determine whether they reflected firm size, subsector, value-chain position, digital maturity or a genuine difference of view.

The study was guided throughout by a Steering Group chaired by DETE and comprising representatives from industry, industry representative bodies, government departments, enterprise agencies and publicly funded research and innovation centres. The Steering Group provided governance, advice and challenge on the research plan, methodology and findings.

Generative AI tools were used throughout the research process to help check, structure, interpret, synthesise and critique research material and emerging analysis. Their role was assistive; human researchers directed each task, reviewed outputs and made the substantive analytical judgements. See Appendix A for more detail.

Part 1:

Increasing AI adoption in manufacturing, tourism and construction

Cross-sectoral framework and summary findings

A pharmaceutical plant, a small hotel, a specialist engineering firm and a construction subcontractor start with very different systems, skills, access to capital and appetite for risk. But they face many of the same questions about AI. What problem is worth solving? Which type of AI is appropriate? Who owns the change? How much authority can be delegated safely? And what support do firms need when they cannot act alone?

Drawing on the sector deep dives, this chapter sets out the common framework for Part 1 and captures recurring patterns in where firms are applying AI, how those applications create value, the barriers firms face and the interventions that could help overcome them.

One theme runs through the evidence: Firms are adopting AI faster than they are embedding it in their operations. General-purpose AI assistants are becoming more common, but most firms have yet to integrate AI with the data, systems, workflows and decisions that drive performance. The immediate policy challenge is to broaden adoption among smaller firms while helping more advanced enterprises move beyond isolated tools and embed AI safely in day-to-day operations.

1. How AI is impacting the value chain globally

Drawing on more than 500 global use cases, this section shows how firms across manufacturing, construction and tourism globally are applying AI and identifies the patterns that recur across all three sectors.

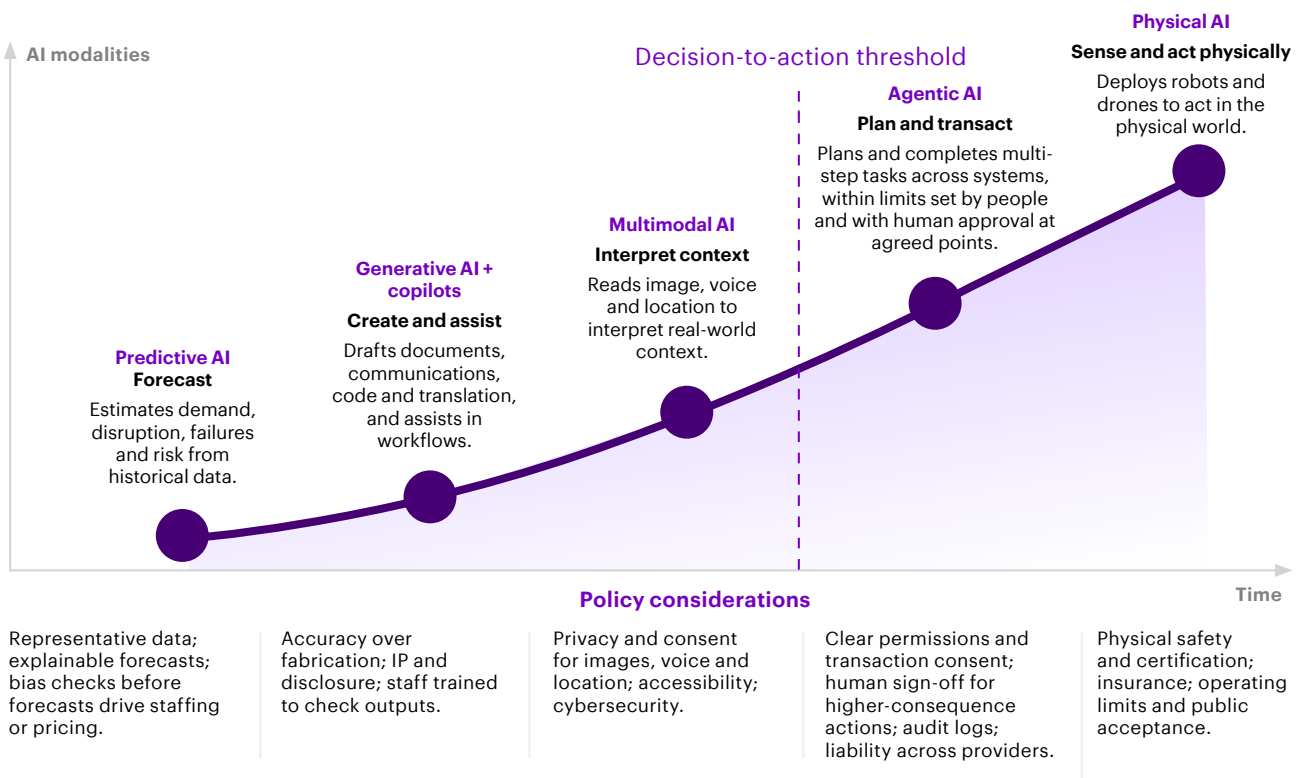
Understanding AI adoption and the drivers of change: AI modalities

Before examining where firms use AI, it's worth clarifying what it is. AI is often associated with publicly available assistants such as ChatGPT and Claude, but it encompasses a much wider set of capabilities. AI can forecast outcomes, retrieve and organise knowledge, generate

content and designs, interpret different types of data, plan and complete tasks and act through software and machines. A single use case may combine several of these capabilities.

Figure 5 places these modalities on a broad curve from prediction to physical action. It shows how AI's role shifts from informing decisions and assisting people to interpreting context, completing tasks and transactions and ultimately acting in the physical world. This is not a hierarchy of value. A predictive model embedded in a critical production or pricing process may be more mature and commercially important than a newer generative tool.

Figure 5. There are multiple modalities of AI that range from prediction to physical action



Source: Accenture Research analysis.

The modalities delivering value today

Predictive AI estimates what is likely to happen and helps firms decide what to do next. It is used to forecast demand, detect anomalies, assess risk and optimise schedules or inventories. These applications are often less visible than chatbots because they sit inside planning, pricing, maintenance and operational systems. The objective is usually clear, performance can be tested against observed outcomes, and the technology can often be introduced into an existing decision process.

Generative AI creates new outputs, including text, images, code and designs. Its use ranges from low-risk drafting to more consequential design and decision support. The model, the information it draws on, the constraints governing its use and the review of its outputs all shape the value it creates.

Copilots are a common way for people to use generative AI. Built into familiar software and workflows, they can retrieve information, summarise records, or prepare responses while leaving judgement with the user. This makes them a relatively accessible starting point for firms that want to improve a defined task without redesigning an entire process.

Multimodal AI works across different forms of information, including text, images, speech, video, sensor readings and structured data. It can, for example, use a photograph to retrieve the right asset record or combine video, process data and technical specifications to identify a quality or safety problem.

Emerging modalities

Agentic AI can plan and complete a sequence of tasks towards a goal. An agent might monitor demand, check inventory, revise a schedule, contact a supplier and update an enterprise system within defined permissions. It can also transact on behalf of a customer or employee. This marks the decision-to-action threshold shown in Figure 5.

Physical AI combines AI with machines that can sense and act in the physical world. It includes robotics, autonomous inspection, mobile machinery and self-optimising equipment. These applications could change the economics of production and service delivery, but they require connected assets, reliable data, clear operating limits and stronger assurance than tools used only to generate or analyse information.

The governance requirements increase as systems take on more responsibility. Predictive systems depend on representative data and reliable performance. Generative systems add concerns around the origin and reliability of the information used and intellectual property. Multimodal systems can raise further questions about privacy, consent and cybersecurity. Once AI begins to act, permissions, audit trails, liability and operational safety become more important.

How the modalities may evolve

While our focus is on use cases that can be put into production today, business leaders and policymakers need to plan for a moving technological frontier rather than a fixed set of capabilities (Figure 6). A large manufacturing

plant, tourism group or building contractor may already be testing applications that remain distant for a micro-enterprise. The relevant horizon will depend on advances in AI as well as the maturity of a firm's data and systems, its skills and its ability to redesign processes around the technology.¹²

Figure 6. How AI capabilities may advance across the modalities

Modality	Near-term 0–2 years	Mid-term 3–5 years	Long-term 5+ years
Predictive AI Forecast	Demand, disruption and no-show forecasting; predictive maintenance and anomaly detection	Forecasting feeding closed-loop optimisation and scenario simulation	Self-tuning predictive systems across operations
Generative AI + copilots Create and assist	Text, image, video and audio generation with provenance tooling; embedded workflow copilots	Generative and AI-driven design, AI-accelerated R&D and materials discovery	Content generated from AI world simulations; design-to-outcome automation
Multimodal AI Interpret context	Real-time voice, vision and translation; computer vision; AI-enabled devices and edge inference	Mature AR smart glasses, spatial computing and assisted reality at scale	Ambient, always-on multimodal assistants and screenless computing
Agentic AI Plan and transact	Agents that plan and complete tasks; agent-ready data and interoperability; agentic commerce	Multi-agent orchestration of end-to-end processes; autonomous planning and scheduling	Autonomous agent ecosystems coordinating across organisations
Physical AI Sense and act physically	Early task-specific robots and autonomous mobile robots in structured settings	Service and field robots at scale; autonomous vehicles; robotic fabrication and 3D printing	General-purpose humanoids; world models and robots trained in simulation; broad autonomy in unstructured settings



Wildcard | High impact · Low certainty

Transformative AI, Artificial General Intelligence (AGI) and Artificial Superintelligence (ASI)

Broad expert-level, then superhuman capability that could compress every modality above.

2026–2030

Frontier-lab leaders' stated AGI timelines

~2047

The year 2,778 surveyed AI researchers gave a 50% chance that machines could outperform humans at every task

Source: Accenture Research analysis; OECD, *The agentic AI landscape and its conceptual foundations* OECD AI Papers No.56, February 13, 2026; Stanford HAI, *AI Index Report 2026*. AGI/ASI timing: Longer-range timing is highly uncertain and definitions are not comparable across sources. Illustrative views include the 2023 Expert Survey on Progress in AI (Grace et al., 2024; 2,778 researchers), public forecasts by frontier AI laboratories (see, for example, Dario Amodei, *The adolescence of technology* (January 2026); Stanford Graduate School of Business, *View from the Top* podcast, 'Demis Hassabis Thinks We're in the 'Foothills of the Singularity' (June 2026)), and quantitative forecasting work by Epoch AI. Benchmark programs such as ARC-AGI provide complementary evidence on unresolved reasoning capabilities. These sources should be read as a range of views and indicators, not as a consensus forecast.

In the near term, most change is likely to come from embedding and scaling capabilities that already exist.

Predictive systems will increasingly shape operational decisions, helping a hotel adjust room prices as demand changes or a factory schedule maintenance before equipment fails. Generative AI will move from stand-alone interfaces into business workflows, drafting a tender from approved company records or preparing a regulated document with controls over its sources and use.¹³ Multimodal systems will make real-time voice, vision and translation more widely available, allowing a technician to photograph faulty equipment and retrieve the relevant maintenance guidance or a hotel employee to assist a guest in another language.¹⁴ Agents will take on clearly defined, multi-step tasks within set limits, such as checking inventory, placing an approved order and updating the relevant systems, while leaving higher-consequence decisions to people.¹⁵ Task-specific robots will also spread through structured environments, inspecting products on factory lines, moving stock through warehouses and cleaning commercial facilities.¹⁶

Over the mid-term, the larger shift may be from individual AI tools to connected, AI-enabled processes. Combined with digital twins, which are virtual representations of physical assets or processes, AI could use measured results to adjust selected operating settings automatically within defined limits.¹⁷ As systems become easier to connect and govern, multiple agents may also coordinate work across them.¹⁸ Individual agents are already becoming capable of handling longer sequences of work. The research organisation METR (which stands for Model Evaluation and Threat Research) estimates that the length of tasks the most capable AI agents can complete with a 50% probability of success has roughly doubled every seven months since 2019.¹⁹

This progress could make it easier to automate processes that require repeated information gathering, hand-offs and manual coordination. In the physical world, firms may become able to adapt robots to new tasks more easily and deploy them in less structured environments. Autonomous-vehicle services may also expand into more locations and operating conditions.²⁰ Progress will remain uneven, particularly where safety, regulation or highly variable environments require closer human supervision.²¹

Beyond five years, scenarios are more useful than forecasts. AI systems may become increasingly adaptive, updating how they operate as new data arrive within defined limits. Assistants that work across voice, images and other information could retain context across devices. Networks of agents could coordinate more complex activity across organisations. AI models that simulate how a physical environment may change, sometimes called world models, could test possible outcomes before acting.²² A robot, for example, could assess different ways to move an object before choosing an action. Progress will depend on whether these systems become more reliable, safe and secure easier to connect and less costly to run.²³

Key areas of application across the value chain

The modalities above describe what AI can do. Where firms apply them determines how they create value. Across the more than 500 global use cases identified in this study, AI appears throughout the value chain, from research and design through supply chains and operations to customer-facing activities and enabling functions (Figure 7).

Several patterns recur across sectors:

Upstream applications can change what the firm creates. In manufacturing, AI can accelerate scientific discovery, product design and process development. In tourism, it can support destination, itinerary and experience design. In construction, it can generate and test options before work begins. These applications can affect development speed, product-market fit and the range of options a firm can explore. They also tend to require proprietary data, specialist expertise and control over research, product or design decisions, making them more accessible to larger or more sophisticated firms.

Supply-chain applications reduce uncertainty. AI can combine everything from demand to supplier, logistics, price, quality and disruption data to improve sourcing, inventory and the overall resilience of supply chains. The value lies in acting earlier: qualifying an alternative supplier before a component becomes unavailable, adjusting stock before demand shifts or identifying a risk before it disrupts production, a project or visitor service.

Operations offer the broadest near-term opportunity. AI can help firms predict equipment failures, detect unusual activity, schedule production and staff, monitor quality and programmes, forecast demand, optimise workflows and allocate resources. These applications improve decisions firms already make by providing earlier warnings and more continuous adjustment.

Downstream applications help firms win demand, set prices and retain customers.

They support tendering, sales, personalised offers, dynamic pricing, customer service, aftercare and reputation monitoring. They are often easier to adopt where customer interactions are already digital. They also raise a wider strategic question: who controls the customer relationship and the underlying data when discovery, booking, ordering or service is mediated by a platform?

Enabling functions often provide the easiest entry point. Firms can introduce document handling, enterprise search, payment controls, reporting, workforce matching and administrative automation through familiar software and readily available data. These applications can free up scarce management and specialist time while helping firms learn how to use AI safely. Firms will capture greater gains when they also redesign the surrounding process or redirect the time saved to higher-value work.

Figure 7. Example use cases from across the value chain

AI use cases by value-chain stage in manufacturing, tourism and construction

Value-chain stage	Manufacturing	Tourism	Construction
Upstream Design, research and product definition	Chemicals and pharmaceuticals Molecule and formulation design Generates and screens candidate molecules and formulations before extensive wet-lab work. Concept to candidate, faster	Attractions and experiences Destination and experience product planning Models visitor demand and gaps in the offer to shape new experiences and packages. Better product-market fit	Design and engineering Generative design and constructability analysis Explores building options and tests buildability before the design is frozen. Fewer late design changes
Supply chains Sourcing, materials and inbound flow	Chemicals and pharmaceuticals Supply-chain spend and working-capital optimisation Forecasts material prices and simulates inventory to hold availability on less stock. Less cash tied up	Food service Inventory and food-waste optimisation Forecasts covers and orders to match, cutting spoilage and over-ordering. Lower food waste	Contracting Materials procurement and supplier risk scoring Times material buys and flags supplier delivery, quality and solvency risk. Fewer supply disruptions
Operations Production, delivery and service execution	Food and beverage Production scheduling and yield optimisation Sequences lines and tunes process settings to lift throughput and reduce waste. Higher yield per line	Accommodation Housekeeping and staffing scheduling Matches rotas to forecast occupancy, arrivals and room-turn workload. Better labour utilisation	Infrastructure Programme re-optimisation and progress monitoring Reads site data to track real progress and re-sequence works as conditions change. Fewer programme overruns
Downstream Demand, pricing and the customer relationship	Computer and electronics Dynamic pricing and after-sales upsell Sets quoted prices and spots service and upgrade openings in the installed base. Higher margin per account	Accommodation Revenue management and dynamic pricing Prices rooms and seats against demand, events and competitor movement. Higher revenue per room	Contracting Bid/no-bid support and win-probability scoring Scores tenders on fit and win odds before bid costs are committed. Better return per bid
Enabling functions Finance, people, compliance and knowledge work	Chemicals and pharmaceuticals Finance operations and payment-leakage control Automates finance workflows and finds duplicate invoices and vendor anomalies. Cash leakage recovered	Travel services Guest communications and service copilots Drafts and triages guest messages across languages, channels and time zones. Faster response times	Design and engineering Specification and contract document copilots Reviews specifications, contracts and variations to surface obligations and risk. Less time on document review

Source: Indicative examples from use case library.

Differences across firm size

The global evidence on AI use cases focuses mainly on large firms. Around seven in 10 use cases in our library are most relevant to large firms, while fewer than one in 10 focus on micro or small firms.²⁴

Large firms have more of the data, systems and specialist expertise needed to integrate AI, but their scale can slow implementation. Multinationals and large domestic groups must coordinate across business units, technology architecture, cybersecurity, procurement, legal, quality and regulatory functions. Local operations may have the capability to act but lack the authority to do so. Legacy systems and brownfield sites can make integration harder still.

Micro and small firms face the opposite problem. They have fewer systems to connect and may be able to adopt a focused product

quickly, but they lack management time, specialist staff, bargaining power and the data needed for bespoke solutions. Their strongest route is often through AI built into existing products: an assistant in office software, revenue management in a booking platform, machine vision at one workstation or a sector tool for estimating, scheduling or document review. Some may be able to skip earlier stages of digitalisation, but only where basic foundations are in place in structured records, secure access and a stable digital workflow.

Medium-sized firms face a distinct challenge. The scale of their operations mean that using AI requires meaningful process redesign, systems integration and governance. But they often lack the specialist teams and financial capacity required. Their best route is often a focused use case backed by a practical roadmap, specialist support and continuity of advice from pilot through to implementation.

2. From global potential to priority opportunities in Ireland

Across sectors, the use cases group into five broad sources of value (Figure 8).

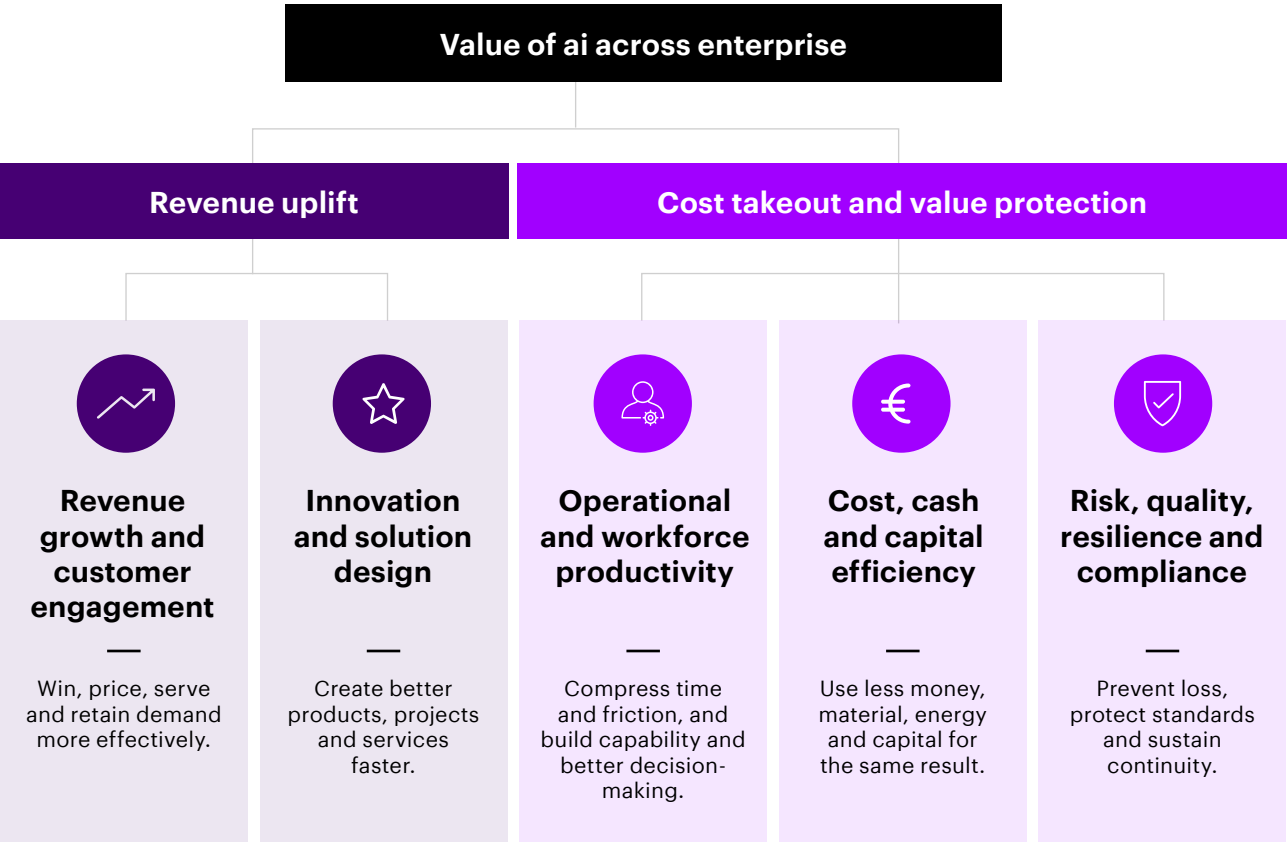
Two support growth. **Revenue growth and customer engagement** help firms attract demand, improve pricing and retain customers. **Innovation and solution design** shorten the path from idea to viable product, service or project.

Three improve efficiency or protect value.

Operational and workforce productivity help firms complete work more effectively. **Cost, cash and capital efficiency** reduce waste and make better use of working capital and assets. **Risk, quality, resilience and compliance** help firms identify defects, disruption and failure earlier.

The specific opportunities also vary by sector and are explored in the sector deep dives that follow.

Figure 8. A common value tree describes how AI creates value in any sector



Source: Cluster analysis of use case library.

Two factors determine which opportunities are most relevant in Ireland: where firms operate and make decisions within their value chains, and their current levels of digital maturity and AI adoption.

Factor 1: The value-chain footprint and enterprise landscape

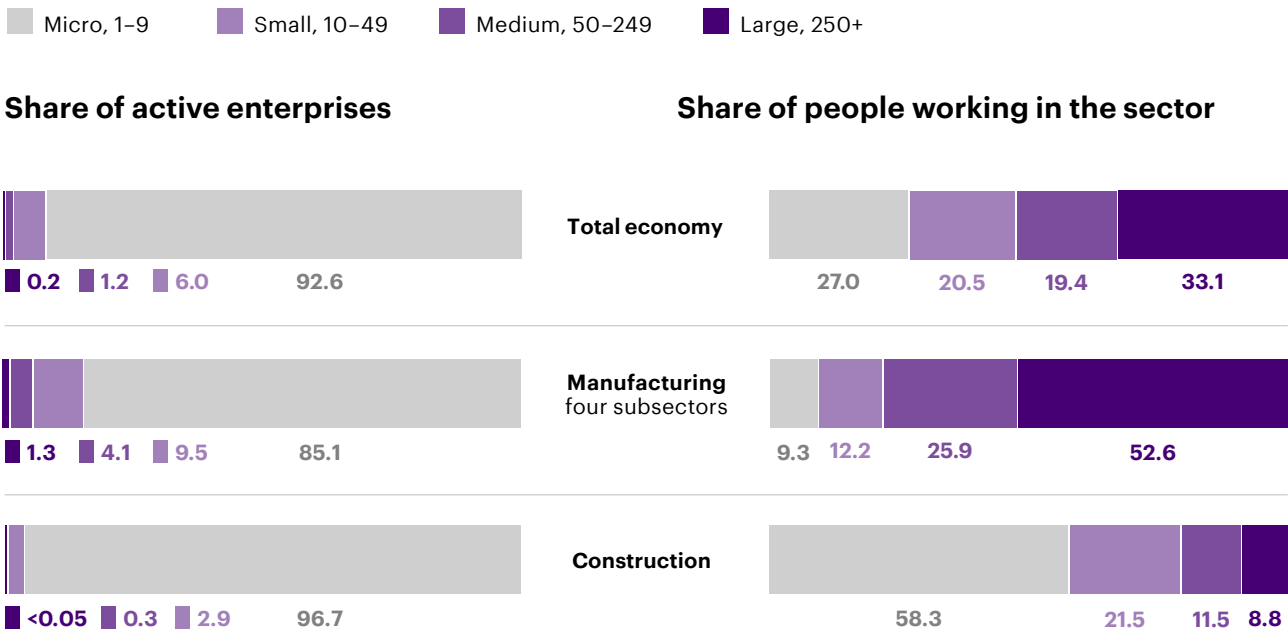
The first factor determining which AI adoption opportunities are most relevant in Ireland is a firm’s position within Ireland’s enterprise landscape and wider value chains. The opportunities available to firms vary with their

scale and with the degree of control they have over the data, systems and decisions needed to capture value from AI.

Ireland combines a small number of large, often multinational, enterprises with a long tail of small businesses. In 2023, large enterprises accounted for just 0.2% of firms but one-third of employment, while 92.6% of enterprises employed fewer than 10 people (Figure 9).²⁵ Smaller firms can adopt AI widely when it comes built into software they already use. Bespoke applications that require systems integration, specialist skills and large datasets generally favour larger firms.

Figure 9. SMEs dominate sectors, while a small number of large firms account for a disproportionate share of employment

Share of active enterprises and share of people working in the sector, by size band, 2023. Size-band data are not available for tourism.



Source: CSO, Business Demography (BRA31), 2023. Share of people working in the sector is equivalent to ‘persons engaged’ and comprises employees plus working proprietors. Manufacturing consists of four of the five subsectors in scope, as a breakdown of medical device enterprises by size is not provided. Within that, food and beverage manufacturers includes tobacco. Tourism is not shown as the CSO Business Demography dataset BRA31 does not disaggregate tourism sub-sectors.

Authority to make decisions can be just as important as firm size. Pharmaceutical, medical-device and electronics plants in Ireland may have advanced systems and specialist workforces, while parent companies or global functions make decisions about products, R&D, technology, vendors or data. Tourism businesses may deliver the customer experience but depend on global platforms for discovery and booking. Construction subcontractors may generate field data without controlling the project platform. A firm’s opportunity therefore depends on whether it can access the relevant data, change the workflow and capture the benefit.

These considerations vary considerably by sector:

Manufacturing. A broad base of smaller firms and suppliers sits alongside a small number of large plants that account for much of the sector’s employment and output. Large enterprises account for 53% of employment across the manufacturing subsectors for which data are available, rising to 79% in chemicals and pharmaceuticals and 85% in computer and electronics. Engineering is the main exception, with SMEs accounting for 78% of employment.²⁶ Production, quality, laboratory operations, maintenance, planning and supply-chain management are widely relevant opportunities

because Irish sites generally control these activities. R&D and product design are more selective, depending on whether the Irish operation holds the relevant mandate, data and decision rights.

Tourism. The sector is made up of a very large number of small businesses. Around four in five accommodation and food-service enterprises employ fewer than 10 people, with an even higher share among travel agents and tour operators.²⁷ Priority opportunities therefore sit close to the day-to-day economics of the business: demand forecasting and pricing, rostering, booking and customer administration, inventory, energy and waste. Larger groups can connect these decisions across properties or routes; smaller firms are more likely to access AI through the systems they already use. Maintaining discoverability requires collective action because national tourism bodies, destination management organisations, local authorities and digital platforms all shape the information and infrastructure through which tourism businesses are found and booked.

Construction. The sector is highly fragmented: 97% of businesses are micro firms, employing 58% of its workforce.²⁸ Its project-based nature adds complexity, with responsibility spread across clients, designers, main contractors and specialist subcontractors. A lack of common data standards is a major barrier to wider AI adoption on construction sites. The sector has also lagged behind others in achieving digital productivity gains. With strong demand for housing and infrastructure, the need to improve productivity has never been greater.

Immediate opportunities include estimating and tendering, document and contract searches, scheduling, change management, safety, quality and project handover. Clients and main contractors are likely to lead project-wide adoption, while smaller firms will benefit

from shared systems and simpler tools for site records, reporting and document retrieval.

Factor 2: Current levels of digital maturity and AI adoption

The second factor determining which AI adoption opportunities are most relevant in Ireland is digital readiness. Firms with reliable data and connected systems may be able to deploy an application today, while those that still rely on manual processes or fragmented technology may need to strengthen those foundations first.

Measuring AI adoption is less straightforward than the headline figures suggest. Different surveys can produce very different pictures of the same sector because they cover different firms, define sectors differently and ask different questions. In tourism, for example, an ITIC/Toposophy survey of 73 organisations found that 62% used AI in some form, while the CSO-based tourism proxy used in this study puts AI use at 14.9% among enterprises with at least 10 people.²⁹ The ITIC survey also found that 52% of respondents described their adoption as early or experimental and only 5% as extensively integrated.³⁰

Headline adoption rates can obscure large differences in how AI is being used. A survey that asks whether a firm uses any AI can place occasional use of a general-purpose assistant in the same category as AI embedded in a core workflow or decision. It can also miss AI capabilities such as forecasting or pricing when firms use them through commercial software without recognising them as AI. This report therefore distinguishes between the breadth of adoption, whether firms use AI at all, and its depth, whether firms have embedded AI in repeatable workflows, systems and decisions.

No single measure captures the full picture. Official enterprise data from the CSO provide the main estimate of adoption across the business population, although annual surveys can lag rapid changes in use. The Credit Demand Survey, employee research, online consultation, interviews, workshops and Accenture surveys are used in this report for additional evidence on micro firms, the depth of use and how adoption is changing, but they cover different populations, use different methodologies and, in some cases, are self-selected and unweighted. International comparisons also require care because surveys outside the common Eurostat framework may cover different firms, technologies and thresholds for adoption.³¹ We therefore use these sources as complementary evidence, with each helping to illuminate a different aspect of adoption. Further work is needed to determine how Ireland should define and monitor AI adoption over time, including how to reflect micro-enterprises and different depths of use.

What is clear is that Ireland starts from relatively strong digital foundations. In 2025, 83% of people aged 16–74 had at least basic digital skills, the second-highest share in the EU and well above the EU average of 60%.³² Ireland also ranked fifth in the EU for generative AI adoption, at 45%, compared with an EU average of 34%.

Businesses also have strong digital foundations, although readiness rises sharply with firm size. Among enterprises with at least 10 people, 80% had at least basic digital intensity, meaning that they used at least four of 12 specified digital technologies or practices. The share ranged from 77% of small firms to 92% of medium-sized firms and 98% of large firms.³³

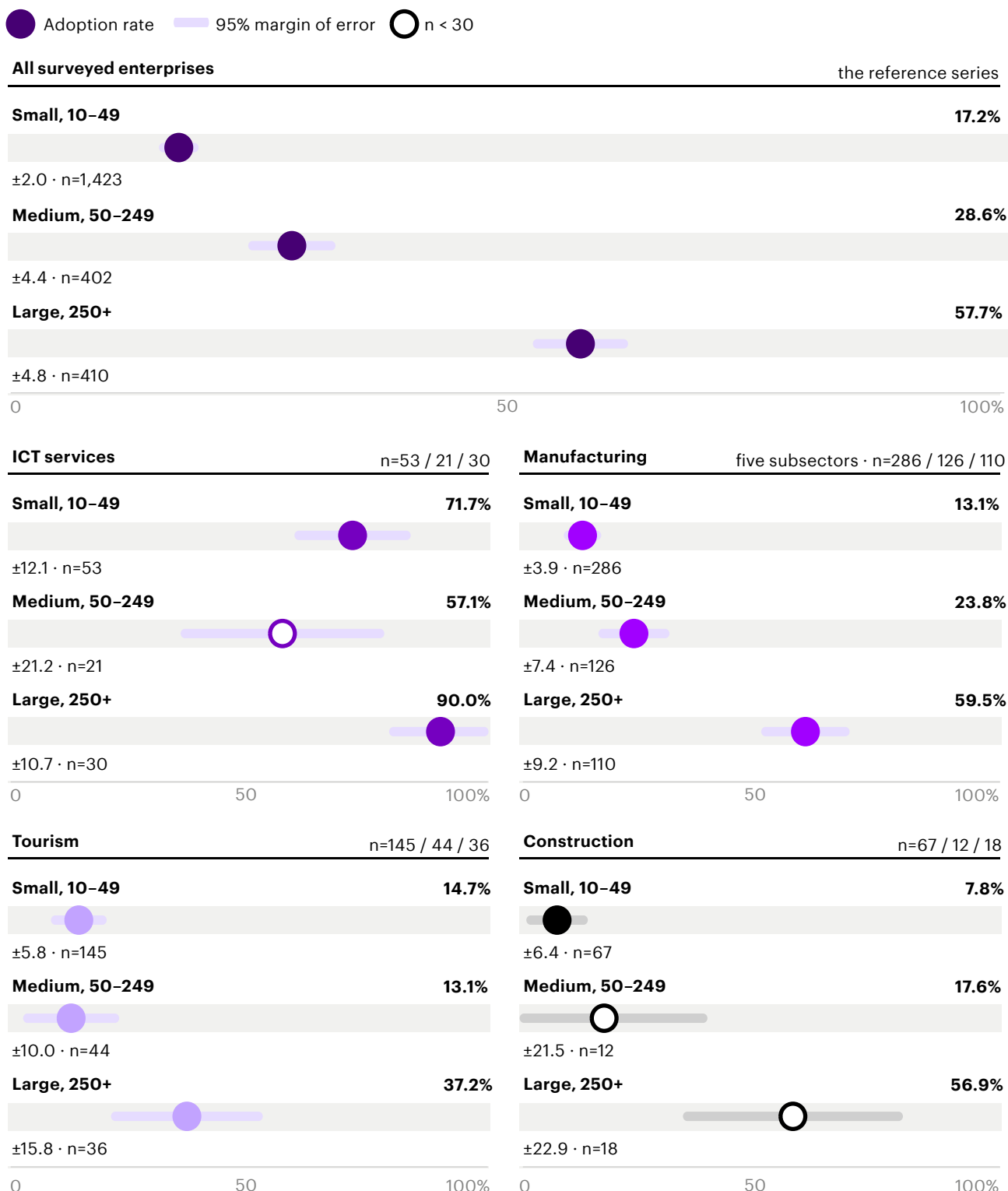
AI adoption is accelerating. CSO data show that AI use among enterprises in Ireland with at least 10 people more than doubled, from 8% in 2023 to 20% in 2025.³⁴ A separate Accenture employee survey found that 22% of workers in Ireland used generative AI daily at work in 2026, up from 8% in 2024.³⁵ The Irish employee sample comprised 194 respondents in 2026 and 409 in 2024, so these findings should be treated as indicative of employee use rather than representative of AI adoption across Irish enterprises.

Meanwhile, findings from the Working in Ireland Survey (WIIS) 2025, a large-scale survey administered to 4,300 workers in both the Republic of Ireland and Northern Ireland, found that while 45% of GenAI users use GenAI daily, the majority uses it for less than 30 minutes per day, and three-quarters of users rely on a single tool.³⁶ However, the same report found that 84% of GenAI users in Ireland anticipate some increase in GenAI usage, and a third of respondents expects to greatly increase their use.

Adoption remains uneven. Large enterprises lead, with 58% reporting AI use, but they represent only a small share of Ireland's business base (Figure 10). More than nine in 10 enterprises employ fewer than 10 people.³⁷ Among these micro firms covered by the Credit Demand Survey, 93% in construction and 83% in manufacturing reported no AI use between 2022 and 2024.³⁸ The widening gap between large and small enterprises could allow larger firms to capture a disproportionate share of AI-related productivity gains.³⁹

Figure 10. AI adoption is narrow and concentrated in large firms

AI adoption by sector and firm size — survey covers firms with 10+ employees, so adoption may be lower in sectors such as tourism and construction where many businesses employ fewer than 10 people



Source: CSO, data from Survey on ICT Usage and E-commerce in Enterprises (2025), prepared for DETE. Covers enterprises with ten or more persons engaged. Bars show approximate 95% margins of error calculated on unweighted respondent counts. Sector definitions: ICT services covers computer programming, consultancy and related activities under NACE J62; manufacturing is high-level manufacturing, sector C; construction is NACE section F; tourism is a proxy grouping following Fáilte Ireland's definition (covers accommodation; food and beverage services; selected passenger transport and rental activities; travel agencies and tour operators; cultural activities; and sport and recreation). The statistical proxy used for enterprise-technology analysis is narrower than the study's analytical tourism scope because equivalent enterprise data are not available for all activities.

Firms are also adopting AI more often for individual tasks than for core systems and workflows (Figure 11). The CSO survey of AI adoption found that 8.5% of manufacturing

enterprises used AI for workflow automation or decision support and 2.8% used autonomous systems. The tourism and construction samples record little or no use of these applications.⁴⁰

Figure 11. AI adoption is shallow in manufacturing, construction and tourism

The six AI technology categories recorded in the survey, by sector, ordered from task-specific to embedded — survey covers firms with 10+ employees, so adoption may be lower in sectors such as tourism and construction where many businesses employ fewer than 10 people

	All surveyed enterprises n=2,235	ICT services (J62) n=104	Manufacturing, five subsectors n=522	Tourism n=225	Construction n=97
Text mining and data analysis	8.4%	32.4%	7.2%	4.3%	3.4%
Image recognition	2.8%	16.2%	3.6%	2.8%	0.7%
Language and content generation	7.5%	39.9%	8.5%	2.9%	0.5%
Machine learning and predictive analytics	6.0%	34.7%	5.5%	1.5%	2.4%
Workflow automation and decision support	6.2%	30.9%	8.5%	1.9%	1.7%
Autonomous systems	0.8%	1.0%	2.8%	0.3%	0.0%

0%  40%

Text mining and data analysis combines data mining and speech recognition; language and content generation combines text generation and image, video or sound generation. Rates are means of the two component technologies, all enterprise sizes.

*No use recorded in the sample. Source: CSO, data from Survey on ICT Usage and E-commerce in Enterprises (2025), AI analysis by sector prepared for DETE. Covers enterprises with ten or more persons engaged. Sector definitions: Manufacturing is high-level manufacturing, section C; construction is NACE F; tourism is a proxy grouping following Fáilte Ireland's definition (covers accommodation; food and beverage services; selected passenger transport and rental activities; travel agencies and tour operators; cultural activities; and sport and recreation). The statistical proxy used for enterprise-technology analysis is narrower than the study's analytical tourism scope because equivalent enterprise data are not available for all activities.

The online consultation points in the same direction. Half of respondents described task-level organisational use of AI. A further 15% reported a pilot or embedded workflow, while 10% had scaled AI or designed their operating model around it from the outset.⁴¹ Tourism

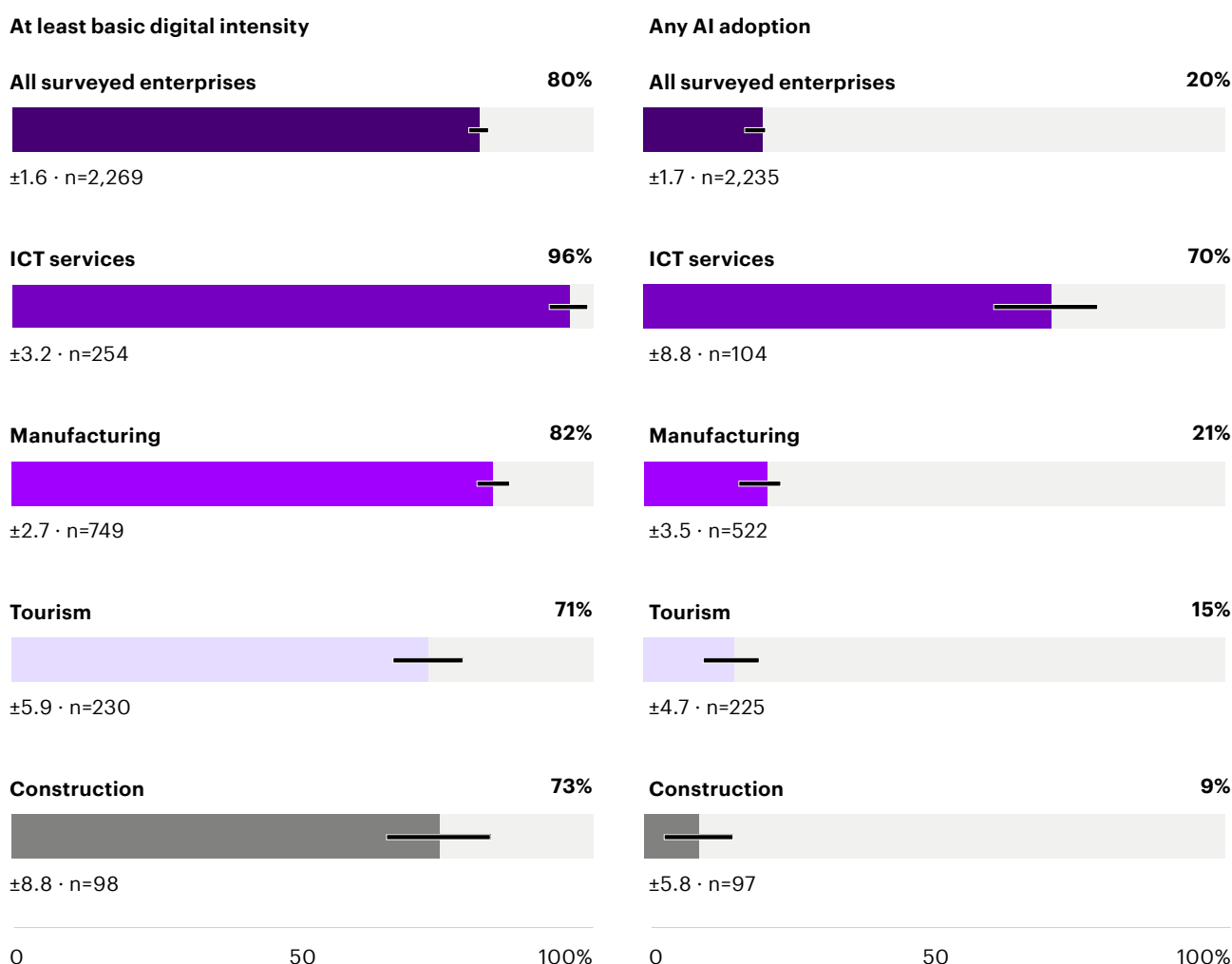
and construction respondents and workshop participants also described fragmented data, continued reliance on spreadsheets and adoption centred on general-purpose assistants, features embedded in existing software and isolated productivity tools.⁴²

Starting points differ by sector (Figure 12). Across the five manufacturing subsectors in scope, 82.5% of enterprises had at least basic digital intensity and 20.5% reported using AI. The equivalent figures were 73% and 9% in

construction, and 71% and 15% in tourism.⁴³ Because these estimates exclude micro firms, which account for a large share of construction and tourism businesses, AI adoption across each sector is likely lower.

Figure 12. Sector data reveals different starting points for digital intensity and AI adoption

At least basic digital intensity and any AI adoption, by sector — survey covers firms with 10+ employees, so adoption may be lower in sectors such as tourism and construction where many businesses employ fewer than 10 people



Source: CSO, data from Survey on ICT Usage and E-commerce in Enterprises (2025). Covers enterprises with ten or more persons engaged. Digital intensity follows the Eurostat four-level Digital Intensity Index. 'At least basic' denotes four or more of twelve digital indicators. Whiskers show approximate 95% margins of error calculated on unweighted respondent counts. Sector definitions: ICT services covers computer programming, consultancy and related activities under NACE J62; manufacturing is high-level manufacturing, section C; construction is NACE F; tourism is a proxy grouping following Fáilte Ireland's definition (covers accommodation; food and beverage services; selected passenger transport and rental activities; travel agencies and tour operators; cultural activities; and sport and recreation). The statistical proxy used for enterprise-technology analysis is narrower than the study's analytical tourism scope because equivalent enterprise data are not available for all activities.

Manufacturing also varies considerably by subsector. CSO survey evidence indicates that AI adoption is higher in chemicals and pharmaceuticals, computer and electronic products, and medical devices than in engineering.⁴⁴ Some of the survey samples are small, and the figures capture only whether an enterprise uses AI somewhere in the business, rather than whether it has been embedded in workflows. But the pattern is nevertheless consistent with firm structure: large, capital-intensive plants dominate the first three subsectors, whereas SMEs account for most employment in engineering.

Low adoption does not mean AI has little relevance. Accenture's analysis of work tasks estimates that activities that AI already support or could theoretically support account for around 93% of working time in manufacturing and production, 86% in construction, extraction and architecture, and 90% in hospitality, food and tourism.⁴⁵ These occupational groupings do not match the study sectors exactly, and theoretical scope does not predict realised value. The gap between current adoption and potential nevertheless points to implementation and organisational readiness as the more immediate challenges.

What this starting point means for Ireland's priorities

The gap between adoption and business value shows why Ireland must focus on depth as well as reach. Accenture's 2026 executive survey, based on 57 respondents in Ireland (and therefore indicative rather than representative of enterprises nationally), found that 72% believed firms wasted at least part of their AI budgets, while only one in 10 large

organisations reported a significant positive effect on profit and loss (P&L).⁴⁶ Firms reporting stronger returns applied AI tailored to their industries within redesigned workflows. Making one task faster creates limited value when approvals, hand-offs and bottlenecks continue to slow the wider process. The goal is therefore not adoption for its own sake, but stronger enterprise performance and competitiveness.

Ireland should therefore focus on where and how firms use AI, as well as how many firms adopt it. The five sources of value set out in Figure 8 above provide the measures of success: revenue and customer outcomes, faster innovation, higher productivity, lower costs and better use of capital, and stronger quality, resilience and compliance. Adoption support should help firms achieve these outcomes while building the data, systems and skills needed for deeper use.

The opportunity also extends beyond efficiency. Executives are twice as likely to identify cost reduction rather than revenue growth as AI's greatest future benefit. Yet Accenture analysis across 17 industries estimates that the potential revenue uplift from AI is more than twice the combined potential from labour cost avoidance and savings.⁴⁷ Ireland's priorities should therefore reflect each sector's economics, value-chain position and readiness to adopt AI.

For large, capital-intensive manufacturing plants, the priority is to scale AI in areas such as production planning, yield and quality, predictive maintenance, laboratory and regulatory work, supply chains and operational decisions. When an Irish site does not control product or R&D decisions, strong AI implementation can help it compete for future investment and higher-value responsibilities.

Engineering firms and smaller suppliers more often need narrower solutions that work with their existing enterprise resource planning (ERP), quality, maintenance, production or document systems. These applications can deliver near-term value while improving the data and processes required for more integrated uses.

For many tourism and construction firms, commercial software provides the most practical route into AI. Tourism applications include forecasting and pricing, rostering, booking and customer administration, inventory and waste management. Construction applications include estimating and tendering, document search, project reporting, scheduling and mobile tools for quality and safety checks. Capabilities built into familiar systems can reduce the effort and cost of implementation and help firms demonstrate value before making larger investments.

Adoption can spread through value chains. Large manufacturers can raise supplier standards for data, quality and traceability. Clients and main contractors can extend digital project systems across construction supply chains. In tourism, destination management organisations, local authorities and larger operators can improve the information and digital infrastructure available to smaller businesses. This can include shared destination data as well as AI-enabled infrastructure such as digital wayfinding, connected trails and visitor-flow management. When value depends on several organisations sharing data or changing how they work together, support for individual firms will not be enough.

The consequences of not adopting AI

Evidence from the interviews, online consultation and workshops points to risks at three levels: firms, sectors and the wider economy.

At the firm level, shallow adoption can create more activity without improving performance. Employees may produce drafts, reports or analysis faster while approvals, hand-offs and decision rights remain unchanged. Firms can then accumulate licences and pilots without a clear effect on revenue, cost, quality or risk. Reliance on software and platform providers also raises questions about the ability to move data between providers, retain access to customers, maintain continuity and switch services.

Poor governance creates a different set of risks. Employees already use many AI tools outside formal company controls: 30% of employees in Ireland say they have sourced AI tools independently, compared with 34% who use tools provided by their employer.⁴⁸ Uncontrolled data sharing, unreliable outputs and unclear accountability can expose firms to privacy, intellectual property, cybersecurity, regulatory and reputational risks. Among executives in Ireland, 37% cite data security and privacy as a major barrier to maximising value from AI, while 32% cite the regulatory environment.⁴⁹ Firms should therefore match controls to the consequences of the use case. Low-risk applications need lighter controls; applications that affect customers, safety, regulated outcomes or professional judgement need stronger oversight.

At the sector level, slow adoption could widen the gap between digitally mature firms and the long tail of smaller businesses. The effects would spread through value chains. A construction firm that cannot work within a digital project process may slow the wider project or lose access to work. A tourism provider with incomplete or poorly organised information may become harder to find and more dependent on intermediaries.

At the economy level, Ireland must determine whether firms build AI capability here or mainly consume technology developed elsewhere. Slow adoption would limit the spread of skills, practices and productivity gains from leading firms and multinational investment. Ireland could end up with a small group of advanced firms integrated into global AI-enabled value chains and a much larger group that depends on externally supplied tools but has little influence over how providers design, govern or supply them. More value, data and decision-making would then remain outside Ireland.

3. Common barriers to AI adoption

Firms face four groups of recurring barriers to creating value from AI (Figure 13). **Strategy and financial barriers** make it difficult to identify valuable use cases, find the right route to support, establish clear ownership, build a credible business case, justify the full cost of implementation, or overcome principled resistance to AI. **Organisational barriers** include limited skills, management time, leadership and change management during implementation and capacity to redesign work. **Technology and ecosystem barriers** arise from inadequate data and weak digital foundations, integration challenges, and dependencies across suppliers, platforms and other partners. **Safety, security and trust barriers** reflect concerns about reliability, privacy, cybersecurity, intellectual property, regulatory uncertainty and accountability, alongside the difficulty of finding impartial advice and credible suppliers.

Together, these barriers make it harder for firms to decide where to invest, implement AI effectively and manage the risks.

Figure 13 shows which of these barriers participants identified as most significant in each sector. The shading indicates a barrier's position within the five primary barriers recorded for that sector. This means that a barrier that is shown as being outside the five (i.e. unshaded) is not absent, but rather that it was cited less frequently than others. Data and digital foundations are the most widely shared or cited barrier, appearing among the primary barriers in every sector.

These barriers recur across sectors and firm sizes, but their form and significance vary. The discussion below examines each barrier (including those that were not primary barriers) across sectors and firm sizes, then shows how they interact as firms move from initial testing to day-to-day use and scale.

Figure 13. Common barriers to AI adoption, and which matter most in each sectorSignificance within the sector's five primary barriers:  most significant   least significant of the five  not in the five

Barrier	Manufacturing					Tourism	Construction
	Chemicals And Pharma	Medical Devices	Computer and Electronics	Food and Beverages	Engineering		
Strategy And Financial – Where should the firm act, who owns it and will it pay?							
Understanding Firms cannot identify the right use case, judge what good looks like or connect AI to business value.							
Navigating and accessing support Firms struggle to find the right route through the support system.							
Leadership, strategy and ownership AI remains a technology experiment when no senior leader defines the AI strategy, owns it as a priority or sets a route to scale.							
Cost, funding and uncertain returns Full implementation costs and payback are unclear, while time, cofunding and capital compete with other priorities.							
Principled or values-based resistance Some firms object to AI on employment, ethical, environmental, brand or authenticity grounds.							
Organisational – Does the firm have the skills, time and support to change the work?							
Skills and capability Firms lack applied AI literacy and people who combine technical capability with sector and business knowledge.							
Time and management bandwidth Daytoday delivery leaves little protected time to assess, learn, implement or improve.							
Leadership and change management Weak leadership through implementation, poor communication and limited buyin stop staff using a viable solution.							
Organisational redesign AI is added to existing processes instead of changing tasks, roles, handoffs and decision rights.							
Technology and Ecosystem – Are the data, systems and wider value chain ready?							
Data and digital foundations Information is incomplete or poorly governed, while manual processes and legacy systems keep AI outside daytoday operations.							
Platform and supplychain dynamics Customers, suppliers, platforms, contracts and shared standards determine what firms can adopt and exchange.							
Provider and compute dependency Firms face lockin, changing prices, continuity risk, datasovereignty concerns and uneven access to secure infrastructure.							
Safety, Security and Trust – Can the firm trust the system and remain accountable?							
Trust, reliability and governance Firms need confidence in accuracy, security, human oversight, monitoring and responsibility for decisions.							
Identifying credible suppliers Firms struggle to find impartial advice and credible suppliers.							
Regulation and compliance Uncertainty over validation, traceability, liability and regulatory treatment slows higherconsequence applications.							

Source: Accenture Research analysis of the coded interview register, online consultation and workshops.

Strategy and financial: deciding where to act, who owns it and whether it will pay

Many firms recognise the importance of AI adoption but struggle to understand how they might use it, identify valuable use cases, judge what a good result would look like or determine whether the return will justify the effort. One construction interviewee said firms “just don’t know what AI can do”.⁵⁰ A tourism respondent described the challenge as “understanding how it works, where it fits and how best to implement, as well as understanding the costs”.⁵¹

Firms that do identify a promising application then face the question of where to go for help. Participants described a support system dispersed across several agencies and programmes, with eligibility criteria that were not always clear to them (Section 4 of this chapter examines the support landscape in more detail).

Ownership – or lack thereof – is a barrier too. AI often remains a technology experiment, where no senior leader owns it, defines the strategy, or lays out a route to scale. Workshop participants described AI sometimes being treated as an IT project, rather than a business priority, with initiatives stalling at pilot stage. This was most prominent in medical devices, chemicals and pharmaceuticals, and food and beverages, where participants called for projects to have named senior owners with authority to change workflows as needed.

Cost is another barrier and it extends beyond the model, enterprise licence or initial pilot. Firms also need to fund the wider work of implementation, from preparing data and systems to redesigning workflows and building the skills and controls needed for operational use.

The sector deep dives found that costs rise substantially when firms move from stand-alone tools and pilots into operational use.

Costs can continue to grow after implementation. Many AI providers charge according to use, so spending rises with the volume of information processed and the number of times a model runs. AI agents can increase these costs because they may call a model several times to complete one task. Goldman Sachs Research estimates that AI consumption, measured by monthly token use, could reach about 24 times its 2026 level by 2030.⁵² Firms therefore need to match the model to the task rather than default to the most capable and expensive option. The business case should consider not only licence or token costs, but also recurring compute, integration, maintenance and monitoring costs. Unnecessary technical complexity can increase cost, resource use and dependence on individual providers without increasing business value. Accenture estimates that only 10% to 20% of enterprise tasks require the most capable models. At one telecommunications company, better visibility into use and changes to model routing and workflow design reduced annual AI spending by 68%.⁵³

Cost and confidence in the return remain closely linked. As one small tourism business put it, “Cost is one barrier, making changes using AI that we can trust will benefit the business is the other.”⁵⁴

Principled or values-based resistance was the least frequently raised barrier in this barrier group. Where it arose, it was typically specific to certain respondents rather than a general view. In tourism, for example, some businesses were unwilling to let AI substitute for unique, local knowledge or personal service.

Sector differences

Sector-specific operating conditions can raise the investment threshold further. In highly regulated manufacturing sectors like pharmaceuticals and medical devices, firms may need to validate a successful pilot formally, approve later changes through controlled processes and, where required, secure regulatory acceptance before using it in production. These additional requirements increase both the cost and uncertainty of implementation.

Construction firms face a different problem because the organisation that pays for AI may not capture the full benefit. Firms often fund the capabilities centrally, while projects generate the returns. Depending on the contract, a contractor that uses AI to save time or labour may pass part of the saving to the client, weakening the incentive to invest even where the productivity case is credible.

In tourism, management capacity can constrain investment as much as cost. During peak periods, when AI could create the most operational value for small or owner-managed businesses, managers have the least time to implement change. Quieter periods provide more capacity but can coincide with weaker cash flow, making timing an unusually important part of the investment decision.

Firm-size differences

For micro and small firms, even a modest project can require a significant commitment of money and management time. These firms are also less likely to have in-house technology or procurement expertise, which makes it harder to assess suppliers and estimate the true cost of implementation.

Medium-sized firms face a different challenge. Their operations may be complex enough to require significant spending on integration, governance, skills and organisational change, yet they often lack the specialist teams or financial headroom of larger enterprises. An affordable pilot can therefore reveal a much larger investment requirement when the firm tries to incorporate AI into day-to-day use.

Large firms have greater capacity to fund experimentation, but expanding successful projects can still require substantial investment in integration, safeguards and organisational change. Investment decisions may span several functions, while multinational operations in Ireland may also require group-level approval. The main question is whether the case for wider deployment is strong enough to secure the necessary investment.

Organisational: creating the capacity to change

Skills are the most frequently raised organisational barrier across the evidence.

The skills required to build and deploy AI are rapidly evolving. New roles, such as AI engineers and AI assurance specialists, have emerged alongside established software and data roles. Teams must also learn to build systems that can produce different answers to similar inputs, making them harder to validate and govern than conventional software.

The challenge goes further than technical teams. Leaders need to be able to judge whether and where AI is worth using. Operational staff need to know when to rely on a system and when to question it. Legal and compliance teams need to understand the rules and safeguards that should govern AI use.

Firms particularly need people who can connect a business problem with the relevant process, data and technology.

Time is often as scarce as skill. Tourism owner-managers were described as already “flat out”, while manufacturing and construction teams said day-to-day delivery and “firefighting” left little room to investigate tools, prepare data or redesign processes.⁵⁵

These constraints become clearest when firms try to move from pilot into day-to-day operations. One large construction respondent said that “while pilot projects are often successful, scaling AI across a diverse, multi-site organisation remains the greatest challenge”.⁵⁶ Scaling requires leadership that stays involved through implementation, dedicated implementation time and changes to tasks, hand-offs, roles and decision rights. Organisational redesign is an element that is easily overlooked: where AI is simply bolted on to existing processes, it tends to become another tool that doesn’t change how work gets done.

Employee engagement is part of the same challenge and can determine whether adoption succeeds. Employees may fear job loss, reduced professional judgement or greater monitoring, creating anxiety or resistance to change. Weak communication can leave these concerns unaddressed; this in turn can mean staff avoid using an otherwise viable solution. Firms therefore need to involve employees in redesigning the work, explain how roles will change and where human judgement remains essential, and show how AI can support people as well as alter tasks. Change management is therefore an integral part of implementation rather than something that happens after the technology is deployed.

Sector differences

Sector structures can intensify these organisational barriers. In regulated manufacturing, particularly pharmaceuticals, managing change is closely tied to compliance. Workshop participants said employees were willing to change but cautious about breaching regulatory requirements. Firms therefore need to involve operations, engineering and quality teams early when introducing AI into a regulated process. They must also define responsibilities and agree on approved ways of working. Otherwise, even technically successful applications may fail to become part of normal operations.

Construction’s project-based structure creates a different challenge. Clients, designers, contractors and specialist firms come together in changing combinations to deliver projects. An employee may be able to improve a task within their own organisation but lack the authority to redesign the wider workflow. Workshop participants also raised the risk that greater reliance on AI could weaken skills in professions where people develop judgement through experience. AI can support engineers and other professionals, but junior staff must still understand why an answer is correct rather than simply accept it.

Tourism’s workforce model creates another set of constraints. Many firms are too small to justify dedicated AI roles, while seasonal and part-time staffing can make lengthy or specialist training difficult to sustain. Workshop participants therefore emphasised short, practical training linked to specific tasks, alongside upskilling support for longstanding staff who know the business well.

Firm-size differences

In smaller firms, no one may have clear responsibility for leading AI adoption through implementation. An owner-manager, operations lead or general IT provider may need to assess tools, learn the technology and redesign the process while continuing to run the business. External expertise can help, but firms still need someone who understands the work and has the authority to change it. The related question of who owns AI as a strategy priority is discussed under strategy and financial barriers above.

As firms grow, the problem shifts from limited capacity to unclear responsibility. Medium-sized firms may have functional managers and technical specialists but lack an implementation lead with authority across operations and technology. Large firms can assemble more specialist teams, but wider adoption may require agreement across business units, IT, quality, cybersecurity, legal and procurement. In multinational manufacturers, decisions about technology partners or architecture may also sit outside Ireland. These factors help explain why manufacturing pilots get stuck in the “pilot purgatory” described in the evidence and why large construction firms struggle to expand successful experiments across sites.

Technology and ecosystem: connecting data, systems and the wider value chain

AI depends on usable data and systems that can work together and exchange information. Firms describe disparate, disconnected systems, poor data quality and legacy infrastructure that they must address before more advanced applications can work reliably. One interviewee estimated that around 90% of firms are not yet AI-ready.⁵⁷

Having data is not enough. To use AI in day-to-day operations, firms usually need to connect it to the systems where they record information and make decisions. These systems may organise information differently, have limited ways to exchange data or have been introduced at different stages of the firm’s development. A business can therefore hold substantial data without being able to bring it together reliably enough for AI.

Some constraints extend beyond the firm. Businesses increasingly depend on customers, suppliers, platforms and other partners for the information or systems needed to complete a process. Systems that cannot exchange data can therefore limit adoption even where an individual enterprise has strong internal foundations. A separate problem of exposure arises from provider and compute reliance. Dependence on AI model providers, general-purpose AI platforms, cloud providers and software vendors also raises questions about pricing and continuity where enterprise data are stored; how confidential or proprietary information is used; rights over data and derived outputs; and the ability to move data or switch providers. Access to secure infrastructure is also uneven, though the issue cited is less one of general shortage in the country, and more to do with firms’ ability to manage their dependence on external providers. Addressing these constraints may require common standards, interoperable systems and trusted technical advice, rather than action by individual firms alone.

The differences in technical readiness also indicate that firms need different routes into adoption. Those without reliable digital foundations may first need support to establish usable data and connected processes, while firms that are already AI-ready can move directly into defined use cases with clear measures of value.

Sector differences

Manufacturing faces a distinctive challenge in connecting operational technology. The information required for higher-value applications often sits across enterprise software, production equipment, sensors, controllers, laboratory instruments and quality systems installed over many years. A plant can therefore be highly automated without having a connected flow of usable data. Pharmaceutical industry interviewees, for example, described instruments and production assets operating through proprietary interfaces and separate systems, while engineering workshop participants highlighted multiple independent platforms. Connecting these existing systems can require substantial engineering, particularly when firms cannot simply replace the equipment.

Construction faces a different challenge because its digital foundations span a temporary network of firms. Clients, designers, contractors and specialist trades create and hold project information in different systems and formats. Workshop participants described systems changing between, and sometimes within, projects. One interviewee said staff could spend “three hours... looking for one PDF”. Even a digitally advanced contractor cannot solve this problem alone. Higher-value AI applications require more consistent information structures and systems that can exchange data across project participants.

In tourism, reliance on external technology also affects access to customers. Businesses operate through property-management systems, booking engines, online travel agents, payment providers and search platforms that they do not control. As AI plays a greater role in travel discovery and booking, the accuracy and structure of information across these systems can determine whether a business appears in

AI-supported search and whether customers can book it. The sector therefore needs to establish common tourism data standards and infrastructure that allow existing systems to exchange reliable and consistent product information.

Firm-size differences

Firm size shapes both the starting point and the challenge of connecting systems. Smaller firms are often still establishing basic digital records and consistent processes. They are also more likely to adopt AI through software they already use, with little capacity to build custom integrations or negotiate with suppliers. Their immediate challenge may therefore be whether an AI-enabled product works with their existing systems at all.

As firms grow, the challenge shifts from having systems to connecting them. Medium-sized firms may have enterprise resource planning (ERP), customer or complex operational systems that require specialist integration, yet lack the data-engineering and architecture teams that larger firms use to design how systems work together. Large firms have greater technical capability, but they may also have more legacy equipment, sites, functions and generations of software to connect. In multinational groups, decisions about architecture, cloud, vendors and data may also sit outside the Irish operation.

Safety, security and trust: proportionate safeguards and trustworthy advice

Trust depends on whether a system is reliable enough for its intended use. Firms raised concerns about inaccurate outputs, intellectual-property loss, cybersecurity, privacy and liability when an AI-supported decision goes wrong.

Without clear rules, these concerns can stall low-risk uses while employees adopt higher-risk applications informally.

In response, firms need evidence and controls showing that an AI system is sufficiently reliable and safe for the task at hand. The level of assurance should reflect the consequences of the decision. Drafting an internal document, recommending a room price, flagging a possible defect, changing a production parameter and making a safety-critical decision require very different controls. Firms need to know what information a system can access, when someone must review its output, who remains accountable and what to do when the system performs unexpectedly.

These safeguards must continue after deployment. Models, data and suppliers can change, while performance can deteriorate as operating conditions change. Applications with greater consequences therefore need ongoing monitoring and a clear process for intervention. Where AI is embedded in important operational processes, firms also need to consider how they would continue operating if an AI service, cloud platform or connection became unavailable, including during a cyber incident. Depending on the use case, this may require fallback processes, retained human capability or a safe reduced-capacity mode of operation.

Firms should match safeguards to the risk. Low-consequence applications should move quickly, while uses affecting customers, safety, regulated outcomes or professional judgement require stronger testing, oversight and accountability. Regulatory uncertainty also hinders adoption in a related way. Where the treatment of an application is unclear – over what validation is required or who is liable,

for example – firms tend to defer decisions, particularly when it comes to applications with higher consequences.

Trust also extends beyond the technology itself. Firms may struggle to compare providers or distinguish independent advice from a sales pitch. Interviewees described advisers who were fluent in AI terminology but ultimately selling something. They also pointed to the problem that some advisers might know about AI but not about the sector or context. Firms were more persuaded by evidence from comparable businesses that experience the same sorts of challenges, but this sort of information was noted to be rare.

Sector differences

Regulated manufacturing, particularly pharmaceuticals and medical devices, faces the most demanding requirements. When AI influences a regulated production, quality or laboratory process, firms may need to define its intended use, validate its performance, document the evidence and manage later changes through existing quality controls. Workshop participants and interviewees repeatedly raised questions about qualification, declining model performance as data or operating conditions change, known as ‘model drift’, and the need to retest and reapprove systems after significant changes.

Construction faces a different accountability problem because clients, designers, contractors and specialist firms all have responsibility for decisions. If AI informs a design judgement, cost estimate, safety decision or site instruction, firms need clarity over who remains professionally and contractually responsible when the output is wrong. This gives contractual liability and insurance greater prominence than in other sectors.

AI does not remove existing duties of care, but firms and insurers need to understand how those duties apply when AI contributes to decisions.

In tourism, trust also depends on authenticity. Customer-facing AI can produce content that sounds plausible but feels generic, culturally inappropriate or inconsistent with the character of a business or destination. Workshop participants were more comfortable using AI to reduce administrative work than allowing it to replace local knowledge, personal service or human interpretation. One consultation respondent objected to extensive AI use in social media because it “takes away expression”. The Dublin pub, *The Thomas House*, similarly banned AI-generated posters and flyers to support independent artists.⁵⁸ Overuse can therefore weaken the distinctiveness that tourism businesses are trying to sell, even when the content is accurate.

Firm-size differences

Micro and small firms need straightforward guidance. They are unlikely to employ legal, cybersecurity or AI-governance specialists, so they need to know which tools they can use, what information they should not enter into them, which outputs require review and what to do when something goes wrong. This guidance is especially important when employees already use readily available consumer tools without a formal policy.

As firms grow and integrate AI more deeply into operations, they need more formal oversight. Medium-sized firms may reach this stage without the specialist teams available to the largest enterprises, leaving them caught between informal controls and a mature governance approach.

Large organisations are more likely to have dedicated legal, cybersecurity, risk and quality teams, but applications may need to pass several internal reviews, meet group-wide standards and operate consistently across sites. In multinational manufacturers, local teams may also need approval from global quality, technology or legal functions before a use case can proceed.

How barriers change from pilot to scale

The barriers are closely connected. A firm may identify a useful application but lack an owner. It may have capable staff but no usable data, or run a successful pilot that cannot pass investment, security or regulatory review. These interactions become more significant as firms move from experimentation into operational use. A pilot can remain deliberately narrow: A small team can work with a limited dataset, use manual workarounds and test the technology without changing the underlying process. Putting the same application into day-to-day use is more demanding. It can require firms to connect live data and systems, redesign workflows and responsibilities and put the right controls in place. This helps explain why successful pilots do not always lead to wider, scaled use.

The priorities also change along the way. Early on, firms need to identify where AI can create value, assess whether they are ready to proceed and decide what safeguards they need before experimentation begins. During testing, they must prove value, validate performance and involve the people who will use or oversee the system. Implementation requires firms to connect live data and systems, redesign work, train users and fund the full cost of deployment.

At scale, they must maintain ownership, monitor performance and risk, and extend the technology across sites, functions or partners.

Figure 14 shows how the four groups of barriers recur at each stage. An early question about whether an idea is worth pursuing becomes a decision about further investment.

A basic data-readiness issue becomes a challenge of connecting systems and exchanging information. Initial rules for safe use become ongoing requirements for assurance, monitoring and accountability. Support must therefore extend beyond awareness and experimentation to help firms implement, operate and scale successful applications.

Figure 14. How barriers evolve across the adoption journey

Journey Stage	1	2	3	4	5
	Understand and prioritise	Prepare the organisation	Test and validate	Implement and integrate	Scale and improve
What the firm must achieve	Define the problem, set a baseline, assign an owner and decide whether AI is the right response.	Put in place the minimum data, systems, skills, roles, controls and investment plan.	Show it works in the firm's environment, delivers measurable value and meets assurance needs.	Configure the application, connect live systems, redesign the workflow, train users and run controls.	Extend across functions, sites or partners and keep monitoring performance, value and risk.
How the four barriers appear	- Leaders lack confidence, no one owns the decision and the value and return are unclear - Firms lack the in-house skills and staff time to explore options - Firms cannot judge readiness, products or suppliers - Uncertainty over safe use discourages action	- The firm must decide which foundations justify investment - It needs capability, ownership, staff time and engagement - Data, systems, connectivity and cybersecurity must be prepared - Approved tools, data rules and governance must be established	- The firm must prove the return before committing more capital - Operational users and domain experts must take part - The application needs representative data and realistic systems - Accuracy, security, oversight and accountability must be tested	- The full cost of deployment must be funded - Tasks, responsibilities and performance measures must change - AI must connect to operational data and existing systems - Controls and accountability must work in practice	- Benefits must be measured and further investment justified - Ownership and capability must be sustained organisation-wide - Systems must scale across sites, suppliers and destinations - Performance, supplier and regulatory duties need oversight

4. How firms can overcome the barriers: Existing supports

Ireland offers a broad range of support to help firms adopt AI. Rather than providing a single programme from start to finish, the system offers three types, or layers, of support:

1. **AI-specific support** builds AI awareness, skills and adoption.
2. **AI-eligible support** covers areas such as digitalisation, productivity, capital investment, skills and innovation, which can support AI projects that meet programme criteria.
3. **Indirect or complementary support** covers areas such as cybersecurity, intellectual property, sustainability, market development and growth finance. These programmes do not fund AI adoption directly, but they can make projects safer, more commercially viable or easier to scale.

Most support falls in the second category.⁵⁹ Most enterprise funding can cover a range of technologies rather than reserving funding specifically for AI. This gives agencies flexibility, but the existence of a programme does not guarantee funding for an AI project. Eligibility depends on the purpose of the programme, the nature of the proposed project and the enterprise's size, ownership, sector and agency relationship.

Responsibility for enabling adoption also extends across government. DETE and the enterprise agencies have a central role in enterprise development and investment, while the Department of Further and Higher

Education, Research, Innovation and Science (DFHERIS) shapes skills provision through the National Training Fund and bodies including Skillnet Ireland and SOLAS. The Department of Finance shapes the wider tax framework within which firms make technology and capital-investment decisions.

Overall, several cross-sector and sector-specific organisations provide access to support, including:

- **Local Enterprise Offices (LEO)** primarily support indigenous micro and small enterprises.
- **Enterprise Ireland's** principal client base is indigenous companies operating in manufacturing or internationally traded services, including high-potential start-ups; it also supports the construction sector.
- **IDA Ireland** supports foreign-owned enterprises.
- **Skillnet Ireland, SOLAS, education and training boards, and the further- and higher-education systems** provide routes to workforce skills and individual capability.
- **The European Digital Innovation Hubs, Technology Centres and Technology Gateways** provide routes into specialist expertise, experimentation, test-before-invest facilities and research collaboration. The wider research and technical ecosystem adds further capability. In particular, Rinn Artificial Intelligence is Research Ireland's new

national centre for research and innovation in data science and AI, bringing together research capability at national scale and providing a platform for collaboration with industry. Other organisations, including Digital Manufacturing Ireland, Lero, Tyndall National Institute and ICHEC, provide complementary capabilities in areas such as digital manufacturing, software, semiconductors and high-performance computing.

- **Fáilte Ireland** provides a separate route for tourism businesses, the majority of which are micro or small enterprises.

These organisations play different roles across Ireland's AI ecosystem. Enterprise agencies and sector bodies are the main routes into firm-level advice, capability building, financial support and transformation; skills bodies develop AI literacy, specialist expertise, leadership capability and workforce adaptation; and the European Digital Innovation Hubs (EDIHs), research centres and technical organisations provide access to specialist expertise, facilities, testing, validation and collaborative research. Alongside these, regulators, standards bodies and professional organisations help build trust and support responsible adoption, while national digital and computing infrastructure provides the connectivity, compute, storage and data-processing capability needed to develop and scale AI. Together, these elements support the progression from research and innovation through enterprise adoption, workforce change and deployment at scale.

Cross-sector support by barrier

The supports available help address the four groups of barriers outlined above.

1. Strategy and financial

Firms need help understanding and identifying where AI can create value, choosing suitable use cases, building a business case and securing the resources to implement them.

Supports to help firms get started on the AI adoption journey

Several support programmes provide a starting point. Enterprise Ireland's new Make AI Work pathway gives its clients a structured route through three stages: exploring AI, testing an idea and moving into implementation. It combines practical guidance with an AI opportunity check, Irish case studies and webinars, and connects firms to relevant advice, expertise, training and funding. LEO introductory programmes, Fáilte Ireland supports and LearnIFI (its online learning platform), IDA digitalisation diagnostics and the European Digital Innovation Hubs (EDIHs) provide additional routes for firms with different agency relationships and sector needs to help decide where to begin. AIReady.ie provides a further national awareness resource, particularly for very small businesses and individuals - designed to make learning about artificial intelligence simple and accessible to everyone.

Supports helping with development plans

A second group of measures helps firms develop more detailed plans. LEO Digital for Business provides consulting support to assess existing digital systems and identify opportunities. For eligible Enterprise Ireland clients, Access Advice: Digital Discovery provides short engagements with external digital experts to assess current systems, identify digital or AI opportunities and define the next steps. IDA's Business Development Programme for digitalisation can support consulting costs through grants of up to €300,000, awarded case by case. The EDIHs offer similar support for firms that need more specialised advice on AI or data readiness.

Financial supports for AI Adoption

Financial measures can help firms buy and configure software and equipment, purchase related services and introduce new production or service-delivery methods. The LEO Grow Digital Voucher supports relatively small investments in software, training and configuration. Enterprise Ireland's company-development, digital-process, capital and transformation programmes can finance more substantial projects for eligible Irish-owned firms, while IDA's digitalisation, asset and transformation programmes support eligible foreign-owned companies. Fáilte Ireland offers support for tourism enterprises specifically.

For larger firms, the route to support therefore differs according to ownership and agency relationship. These differences in agency eligibility are distinct from the State aid rules that apply to individual projects, which depend on factors such as the legal basis for the aid, firm size, eligible expenditure and the characteristics of the project.

Public grant funding must comply with EU State aid rules. Broadly, this is the case where public funding gives a particular business or group of businesses an economic advantage that would not otherwise be available on normal market terms, and that advantage has the potential to affect competition and trade within the EU. There is no general State aid route specifically for AI adoption, but AI implementation is not inherently excluded from public support. An AI project may receive support where it meets the conditions of an applicable State aid category or approved aid scheme. Where applicable, support can be provided under the de minimis Regulation, which permits up to €300,000 to a single undertaking over a rolling three-year period. Where support constitutes State aid and is not provided under the de minimis Regulation, it must have another valid legal basis, for example under an applicable General Block Exemption Regulation provision, and existing approved aid scheme, or another State aid route.⁶⁰ The conditions and permitted aid intensity will vary according to the form of support, firm size, eligible costs and project characteristics.

The tax system can also support elements of AI investment through measures that are not specific to AI. Capital allowances are available for qualifying expenditure including computer software and plant and machinery. Qualifying R&D activity can also benefit from the R&D Corporation Tax Credit. These routes will not apply to every AI investment: routine acquisition or integration of an established product, for example, may not meet the criteria for qualifying R&D.⁶¹

Financial Support for RD&I

Research, development and innovation (RD&I) and commercialisation programmes provide a separate pathway for technically novel applications. Enterprise Ireland's Research Development and Innovation Fund, IDA RD&I grants, the Disruptive Technologies Innovation Fund and Horizon Europe can all support qualifying projects. These programmes play an important role, but they do not replace funding for routine AI adoption. A gap can arise where a strategically important AI implementation involves substantial expenditure on established technology, data preparation, systems integration and organisational change but does not meet the requirements for RD&I funding or fit the conditions and eligible costs of another available support. Integrating an established AI product, for example, may not constitute qualifying R&D.

2. Organisational

Organisational barriers include skills, specialist capability, employee adoption, leading through change, process redesign and the ability to embed AI in normal operations.

Skills programmes are one of the strongest parts of the current support system. Skillnet offers training in AI literacy, leadership, ethics and sector-specific applications. SOLAS and Education and Training Boards also provide accredited AI micro-qualifications through Skills to Advance, with provision spanning introductory AI, productivity, responsible use and strategic planning. The model is designed particularly around enterprise and SME needs and applies learning to workplace use cases.

Further- and higher-education providers offer courses ranging from short introductory modules to postgraduate programmes in AI, machine learning, data analytics and AI strategy. Enterprise Ireland and IDA provide company-level training grants, while programmes such as Key Manager Support, GradStart and PhDStart can help eligible firms build specialist capability. Fáilte Ireland provides a suite of digital and AI focused training modules through its National Calendar programme, available to tourism enterprises from all tourism sectors.

Availability alone does not ensure that training is taken up or meets firms' needs. AI capability increasingly needs to be incorporated into existing occupational and operational learning, rather than treated only as a standalone technical skill. In manufacturing, for example, this can mean integrating AI into training on maintenance, validation and technical documentation, supply-chain management and other activities undertaken by engineers, technicians and managers. This should connect with the wider national skills architecture, including the National Skills Council and the Expert Group on Future Skills Needs' work on AI and the Irish labour market.

Broader transformation programmes can help firms turn that expertise into new ways of working. Enterprise Ireland and IDA can support consulting, internal project teams, training, process redesign and, in some cases, capital investment. Fáilte Ireland combines training and mentoring with digitalisation support. The EDIHs and agency mentoring networks offer further guidance.

3. Technology and ecosystem

Technology and ecosystem barriers include the digital and data foundations needed for AI, systems integration, access to expertise and test facilities, interoperability and collaboration across firms and sectors.

Ireland has a substantial network of facilities and expertise for testing and developing new applications. Its four EDIHs offer complementary capabilities:

- CeADAR focuses on AI, machine intelligence and data analytics. CeADAR operates as Ireland's national centre for applied AI, supporting AI innovation, skills development, infrastructure access, translational research and enterprise development.
- Data2Sustain focuses on data-driven innovation and sustainability, particularly in the North and West.
- ENTIRE supports digital technologies, sensors, the Internet of Things and cybersecurity.
- FactoryxChange led and managed by Irish Manufacturing Research (IMR), supports advanced digital and AI adoption in manufacturing through training and related services.

Technology Centres, supported by Enterprise Ireland and IDA Ireland, connect groups of firms to shared applied-research capacity. The Enterprise Ireland and ERDF-funded national Technology Gateway network gives firms open access to researchers and equipment in the technological universities. These designations describe different functions, and some organisations hold more than one. CeADAR is a Technology Centre, undertaking applied AI and data-analytics research, industry-led research projects and the development of new AI capabilities, and bringing firms and researchers together; in its EDIH role it provides firm readiness assessments, demonstrators, advisory and implementation support and skills development. Irish Manufacturing Research (IMR) is likewise a Technology Centre and hosts the EDIH-FactoryxChange. Other examples include Construct Innovate and the Smarter Factory Gateway. Together, these organisations give firms access to specialist expertise, research capability and facilities that many could not build on their own.

The wider research ecosystem also strengthens national AI capability. Rinn Artificial Intelligence, Research Ireland's new national centre for data science and AI, builds on the expertise developed through the former Insight and ADAPT centres and provides a national platform for AI research and industry collaboration. Lero provides complementary expertise in software research, alongside institutions such as Tyndall National Institute with relevant capability in semiconductors, microelectronics and related technologies. These organisations do not all provide direct enterprise-adoption grants, but they add research capability, talent, test and research infrastructure, and routes for industry collaboration.

Innovation vouchers, innovation partnerships, feasibility grants and collaborative R&D programmes give firms routes into this network. They are particularly useful where firms need to test whether an idea will work, develop a prototype or solve a shared industry problem. Once firms have proved an application, implementation and capital programmes can support some of the software, equipment and integration needed to deploy it.

The breadth of this network does not mean that delivery capacity will scale automatically with demand. Capacity across centres, hubs and collaborative programmes is finite, and programme budgets may become more constrained as enterprise engagement grows. If demand for AI support increases materially, delivery capacity and programme funding may therefore need to expand alongside it.

4. Safety, security and trust

Safety, security and trust barriers include cybersecurity, privacy, intellectual property, regulation, data governance, confidence in AI outputs, accountability and the monitoring of systems after deployment.

Existing programmes address parts of this agenda. Enterprise Ireland's Cyber Security Review Grant and intellectual property supports can strengthen firms' foundations. Skillnet and further- and higher-education providers offer training in AI ethics, law, security and responsible innovation. DataSMART and related programmes can help firms improve their data capabilities, while parts of Fáilte Ireland's training include guidance on responsible use. The EDIHs and specialist centres such as CeADAR can also advise firms on technical safeguards and governance.

Figure 15. Ireland's enterprise AI support architecture

Type of Support ■ AI-specific: designed for AI □ AI-eligible: where criteria are met ○ Complementary: makes adoption safer



Source: Based on the policy-support compendium collated by DETE. The figure shows the indicative structure and coverage of the current offer; it does not assess ease of access, enterprise take-up, whether the support changes what firms would otherwise have done, or programme impact. Named measures are illustrative rather than exhaustive.

Sector-specific additions to the cross-sector offer

Sector-specific measures sit on top of the wider enterprise support system rather than replacing it. Their depth varies considerably.

Manufacturing: Manufacturing has the most developed sector-specific ecosystem. Relevant supports include IDA's Advanced Manufacturing Diagnostic; Digital Manufacturing Ireland, which helps manufacturers test, adopt and deploy advanced digital technologies; FactoryxChange and Irish Manufacturing Research; the Smarter Factory Gateway; and, programmes delivered through Industry 4.0 Skillnet, MIDAS Electronic Systems Skillnet, Irish Medtech Skillnet, Food and Drink Ireland Skillnet and Bio Pharma Chem Skillnet. Manufacturers can also access substantial capital, digital-process and operational-excellence support through Enterprise Ireland or IDA, depending on ownership and client status.

Tourism: Tourism has a clearly identifiable sector-specific entry point through Fáilte Ireland. Its digital transformation programmes combine diagnostics, advice, training, mentoring and grant support, with AI-related content covering digital marketing, content strategy, online discoverability and multichannel discovery.

LearnIFI, Fáilte Ireland's online training platform, includes courses on practical AI, reusable AI assistants, digital content performance, strategy, guardrails and responsible use via its National Calendar always-on training programme. Additional measures include Fáilte Ireland's Tourism Research and Insights, cost-management resources and workforce and career-development programmes. Skillnet provides a dedicated course on demystifying AI for hotels. LEO digital supports and the CeADAR and Data2Sustain EDIHs provide further cross-sector routes.

Construction: Construction has a smaller and more fragmented sector-specific overlay. Relevant measures include Build Digital, which provides practical guidance, tools and implementation support to help construction and built-environment organisations adopt digital workflows and information-management standards; CitA Skillnet's AI Core Skills for Construction and Microsoft 365 Copilot training; the Construct Innovate Technology Centre; and Enterprise Ireland's Built to Innovate programme. Construction firms may also draw on generic LEO digital and training supports, the European Digital Innovation Hubs, Technology Gateways and collaborative R&D mechanisms where eligible.

5. How firms can overcome the barriers: Potential interventions

Participants stressed that Ireland already has many of the instruments, research centres, networks and sources of expertise needed to support AI adoption. Their concerns centred on three gaps:

1. **Visibility—firms do not always know how to use AI, develop a practical plan or access the right support:** Businesses may struggle to understand where AI could create value, which programme is relevant or which organisation to approach. Newer routes, including Enterprise Ireland's Make AI Work pathway, are strengthening navigation for their target clients. The remaining need is to ensure that similarly clear, relevant routes reach firms across different agency relationships, sectors and levels of digital maturity.
2. **Depth—support becomes less consistent as firms move into implementation:** Provision is strongest in areas such as awareness, training and experimentation. Support is less consistent for the practical work of preparing data, integrating systems, change management, redesigning processes, completing assurance and supporting early operation.

3. **Foundations—some barriers require collective action:** Most support is designed for individual firms, yet common data standards, interoperability, shared infrastructure, value-chain coordination and practical assurance often require several businesses, platforms or public bodies to act together.

Participants generally favoured making better use of existing institutions and programmes: improving visibility and navigation where support already exists, connecting complementary offers more effectively and extending provision where genuine gaps remain. The first two interventions identified address visibility and navigation; the next two strengthen implementation capability; and the final two address shared data, technical and assurance foundations that firms cannot effectively build on their own. Three additional interventions respond to structural challenges specific to manufacturing, construction and tourism (see Figure 16).

Figure 16. Potential interventions

Significance									
Critical									
High									
Moderate									
Low									
Barrier cluster									
Strategy and financial									
Organisational									
Technology and ecosystem									
Safety, security and trust									

Significance ■ Critical ■ High ■ Moderate ■ Low

Barrier cluster ■ Strategy and financial ■ Organisational ■ Technology and ecosystem ■ Safety, security and trust

	Sector			Firm size					
Intervention	Mfg	Tourism	Constr.	Large	Medium	Small		Barrier addressed	How it is addressed
Gap 2 – Depth									
3. Fund the full work of implementation and scale Stage-gated support that closes the gap between a successful pilot and day-to-day use.								Cost, funding and uncertain returns: The cost of operational deployment can rise sharply after a successful pilot.	Releases support in stages as evidence of value and readiness increases.
								Time and management bandwidth: Implementation competes with day-to-day work for scarce staff time.	Allows implementation effort, staff time and backfill to form part of the supported project.
								Data and digital foundations: Pilots may succeed without the data and integration work live operation requires.	Extends eligible work to migration, interfaces and integration.
								Trust, reliability and governance: Assurance requirements can add substantial cost before an application can go live. ¹	Treats testing, cybersecurity and independent assurance as part of implementation.
4. Build training around real work Role-specific capability built around live use cases, with time and backfill where needed.								Leadership, strategy and ownership: Leaders may lack capability to make informed choices on AI priorities and investment.	Builds leadership capability through live use cases rather than generic training.
								Skills and capability: Firms may lack people who combine AI knowledge with operational and sector expertise.	Develops role-specific capability around the processes where AI will be used.
								Leadership and change management: People affected by adoption may be involved too late or lack time to participate.	Brings affected teams into live implementation with capacity to participate.
								Organisational redesign: Introducing AI can change roles, hand-offs and human oversight of decisions.	Uses live workflows to redesign these arrangements as part of implementation.
Gap 3 - Foundations									
5. Treat data and shared foundations as part of adoption Firm-level data and integration work, plus shared standards where problems cross organisational boundaries.								Data and digital foundations: Data may be fragmented, inconsistent or inaccessible across the systems where it is needed.	Provides practical data engineering and integration to make information usable in operational workflows.
								Platform and supply-chain dynamics: Incompatible systems, formats and standards can prevent information moving across organisations.	Develops shared definitions, interfaces and standards where interoperability depends on collective action.
								Provider and compute dependency: Firms may become locked into a small number of model, platform or compute providers.	Portability, common standards and access to alternative compute reduce reliance on any one provider.
6. Make governance & assurance usable and proportionate Practical templates and shared assurance matched to the consequence of the use case.								Trust, reliability and governance: Firms may be unsure what level of testing, oversight and monitoring a use case requires.	Provides proportionate templates and methods matched to the consequences of the application.
								Regulation and compliance: Legal and sector requirements can be difficult to translate into day-to-day controls.	Turns those requirements into practical controls and routes to specialist or independent assurance.

Significance ■ Critical ■ High ■ Moderate ■ Low

Barrier cluster ■ Strategy and financial ■ Organisational ■ Technology and ecosystem ■ Safety, security and trust

Intervention	Barrier addressed	How it is addressed
Sector-specific – Structural Challenges		
7. Manufacturing Develop test, validation and acceptance pathways Representative test environments and common validation methods, with a formal route where required.	■ Data and digital foundations: Testing against realistic production data and conditions can be difficult without disrupting operations.	Provides shared environments in which applications can be tested against representative conditions before deployment.
	■ Trust, reliability and governance: Technical performance in a pilot may not demonstrate reliability under operational conditions.	Applies common evaluation and validation methods before an application is accepted for use.
	■ Regulation and compliance: Regulated and safety-critical uses may require formal evidence before operational acceptance.	Creates a recognised route for firms and relevant assurance or regulatory bodies to review that evidence.
8. Construction Adapt procurement, contracts and liability arrangements for AI-enabled delivery Standard contractual arrangements, clearer accountability and common information requirements.	■ Cost, funding and uncertain returns: The party funding adoption may not capture all of the resulting productivity gains.	Uses contracting and procurement arrangements to clarify how costs and benefits are shared.
	■ Platform and supply-chain dynamics: Project participants often use different systems and information formats.	Sets common information requirements and encourages interoperability across the project lifecycle.
	■ Trust, reliability and governance: Accountability may be unclear when AI informs technical or safety-related decisions.	Clarifies responsibility, audit rights and insurance through standard clauses and guidance.
	■ Regulation and compliance: Existing professional and legal duties may not be reflected clearly in AI-enabled delivery.	Embeds those duties in procurement requirements, contract terms and acceptance criteria.
9. Tourism Strengthen Ireland's position in AI-mediated discovery and distribution Improve shared tourism information and engage the platforms increasingly shaping discovery and booking.	■ Data and digital foundations: Tourism information may be incomplete, inconsistent or poorly structured for AI-mediated discovery.	Improves the availability of accurate, machine-readable destination and product information.
	■ Platform and supply-chain dynamics: Individual firms have little influence over how the platforms that shape discovery and booking present them.	Enables tourism bodies to engage those platforms collectively on how Irish businesses are represented.
	■ Provider and compute dependency: The sector depends on a few global providers, so a change in terms or ranking affects many firms at once.	Monitors provider terms and market concentration so the sector can anticipate change and respond collectively.

1. Launch a national AI awareness and engagement campaign

Participants proposed a national publicity campaign showing where AI can create value, what responsible adoption involves and where firms can find practical help. But it would need to “meet people where they are”.⁶² A building subcontractor, a publican and the manager of a semiconductor plant are unlikely to rely on the same sources of advice.

The campaign should provide a common national message and entry point for firms of all sizes, while using different channels and levels of engagement to reach them. Content should focus on familiar problems – scheduling, quality, tendering, pricing, or administration – rather than explain AI in the abstract. It should combine the national message with delivery through trusted sector and local intermediaries. It could build on Enterprise Ireland’s Make AI Work pathway, including its opportunity check, Irish case studies and webinars, alongside AIReady.ie, the National Enterprise Hub and the existing reach of Local Enterprise Offices, IDA Ireland, Fáilte Ireland, Skillnet networks, industry bodies and professional organisations. Minister-led AI “roadshows” provide a further platform for direct engagement with firms in their own regions. They could be used to showcase practical examples, hear directly from businesses about adoption barriers and increase awareness of the support already available.

The overall aim should be to extend practical, peer-based engagement across the wider enterprise base, and should avoid duplicating existing agency resources or creating separate information layers.

For small and medium-sized firms in particular, the first hurdle may be uncertainty rather than finance. Before investing, firms want evidence that a comparable business has implemented AI successfully: what it changed, what it cost, what skills and management time were required, what problems arose and what value was achieved. The campaign should therefore be supported by a network of Irish SME demonstrator or reference firms across the sectors examined. These firms could provide practical case studies and, where appropriate, allow other businesses to visit or see implementations in operation, speak directly to peers and understand the adoption journey first-hand. This would turn awareness activity into practical risk reduction rather than simply promotion.

The sector use cases assembled through this study could feed directly into campaign case studies, demonstrator examples and follow-on guidance and training.

Success should be measured by firms moving into these next steps, not campaign reach alone.

Sector considerations

Channel strategy should reflect how firms in each sector consume information and who they already trust. In construction, that may mean combining formal enterprise channels with trade media, supplier and merchant networks, industry events, social media and short-form video that can reach smaller firms during their working day. Tourism similarly requires strong use of Fáilte Ireland, destination management organisations (DMOs) and local destination development networks.

Manufacturing can rely more on enterprise agencies, industry bodies, Technology Centres, technical media and peer-to-peer engagement, particularly where firms are looking for evidence from comparable plants or subsectors. The opportunity is also to apply a stronger sector lens to existing national and agency resources, using sector-specific use cases, demonstrators and routes into support so that firms can see how the adoption journey translates into their own operating environment.

Firm-size considerations

Within the common national framework, the mix of channels and content should vary by firm size.

Micro and small firms should be reached through channels embedded in their day-to-day working. Communications should be short and practical, with trusted local or sector intermediaries providing a clear route to peer examples, demonstrator firms and the next source of support. Where feasible, site visits, open demonstration days or virtual walkthroughs could allow firms to see relevant applications operating in businesses similar to their own.

Medium-sized firms are likely to need more detailed reference cases showing the full implementation journey — including integration, internal resource requirements, governance, costs and realised returns — alongside opportunities to engage directly with peer firms that have moved beyond pilots. Large firms could be engaged through enterprise agencies, industry leadership networks and senior peer forums.

2. Create a managed pathway from diagnosis to scale

Participants also called for a clearer route through the existing support system. The issue is not always an absence of support: firms may also struggle to identify which existing programme is relevant, how complementary offers fit together and where to go next. Enterprise Ireland has since launched its Make AI Work pathway for clients, providing a structured route from exploring AI through testing and into implementation, with Client Advisors connecting firms to relevant supports. This provides a stronger foundation on which to build.

Diagnostics used across the support system could establish the business problem, expected outcome, digital and data starting point, internal capability, likely cost and level of risk, then direct the firm to the appropriate advice, training, test facility, finance or assurance support. Firms that first need stronger digital or data foundations should be directed towards those supports before undertaking more complex AI projects; firms that are already ready should be able to move directly into a defined use case with clear measures of value. Where several organisations provide complementary support, firms should be able to move between them without repeatedly re-establishing the same needs and starting point.

The pathway should be vendor-neutral and draw on advisers with relevant sector and process expertise. Firms also need evidence from comparable businesses and transparency over any commercial relationships with technology providers.

Sector considerations

The pathway should use a common structure but become more specific as firms move towards implementation. In tourism and construction, entry points should be anchored in familiar business problems and delivered through trusted sector intermediaries. Manufacturing requires greater technical depth, including assessment of production systems, operational technology, data integration and, where relevant, quality and regulatory requirements. The use cases and sector analysis developed through this study could provide a basis for tailoring diagnostics, reference cases and onward support without creating separate pathways for every sector.

Firm-size considerations

For micro and small firms, the pathway should be light-touch: one defined use case, a simple readiness and risk assessment, and a clear next step, preferably using systems the firm already has.

Medium-sized firms will often need a deeper assessment of the integration, capability, governance and investment required to move beyond a pilot, together with a practical roadmap covering priorities, ownership and the organisational changes needed to scale. Continuity of advice is particularly valuable where the firm lacks specialist teams to coordinate these elements internally.

Large, multi-site or regulated enterprises need a more sophisticated route covering architecture, integration, assurance and organisation-wide change. Multinational enterprises currently have relatively few supports available specifically for AI adoption, with grant support largely concentrated on projects that meet RD&I requirements.

This can leave a gap for substantial AI implementation and integration projects that are strategically important but do not qualify as R&D. Multinational operations may also need help navigating group-level technology, procurement, quality and investment requirements.

3. Fund the full work of implementation and scale

Participants highlighted that funding should reflect the full cost of implementation, not simply the cost of software.

Support could be released in stages, with larger awards available only as firms demonstrate greater readiness and evidence of value. Following a diagnostic, firms with a credible case could receive support for a pilot with agreed success measures. Larger implementation awards would follow only where the pilot demonstrates sufficient value and the firm has a viable plan for scaling.

- Eligible expenditure could be grouped into areas, including:
- Data and integration, including preparation, cleaning, migration, interfaces and connectivity;
- Technical infrastructure and assurance, including cybersecurity, testing and independent validation;
- Organisational implementation, including staff time, backfill, training and workflow redesign; and
- Deployment and early operation, including software, equipment, technical services, subscriptions and initial recurring costs.

Sector considerations

In manufacturing, particularly pharmaceuticals and medical devices, implementation can require substantial integration with existing production systems alongside testing, qualification, validation and assurance. Funding should recognise these costs rather than assume that a successful pilot can move easily into operational use.

Construction may require funding models that reflect its project-based structure. Some applications will depend on data, systems or process changes involving clients, contractors and specialist firms rather than a single enterprise. Support may therefore need to accommodate collaborative pilots or implementation costs that cross organisational boundaries.

In tourism, technology costs may be modest, but implementation can still require scarce management and staff time, integration with booking or customer systems and changes to day-to-day processes. Smaller funding grants covering these practical costs may therefore be more effective than investment supports focused primarily on technology purchase.

Firm-size considerations

For micro and small firms, support should be simple to access and proportionate to the project, with eligible costs extending to external expertise and staff time where these are necessary for implementation.

Medium-sized firms are likely to face the largest gap between affordable experimentation and the cost of operational deployment. Integration, governance, specialist skills and organisational change can create a much larger funding requirement once a pilot succeeds, making stage-gated support particularly relevant.

Large firms have greater capacity to fund pilots and routine technology purchases. Public support is more likely to add value where deployment involves substantial integration, assurance or collaborative demonstration. For multinational operations, it may also help Irish sites build the evidence required to secure wider group investment.

4. Build training around real work

Participants wanted training to be tied more closely to implementation.

Capability needs differ by role. Leaders must set priorities and assign ownership; operational users need to apply and challenge outputs; technical teams need to integrate and monitor systems; managers need to redesign processes; and legal, quality, cybersecurity and governance functions need to manage risk.

Training built around live use cases could combine AI knowledge with sector and operational expertise. It should also involve the people whose work will change, helping firms build understanding and engagement alongside technical capability. Firms should emerge with a redesigned workflow and implementation plan, rather than simply more trained individuals. Learning should, where possible, continue through implementation as firms encounter technical, organisational and governance challenges.

Time is part of the constraint. Wage, backfill or project-capacity support could help smaller firms release key staff, while embedded mentors, graduate placements, industry residencies and shared specialists could provide capability that firms cannot justify employing permanently.

Sector considerations

In manufacturing, training should combine AI capability with knowledge of production processes. Operational and engineering teams need to understand how AI interacts with equipment, data and existing workflows, while quality and regulatory functions need sufficient capability to assess validation, monitoring and change.

Construction training should reflect project-based working and professional responsibilities. Practical programmes could be built around activities such as design coordination, estimating, planning and site management, while reinforcing where professional judgement and accountability remain with the individual. Apprenticeship and further-education routes also provide an opportunity to introduce practical AI capability early, helping skills diffuse into smaller firms as new entrants move into the workforce.

In tourism, training needs to fit a workforce dominated by small firms and, in many cases, seasonal or part-time staff. Short, practical modules linked to tasks such as marketing, booking, customer service or demand management are likely to be more useful than lengthy generic programmes.

Firm-size considerations

For micro and small firms, training should minimise time away from the business and be built around an immediate problem. Mentoring, external specialists and wage or backfill support can help firms participate without sacrificing day-to-day delivery.

Medium-sized firms may need more structured cross-functional programmes and access to people who can bridge operations, technology and data. Placements and shared specialists can help build capability without requiring a permanent AI team.

Large firms can support more specialised training, but the challenge is deploying capability consistently across functions and sites. Role-specific programmes should therefore be linked to live implementation, with mechanisms to spread learning between teams and build common approaches to integration, governance and assurance.

5. Treat data and shared foundations as part of adoption

Participants proposed that AI support should extend to the data and systems on which it depends. At firm level, diagnostics should be able to lead into practical work such as data audits, cleaning, classification, migration, access controls and secure integration.

European Digital Innovation Hubs, Technology Centres, Technology Gateways and research centres can provide technical expertise, test environments and reference architectures. Their enterprise-facing services could be connected more clearly to the wider adoption pathway so that firms identified as having data or integration constraints can move directly into appropriate technical support.

Some foundations require collective action. Data and interoperability problems can extend across firms and value chains, particularly where different organisations use different systems, formats or standards. Common definitions for data, standards that allow systems to exchange information, reference technical architectures and joint projects involving several firms can reduce the cost of solving the same problem firm by firm. Public procurement and large enterprise customers can also encourage common standards, provided smaller suppliers receive help to meet them.

Sector considerations

Manufacturing often requires firms to connect data across enterprise systems and the technology used to run production. In established plants, relevant information may sit across legacy equipment, sensors, laboratory instruments, quality systems and enterprise software introduced over many years. Support may therefore need to include data engineering, interfaces and reference architectures for connecting existing equipment rather than assuming firms can replace it. Interoperability can also be a value-chain issue where manufacturers need to exchange data with equipment providers, suppliers, customers or contract partners using different systems and standards. In regulated subsectors such as pharmaceuticals and medical devices, changes to data flows and systems may also need to preserve the controls and traceability required for validated processes.

Construction requires greater consistency across organisations as well as within firms. Project information is often held by clients, designers, contractors and specialist firms in different systems and formats. Common information structures, interoperable systems

and procurement standards would help. Public clients and major contractors can help establish these requirements, with technical support for smaller suppliers. Intervention 8 considers how procurement and contracting arrangements could reinforce these shared foundations across projects.

In tourism, shared foundations include destination and product information and destination-level digital infrastructure, much of which is commissioned or managed by national agencies, destination management organisations and local authorities. Improving the accuracy, consistency and machine-readability of information on products, availability, accessibility and booking would provide a stronger common foundation for AI-mediated discovery. AI can also enhance shared infrastructure such as digital wayfinding, connected trails and visitor-flow management. Better shared information and infrastructure could also help surface a broader range of regional and off-peak experiences, supporting national objectives for regional dispersal and extending the tourism season. Intervention 9 considers the wider implications for Ireland's visibility and distribution through AI-mediated channels.

Firm-size considerations

For micro and small firms, the priority may be basic digitisation: consistent records, reliable workflows and better use of existing commercial systems. Support should not require sophisticated data architectures where a simpler improvement would enable the use case.

Medium-sized firms are more likely to need help connecting multiple customer, finance or operational systems and establishing consistent data across the business. Technical support for integration and data architecture may therefore be more valuable than further software acquisition.

Large firms have greater technical resources but also more complex estates spanning legacy systems, equipment, sites and external partners. Support is more likely to add value around common architectures, standards and data flows across that complexity.

6. Make governance and assurance usable and proportionate

Participants proposed practical guidance and shared assurance mechanisms calibrated to the consequences of the application.

Proportionality should also apply to the design of the solution itself. Responsible adoption means using AI where it creates a clear business benefit and choosing an approach proportionate to the task. Firms should consider whether a simpler model or existing software can achieve the required outcome, the compute and infrastructure the application will consume, its ongoing cost and maintainability, and its dependence on particular technology providers. These considerations are especially important for smaller firms, where unnecessary complexity can increase cost, resource use and lock-in without adding commensurate value. Where material, firms should also consider the energy and wider sustainability implications of different deployment options.

An internal drafting assistant does not require the same controls as a system influencing production quality, professional advice, customer payments or site safety. A common service could help firms classify applications and apply proportionate requirements.

Practical templates could cover three connected areas:

- Use and data controls, including approved tools, acceptable use and the treatment of personal, commercial and intellectual-property data;
- Application assurance, including vendor assessment, human oversight, output testing, validation, documentation and traceability; and
- Continuing governance, including performance and value monitoring, incident response and relevant obligations under the EU AI Act, data-protection and cybersecurity rules.

These approaches should build on existing regulatory, standards, quality and advisory structures rather than create a parallel assurance regime. Higher-consequence uses may require independent technical assurance or access to relevant regulatory, standards or professional expertise. Where relevant, this should align with the role of the National AI Office and existing sector regulators.

Sector considerations

In regulated manufacturing, particularly pharmaceuticals and medical devices, governance needs to connect with existing quality and regulatory processes. Higher-consequence applications may require qualification, validation, change control and revalidation, with a clear route into regulatory acceptance mechanisms. Intervention 7 sets out a more detailed manufacturing-specific approach to testing, validation and acceptance.

Construction requires greater clarity over accountability when AI contributes to professional or project decisions. Firms need clarity on who remains responsible for AI-supported professional or project decisions and when specialist legal, insurance or professional advice is required.

In tourism, the emphasis is generally less on formal technical validation and more on practical controls for customer-facing use. Firms need straightforward guidance on privacy, approved tools, checking customer information and maintaining appropriate human oversight where AI affects pricing, booking, communications or generates content that represents a business or the destination it operates within.

Firm-size considerations

For micro and small firms, governance needs to be simple enough to use. Many will not have dedicated legal, cybersecurity or risk specialists, so practical packs should answer basic questions: which tools are approved, what information can be shared with them, which outputs need checking, who is responsible and what to do when something goes wrong. Access to trusted external advice should be available where a use case exceeds those basic controls.

Medium-sized firms are more likely to need formal vendor review, access controls, testing, documentation and incident processes, without having specialist assurance functions to design them. Shared templates, independent assessment and access to specialist expertise could prevent each firm from having to build these capabilities from scratch.

Large firms generally have more developed legal, cybersecurity, risk and quality functions, but face greater governance complexity across functions, sites and technologies. Support is more likely to add value through common assurance methods, sector-specific acceptance criteria and approaches to monitoring, change control and audit evidence that can be applied consistently across the organisation.

Additional sector-specific interventions

The six interventions above address needs that recurred across the sectors examined. The sector deep dives also identified challenges arising from the structure of particular sectors that require a more tailored response.

7. Manufacturing: Develop test, validation and acceptance pathways

Manufacturers need practical routes for testing AI where errors can affect production, quality, safety or regulatory compliance. Firms need clarity on how applications should be tested, what evidence should be retained, how performance should be monitored and when changes to models, data or operating conditions require further validation.

A shared assurance approach could build on existing testbeds, European Digital Innovation Hubs, Technology Centres and research infrastructure. This could also draw on test and pilot-line capability being developed by Irish Manufacturing Research for engineering and broader manufacturing applications, providing firms with environments in which to test and de-risk AI before operational deployment. It could provide representative test environments, common evaluation and validation methods, reference architectures and independent technical assurance. This would reduce duplication across firms and help successful pilots move into operational use.

The depth of the pathway should vary by subsector. In pharmaceuticals and medical devices, a more formal route should be developed with regulators, standards bodies, industry and technical experts. Participants proposed controlled testing environments with regulators—described as regulatory ‘sandboxes’ or an ‘AI Airlock’—where firms could test applications and evidence before full operational approval. In pharmaceuticals, this would need to align with Good Manufacturing Practice (GMP), existing quality systems and formal processes for approving changes; in medical devices, it should distinguish AI used in production and quality processes from AI incorporated into the device itself.

Other manufacturing subsectors would need a proportionate version. Food and beverage firms raised questions around food safety, quality and release decisions, while engineering and electronics require assurance for applications affecting machinery, inspection, maintenance and process control. The common aim is a recognised route from technical demonstration to assured operational use.

8. Construction: Adapt procurement, contracts and liability arrangements for AI-enabled delivery

Public clients, industry and professional bodies, insurers and legal specialists could develop practical arrangements for AI-enabled projects. These could include standard contract clauses covering data and intellectual property, supplier obligations, audit rights and allocation of liability; guidance on professional accountability and insurance where AI informs technical or safety-related decisions; and standard procurement questions for evaluating AI providers. The construction evidence explicitly identifies the absence of a practical assurance and coordination framework spanning product selection, project deployment, contractual responsibility and insurance.

Procurement can also be used to improve the digital conditions for adoption. Public and major private clients can set more consistent, machine-readable information requirements and encourage interoperability across the project lifecycle. Demonstrator projects could show how information moves from design through construction into asset operation and how AI-supported decisions are governed in practice. But these requirements should be introduced with practical support for smaller contractors and specialist trades rather than simply adding another compliance requirement.

Commercial arrangements may also need to reflect how the costs and benefits of adoption are shared. Where contractors fund capabilities, but savings accrue to a particular project or are passed to the client, incentives to invest can weaken. Procurement and contracting models could therefore consider how the costs of experimentation and resulting productivity gains are shared across project participants.

9. Tourism: Strengthen position in AI-mediated discovery and distribution

AI is becoming another intermediary between visitors and tourism businesses, displacing the role of traditional search and a more linear path to purchase. AI assistants and AI-enabled search increasingly influence which destinations and businesses customers see, how itineraries are assembled and potentially how bookings are completed. Individual firms have little influence over the requirements, ranking mechanisms or commercial terms of these AI systems. Interviewees raised the risk that businesses outside the main online distribution platforms could be “crowded out completely”.

Relevant national tourism bodies, destination management organisations and local authorities could therefore monitor how Ireland, its regions and individual tourism businesses appear in AI-mediated travel discovery, including whether regional and off-peak experiences are being surfaced. Where gaps are identified, they could

seek to engage search providers, online travel agents, AI model providers and emerging agent platforms on how to support businesses in Ireland to remain discoverable and bookable.

This should build on the shared destination and tourism product information described under Intervention 5, including national owned channels such as discoverireland.ie and visitdublin.com and their ability to make accurate, structured tourism information accessible to AI-mediated discovery. Pilot projects could test whether better access to this shared information improves visibility, itinerary inclusion and routes to booking through AI-enabled services.

Sector deep-dives

The chapters that follow examine the five manufacturing subsectors (pharmaceuticals and chemicals, medical technology, computer and electronics, food and beverages, and engineering) alongside tourism and construction.

Each chapter first looks outward, examining how AI is being applied across the value chain globally and how its relevance differs by firm size. It then turns to Ireland, assessing how the sector's structure and digital maturity shape the priority opportunities for adoption and what the risks of falling behind are.

Finally, each chapter examines the barriers to adoption and what could unlock progress – including how existing supports respond, where gaps remain and what further action may be needed.

Unless otherwise stated, the Ireland-specific findings draw primarily on stakeholder interviews, the online consultation and sector workshops, supported by the wider evidence base for the study.

Manufacturing: Pharmaceutical and Chemicals

At a glance

Ireland's pharmaceuticals and chemicals manufacturing base contains two distinct enterprise populations. A small number of large, mainly multinational pharmaceutical plants account for most of the sector's economic weight. A much broader group of smaller chemical producers, specialist suppliers and contract manufacturers accounts for most firms. The sector spans active pharmaceutical ingredients, biologics, finished medicines, specialty and industrial chemicals, and the contract development and manufacturing services that support them. Its value chain runs from discovery, formulation, analytical and method development, and process development through raw-material sourcing and supplier qualification to validated production, laboratory quality control, stability testing, release, distribution and post-market surveillance.⁶³

Near-term value of AI adoption in Irish plants lies in regulatory and quality documentation, audit readiness, laboratory and production planning, yield, asset reliability, technology transfer and the use of scarce technical expertise. More advanced applications include AI-enabled

discovery, automated experimentation and adaptive production. Primary discovery is not located at every Irish site, but Irish operations also undertake analytical and method development, stability work, process development, manufacturing science and technology, technology transfer, validation and scale-up. These activities sit between discovery and routine commercial production and offer a substantial route to value. Regulation sets the pace. As AI moves closer to a product-quality, release or validated process decision, the requirements for evidence, oversight and change control increase.

Opportunities

- **Make regulatory and quality evidence faster and audit-ready.** The largest near-term gain is in the documentation, evidence assembly and audit preparation that surround regulated production, where the work is text-heavy and the burden falls on scarce technical staff.

- **Detect drift before a batch or test cycle is lost.** Production planning, process control and yield applications can identify deviation while a batch can still be corrected, and move maintenance from schedule to condition.
- **Accelerate technology transfer and scale-up.** Process development, prototyping and validation are where Irish sites add most value between discovery and commercial production, and where AI can shorten the path, using scarce technical expertise where it counts most.

Barriers

- **The record is not joined across plants and partners.** Instrument, laboratory, process and quality data sit in separate systems, and connecting them requires sustained site-specific engineering.
- **Capability is not built around regulated work.** Available training develops general business or technical skills; what firms need is learning that combines AI with process science, laboratory work, quality systems and regulatory affairs, applied to a live use case.
- **No recognised route from model testing to validated use.** Firms do not know how to qualify a model, what evidence suffices, or how to handle a model that changes after deployment.

Potential interventions

- **Create a regulator-backed sandbox for GMP contexts.** A controlled setting to test AI with regulatory input, supported by common expectations, guidance, and checklists.
- **Fund the integration and qualification work.** A digital capital instrument covering the whole of integration — software, data engineering, cybersecurity, validation and the internal staff time implementation requires.
- **Provide a stage-gated route with one owner.** A common diagnostic and a measurable operating problem first, then testbed access, data and architecture support, skills, validation advice and deployment finance, held together by an embedded adviser rather than assembled by the firm.

How AI is impacting the value chain globally

We documented 62 AI applications across the global pharmaceuticals and chemicals value chain, ranging from the reconciliation of supplier statements before a pay run to the design of therapeutic proteins that do not exist in nature.⁶⁴ These are drawn from the study's global AI use-case library, described in Appendix B.

Key areas of application

Upstream, AI accelerates discovery and development. Models combine chemical, biological and clinical data — literature, omics results, patents, assay data and process information — to identify targets worth pursuing and to generate or rank candidates against several criteria at once, allowing scientists to focus laboratory work on the most promising options. Exscientia, now part of Recursion Pharmaceuticals, used this approach to reduce the time required to identify an AI-designed drug candidate from an industry average of about four and a half years to 12–15 months. The same methods extend into clinical development, where structured patient records and unstructured clinical notes can be combined to rank relevant trials and set out why a particular patient may match.⁶⁵

In the **supply chain**, AI helps firms qualify suppliers and detect risk earlier. It can combine audit findings, regulatory history, quality records, procurement data and delivery performance to identify which suppliers or sites need attention. Qualifyze applies this model to pharmaceutical supplier-site risk, reporting a 65% reduction in the time and cost required to

qualify a new supplier.⁶⁶ The paperwork behind those decisions can be handled the same way: supplier emails, quality documents and regulatory dossiers can be read automatically and incomplete submissions flagged, so quality and procurement teams review exceptions rather than process every record. Planning is a further application again: digital twins can simulate inventory, demand, production and safety-stock decisions across a complex network, coordinating more decisions at once while still depending on trusted data, clear decision rights and a planner able to challenge the recommendation.

In **operations**, AI supports process improvement. Roche used models trained on reaction conditions and outcomes to identify improved conditions for active-ingredient synthesis across a search space too large to test manually. Related capabilities detect process drift, predict batch outcomes, improve yield and support cleaning validation, batch review and revalidation decisions.⁶⁷ AI can also support quality control in labs, including sample and instrument scheduling, image-based inspection, review of certificates and test reports, stability analysis, investigation triage and review by exception.

Downstream, AI is most established in pharmacovigilance. Safety information arrives through reports, emails and clinical records and must be assessed quickly without weakening human review. Merck used AI to identify valid case criteria and extract safety-relevant information from unstructured documents before verification, reporting a 39% efficiency gain in the proof of concept.⁶⁸

Across **enabling functions**, the applications are less sector-specific but often easier to deploy. Boehringer Ingelheim used AI to build an enterprise skills map from employee profiles and learning needs, while Moderna used automated supplier-statement and duplicate-payment controls to widen coverage and recover payments.⁶⁹

Differences across firm size

The use cases identified are strongly concentrated in large enterprises. This skew reflects what many use cases assume: a discovery pipeline, validated quality system, submissions programme, supplier panel, clinical dataset, connected laboratory or installed production estate. Those capabilities are concentrated in larger companies and contract manufacturers.

Smaller firms ultimately have fewer batches and deviations for models to learn from.

The more accessible use cases are those where the unit of work is a document, experiment or defined workflow rather than an integrated plant. Formulation support, clinical evidence screening, supplier-document review, certificate checks and digital batch records can be purchased or implemented without building an enterprise-wide AI platform.⁷⁰ For Ireland, this points to different adoption routes: large sites can pursue integrated process, quality and planning systems, while smaller firms need narrower tools, shared expertise, test environments and support that reduces the cost of data preparation and validation.

Key opportunities in Ireland

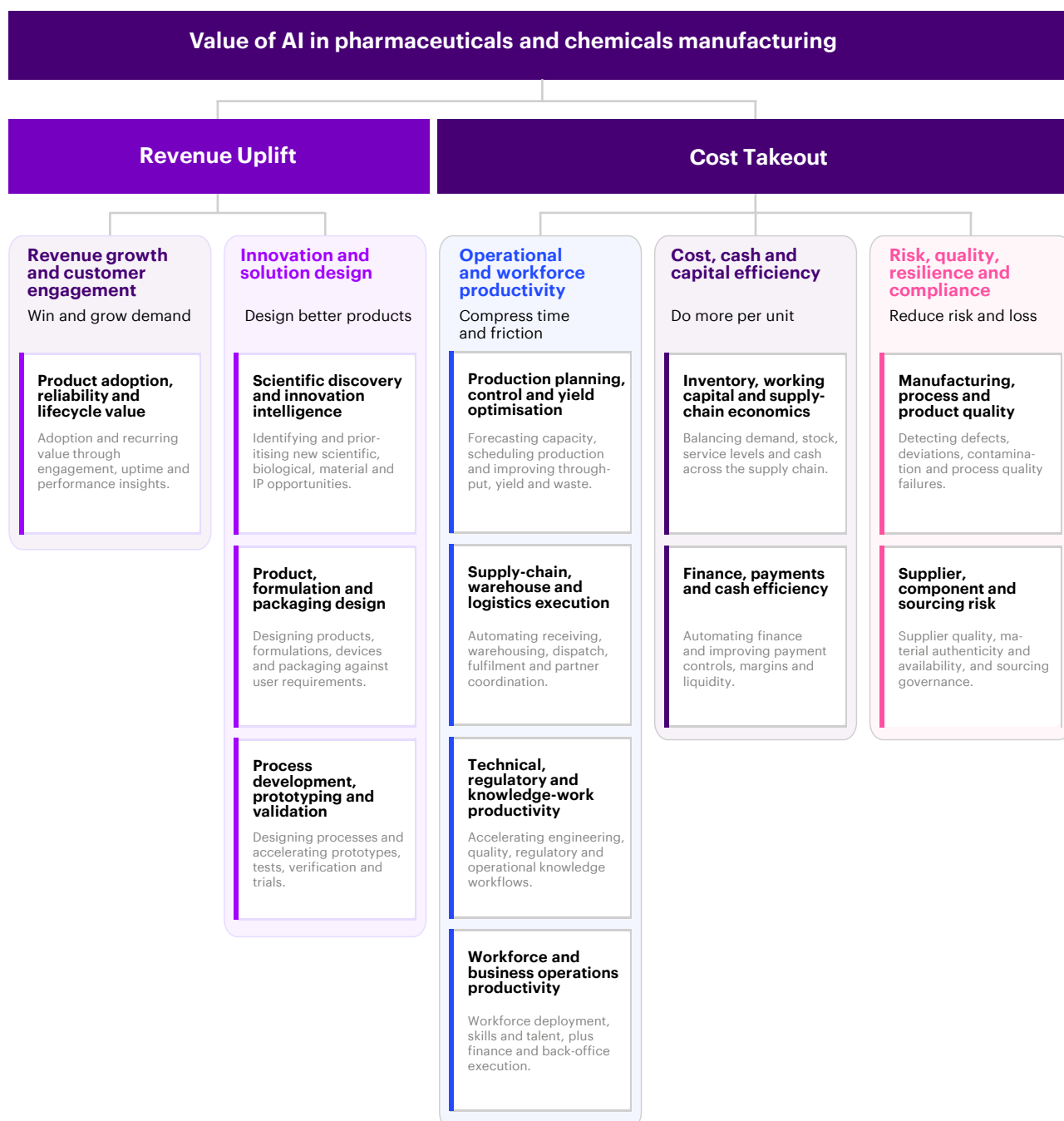
The use cases identified group into 12 opportunity themes across five clusters (see Figure 17).⁷¹

Revenue uplift is concentrated in discovery and development. Scientific discovery and innovation intelligence, product and formulation design, and process development and validation account for nearly all applications on the revenue side. Product adoption, reliability and lifecycle value contributes one further application. In this sector, revenue growth

comes mainly from what firms invent, develop and bring to market.

Cost takeout is broader. It includes production and laboratory planning and yield, technical and regulatory work, workforce deployment, logistics, inventory and finance, as well as quality, supplier risk, traceability, product safety and delivery resilience. These applications protect batches, licences, working capital and the continuity of supply.

Figure 17. AI value and opportunity tree in pharmaceuticals and chemicals manufacturing



Source: Based on cluster analysis of the sector use cases in the global use case library. Clusters are mapped into their dominant value impact.

How the enterprise landscape shapes the priority opportunities in Ireland: Scale dominates, but local mandates determine where value can be captured

CSO Business Demography recorded 730 active chemicals and pharmaceutical enterprises in 2023. Micro firms accounted for 576, or 78.9%, while only 40 firms were large. Employment was much more concentrated: large enterprises accounted for 79.4% of people working in the subsector.⁷²

This creates two adoption contexts. Large pharmaceutical and chemicals plants have the quality systems, specialist teams and capital needed for production-grade AI, but global procurement, technology governance and validation can slow local decisions. Micro and small firms can move quickly on a focused tool, but often lack the data volume, management time and purchasing power required for custom integration.

Ireland's position in global value chains also narrows and sharpens the opportunity. Large companies split development activities across locations, and Ireland's strength sits in advanced manufacturing and process-development R&D rather than early-stage discovery, so the largest discovery gains tend not to be within an Irish site's control.⁷³

The broadest accessible value from AI lies in manufacturing, quality control, regulatory work and the supply chain. The inputs are already familiar to Irish operations: methods, samples, batch records, supplier lists, process histories, laboratory results and regulatory documentation. Applications in documentation, laboratory workflow, technology transfer, process control and quality can therefore improve speed and reliability within an Irish site even when discovery or product ownership sits elsewhere.

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: Strong digital foundations, but a modern plant is not always a connected one

The subsector has a comparatively strong digital starting point. Not accounting for micro enterprises, 93% of firms have at least basic digital intensity and 38% use at least one AI technology, compared with 21% across the five manufacturing subsectors in scope.⁷⁴

The qualitative evidence, meanwhile, points to three levels of maturity. At one end of the scale, staff are simply using co-pilots, whether for research, or drafting or handling documents. A second group is piloting bespoke tools that support regulatory documentation and predictive warning systems. A smaller group of large companies is using AI in advanced discovery and process work.⁷⁵

Many life-sciences plants are relatively modern and automated, and interview evidence points to a highly educated workforce that is receptive to digital adoption.⁷⁶ But issues remain; a modern plant is not necessarily a connected plant. Enterprise applications may sit in the cloud while instruments, controllers and production equipment still expose data through vendor-specific workstations, heterogeneous protocols or incomplete histories. Retrofitting a live brownfield environment is also not a straightforward task; it comes with downtime, but may also carry cybersecurity and qualification costs.⁷⁷ The same issue arises in quality-control laboratories, where methods, samples, raw data and results must remain traceably linked across several instruments and platforms.

It is against this backdrop of relatively strong but uneven digital maturity, high requirements for assurance and a legacy infrastructure challenge that the sector's most important AI opportunities arise.

Key opportunities

Five opportunities stand out for Ireland: regulatory documentation and audit readiness; production planning, yield optimisation and early warning; asset reliability; technology transfer and scale-up; and workforce productivity. They do not have to be pursued in sequence. A firm can improve document workflows before its production data is ready, while a digitally mature site may already be testing process recommendations. The common starting point is to begin with a named owner, reliable evidence and expert review.

1. Technical, regulatory and knowledge-work productivity: Make evidence faster and audit-ready

Regulatory evidence is the clearest near-term opportunity because it is both large and unavoidable. Workshop participants identified audit readiness, regulatory filing, packaging and label checks, and the interpretation of evidence from sister sites as priority applications. They also stressed that technical writers and subject-matter experts should be involved from the start.⁷⁸

The value lies in drafting, retrieving and checking evidence while preserving accountability. Interview evidence described test protocols and standard operating procedures being produced in hours rather than days, with expert review retained.⁷⁹ Internationally, Aizon has digitised

pharmaceutical production batch records and Zydus Lifesciences has applied AI to cleaning-validation workflows, including residue limits, worst-case selection and revalidation flags.⁸⁰

Quality-control laboratories add another large evidence burden. Methods, specifications, certificates, raw data, stability results, investigations and reviewer decisions all need to be assembled and checked. Assistive tools can retrieve the relevant controlled source, flag missing information and prepare a first review package. Qualified staff remain responsible for interpretation, disposition and release.

This opportunity is relevant across firm sizes because the unit of work is a document or evidence set rather than a production line. It requires controlled source material, traceable references, a defined reviewer and an audit trail showing what the system produced and what a qualified person approved. Success should be measured through shorter preparation and review times, fewer avoidable errors and better inspection readiness.

2. Production planning, control & yield optimisation: Detect drift before a batch or test cycle is lost

Earlier warning can protect a batch while operators still have room to act. Workshop participants highlighted standard work, resource allocation, end-to-end plant visibility and models that provide process insight for yield optimisation.⁸¹ Interview evidence described the same opportunity from the risk side: identifying a developing problem before it becomes a deviation or a write-off.⁸²

Quality-control laboratories influence the sample release timeline. Sample queues, instrument availability, method execution, result review, stability testing and investigations can all delay a batch.

AI can help schedule work, identify anomalous patterns, support review by exception, retrieve method and stability histories and guide instrument diagnostics. Workshop participants identified human-in-the-loop quality review and vision or monitoring systems as practical applications.⁸³ Use cases identified already cover tablet and vial inspection, certificate review and digital batch records.

Production models require consistent links between the batch, material, equipment, process conditions and quality result. Laboratory models require traceable links between the sample, method, instrument, raw result, calculation and reviewer action. A practical starting point is one process area, method family or instrument class where the data, operating limits and failure modes are well understood.

The opportunity is concentrated in large and digitally mature medium-sized sites, although a bounded laboratory workflow may also be viable for a smaller firm. Any move from warning to changing a validated parameter, dispositioning a result or influencing release raises the requirements for validation, monitoring and human authorisation.

3. Maintenance, asset reliability and diagnostics: Plan maintenance around condition, not failure

Workshop participants added asset reliability as a priority because the relevant data is often more accessible than the data needed for full process optimisation. Applications include predictive maintenance, equipment and downtime planning, automatic work-order creation and assistants that help technicians diagnose shop-floor problems.⁸⁴

This is a practical route into operational AI. Some assets already expose usable alarms and condition data; others are electronically controlled but lack accessible histories, consistent tags or interfaces that allow the data to be combined. Connecting alarms, maintenance records, calibration histories and spare-parts data can help firms identify failure patterns, plan interventions around production schedules and reduce the risk that a critical asset stops a validated process unexpectedly.

The opportunity is strongest in large sites and contract manufacturers with connected equipment, but it can be pursued one asset class at a time.

4. Process development, prototyping and validation: Accelerate technology transfer and scale-up

Technology transfer connects global discovery to the work performed in Irish sites. The current process is often document-heavy and manual, with development knowledge spread across reports, spreadsheets, specifications and quality records. Interview evidence described firms adding people simply to complete transfers, an approach that becomes difficult to sustain when several products move at once.⁸⁵

AI can consolidate these sources, identify missing information, compare process assumptions and help teams prioritise the work needed to move from development to commercial production. The opportunity includes analytical and method transfer, stability evaluation, process characterisation, manufacturing science and technology, validation and scale-up. Companies can, for example, use AI to bring together chemical-route, supply and cost data to rank options that balance manufacturability and risk.

The competitive effect is speed and reliability. Irish sites that can absorb process knowledge, resolve gaps and reach a stable commercial process faster strengthen their case for new mandates.

5. Workforce and business-operations productivity: Use AI as a force multiplier for scarce expertise

The sector faces shortages of scientists, engineers, technicians, laboratory analysts, quality specialists and regulatory staff. Much of the time of these groups is absorbed by search, documentation, administration and coordination. Workshop participants identified resource allocation, skills matching, training, review by exception and general administrative reduction as practical opportunities.⁸⁶

Assistive tools can help with this. They can search controlled knowledge, create first drafts, organise evidence and help staff prepare for unfamiliar tasks. Skills maps can show where capability is concentrated and where training is required.⁸⁷

Firms of any size could in theory adopt such tools, but the operating model plays a role in determining how easily they can do this. Firms need approved tools, access rules, curated knowledge and time to redesign the task. The objective should be to release scarce expertise for higher-value work and to shorten the time required to onboard and train new staff, and enable more consistent execution across shifts and sites.

The frontier: where the sector is heading

The frontier is concentrated in discovery, automated experimentation and release. Identified use cases include the generation of candidate molecules and therapeutic proteins, running closed-loop formulation experiments and using historical patient data to create digital twins of trial control arms. In downstream release, Controlant reports a model in which most products can be released without manual intervention and average release times fall sharply.⁸⁸

Closed-loop laboratory and production systems are opportunities for the longer-term. The adoption of closed-loop and automated release systems is limited to deterministic, explainable models (“Glass Box” AI). Probabilistic models cannot currently be used for final GMP release decisions due to explainability and validation constraints. The viability of closed loop models depends on connected instruments and assets, controlled data, defined operating limits and an assurance approach that covers model performance, drift and change. Regulatory requirements will remain tighter for applications that affect patient safety, product quality, or data integrity.⁸⁹

The consequences of not adopting AI

Slow commercialisation creates mandate risk. Irish plants that take longer to absorb and stabilise a new process are less likely to receive the next product or development mandate.⁹⁰

Contract manufacturers and suppliers face a related interoperability risk. AI deployment is harder when data is split across sponsors,

contract manufacturers, laboratories and suppliers, while multinational customers are raising their expectations for traceability and integration. Firms that cannot exchange trusted data or work inside an integrated planning and quality environment may be excluded from future programmes.⁹¹

Regulatory caution is appropriate in a sector where errors affect patients and licences. Waiting for complete certainty carries its own cost. Firms that postpone work on improving their data, instrument connectivity, governance and reviewer capacity will struggle to move quickly when regulatory guidance matures.⁹²

Overall, uneven adoption would reinforce the divide between a small number of globally connected plants and a long tail of smaller firms. Large sites may progress through group investment while domestic suppliers and smaller chemical firms remain outside the digital thread. That would weaken spillovers, reduce the depth of the local ecosystem and leave more technology and decision-making outside the country.

Barriers—and what would unlock adoption

Adoption depends on a connected set of capabilities: reliable data, people who understand both AI and regulated production, a practical assurance route, organisational ownership and an investment case that covers deployment and operation. Ireland has substantial provision in training, diagnostics, feasibility, research and selected capital costs. Participants typically described the problems as occurring once a use case had to be validated, integrated and operated.⁹³

Figure 18 summarises the chain from barrier to potential response. The sections that follow set out each barrier in turn, drawing on the workshop, the interview evidence and the supports currently available.

Figure 18. Barriers to AI adoption in chemicals and pharmaceuticals manufacturing: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Data and digital foundations Joining the record across plants and partners	Equipment is often electronically controlled without being digitally connected, and records are split across plants, sponsors and contract manufacturers.	Diagnostics, vouchers, capital and cyber-review supports exist, with PMTC, PMBrc and the EDIHs for test-before-invest. Sustained data engineering, interface qualification and cross-organisation interoperability remain thin.	- Co-funded interface assessment and data context engineering - Master-data reconciliation and qualification - Common architecture patterns and secure local test beds - End-to-end demonstrators, instrument to governed workflow
Skills and capability Building expertise around regulated work	Firms need people combining process knowledge with data engineering, model evaluation, quality systems and regulation. A lone champion is no substitute for a multidisciplinary team.	Skillnet, Enterprise Ireland and IDA provision is broad. Weaker is learning applied inside a GMP production, laboratory or validation workflow, and protected time to use it.	- Invest in Springboard and Skillnet rather than new programmes - Role-specific modules for operators, laboratory, engineering and quality staff - Co-funded residencies pairing AI specialists with domain experts - A regulated-manufacturing learning factory
Regulation and compliance Creating a route from testing to validated work	Firms do not know how to qualify a model affecting a product, process or release decision, what evidence suffices, or how retraining and drift fit change control.	Cyber, IP, governance and research supports exist, with places to test. There is no recognised route from model testing into routine GMP production.	- A regulator-backed airlock for testing AI in a GMP context - Qualification guidance, validation checklists and oversight thresholds - Audit-readiness support and better regulatory advice - Clearer rules on data, model and IP ownership
Leadership, strategy and ownership Turning pilots into production capabilities	Large sites fund experiments but face pilot purgatory, with decisions often taken outside Ireland; smaller firms lack the capacity to carry a project through.	Diagnostics, consultancy and Lean instruments cover several stages, and Digital Process Innovation reaches internal time. Firms must assemble the pathway themselves, and continuity through implementation is missing.	- A stage-gated pathway from diagnostic to deployment finance - An embedded implementation manager coordinating providers - Funding for a named internal lead and protected staff time - Peer demonstration, starting with lower-risk applications
Cost, funding and uncertain returns Funding integration and qualification, not only experiments	The licence is a small part of the cost. Digitising records, connecting equipment, validation, downtime and recurring cloud spend sit behind an uncertain first-year return.	Feasibility, innovation and capital instruments are broad, but research funding requires novelty. Buying a proven product, connecting data and qualifying interfaces fall outside eligible categories.	- Proof-of-value funding linked to a second deployment stage - Digital capital support covering integration, validation and internal staff - Clearer treatment of digital and AI spend under the R&D tax credit - Faster administration and risk-sharing for first movers

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Data and digital foundations: Joining the record across plants and partners

AI needs a traceable path from the measurement point to the batch, method, equipment and decision it supports. Much of the difficult work sits below the enterprise-system layer. A plant may have ERP, MES, QMS, LIMS and cloud platforms while instruments, controllers and production assets still produce proprietary files, incomplete histories or data without the context required for analysis. Manufacturing interview evidence describes the IT-OT divide directly: equipment may be electronically controlled without being digitally connected through usable interfaces and feedback loops.⁹⁴

Quality-control laboratories present a particularly delicate challenge. A site may operate equipment from several suppliers, each with its own control software, data structure and upgrade cycle. The firm then has to preserve the relationship among sample, method, instrument, raw data, calculation, result and reviewer action. Connections can require custom interfaces, cybersecurity review, qualification and continued maintenance when software or firmware changes.

The data boundary also extends beyond the site. Firms that depend on contract manufacturing organisations hold production and quality information across separate legal entities and systems, and multinational plants may depend on platform and vendor decisions taken outside Ireland. A large site can therefore have access to more digitised data and more central expertise while having less freedom to change the architecture locally.

Open standards are beginning to address parts of this problem. The Allotrope Data Format is designed to standardise the acquisition, exchange, storage and access of analytical

data; SiLA 2 provides open connectivity for laboratory devices and software services; and the OPC UA Laboratory and Analytical Device Standard provides a manufacturer-independent information model for laboratory equipment.⁹⁵ Their existence reflects that instrument interoperability is an industry-wide engineering problem that suppliers and industry consortia are addressing directly, rather than one that public policy can resolve on its own.

Provision differs by starting point. At the smaller end, Digital for Business gives Local Enterprise Office clients access to a digital consultant who assesses existing systems and produces a roadmap, after which the Grow Digital Voucher can contribute up to €5,000 towards software, training and IT configuration. This is appropriate where the immediate need is structured records rather than instrument integration. Enterprise Ireland's Capital Funding Support can contribute towards equipment, production software and licence costs to a maximum grant of €250,000, with the IDA Business Asset Grant providing up to €250,000 for foreign-owned sites. Because connecting instruments and controllers opens security questions, the Cyber Security Review Grant is also relevant: it contributes 80% towards a defined €3,000 review against the National Cyber Security Centre framework.⁹⁶

Sector-specific technical capacity is strong. The Pharmaceutical Manufacturing Technology Centre and the PMBrC–Pharmaceutical & Healthcare Technology Gateway provide research and test facilities configured for regulated manufacturing, while EDIH–CeADAR supports data readiness, analytics and experimentation and EDIH–FactoryxChange offers manufacturing digital assessment and test-before-invest activity. These give a firm somewhere to test an interface or a model before committing to a plant deployment.⁹⁷

What this provision reaches less well is the sustained engineering between a diagnostic and a connected plant. Reconciling master data, contextualising instrument signals, qualifying custom interfaces and maintaining them through software and firmware changes is labour-intensive, site-specific and continuous. A voucher is too small for it; a research instrument is a poor fit because the work is necessary engineering rather than novel investigation; and capital support may fund an asset without funding the effort to connect it. Cross-organisation data exchange presents an additional challenge. Existing firm-level supports can fund elements such as software, consultancy or integration, but there is support specifically focused on the shared data standards, interfaces, governance and access arrangements needed to exchange production and quality data between manufacturers and contract partners.

The gap differs by firm size. Large sites need to integrate legacy systems and data held by contract partners without disrupting validated operations. Smaller firms need structured records and secure infrastructure in the first place. Both face work that is difficult to fund because it produces no visible AI outcome on its own.⁹⁸

A practical route would carry a firm from diagnostic to connected production and laboratory data. Relevant measures include co-funded equipment and interface assessment, data context engineering, edge connectivity, cybersecurity, master-data reconciliation and qualification. Common architecture patterns and secure local test environments would reduce repeated design work. Demonstrators should follow data end-to-end, from a sensor or laboratory instrument through the operational system and into a governed workflow.⁹⁹

2. Skills and capability: Building expertise around regulated work

The skills gap extends well beyond general awareness. Firms need people who can combine process and product knowledge with data engineering, model evaluation, quality systems, cybersecurity and regulation. Workshop participants ranked skills first and noted that pharmaceuticals competes poorly with other sectors for AI talent. The challenge is compounded by the sector's existing difficulty recruiting and training qualified staff.

The capability requirement differs by size and ownership. Micro, small and medium firms rarely hold all the required disciplines internally, and the same manager may identify the use case, choose the supplier, secure funding and run the implementation alongside normal operations. Outsourcing does not remove the need for someone inside the firm who understands the process well enough to judge the work. Large multinational sites can draw on global centres of excellence, but that expertise is often distributed across quality, IT, operational technology, data, engineering and corporate teams. A single local champion is not a substitute for a multidisciplinary team with authority to change the process.¹⁰⁰

Various aspects of how training programmes are designed need to be considered. Participants cautioned against building capability around individual software products, which risks rapid obsolescence and vendor lock-in, and favoured more transferable problem-solving, data and critical-thinking skills. In a regulated setting this distinction carries additional weight: an employee who has learned only how to operate a tool is poorly placed to recognise when its output conflicts with the process specification, the analytical record or conditions on the line. Training therefore needs to cover the technology's limits and the underlying scientific

and quality principles, so that human review remains meaningful rather than a formality at the end of an automated process.¹⁰¹

The strongest sector-specific provision sits within Skillnet. Bio Pharma Chem Skillnet lists the UCD Professional Academy Diploma in Artificial Intelligence for Business alongside shorter Skill Sprints in Change Management & AI, Generative AI, Boosting Productivity with AI, and AI Prompt Engineering with Microsoft 365 Copilot. Industry 4.0 Skillnet's AI MASTERY for Industry and Technology Ireland Digital Skillnet's AI Capability Accelerator for Senior Leaders and DataSMART extend this to manufacturing application, leadership decisions and data capability among non-IT staff. These are subsidised for eligible network members and are open to both SMEs and large firms.¹⁰²

Where the requirement is to build or recruit capability rather than attend a course, Enterprise Ireland's Build Capability grant can provide between €5,000 and €70,000 towards non-routine strategic training, and Training Funding Support can cover leadership, change management and digitalisation. Spotlight on Skills helps a management team diagnose its own skills needs, while Key Manager Support can fund the recruitment of a senior leader to own a change programme. For foreign-owned sites, the IDA Training Grant can provide up to 50% support, to a maximum of €3 million, for eligible training plans covering AI, machine learning, data analytics, cloud and organisational agility.¹⁰³

The more fundamental question is whether this provision can be applied inside a Good Manufacturing Practice (GMP)¹⁰⁴ production, laboratory, validation or technology-transfer workflow, and whether firms can release the staff who would use it. Much of the available learning develops general business, productivity or technical capability. What firms

describe needing is role-based learning that combines AI with process science, laboratory work, quality systems, regulatory affairs and cybersecurity, then applies it to a live use case. Across both, the scarcest resources are protected implementation time and access to people who can stay with a project from problem definition through validation and handover.

Participants were clear that the answer was not a new programme. They pointed to Springboard and Skillnet as models that already work and argued for investing in those rather than building alongside them, while calling for easier access to National Training Fund resources and for AI learning to be embedded across all job disciplines rather than confined to technical roles. Beyond course provision, they proposed short role-specific modules for operators, laboratory staff, engineers, and quality and regulatory teams; programmes aimed at a whole management team rather than a lone champion; and co-funded residencies or secondments that pair an AI specialist with a domain expert. Several interviewees argued that funding should cover the time of the internal staff who must take part, not only the external course or consultant. One workshop group also suggested recruiting a deliberate disrupter to force the pace — a proposal that maps onto Key Manager Support, though participants framed it as a cultural intervention rather than a funding question. A regulated-manufacturing learning factory, where teams could work through data, validation and change-control problems in a realistic environment, was proposed as a bridge between classroom training and plant deployment.¹⁰⁵

3. Regulation and compliance: Creating a route from testing to validated use

The regulatory barrier begins where AI affects a product, process or release decision.

Firms need to know how to qualify a model, what evidence is sufficient, how model change and drift fit within change control, and where human oversight must remain. Workshop participants treated this as distinct from AI regulation itself, ranking the regulation of pharmaceuticals highly among all barriers and recording it as affecting organisations of every size significantly; AI regulation and compliance was also considered an important issue. Causes discussed included that regulatory frameworks are slow to emerge, that guidance and knowledge of the applicable regulations are lacking, and that firms do not know how to qualify AI tools which affect GMP.¹⁰⁶ Because GMP requires that changes affecting product quality be qualified and documented before use, a model which is retrained or which adapts after deployment can create problems within existing change-control expectations.

Existing provision sits adjacent to the problem rather than directly over it. Enterprise Ireland's Cyber Security Review Grant, described in barrier 1, and Access Advice: IP Start address discrete cybersecurity and intellectual-property questions, while the further-education inventory includes courses in AI legal and ethical considerations and several Skillnet programmes carry responsible-use content. The Pharmaceutical Manufacturing Technology Centre, PMBrc and EDIH – CeADAR, also described in barrier 1, can provide technical expertise and a setting in which to test a system. Enterprise Ireland and IDA feasibility, innovation-partnership and RD&I instruments can fund the development and testing of a technically uncertain application, and can help a firm generate evidence with a research provider.¹⁰⁷

Whether the resulting evidence is sufficient for GMP use remains an open question though. Participants were unsure about a recognised

route from model testing into routine production. Approaches that might help here could include common expectations for model evaluation, or a place to test difficult cases with regulatory input before committing to a production programme. This is a system-level gap, and it cannot be closed by a grant to an individual firm, because the value lies in a shared interpretation that quality teams, technology suppliers and regulators can all rely on.

The residual gap is practical and institutional. A general responsible-AI framework cannot tell a plant when a process recommendation is reliable enough to use or how to document a model that changes after deployment. Smaller firms need independent support to assess vendors and contracts. Larger firms may have corporate standards but still need task- and equipment-specific qualification. Participants described the applicable frameworks as slow to emerge and the available guidance as insufficient, and asked for better regulatory advice rather than for funding.¹⁰⁸ But the professional and accreditation dimension here is also unresolved. Where AI contributes to a decision that a qualified professional signs, that professional's competency framework and continuing-education requirements are part of the assurance route, and it is not clear that professional body accreditation criteria or upskilling provision yet reflect AI use in regulated work.¹⁰⁹

Participants proposed a regulator-backed "airlock" or sandbox in which firms could test AI in a controlled GMP context, together with better regulatory advice and guidance and support for audit readiness.¹¹⁰ Interviewees added clearer qualification guidance, validation checklists and defined human-oversight thresholds.¹¹¹ Secure local test infrastructure and clearer rules on data, model and IP ownership would make that route usable.

4. Leadership, strategy and ownership: Turning pilots into production capabilities

When it comes to new initiatives, smaller firms face fewer stakeholders and process bottlenecks, but have little time and capacity to run the project. Large firms, by contrast, often have no shortage of experiments. But they are especially exposed to what interviewees described as “pilot purgatory.” They can fund experiments and access specialist teams but must align more stakeholders and reconcile local priorities with global demands.

Where a large organisation develops solutions in isolation, the result can be another disconnected tool rather than a reusable production capability. Workshop participants noted too that decisions on AI are often not taken locally (in Ireland), potentially compounding this issue. Several interviewees argued that a firm needs a single source of truth and a plant or enterprise roadmap before a collection of local use cases can scale.¹¹²

Change management is inseparable from assurance here. Workshop participants challenged the idea that the workforce is inherently resistant to technology, describing people as willing to change but cautious about breaching compliance requirements. This distinction is important when it comes to the design of supports. Communication – about both jobs and tool use – remains necessary, but confidence will come from clear roles, approved operating procedures and evidence that the new process remains compliant. Treating AI as an IT installation risks omitting those questions and therefore impedes its ability to scale.¹¹³

Several supports can help a firm structure the transition. Enterprise Ireland’s AI and Digital Pathfinder tool provides initial signposting, and

Access Advice: Digital Discovery funds three to seven days of expert input at up to 80% and €5,000 for eligible indigenous manufacturers with ten or more employees. Where the question is strategic rather than technical, the Strategic Consultancy Grant can bring in external expertise to address a significant business issue. Digital Process Innovation goes further than most: it can contribute 50% of eligible expenditure to a maximum grant of €150,000 and covers internal implementation time alongside external expertise and project costs, which is directly relevant if the main problem is the availability of the firm’s own people.¹¹⁴

For foreign-owned sites, the IDA Advanced Manufacturing Diagnostic establishes a maturity baseline, and the Business Development Programme’s Digitalisation Consultancy Grant can fund a site roadmap, systems architecture, process maps and implementation plan, with consultancy costs considered up to €300,000. The Lean/Digitalisation suite (comprising LeanStart, LeanPlus and LeanTransform) provides progressively deeper routes from a short diagnostic through to multi-year transformation.¹¹⁵ Regional provision adds a further route, with centres such as the Advanced Manufacturing Innovation Centre in Sligo supporting adoption among manufacturers in the west.¹¹⁶

These measures cover several stages of the journey, but firms must assemble the pathway themselves across providers and funding rules. Workshop participants described the landscape as crowded and the advisory market as uneven. The issue is not the absence of support, but the lack of continuity through implementation.

The transition from a working pilot to a qualified operating capability is where help is most needed.

Deployment is much more complex than a traditional IT roll-out and includes system and interface qualification, validation, change control, user training, monitoring and evidence that the process remains in control. Yet support for the internal work of implementation is uneven: project ownership, protected staff time, backfill, cross-functional coordination and post-launch monitoring can fall between eligible categories.¹¹⁷ Public support cannot resolve internal alignment issues within a complex multinational, but it can make the route clearer and fund the external integration and assurance work around it.¹¹⁸

Participants proposed a stage-gated pathway rather than another stand-alone programme: a common diagnostic and a measurable operating problem first, then a route connecting the firm to a suitable testbed, data and architecture support, skills, validation advice and deployment finance. An embedded adviser or implementation manager could hold ownership and coordinate engagements between agencies and technical providers. Participants also suggested that funding cover a named internal project lead and protected time for the quality, engineering and operations staff who must redesign the work.

Peer demonstration was also discussed. This was deemed a practical way to show what successful implementation looks like, particularly of lower-risk documentation and knowledge applications in the first instance. This would help firms envisage success before they attempt higher-consequence production uses.¹¹⁹

5. Cost, funding and uncertain returns: Funding integration and qualification, not only experiments

The visible cost of an AI model or licence is often a small part of the investment required

to make it useful in a regulated plant. Firms may need to digitise records, install sensors, connect equipment, clean and contextualise data, and build secure infrastructure. They must also absorb the internal costs of change: validating the system, releasing staff for training, accepting production downtime and establishing monitoring, retraining and revalidation routines. Recurring costs also appear, for licence, cloud, support and token usage. A business case built on the software price therefore understates both the cost and the work.

The financial challenge differs by firm type. For an indigenous micro or small firm, access to capital can determine whether any project begins, and a failed supplier choice can absorb a material share of available investment (and dent confidence in the technology). Firms are therefore inclined to wait for evidence from peers. Medium-sized firms, meanwhile, can finance an experiment but struggle to fund the wider integration and operating model around it. Interview evidence also identified a “squeezed middle” among smaller and mid-sized foreign-owned sites: those outside small-enterprise support schemes, yet without the resources or R&D profile of the largest strategic clients.¹²⁰

Large multinational plants can usually fund a proof of concept, but early returns are hard to demonstrate when benefit takes the form of avoided deviations, faster investigations, lower failure risk or a capability that will support several later uses. Workshop participants also highlighted the effect of State Aid rules on the incentives that can be offered. The case is harder again where the plant must fund qualification and integration before knowing whether the use will be accepted into routine production – and so whether the spending will go anywhere.¹²¹

Several instruments can carry a firm through the early stages. For micro and small firms, the LEO Feasibility Study Grant can support up to 50% of eligible expenditure to a maximum of €15,000 towards market research, consultancy, development and prototyping, and Priming and Business Expansion Grants can cover eligible capital, salary and consultancy costs. For Enterprise Ireland clients, the Exploring Innovation Grant provides up to €35,000 towards feasibility work, prototypes and innovation planning, and Innovation Vouchers offer a standard €10,000 route into the research system, with co-funded vouchers to €20,000. Innovation Partnership Grants and the RDI Fund support company-driven research with a research institution, while the Disruptive Technologies Innovation Fund and Horizon Europe are available for larger collaborative development. Alongside these, the Grow Digital Voucher and Capital Funding Support described in barrier 1 can meet part of the software and equipment cost.¹²²

One issue is that these instruments are bounded in what they can be used for. Research and innovation funding requires technical novelty, and an IDA RD&I Grant cannot simply fund AI adoption: the work must meet R&D definitions under State Aid rules. Much of what a regulated manufacturer needs to spend money on falls outside that definition. Activities such as buying a proven product, reconciling and connecting data, qualifying interfaces, or validating and operating a process over time are commercially essential but do not count as research. Recurring AI expenses – for licences or cloud, for example – are also harder to fund than discrete assets. Small vouchers cannot cover plant integration and qualification, while large R&D instruments are a poor fit when a firm wants to buy and integrate an available solution rather than create new knowledge. Some of the costs cited – to do with data remediation,

internal project time, validation or downtime – at best sit only partially inside eligible cost categories.¹²³

Access is another issue. Smaller firms struggle with co-funding and administrative effort, while multinational sites may find public funding less relevant than a credible proof of value that changes internal capital allocation.¹²⁴

The danger is that the funding supports the demonstration but not the deployment – contributing again to “pilot purgatory”. A small pilot may produce an interesting result, but if the firm then cannot finance the interfaces, validation, cybersecurity and workforce change needed to use it, that reinforces scepticism internally and makes the next proposal harder to approve. A credible investment pathway therefore needs to consider the full lifecycle and link the proof of value to a pre-defined route for scaling.

Participants proposed proof-of-value funding explicitly linked to a second stage for production deployment once agreed evidence thresholds are met. They also called for a digital capital support instrument covering both tangible and intangible investment: software, integration, data engineering, sensors or edge infrastructure, cybersecurity, validation and the internal staff needed to implement the change.

Other suggestions included faster and clearer administration for small awards, greater risk-sharing for first movers, clarification of how digital and AI expenditure is treated under the R&D tax credit, consideration of a lower-friction digital tax credit, and support targeted at operational pain points such as technology transfer. Participants did recognise, however, that any such route would need to respect State Aid rules while avoiding a design in which only novel research qualifies and ordinary adoption remains unfunded.¹²⁵

Manufacturing: Medical Devices

At a glance

Ireland's medical-device manufacturing base combines a substantial multinational plant network with a specialist indigenous cluster, particularly in the west and around Galway. The sector spans implants, disposables, diagnostics, precision instruments, hospital equipment and related supplies. Its value chain runs from device design, prototyping and evidence planning through component sourcing and supplier qualification to precision manufacturing, inspection, sterilisation and packaging, and then into distribution, device tracking, field service, complaints and post-market surveillance.¹²⁶ In 2024, 394 enterprises were active in the sector. Of these, 309 were micro firms and 34 were large; large firms represented 8.6% of enterprises, compared with 1% across manufacturing as a whole.¹²⁷

That structure gives the sector a strong base for AI adoption but also creates a wide gap between firms. The immediate opportunity is operational: machine vision, quality control,

supplier risk, workforce augmentation and regulatory knowledge work. The longer-term prize is more integrated – adaptive assembly, digital twins, predictive service and connected devices that improve after they leave the factory. For Irish plants, these gains matter twice. They can reduce the cost and variability of production, and they can strengthen the case for future product and technology mandates. The constraint is the validated environment in which firms operate: the closer AI moves to a patient-safety, quality or regulatory decision, the stronger the requirements for data integrity, evidence and human accountability.

Opportunities

- **Make machine vision the first operational use case.** Automated inspection is the clearest immediate application, augmenting human inspectors who tire where machines do not, and it sits inside a workflow firms already run.

- **Augment skilled work around the line.** Workforce and business-operations applications match the right operator to the right line, and reduce search and documentation load on technical staff in a high-cost location.
- **Protect supply continuity and use field data.** Supplier and sourcing risk applications defend qualification and continuity, while product and service data can improve reliability and lifecycle value after sale.

Barriers

- **Pilots do not become production capability.** Firms are not short of ideas; the break comes after a use case has been technically demonstrated, when it needs an owner, funding, integration and measurable benefits.
- **The validated digital thread is incomplete.** Fragmented records, legacy hardware and brownfield equipment mean integration must be completed without disrupting validated production.
- **No settled assurance route for production use.** Firms must reconcile the AI Act, data and health-data rules, device regulation, quality systems and cybersecurity, and lack practical guidance on human oversight/validation where AI affects clinical or production decisions.

Potential interventions

- **Build a network of reference companies.** Irish SMEs running production AI applications that comparable firms can view, so a prospective adopter can see the implementation operating and hear what it took.
- **Fund the full deployment economics.** Purpose-built pilot and deployment support covering software, hardware, validation and lifecycle cost rather than the demonstration alone, with clearer treatment under R&D and digital tax incentives and shorter grant processes.
- **Train around roles and live use cases.** Role-specific modules and micro-qualifications built around a practical output, with embedded mentors and education options that combine domain knowledge with AI rather than treating them as separate careers.

How AI is impacting the value chain globally

Fifty-nine AI applications are documented across the global medical-devices value chain, from drafting the narrative around an enterprise management report to optimising a validated precision-assembly line. These are drawn from the study's global AI use-case library, described in Appendix B.

Key areas of application

Upstream, AI supports device design, simulation and evidence planning. It can test more geometries, identify design weaknesses and map regulatory requirements earlier, reducing the risk that problems emerge after design decisions are difficult to reverse. NuVasive used generative design to create a porous titanium spinal implant for 3D printing, with a structure designed to support bone ingrowth.¹²⁸ Evidence work forms a second strand. Geistlich Pharma used an assistive system to prioritise references for clinical-evidence review, reducing title-and-abstract screening time from almost four minutes to 35 seconds per reference.¹²⁹

In the **supply chain**, AI links sourcing with quality. It can read approved-supplier lists, specifications, certificates, audit findings, lead times and nonconformance history to recommend components that meet both technical and regulatory requirements. Becton, Dickinson and Company illustrates why these decisions are inseparable in a global device and consumables network: a component is useful only if its supply and compliance position are both secure.¹³⁰

The same reasoning extends to deciding who manufactures alongside you. Supplier capabilities, engineering records, statements of work, design information and intellectual-property constraints can be compared to shortlist manufacturing partners and surface risks before commitments are made.

In **operations**, AI is most visible in inspection and process control. Models combine images, metrology, test results and nonconformance history to detect defects earlier and direct quality teams towards exceptions. Cognex supplies machine-vision systems for life-sciences and medical-device production, turning periodic manual inspection into a continuous control.¹³¹ Sterilisation and packaging can be monitored on the same principle, combining cycle parameters, environmental conditions and packaging evidence to identify risks before sterile-barrier assurance fails.

Downstream, AI creates value from the installed base. Device telemetry, service records, complaints and maintenance history can be used to predict failures, classify cases and recommend service actions. Siemens Healthineers applies this model across a large fleet of imaging and clinical equipment, where uptime and reliability are part of the customer proposition.¹³²

Across **workforce and finance**, applications are more general but often easier to introduce. Abbott used AI to match incoming payments to open invoices, reporting a 33% improvement in full-time-equivalent productivity. In workforce management, similar tools identify skills and competency gaps against project and regulatory requirements.¹³³

Three of the applications we identified were considered potentially transformative to the sector. These related to precision manufacturing and assembly optimisation, quality inspection, and predictive field service across an installed base.¹³⁴ Their impact comes from changing control rather than reducing effort. Precision assembly can identify drift and adjust work before output moves out of specification; continuous inspection can stop a defect becoming a recall; predictive service moves a manufacturer from responding to complaints to managing reliability across the product lifecycle. Their prerequisites also explain why they remain concentrated: a coherent digital thread through the plant, stable imaging with labelled defect history, or device telemetry linked to complaints and service records. A model alone cannot create any of those foundations.

Differences across firm size

The mapped applications are concentrated in larger enterprises. Forty-four of the 59 have large firms as their primary relevance, 11 apply across all sizes and four are centred on medium-sized firms. No mapped application has a small or micro firm as its primary relevance.¹³⁵

High relevance extends further down the size range, but not to the smallest firms. All 59 applications are highly relevant to large enterprises, 44 to medium-sized firms and 11 to small firms. None is rated highly relevant to micro firms.¹³⁶

The skew reflects the systems and assets that many applications assume: a validated manufacturing execution system, an installed base that produces telemetry, a submissions pipeline, a large supplier network or enough production volume for defect patterns to emerge. Large multinationals also have group technology, data and procurement functions that smaller firms must replicate for themselves.

The exceptions are bounded applications in which the unit of work is a document, workstation or defined quality step. Clinical-evidence screening, supplier qualification, skills management, management reporting and selected inspection or traceability tools can be used without a plant-wide platform. For Ireland, this points to different adoption paths. Large firms can pursue integrated quality, production and service systems; smaller firms need off-the-shelf tools, access to shared expertise and a route to validate solutions that have already been proven in the wider supply chain.

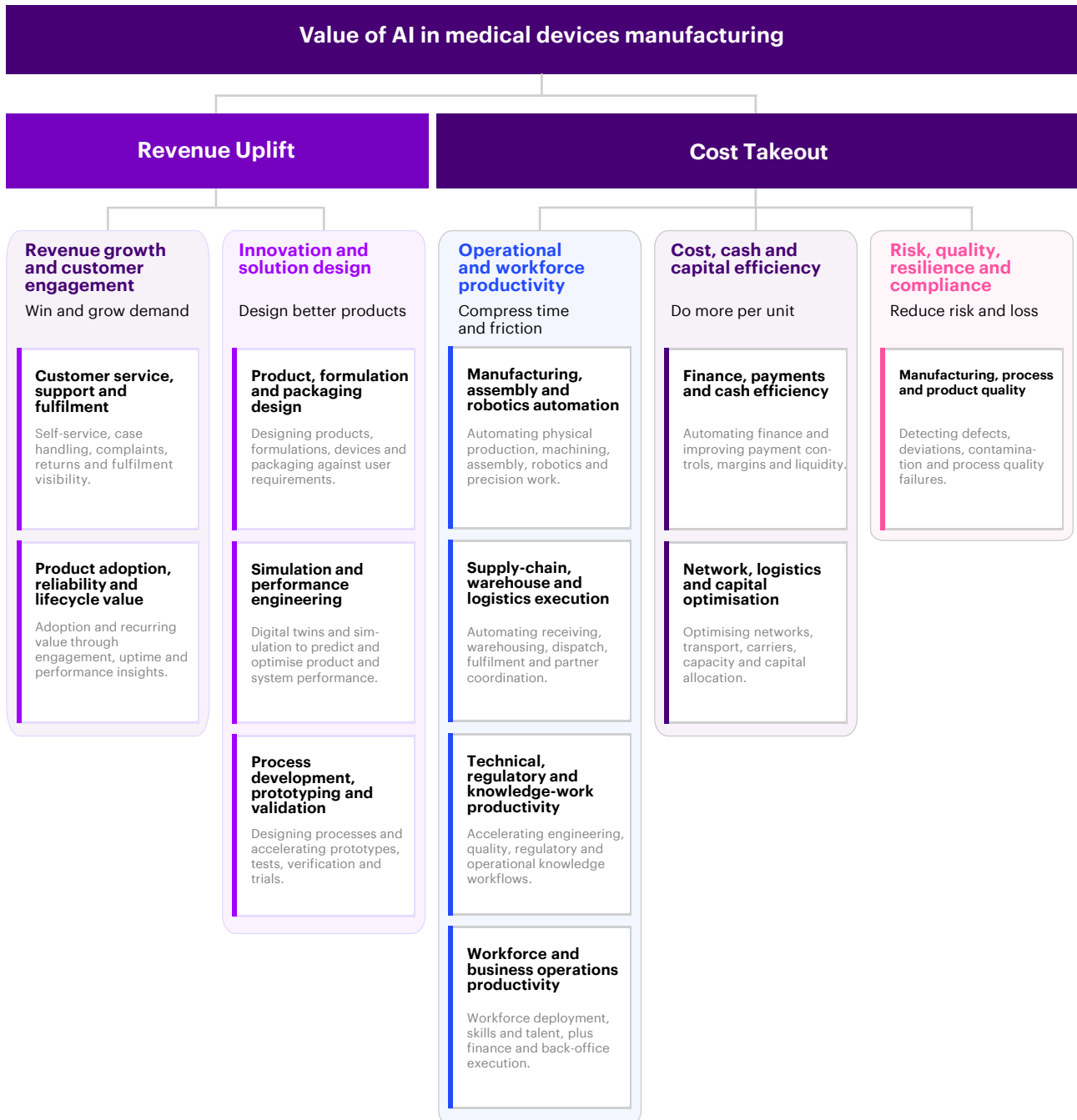
Key opportunities in Ireland

The 59 mapped applications group into 12 opportunity themes across five clusters (see Figure 19). Innovation and solution design, and Revenue growth and customer engagement, primarily support revenue uplift. Operational and workforce productivity; Cost, cash and capital efficiency; and Risk, quality, resilience and compliance primarily support cost takeout.

Revenue opportunities sit in better products and stronger lifecycle value. AI supports device design, simulation, prototyping and validation upstream. Downstream, it can improve customer support, clinician enablement, product reliability and installed-base service.

Product adoption, reliability and lifecycle value is the single largest theme in the library.

Cost opportunities are concentrated in regulated production and the work around it. They include assembly automation, inspection, supplier qualification, regulatory evidence, traceability, workforce deployment, finance and logistics. Risk, quality, resilience and compliance is the largest cluster, reflecting the cost of defects, recalls and non-compliance.

Figure 19. AI value and opportunity tree in medical devices manufacturing

Source: Based on cluster analysis of the sector use cases in the global use case library. Clusters are mapped into their dominant value impact.

How the enterprise landscape shapes the priority opportunities in Ireland: A substantial multinational tier sits alongside a long tail of micro firms

The sector contained 394 active enterprises in 2024. Micro firms accounted for 309, or 78.4%, while 28 were small, 23 medium-sized and 34 large.¹³⁷

The large-firm share is unusually high. Large firms represented 8.6% of medical-device enterprises, close to nine times the manufacturing-wide share. This reflects Ireland's role as a location for multinational production alongside a smaller indigenous and supplier base.¹³⁸

Output is even more concentrated. In the 2024 agency-assisted population, large medtech firms generated 92.8% of exports and 93.1% of value added. This means that the investment and technology decisions of a relatively small number of multinational sites have an outsized influence on the sector's AI trajectory.¹³⁹

The two groups face different adoption conditions. Large sites can draw on group strategies, shared infrastructure and procurement, but they also face global approvals, legacy systems and validation processes. Smaller firms have fewer organisational layers but must make their own decisions on tools, infrastructure and compliance, often with smaller datasets and greater exposure to vendor lock-in. Some smaller multinational subsidiaries sit between these categories: too large for SME supports but too thinly resourced to compete for major research funding.¹⁴⁰

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: Strong digital foundations, uneven scaling

The available survey points to a digitally mature starting point. Around 37% of the 31 enterprises captured reported using at least one AI technology, compared with about 21% across the manufacturing subsectors in scope. All of them met the threshold for at least basic digital intensity, while around 96% reported internal data analytics and paid cloud use. In a regulated sector, AI use spans a wide range – general administrative use requires no qualification, while AI embedded in assembly or quality processes must be validated first – and headline rates of adoption should therefore not be read necessarily as evidence of AI in validated production, which the interview and workshop evidence suggests remains far less common.¹⁴¹

Medtech sits further along the adoption curve than most of manufacturing in Ireland, because it is a mass-produced, quality-driven, heavily regulated sector in which firms already run mature ERP and MES systems and have accumulated years of operational data. The shift of the last eighteen to twenty-four months has been from collecting that data to extracting value from it. Adoption is nonetheless patchy, concentrated in a handful of systemic global leaders with a long tail of capable but less advanced firms behind them. The most mature area is production and manufacturing optimisation, where the object is to shave turnaround time and operator productivity in a high-cost location – firms look, as one interviewee put it, to “shave each margin or each percentage point they can.” Visual inspection is the clearest immediate application, with camera systems and pattern recognition augmenting human inspectors who, unlike machines, can tire.

Supply-chain management is a COVID-hardened strength, covering inventory, materials call-down, forecasting, scheduling and distribution; workforce planning is emerging, matching the best-skilled operator to the right line; and document consumption – feeding manuals and PDFs to a model to infer the cause of production variation – is at the experimental end.¹⁴²

Workshop participants described the same centre of gravity from the firm side. They consistently prioritised applications connected to physical production, treated machine vision and automated product quality inspection as the most tangible, and showed a clear preference for AI embedded in existing operational workflows where value can be demonstrated through throughput, quality, downtime or labour productivity. They were markedly less interested in AI as a standalone product than in AI as an improvement to the manufacturing system.¹⁴³

Maturity falls away sharply below the large-firm layer. Large multinationals draw on centrally developed strategies, shared infrastructure and group-level procurement; smaller firms must make their own choices about tools, infrastructure and compliance, work with smaller datasets, and carry a greater risk of vendor lock-in. They also tend to adopt only after a technology has been validated by a larger supply-chain partner. The cost of independence is concrete: one participant described spending close to €240,000 on local servers to avoid relying on overseas data centres.¹⁴⁴ Within the multinational population the gradient runs the other way too: smaller and mid-sized subsidiaries are too large for SME supports and too thinly resourced for research grants, and behave in practice like the SMEs they are not classified as.¹⁴⁵

The direction of travel is from fragmented pilots towards integrated digital threads, and from reactive operations towards predictive and self-optimising ones.¹⁴⁶ Progress along that

path is slower than enthusiasm would suggest. Pilot activity is widespread and scaling is weak: participants described strong appetite for pilots and innovation teams, and little progression beyond them, with funding, ownership, integration and benefits realisation all tending to disappear once the experiment ends.¹⁴⁷

Priority opportunities

Five opportunities stand out for Ireland: machine vision and quality inspection; workforce augmentation; supplier and component risk; regulatory and technical knowledge work; and installed-base reliability. They share a practical feature: each can begin with a bounded workflow before a firm attempts plant-wide optimisation.

1. Manufacturing, process & product quality: Make machine vision the first operational use case

Machine vision is the clearest near-term opportunity. Workshop participants consistently prioritised automated product inspection, and interview evidence identified visual inspection as the most tangible current application. Machines can apply the same check continuously without fatigue, while people retain responsibility for exceptions and the quality decision.¹⁴⁸

The Cognex example shows the plant-scale model. Laerdal shows the more accessible one: a camera at a workstation checks assembled emergency-care kits against the bill of materials. The latter needs a stable image, a defined product and representative examples; it does not need an integrated plant platform.¹⁴⁹

The value is larger than labour substitution. Earlier detection reduces scrap and rework, improves traceability and lowers the risk that a defect reaches a patient. Large plants can combine vision with metrology, test and

quality-system data across a line. Small firms can begin at one station. Where inspection forms part of a validated control, firms also need a clear change-control and revalidation route.

2. Workforce & business-operations productivity: Augment skilled work around the line

Workshop participants framed workforce productivity as task augmentation. The aim is to reduce administrative effort, improve workforce planning and move people towards higher-value work, with human oversight retained. One example discussed in the workshop involved a sales task falling from several weeks to minutes.¹⁵⁰

In operations, AI can match skills to lines, retrieve instructions, organise training and help supervisors identify competency gaps. In regulatory, commercial and finance functions, assistants can draft, search and reconcile information. Examples from Workday and Abbott show how the same pattern applies across workforce and cash management.¹⁵¹

These applications are relevant across firm sizes because they can be introduced within a defined workflow. The main requirement is organisational: firms must redesign the task, control access to data and measure whether time is actually released. Without a changed process, the desired productivity gain is unlikely to materialize.¹⁵²

3. Supplier, component & sourcing risk: Protect continuity and qualification

Supply-chain resilience is a strategic issue because devices depend on qualified components, materials and specialist services that cannot always be replaced quickly. Workshop participants highlighted single-component dependence, supplier visibility and

the need to manage disruption, not simply lower purchase cost.¹⁵³

AI can combine approved-supplier records, quality history, certifications, delivery performance and availability to identify emerging risks and support qualification decisions. The sector already strengthened forecasting, materials call-down and inventory management during the pandemic; AI can extend that capability by connecting quality and supply information.¹⁵⁴

Large firms can apply this across a global supplier network. Smaller manufacturers can use cloud-based sourcing and qualification tools, but they are more exposed to data gaps and vendor dependence. The opportunity depends on clean supplier master data, consistent component identifiers and a governance process that keeps quality teams involved in sourcing decisions.

4. Technical, regulatory & knowledge-work productivity: Reduce the burden of evidence and documentation

Regulatory and technical work absorbs scarce engineering, clinical and quality capacity. AI can help screen evidence, retrieve standards, draft first versions and organise validation or submission material.

Workshop participants identified this as an important productivity opportunity alongside shop-floor applications.¹⁵⁵

The Geistlich Pharma case shows the mechanism: references are ranked against inclusion criteria so medical writers review the most relevant evidence first.

Similar tools can support complaint triage, traceability, labelling and design-history work, provided outputs remain auditable.¹⁵⁶

This is one of the most accessible higher-value applications for smaller firms because it operates on controlled documents rather than integrated production systems. It requires a curated source base, cited outputs, a defined reviewer and records of what was accepted or changed. The objective is to compress preparation and search while preserving professional judgement.

5. Product adoption, reliability & lifecycle value: Use field data to improve service and product performance

The largest mapped opportunity theme sits downstream. Device telemetry, complaints, service history and maintenance records can be used to identify failures earlier, improve uptime and feed evidence back into product design. This is particularly relevant to manufacturers of capital equipment and connected devices, where the commercial relationship continues after sale.

Predictive service changes aftercare from a queue of reported faults into a reliability capability. It can help firms prioritise engineer visits, prepare the right part, identify recurring component issues and distinguish a one-off complaint from a wider safety signal. The same data can improve warranty management and future product design.

This opportunity is concentrated in larger firms because it requires an installed base, secure telemetry and integrated service and complaint systems. Specialist SMEs may still participate through connected components or niche devices, but they need clear data rights and cyber controls.

For Ireland, the strategic value lies in attracting more lifecycle, software and analytics responsibility to sites that already manufacture the physical product.

The frontier: where the sector is heading

The frontier combines adaptive production, predictive service and intelligence embedded in the product. Mapped applications include agent-mediated control of precision manufacturing and predictive maintenance across a deployed fleet.¹⁵⁷ Interview evidence also points to connected devices, on-body or in-body sensing and robotic-assisted surgery as a wider strategic direction.¹⁵⁸

These applications would matter in Ireland because they strengthen the two capabilities on which sites compete: running complex validated processes well and moving into higher-value product, software and service work. They could also help indigenous firms build defensible products around specialist clinical or engineering knowledge.

The common constraint is patient safety and validation. Once AI influences a quality, clinical or product decision, firms need stronger evidence, explainability, cybersecurity, change control and human oversight. Process requalification can make deployment expensive even when the model works.¹⁵⁹ The near-term priorities above build the required foundations: labelled inspection data, controlled evidence sets, connected service records and employees who know how to challenge the output.

The consequences of not adopting AI

For multinational sites, the first risk is losing future mandates. Ireland competes on engineering capability, talent and execution rather than low cost. Sites that cannot demonstrate they can implement AI safely and improve quality, speed or productivity may lose product, software or analytics work to other locations.¹⁶⁰

The second risk falls on the supplier base. As global manufacturers connect planning, quality and traceability systems, suppliers that cannot exchange trusted data or meet new interoperability requirements may be designed out of programmes. The decision is then made through architecture and qualification, not through a later price competition.¹⁶¹

A third risk is becoming confined to generic productivity tools. Firms that do not connect production, quality and service data will still be able to use office assistants, but they will miss the applications that affect defect prevention, process stability and lifecycle value. The gap between high-performing plants and the rest of the sector would widen.

Poorly governed adoption is also a risk. Overlapping rules on AI, data and health information raise uncertainty, and dependence on external platforms can create security, pricing and continuity exposure.¹⁶² The objective is therefore not adoption at any cost, but the capability to use AI well enough that regulators, customers and parent companies trust the result.

Barriers—and what would unlock adoption

The sector is not short of interest or pilot activity. The barriers arise when a firm tries to connect a use case to live systems, assign ownership, build applied capability, fund the full lifecycle and validate the result. Ireland has substantial provision in training, diagnostics, feasibility, digitalisation, cybersecurity and capital investment. It is more continuous at the early stages of diagnosis, learning and experimentation than during the move into validated production, and participants typically described the break as occurring after a use case had been identified and technically demonstrated.¹⁶³ For smaller firms the main

challenge is often uncertainty rather than cost. Before committing, an SME needs to know that a comparable business has done this successfully, what it cost, what internal resources it required and what return it produced. Reducing that uncertainty tends to be a precondition for the first investment.¹⁶⁴

Figure 20 summarises the chain from barrier to potential response. The sections that follow set out each barrier in turn, drawing on the workshop, the interview evidence and the supports currently available.

Figure 20. Barriers to AI adoption in medical devices manufacturing: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Leadership, strategy and ownership Turning pilots into production capability	Firms are not short of ideas. The difficulty is moving from a proof of concept to a system with an owner, funding, integration and measurable benefits.	Pathfinder, Digital Discovery, Digital Process Innovation and IDA consultancy routes exist but are not universally available; smaller foreign-owned plants are most exposed. Continuity through implementation is missing.	■ A single front door or case-management model ■ Embedded advisers and targeted implementation units ■ Pilots attached to a business process and a named owner ■ Demonstrators that continue through integration and validation
Data and digital foundations Building the validated digital thread	Operational AI needs data connecting product, equipment, process and quality. Legacy variation, brownfield equipment and manual records break that thread, and integration cannot disrupt validated production.	Digitalisation, capital, cyber-review and testbed supports exist, with IMR, CeADAR, MCCl and the Technology Gateways. The accumulated work of making an existing plant's data usable is not funded.	■ Co-funded data and process remediation ■ Clearer eligibility for software and integration ■ Secure on-premise or edge test environments ■ Reference architectures for manufacturing, quality and enterprise systems
Skills and capability Training around roles and live use cases	The gap is not awareness. Engineers, technicians and quality teams need to apply AI inside a regulated workflow and challenge its output, and roles are shifting as automation spreads.	Medtech provision is unusually strong, including the Software as a Medical Device suite. It does not establish how a factory should validate AI in production, inspection or quality work, nor free the staff who hold the process knowledge.	■ Role-specific training built around a practical output ■ Micro-qualifications tied to a live use case ■ Students, internal advocates and embedded mentors ■ Education pathways combining domain knowledge with AI
Cost, funding and uncertain returns Covering the work after the pilot	The tool is the smaller cost. Data preparation, integration, validation, monitoring and recurring licence and inference charges sit behind a return that is hard to quantify.	Feasibility, innovation and capital routes are available, but research funding requires novelty. Buying a proven product, connecting data and operating a validated process are not research, and recurring costs are harder to fund than assets.	■ Purpose-built AI pilot and deployment support ■ Capital grants covering software as well as hardware ■ Clearer treatment under R&D and digital tax incentives ■ Shorter grant processes and lower application burden
Regulation and compliance Creating an assurance route for production use	Firms have no authoritative route through the assurance decisions that let AI enter a regulated workflow, and no proportionate line between low-risk administrative use and AI affecting quality or patient safety.	Cyber, medtech training and research supports address parts of the problem. None supplies validation criteria a regulator will recognise, so large firms build their own interpretations and smaller firms wait for a precedent.	■ Regulator-backed guidance and controlled sandboxes ■ Common validation criteria and human-oversight thresholds ■ An independent assessment service ■ Secure local test environments and on-premise options

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Leadership, strategy and ownership: Turning pilots into production capability

Firms are not short of ideas. The recurring problem is moving from interest to a scoped use case, and from a successful proof of concept to a system that has an owner, funding, integration and measurable benefits. Workshop participants described existing support as fragmented, bureaucratic or too abstract, especially for smaller firms, and called for hands-on help inside the organisation.¹⁶⁵

Existing supports can take a firm from initial signposting to a scoped implementation project. Enterprise Ireland's AI and Digital Pathfinder tool provides a first route through the available AI and digital supports. Access Advice: Digital Discovery funds three to seven days of practical expert input for eligible Irish-owned manufacturers with at least ten employees, with grant aid of up to 80% and €5,000 — enough to define a credible next step, though not to deliver it. Where a firm is ready to redesign a process, Digital Process Innovation can contribute 50% of eligible expenditure to a maximum grant of €150,000 and is one of the few measures that covers internal implementation time as well as external expertise. For foreign-owned sites, the IDA Business Development Programme's Digitalisation Consultancy Grant can fund a site-wide transformation roadmap, systems architecture, process maps and an implementation plan, with consultancy costs considered up to €300,000. EDIH – FactoryxChange adds manufacturing-specific digital assessment and test-before-invest capacity for firms that want to trial an application before committing to it.¹⁶⁶

These routes are complementary rather than universally available. Local Enterprise Office and Enterprise Ireland measures principally serve indigenous firms and IDA provision its foreign-

owned clients, while individual programmes add further conditions on size, employment or expenditure. Smaller foreign-owned plants are the most exposed: they can be too large for micro-enterprise provision while lacking the scale or R&D content required for larger IDA-backed projects.

Continuity is the challenge. A firm can obtain an assessment, a short consultancy assignment, a training course or a research partnership; far fewer interventions stay with it across process design, integration, validation, procurement, workforce adoption and benefits measurement. The gap is an implementation model rather than another awareness programme. Smaller firms need one route through tool selection, business case, data, regulation and funding. Large sites need alignment across operations, quality, IT, cybersecurity, procurement and global architecture. In both, a pilot must be attached to a business process and a named owner from the start.¹⁶⁷

Workshop and interview participants proposed a single front door or case-management model, embedded advisers, targeted implementation units and credible sector examples with quantified returns. Demonstrators should continue through integration and validation rather than end when a model works in isolation. The strongest version of this is a network of reference companies: Irish SMEs running production AI applications that comparable firms can visit, so that a prospective adopter can see the implementation operating, understand what it cost and what it required, and hear directly from people who have been through it. A visible – or visitable – example can answer questions that a written case study cannot.¹⁶⁸

2. Data and digital foundations: Building the validated digital thread

Operational AI depends on data that connects product, equipment, process, quality and service. Workshop participants identified fragmented and siloed records, legacy hardware, manual processes and uncertainty over cloud migration. They treated digital-core modernisation as a prerequisite, not a parallel workstream.¹⁶⁹

The issue differs by size. Large firms have more data but also more legacy variation from acquisitions, global platforms and brownfield equipment, and integration work must be completed without disrupting validated production. Smaller firms may have simpler systems but lack the capital and technical staff to build the foundation. More data therefore does not necessarily mean a more usable digital thread. Where firms are reluctant to rely on overseas data centres, this adds a further cost: one workshop participant described setting aside a six-figure sum to spend on servers in order to keep data locally.¹⁷⁰

Support provision differs by starting point. At the smaller end, Digital for Business gives Local Enterprise Office clients access to a digital consultant who assesses existing systems and produces a roadmap, after which the Grow Digital Voucher can contribute up to €5,000 towards software, training and IT configuration. These are the right instruments where the immediate need is basic digitisation rather than integration of a live production environment. Enterprise Ireland's Capital Funding Support can contribute towards new equipment, production software and licence costs to a maximum grant of €250,000, and the equivalent route for foreign-owned sites, the IDA Business Asset Grant, can provide up to €250,000 under de minimis rules for eligible equipment and technology upgrades. The Cyber Security Review Grant contributes 80% towards

a defined €3,000 review, which addresses one part of the security foundation that connecting production equipment requires.¹⁷¹

Ireland also holds research and test infrastructure that individual firms could not maintain internally, and several parts of it are directly relevant to medical technology. Irish Manufacturing Research and CeADAR support applied manufacturing and AI work; MCCI covers embedded systems, connected devices, industrial monitoring, edge AI and devices with embedded intelligence; and the MET – Medical Technology and Smarter Factory Technology Gateways provide specialist researchers and equipment. EDIH – ENTIRE adds sensor, Internet of Things and cybersecurity expertise relevant to connecting older production and inspection equipment.¹⁷²

What this provision reaches less well is the accumulated work of making an existing plant's data usable. Data remediation is labour-intensive and site-specific: mapping identifiers, cleaning histories, connecting older machines, contextualising signals, integrating quality records, validating interfaces and maintaining them after a software or firmware change. A voucher is too small for that work, while a research instrument can be inappropriate because the task is necessary engineering rather than novel research. Capital support may pay for a new asset without covering the data-engineering and validation effort needed to connect it to the operating environment.

What would unlock adoption is co-funded data and process remediation, clearer eligibility for software and integration, secure on-premises or edge test environments and reference architectures for connecting manufacturing, quality and enterprise systems. Support should be judged by whether a firm reaches a stable, governed data layer, not by whether it buys a new platform.¹⁷³

3. Skills and capability: Training around roles and live use cases

Workshop participants ranked skills first, but the gap is not basic AI awareness. Firms need engineers, technicians, quality specialists and leaders who can apply AI to a regulated workflow, understand its limits and challenge its output. Automation also changes roles. Participants described an operative moving towards a technician role, interpreting what an agent, inspection system or machine reports and deciding what action follows.¹⁷⁴

Medical technology has an unusually strong sector-specific training offer. Irish Medtech Skillnet's Data Analytics & Machine Learning module is delivered with TUS Shannon and built on industrial datasets, so it teaches applied technique rather than general principles. Its Software as a Medical Device Suite of Micro Topics covers global regulation, software-development standards, risk management, cybersecurity, verification and validation, maintenance and emerging considerations for AI- and machine-learning-based medical software, which makes it the most directly relevant provision for firms whose products contain intelligence as well as for those deploying AI in the plant. Industry 4.0 Skillnet adds the Diploma in Manufacturing Automation and AI MASTERY for Industry, while Technology Ireland Digital Skillnet's AI Capability Accelerator for Senior Leaders addresses the decisions leaders themselves must make.¹⁷⁵

Where the requirement is to build or buy capability rather than attend a course, Enterprise Ireland's Build Capability grant can provide between €5,000 and €70,000 towards non-routine strategic training, including digital, AI and automation systems, and Training Funding Support can cover change management, digitalisation and systems improvement. Grad Start and Key Manager

Support offer routes to recruit graduate or senior capability. For foreign-owned sites, the IDA Training Grant can provide up to 50% support, to a maximum of €3 million, for eligible training plans covering AI, machine learning, data analytics, cloud, robotics and organisational agility — a scale of support that assumes a multi-site training programme rather than an individual course.¹⁷⁶

The breadth of this provision does not establish that a firm can assemble the right combination of production, data and regulatory expertise, or release the people who hold the process knowledge. The most knowledgeable employees are usually those needed to keep production running. Specialist programmes can also be long relative to an immediate plant need, while short courses stay too general; and the Software as a Medical Device suite, valuable as it is, does not establish how a factory should validate AI used in production, inspection, maintenance or quality workflows.

The residual gap is workplace absorption. General courses do not help a quality engineer validate a vision model or a technician use an anomaly alert on a line. Smaller firms need short, practical formats and access to specialists they cannot hire. Large firms need scalable learning across sites and functions. Both need protected time and a live use case against which learning can be applied.¹⁷⁷

Participants proposed role-specific training, micro-qualifications built around a practical output, stronger partnerships and knowledge transfer, and the use of students, internal advocates and embedded mentors to support simpler applications. Provision of this kind already exists in part. The further-education AI micro-qualifications were developed by SOLAS and the Education and Training Boards under Skills to Advance with enterprise input. They provide accredited, bite-sized learning at NFQ

Levels 4-6 and are built around a workplace problem the participant brings. This model matches what participants describe needing, as they called for shorter, practical trainings, linked to live use cases. Education options should combine domain knowledge with AI rather than treating them as separate careers.¹⁷⁸

4. Cost, funding and uncertain returns: Covering the work after the pilot

The visible cost of an AI tool is often smaller than the cost of making it useful. Firms must prepare data, integrate systems, buy infrastructure, validate the process, train users, monitor the model and pay ongoing licence or inference costs. Workshop participants therefore found ROI difficult to quantify and internal funding difficult to secure.¹⁷⁹

Several measures can carry a firm through the early stages of an investment. For micro and small firms, the LEO Feasibility Study Grant can support up to 50% of eligible expenditure to a maximum of €15,000 towards market research, consultancy, development and prototyping. For Enterprise Ireland clients, the Exploring Innovation Grant provides up to €35,000 towards feasibility work, prototypes and innovation planning, and Innovation Vouchers offer a standard €10,000 route into the research system, with co-funded vouchers available up to €20,000. The RDI Fund offers size-dependent rates for projects that are non-routine and resolve a genuine technical challenge. Alongside these, the Grow Digital Voucher and Capital Funding Support described earlier can meet part of the software and equipment cost.¹⁸⁰

The applicability of these instruments has more of an impact than the amount available. Research and innovation funding requires technical novelty, and an IDA RD&I Grant cannot be used simply to adopt an available

AI product: the project must satisfy EU State Aid and recognised R&D criteria. Much of what a medical technology firm needs to spend money on falls outside that definition. Buying a proven product, cleaning and connecting data, configuring it to a validated process and operating it over time are commercially essential activities that are not research. Recurring licence, inference, hosting, monitoring and retraining costs are also harder to fund than a discrete asset. The result is sharpest for medium-sized indigenous firms, smaller foreign-owned sites and any project whose value lies in operational adoption rather than new intellectual property.¹⁸¹

Access compounds fit. Smaller firms face co-funding and application burden. Large plants need evidence strong enough to compete for group capital.¹⁸²

Participants proposed purpose-built AI pilot and deployment supports, capital grants covering software and hardware, clearer treatment under R&D and digital tax incentives, and shorter grant processes. The important design principle is to cover the complete deployment economics, including validation and lifecycle cost, rather than the demonstration alone.¹⁸³

5. Regulation and compliance: Creating an assurance route for production use

Trust becomes decisive when AI affects a clinical, quality or production decision. Medtech firms must reconcile the AI Act, data rules, health-data requirements, device regulation, quality systems and cybersecurity. Workshop participants ranked trust and governance third and asked for practical guidance on validation, human oversight, accountability and procurement rather than high-level principles.¹⁸⁴

The practical question is how these requirements apply to a particular intended use. An assistant drafting a routine document can be checked before the output is used. A model that influences inspection, process control, non-conformance handling or product release requires a much stronger evidence base. Interviewees described this ceiling, with adoption moving relatively quickly in lower-risk operational work while anything touching clinical or quality outcomes is policed far more heavily.

Existing provision addresses parts of this barrier. The Cyber Security Review Grant, mentioned in barrier 2, supports a structured assessment against the National Cyber Security Centre framework, and EDIH – ENTIRE combines sensor and digital expertise with cybersecurity capability. Irish Medtech Skillnet’s Software as a Medical Device suite, described in barrier 3, is the closest thing to targeted regulatory learning, covering risk management, verification, validation, maintenance and AI- and machine-learning-based software; the further-education inventory adds courses on AI legal and ethical considerations. For technically novel validation questions, innovation partnerships, feasibility programmes and the PMBrc – Pharmaceutical & Healthcare Technology Gateway give firms access to university and research expertise.¹⁸⁵

These measures strengthen cyber readiness, knowledge and technical evaluation. What firms could not identify was an authoritative route through the specific assurance

decisions that determine whether an application can enter a regulated workflow: a proportionate classification distinguishing low-risk administrative use from AI affecting manufacturing quality, product performance or patient safety, common validation criteria, an independent assessment service, or a controlled environment in which to test regulatory and quality-system questions before committing to deployment. Training and research supports help a firm understand or test parts of the problem; they do not supply acceptance criteria that a regulator will recognise. Large firms are therefore left to develop their own interpretations through lengthy internal processes, and smaller firms to buy expensive advice or wait until a customer, competitor or regulator sets a precedent.

Firms need to know how to qualify an AI-enabled tool inside a validated process, what evidence is sufficient, how model drift is handled through change control and when a human must approve or override an action. Smaller firms need independent help to assess vendors and contracts. Larger firms need task-specific validation even where group standards exist.¹⁸⁶

What would unlock adoption is regulator-backed guidance, controlled sandboxes, validation checklists, clear human-oversight thresholds and explicit ownership of cybersecurity and accountability at board and operational levels. Secure local test environments and on-premise options would also reduce data-sovereignty and continuity concerns.¹⁸⁷

Manufacturing: Computer and Electronics

At a glance

Ireland's computer and electronics manufacturing base encompasses semiconductors and electronic components; printed circuit boards and assemblies; computers, communications equipment and consumer electronics; and measuring, testing, navigation and optical products. It consists of a small number of large plants and a long tail of specialist producers and suppliers.¹⁸⁸ In 2023, 417 enterprises employed 22,760 people, yet 13 large enterprises accounted for almost 85% of employment.¹⁸⁹

AI use is often focused on plant performance. Near-term value lies in detecting defects and process drift, protecting yield and freeing scarce engineers and technicians from search, documentation and routine analysis. The gains accrued improve plant economics and strengthen the case for the next investment mandate. Beyond the production line, the strategic prize is broader: AI-accelerated design and the development of intelligent products that create value throughout their lifecycle. The challenge for Ireland is to strengthen the data, skills, governance and infrastructure needed to broaden access to these capabilities.¹⁹⁰

Opportunities

- **Make quality and yield visible, then close the loop.** Defect detection and process-drift monitoring protect yield in plants where a small percentage point matters; the same data can feed back into process control.
- **Use digital twins to de-risk process and product change.** Simulation allows process design and changeover to be tested before committing equipment and material.
- **Free scarce engineers and accelerate design.** Engineering, firmware development and production-preparation applications reduce search, documentation and routine analysis, and shorten design cycles.

Barriers

- **Firms cannot get from use case to production.** Firms struggle to locate their own starting point and follow a route through to a production system.

- **Capability is not built around real work.** Training is available but not organised around a live application, and there is no common way to recognise AI capability across employees.
- **The production data layer is not usable.** Data is unclean, siloed and split across systems that do not communicate, and the divide between enterprise systems and the controllers running production means equipment can be electronic without being connected.
- **Much that is needed cannot be built by one firm.** Shared datasets, demonstrators, testbed access and pilot-to-production pathways are ecosystem assets that no individual plant will fund; participants also raised physical infrastructure (grid capacity, water and fibre) as constraints.

Potential interventions

- **Publish a practical playbook and a common maturity diagnostic.** One assessment available across the agencies, so a firm can locate its starting point without commissioning bespoke advice, with curated roadmaps differentiated by size and maturity.
- **Build capability with recognised, applied learning.** Short role-based modules tied to a live use case, a common way to accredit AI capability, embedded mentors who can integrate a system, and a pipeline running from schools through tertiary education.
- **Fund the shared layer.** Shared datasets, manufacturing demonstrators built around the existing testbed base, explicit pilot-to-production pathways, and an anonymised national repository that tracks maturity over time.
- **Define the control model before AI touches operations.** Validation checklists and human-oversight thresholds specific to a task and a piece of equipment, with independent assessment of vendors.

How AI is impacting the value chain globally

The 57 use cases documented in the study's global AI use-case library (see Appendix B) run from semiconductor design and verification to automated invoice approvals.¹⁹¹

Key areas of application

Upstream, AI accelerates design and verification. Electronic design automation tools analyse circuit constraints, design libraries, simulation results and verification data to recommend configurations or generate alternatives before engineers build physical prototypes. Synopsys, for example, embeds AI across these workflows, allowing teams to test more options and reach viable designs faster.¹⁹² In semiconductors and complex electronics, avoiding one design iteration can shorten time to market and increase the value of the resulting IP.¹⁹³

In the **supply chain**, AI helps firms identify component risks earlier. It combines bills of materials with data on availability, lead times, price movements, supplier risk and geopolitical conditions. Manufacturers can then reallocate stock, qualify alternatives, redesign products or change sourcing before a shortage stops production. Siemens's Supplyframe is illustrative: the platform connects electronics-design and sourcing information so that engineering and procurement decisions can respond to market risk together rather than sequentially.¹⁹⁴ Meanwhile, Panasonic uses AI to allocate work across automated warehouse systems and personnel, coordinating the preparation and shipment of goods. These

applications can improve flow and reduce idle time, but they require connected equipment, reliable process data, operational-technology cybersecurity and clear safety controls.¹⁹⁵

In **operations**, AI improves quality, yield and equipment performance. Applications include line balancing, machine-parameter optimisation, optical and X-ray inspection, defect classification, predictive maintenance and root-cause analysis. Intel, for example, uses computer vision to inspect wafer-backside and film-mount images, detecting defects while corrective action is still possible.¹⁹⁶ Similarly, Pegatron uses live video and factory data to identify missed assembly steps and explain incidents to operators.¹⁹⁷ This is particularly relevant to manual and semi-automated assembly, receiving and inspection, where images alone may not provide enough context.

Downstream, product telemetry supports predictive maintenance and faster technical support. Dell uses diagnostic and performance data to identify current faults and predict hardware failures, allowing support cases and replacement actions to begin before service is disrupted. The same data can inform product design, component selection and warranty management.¹⁹⁸

In **enabling functions**, applications are less sector-specific but often easier to deploy. Firms use AI to allocate engineering talent, identify skills gaps, automate invoice handling and improve inventory valuation. AMD's accounts-payable application extracts approval decisions from email and workflow data and updates

invoice status in SAP. It reduces approval delays, releases staff time and provides a lower-risk starting point before AI is applied to production decisions.¹⁹⁹ At the most accessible level, employees use office copilots for summarisation, drafting, meeting records and analysis. Firms are also beginning to use knowledge assistants that search maintenance manuals and other technical sources. These tools require limited integration and are the most accessible starting point across firm sizes.²⁰⁰

The highest-impact applications are concentrated in product development and production control.

In product development, AI can test more semiconductor and electronics designs and add intelligence to edge devices. Research prototypes also show how agentic systems could carry embedded-development tasks from specification through code generation and device testing. These applications shorten development cycles and create new product capabilities. They change the product or the development process, rather than simply speeding up an existing administrative task.²⁰¹

In production, AI can optimise settings across a line, inspect optical, X-ray and test data, identify root causes and recommend changes to improve yield. The main shift is from detecting defects after production to preventing them while the process is running. This can reduce scrap, rework and quality escapes, while helping lines stabilise faster after a product or process change.²⁰²

Both groups require strong foundations. Design applications need secure design libraries, electronic-design-automation

tools, verification data and engineers able to challenge the output. Production applications need representative process and inspection data, reliable connectivity, integration with manufacturing and quality systems, operational-technology cybersecurity, and clear rules on when a model can advise, stop or change a process. Requirements increase as AI moves closer to direct control.

Differences across firm size

The mapped applications are concentrated in larger enterprises. Advanced semiconductor design, high-volume inspection, closed-loop process control and robotic material handling depend on specialist tools, large datasets, connected equipment and significant capital.

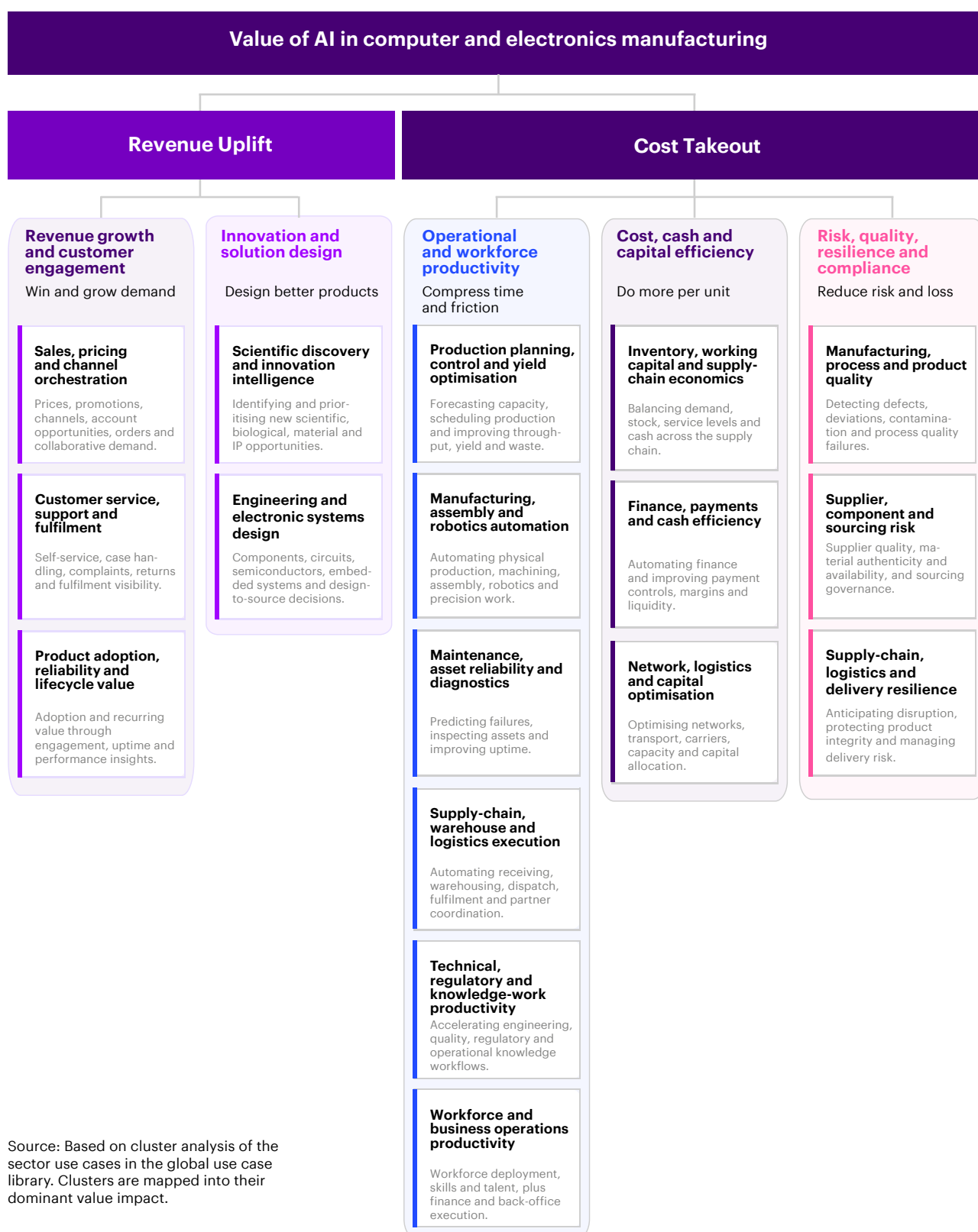
This reflects the economics of adoption, not the absence of useful problems in smaller firms. A small electronics producer may benefit from better inspection or component forecasting, but it has less data, less leverage with vendors and less capacity to connect design, production and service systems. Scale also affects the return: a small improvement in yield can justify major investment on a high-volume line but may not cover the integration cost in low-volume production.

Some applications are more accessible. Commercial copilots, document and code assistants, cloud-based sourcing tools and focused technical-support applications require less bespoke infrastructure. Specialist SMEs can also use AI within a product rather than across the factory. Linxens, for example, adapted an on-device gas-classification library to detect additional hazardous gases.²⁰³

Key opportunities in Ireland

The use cases group into 17 opportunity themes across five clusters (see Figure 21).

Figure 21. AI value and opportunity tree in computer and electronics manufacturing



Source: Based on cluster analysis of the sector use cases in the global use case library. Clusters are mapped into their dominant value impact.

Revenue opportunities begin in design. AI can help firms identify material and intellectual-property opportunities, improve components, circuits and embedded systems, and shorten product development. Downstream, it can improve sales and channel decisions, technical support and fulfilment, and create recurring value from product reliability, uptime and performance data.

Cost opportunities are concentrated in and around production. They include planning, yield, automation, maintenance, logistics, technical knowledge and workforce deployment, as well as finance, inventory and supply-chain resilience.

How the enterprise landscape shapes the priority opportunities in Ireland: A few large plants shape the sector's AI trajectory

Computer and electronics has a long tail of micro and small enterprises, but employment is highly concentrated in a small number of large plants. Of the sector's 417 enterprises in 2023, 350, or 83.9%, were micro firms. Thirteen large enterprises, representing 3.1% of firms, accounted for 19,259 people, or 84.6% of employment. SMEs represented 96.9% of enterprises but only 15.4% of employment.²⁰⁴

The output profile is similarly concentrated. Among agency-assisted firms in 2024, large enterprises generated 86.8% of exports and 88.3% of value added. The sector's AI trajectory is consequently shaped by a small number of large plants, even though the enterprise population contains a long tail of micro and small firms.²⁰⁵

This creates two adoption routes. Large plants are better placed to invest in connected equipment, specialist teams and production-

grade systems, but brownfield machinery, global technology architecture, procurement controls and decisions made at global group headquarters can slow deployment. Micro and small firms may adopt a focused tool quickly, but often lack the data, management time and purchasing power to integrate AI into engineering or production.

A firm's business model also plays a role. Contract manufacturers and repair businesses have most to gain from scheduling, process control, maintenance, quality and documentation. Firms that own products and customer relationships can also apply AI to design, customisation, connected equipment and aftermarket services. Shared expertise and proven, affordable tools are important because many firms lack the scale to build these capabilities alone.

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: The sector starts ahead on digital maturity and AI adoption

CSO data point to a relatively strong starting position. Among surveyed enterprises with ten or more people, 91% have at least basic digital intensity and 36% use at least one AI technology, compared with 21% across the five manufacturing subsectors in scope.²⁰⁶

Computer and electronics is therefore among the more advanced manufacturing subsectors on reported AI use. But the headline figures need care: the survey excludes micro firms, which make up most enterprises in the sector, while basic digital intensity indicates the presence of digital technologies and practices rather than whether production data, equipment and systems are integrated.

AI use is already spread across several types of application. Text, speech or code generation is the most commonly reported technology, at 19.9%, followed by written-language analysis and data mining at 16.8%. Image, video or audio generation, workflow automation and machine learning each register between 13% and 15%.²⁰⁷ This is a broader profile than one centred only on general-purpose assistants: firms are also using technologies relevant to engineering, automation and production. The survey does not, however, establish how deeply these applications are embedded in operational workflows.

The maturity gap is clearest by firm size and use case. Small firms report greater use of text and language tools, which can be adopted with relatively little integration. Large firms report a broader range of applications, including 42.9% using AI in R&D and innovation.²⁰⁸ Workshop and interview evidence nevertheless points to uneven production readiness even among digitally advanced firms: data can remain siloed, production equipment difficult to connect and enterprise and operational-technology systems poorly integrated.²⁰⁹ Large plants may therefore have the data and capability to pursue AI in yield, quality, design and process optimisation while still facing substantial integration work. Smaller firms are more likely to begin with focused tools that work with existing systems.

For Ireland, the next step is therefore less about widening access to AI in the abstract than deepening its use in engineering and production. Less mature firms need reliable digital records and focused applications with a clear return. More advanced sites need to connect production, inspection and engineering data so that AI can move from isolated analysis towards the higher-value

opportunities identified below: quality and yield optimisation, digital twins, workforce augmentation and AI-assisted design.

Priority opportunities

Four opportunities stand out for Ireland: improving quality and yield; using digital twins to test process changes; raising workforce and business-operations productivity; and accelerating electronics design, firmware development and product customisation.

1. Manufacturing, process and product quality: Make quality and yield visible – then close the loop

Quality is the clearest sector-specific opportunity. It affects product performance, plant economics and site competitiveness. Workshop participants described a progression from manual inspection of parts cleanliness to quantitative measurement, linkage with component history and, at higher maturity, lifetime prediction and process adjustment.²¹⁰

At semiconductor fabs, inline vision identifies wafer defects while corrective action is still possible. Comparable systems automate optical and three-dimensional inspection or use inspection and process data to improve yield.²¹¹

Large and medium-sized plants with connected lines can combine inspection, equipment and quality-system data across several process steps. Smaller manufacturers can begin with camera-based inspection at one station or use a specialist service, provided they have enough representative examples of good and defective output. Moving from decision support to automatic control requires validated data, stable interfaces, model monitoring, operational-technology security and clear accountability for production decisions.

2. Production planning, control and yield optimisation: Use digital twins to de-risk process development and production change

A digital twin lets a firm test a process change before making it on a live line. Workshop participants proposed digital twins of new processes to reduce physical trial and error, but stressed that firms should assess digital maturity first. In a brownfield plant, the useful starting point is usually a specific process or decision, not a virtual replica of the whole factory.²¹²

Large firms and digitally mature medium-sized firms are best placed to adopt this directly. Smaller firms may need a technology centre, gateway or demonstrator. The prerequisites are defined processes, equipment models, reliable production data and change-control routines. The model must also be tested against actual performance and updated as the process changes.

3. Workforce and business-operations productivity: Raise workforce, engineering and business-operations productivity

Workforce productivity is one of the few levers an Irish site can often control without a group-wide technology decision. Faster access to instructions, better deployment of scarce technicians and less administrative work can improve performance in time-sensitive manufacturing. Workshop participants also identified AI-enabled training, particularly where process and product knowledge can be converted into role-specific support.²¹³

Most near-term applications are assistive. GitHub Copilot can draft code, tests and explanations while the engineer remains

responsible for the output. The same model applies to technicians querying approved manuals, supervisors identifying skills gaps and finance teams automating routine approvals.²¹⁴

Task-allocation agents are less mature. They require reliable data on demand, skills, availability and production constraints, as well as authority to change work. The immediate priority is to deploy approved tools, curate technical knowledge and redesign tasks around them. This releases time now while building experience for more agentic systems.

4. Engineering and electronic systems design: Accelerate design, firmware development and product customisation

For design-led firms, AI can reduce the time from a product requirement to a verified circuit, board or embedded system. AI can, for example, be used to explore semiconductor design options and speed verification. Similar tools support PCB engineering and firmware development. For firms in Ireland competing through specialist products or IP, faster design and verification may be as valuable as higher factory throughput.²¹⁵

These applications require secure design libraries, specialist engineers, electronic-design-automation and simulation tools, and disciplined verification. Ownership of IP, models and training data also need to be cleared up given that such design information is commercially sensitive. Large firms have an advantage in toolchains and compute. Specialist SMEs can still use focused commercial tools, work with design partners or research organisations, and apply AI in product domains where they hold deep expertise.

The frontier: where the sector is heading

The frontier has three main elements: agentic product development, closed-loop production and physical AI. Embedded-development agents could carry a task through dependency resolution, code generation, compilation, flashing and testing. Production systems could use inspection and process data to detect drift, make bounded adjustments and re-plan work. Robots and connected equipment could

coordinate material movements, while product telemetry could trigger support or replacement before a fault disrupts service.²¹⁶

These applications require high-quality data, reliable connectivity, cyber resilience, standardised processes and clear accountability. In many firms, brownfield equipment, proprietary interfaces and group-level approvals will constrain adoption before model capability does.

The consequences of not adopting AI

Slow adoption would first weaken site performance. Workshop participants linked quality and yield at Irish plants to their ability to secure future investment and new-product mandates. If competing sites use AI to detect process drift, stabilise yield and introduce new processes faster, Irish plants that remain reactive will face a growing disadvantage in cost, quality and speed.²¹⁷

The effects also extend to product development and service. Firms that do not use AI-assisted design and verification will take longer to move from requirement to market. Manufacturers that fail to connect product telemetry, repair records and quality data will detect problems later, learn less from the installed base and miss opportunities to improve reliability and develop lifecycle services.

Suppliers face a market-access risk. Digitally mature customers increasingly expect traceability, trusted data exchange and integration with their planning and quality systems. Smaller suppliers that cannot meet those requirements may be excluded from future programmes, even where their underlying products remain competitive.²¹⁸

For Ireland, uneven adoption would reinforce the sector's dual structure. Large plants may continue to advance through group investment while micro and small suppliers remain disconnected. That would weaken the domestic supplier base, limit the benefits flowing from multinational plants into the wider economy and leave more technology, data and decision-making outside Ireland.

Barriers—and what would unlock adoption

Computer and electronics manufacturers do not face one isolated obstacle. Adoption depends on a connected set of capabilities: a firm must identify a problem worth solving, give someone authority to change the work, assemble the right skills, connect the required data and equipment, and satisfy the assurance, security and infrastructure conditions for production use. When one link is missing, AI remains an office tool or a pilot rather than a manufacturing capability.

The route differs by firm type. Micro and small firms have less management time, fewer specialists and less capacity to absorb a poor vendor or investment decision. Medium and large plants can mobilise more resources, but must connect AI to heterogeneous brownfield equipment, enterprise architecture, quality systems, cybersecurity controls and global approval processes. A specialist electronics SME may therefore move faster on a narrowly defined use case than a much larger plant, while still lacking the capital and data volume required for production-scale applications.

Figure 22 summarises the chain from barrier to potential response. The sections that follow set out each barrier in turn, drawing on the workshop, the interview evidence and the supports currently available.

Figure 22. Barriers to AI adoption in computer and electronics manufacturing: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Understanding Creating a route from use case to production	Firms overestimate what a model can do and underestimate the deployment work. Cost arrives after the pilot, in data preparation, connectivity, workforce change and continuing operation.	Provision is strongest at diagnostic and planning, from AIReady.ie and Pathfinder to IDA consultancy. Diagnostics establish what a firm should do but do not fund doing it, and research-shaped funding requires novelty.	■ A practical playbook and a common maturity assessment ■ Curated roadmaps by sector, size and maturity ■ Advisory support fundable in its own right ■ Better signposting of existing training and funding
Skills and capability Building capability around real work	Capability is needed at three levels, and value depends on changing responsibilities and decisions too. AI is often handed to general IT staff, making this a problem of assignment as much as supply.	Electronics has its own Skillnet, but its provision is engineering rather than applied AI, which sits in the cross-sector networks. Reach is uneven and the gap is absorptive capacity rather than course supply.	■ Short role-based modules tied to a live use case ■ A common AI accreditation for employees ■ Embedded mentors and whole-management-team training ■ Learning factories and representative production environments
Data and digital foundations Building a usable production data layer	Equipment is electronically controlled without the interfaces, feedback loops or ground truth a dependable model needs, and firms often do not know how to retrofit brownfield equipment.	The relevant provision is technical rather than financial: the EDIHs, MCCIs and the Technology Gateways. Continuous data engineering after go-live is too large for a voucher and too routine for a research instrument.	■ Co-funded data and process clean-up ■ Pooled SME datasets or virtual data banks ■ Locally hosted AI servers via universities and hubs ■ Capital-grant rules covering models and compute
Trust, reliability and governance Making production use auditable and reversible	Requirements rise as a system moves from advising a person to stopping equipment. Firms need explainability, audit trails and a way to override, and accountability across interconnected systems is unclear.	Cyber, IP and governance supports exist, with places to test. None sets what evidence is sufficient to validate a system influencing a quality, safety or process-control decision.	■ Validation checklists and human-oversight thresholds ■ Independent assessment of vendors and applications ■ Support for on-premises and edge AI ■ Clearer ownership rules for data, models and derived assets
Platform and supply-chain dynamics Building what no firm can build alone	Grid, water and fibre constrain expansion, and customers adopting AI expect matching maturity from suppliers. The risk for a smaller supplier is exclusion from a customer's connected production system.	The institutional base is substantial but tilted towards intangible rather than physical infrastructure. Maturity information sits separately across the agencies, with no assembled national picture.	■ A standard diagnostic shared across the agencies ■ An anonymised national maturity repository ■ Shared datasets and manufacturing demonstrators ■ Coordinated action on grid, water and fibre

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Understanding: Creating a route from use case to production

The first barrier is knowing where to start. This means the ability to connect a use case to a measurable business objective and find a credible route from trial to production. In this sector the relevant decision might be whether an inspection result is acceptable, which process setting is driving yield loss, when a component is likely to fail, or whether a digital twin is mature enough to replace physical trial and error. Unless the task, the operating response and the performance measure are specified together, a pilot may serve to just demonstrate a tool, rather than change the work.

Workshop participants described understanding as a precursor to everything else, and said firms lacked both a playbook and a common way to locate themselves on a digital-maturity path. Manufacturing interviews reached the same conclusion from another direction: firms often *overestimate* what a model can do, attempt the wrong use cases and become disillusioned, and they *underestimate* the deployment work that follows, including monitoring, retraining and governance. A weak first experiment then creates wider scepticism, particularly where the business case was never expressed in material product terms that they understand (such as yield, downtime, or engineering hours).²¹⁹

The cost of adoption is also larger than the licence or the model. It includes data preparation, equipment connectivity, workforce change and continuing operation, and those costs arrive after the pilot has shown promise rather than before. Interviewees observed that firms underestimate that this is a recurring investment in data, skills and technology

rather than a day-one win. A micro or small manufacturer may have to compare products, advisers and data requirements through the owner-manager or a general IT provider, which makes a wrong choice expensive in both cash and time. Larger plants can run more experiments, but a local project must satisfy group architecture, procurement, cybersecurity and investment criteria, and may compete with other sites for capital.²²⁰

Provision is strongest at the diagnostic and planning stages. AIReady.ie offers a national awareness and self-assessment starting point, and Enterprise Ireland's AI and Digital Pathfinder tool helps a firm identify which supports fit its situation. Access Advice: Digital Discovery funds three to seven days of expert input at up to 80% and €5,000 for eligible Irish-owned manufacturers with ten or more employees, and the Strategic Consultancy Grant can bring in external expertise where the question is strategic rather than technical. For foreign-owned sites, the IDA Advanced Manufacturing Diagnostic establishes a maturity baseline, and the Business Development Programme's Digitalisation Consultancy Grant can fund a site roadmap, systems architecture and implementation plan, with consultancy costs considered up to €300,000.²²¹

Funding for the work that follows is more fragmented. The Feasibility Study Grant can support up to 50% of eligible expenditure to a maximum of €15,000 towards market research, consultancy, development and prototyping, and the Exploring Innovation Grant provides up to €35,000 towards feasibility work, prototypes and innovation planning. Digital Process Innovation is the most directly relevant to deployment: it can contribute 50% of eligible expenditure to a maximum grant of €150,000 and covers internal implementation time alongside external expertise.

Capital Funding Support can contribute towards equipment, production software and licences to a maximum grant of €250,000, with the IDA Business Asset Grant providing up to €250,000 for foreign-owned sites.²²²

Two things limit what this provision achieves. Diagnostics and consultancy establish what a firm should do, but they do not fund doing it, and the gap between a roadmap and a validated production system is where projects stall. Research-shaped funding then requires technical novelty — an IDA RD&I Grant cannot simply fund AI adoption, since the work must meet R&D definitions under State Aid rules — while much of what an electronics manufacturer needs is a proven product that must be connected, validated and operated. Interviewees described this directly as a gap for firms that want to buy, integrate and deploy an available solution. Workshop participants also identified low awareness of the programmes that do exist, so some firms face a navigation problem before they face a funding one.²²³

Participants proposed a practical playbook and a common way to assess digital maturity, so that a firm can locate its starting point without commissioning bespoke advice. Better signposting of existing training and funding provision was a recurring theme. Interviewees went further, arguing for curated roadmaps differentiated by sector, size and maturity, on the basis that awareness is not the problem so much as navigation, and for advisory support to be treated as a fundable activity in its own right rather than an adjunct to a capital grant.²²⁴

2. Skills and capability: Building capability around real work

Skills and capability comprised the barrier topic that workshop participants emphasised most. The need has three layers. Most employees require enough fluency to use approved tools safely and challenge their outputs. Engineers, technicians and managers need role-specific production, data and change skills. A smaller group requires specialist capability in AI, data engineering, operational technology and cybersecurity. These skills will not create value unless firms also change responsibilities, decisions and processes – a single AI champion without management ownership would not be enough. Interviewees also observed that the people asked to look at AI inside a firm are often traditional IT or software technicians, whose capability is not necessarily the right fit for the domain; in smaller firms the general IT team may simply be handed the subject to own. The problem is therefore partly one of assignment rather than supply of skills.²²⁵

Electronics is the one manufacturing sub-sector with a dedicated Skillnet network, though its provision is largely electronics engineering rather than AI. MIDAS Electronic Systems Skillnet offers Analog IC Design CPD, Digital Design Fundamentals, Learning to Programme in Python and Embedded C and C++. This is valuable capability, and directly relevant to firms building intelligence into products, but not training on applying AI to production. The applied AI provision sits in the cross-sector networks: Industry 4.0 Skillnet's AI MASTERY for Industry and Diploma in Manufacturing Automation, Technology Ireland Digital Skillnet's AI Capability Accelerator for Senior Leaders and DataSMART, and CILT Mobility and Supply Chain Skillnet's applied AI in supply-chain management.

AIReady.ie and the further- and higher-education inventory add awareness-level and longer-form learning across AI fundamentals, machine learning, computer vision, cybersecurity and the EU AI Act.²²⁶

Where the requirement is to build or recruit capability rather than attend a course, Enterprise Ireland's Build Capability grant can provide between €5,000 and €70,000 towards non-routine strategic training, and Training Funding Support can co-fund leadership, change management and digitalisation. Spotlight on Skills helps a management team produce a company skills plan, while GradStart and PhDStart can add graduate or research capability the firm cannot recruit directly. For foreign-owned sites, the IDA Training Grant can provide up to 50% support to a maximum of €3 million for eligible plans covering AI, data analytics, automation and organisational agility. Reach differs across these routes: Skillnet provision is tied to participating networks and private-sector employment, micro-enterprise coverage is not consistently established, and Enterprise Ireland and IDA schemes are restricted to their respective client bases.²²⁷

The residual gap is absorptive capacity rather than a shortage of courses. Firms need role-specific learning, but also the decision rights, protected time and operating routines required to apply it. Medium and large sites need specialist capability and a way to spread it across functions, shifts and locations. Across both, training needs to be tied to a current tool, an accountable owner and a live business problem. Interviewees were also direct about format, favouring flexible, rapid and accessible skills funding over multi-year qualifications, and short deep-dive micro-credentials that busy technical teams can absorb while the technology keeps moving.

One observed that a substantial government skills fund already exists but is under-accessed because of administrative burden and inflexibility – a reminder that availability does not necessarily entail usable provision.²²⁸

Participants proposed a common AI accreditation for employees, more online learning and a pipeline beginning in schools and tertiary education, alongside a broader push to promote AI fluency in both corporate and tertiary settings. The wider manufacturing evidence adds a delivery model: short role-based modules tied to a live use case, embedded mentors or software architects who can integrate AI safely, and training aimed at a whole management team rather than a lone champion. Learning factories, technology centres and representative production environments would let employees apply new skills before using them on a live line.²²⁹

3. Data and digital foundations: Building a usable production data layer

Production-grade AI depends on data that is accurate, contextual and accessible across the systems that describe the product and process. The workshop identified unclear data, silos and systems that do not communicate, with smaller firms especially likely to lack sufficient quality and volume. Manufacturing evidence adds to the IT-OT divide – between the enterprise systems that hold business data and the controllers and sensors that run production. Equipment may be electronically controlled yet still lack the interfaces, feedback loops and “ground truth” – the verified record of what actually happened, against which a model's output can be checked – needed for a dependable model. Large plants have more data but also more brownfield variation; small firms may have a simpler architecture but too few observations and no internal data engineer.²³⁰

Interviewees emphasised that this is not simply a matter of expenditure, but also one of knowledge. Intervening in live production to restructure data or add sensors is genuinely difficult, especially in large legacy-heavy plants; firms often do not even know how to retrofit brownfield equipment.²³¹

The diagnostic and capital routes described in barrier 1 apply here too, and at the smaller end Digital for Business gives Local Enterprise Office clients access to a consultant who assesses existing systems, after which the Grow Digital Voucher can contribute up to €5,000 towards software, training and IT configuration. That is the right instrument for basic digitisation, but not for connecting a production line.²³²

The more relevant provision is technical rather than financial. The European Digital Innovation Hubs offer test-before-invest facilities where a firm can trial an integration pattern without interrupting live production: EDIH-ENTIRE brings sensor, Internet of Things and cybersecurity expertise, and EDIH-FactoryxChange provides manufacturing digital assessment. MCCI covers embedded systems, connected devices, industrial monitoring and edge AI, which is close to the interface problem this sector faces, while Technology Gateways give open access to technological-university researchers and equipment beyond the Enterprise Ireland and IDA client bases. Because connecting operational technology widens the attack surface, the Cyber Security Review Grant is also relevant, contributing 80% towards a defined €3,000 review against the National Cyber Security Centre framework.²³³

The work does not end when a system goes live. Firms need time inside live operations to clean records, connect equipment or link different systems, and they then need to monitor and update models after the project team has gone. A voucher is likely to be too small for that continuous work and a research instrument is a poor fit, because the task is necessary engineering, not novel research. One interviewee, drawing on experience across grant applications, described data readiness and interoperability as the most recurring obstacle in grant applications, and pointed to the ground-truthing required as controllers and protocols change.²³⁴

Some of what firms need cannot be built by any single small manufacturer. Workshop participants proposed pooling data across SMEs and creating virtual datasets or data banks, so that a firm with too few observations to train a model could draw on a representative collection instead of waiting to accumulate one. Interviewees made a related case for locally hosted AI servers reachable through universities, technology centres and the digital innovation hubs, allowing a firm to test a model without its data leaving the organisation – an arrangement that addresses capability and sovereignty concerns at the same time.

The rest is a question of what support will pay for. Interviewees argued for co-funded data and process clean-up, understood as an investment of time and access to expertise rather than a purchase, and for capital-grant rules to state plainly how models and computing hardware are treated. In each case the argument is the same: buying the software is the cheap part, and the cost that firms cannot cover is the engineering work of connecting it to the plant. Demonstrators should therefore be judged on whether an application reaches normal production, one interviewee noting that too many proofs of concept stall in the lab.²³⁵

4. Trust, reliability and governance: Making production use auditable and reversible

Trust becomes more demanding when AI influences a product or production decision; workshop participants asked who is accountable when something goes wrong. Interviewees were specific about where the limit currently sits: generative output was not considered good enough for shop-floor control, because an error there carries health-and-safety or cost consequences and there is very little tolerance for one. Firms in regulated work also need explainability, traceability and audit trails that many models cannot provide. And connecting interconnected or agentic systems multiplies the attack surface while leaving override and accountability unclear – one interviewee likened it to handing control of a nuclear reactor to a graduate. Requirements rise as a system moves from advising a person to stopping equipment or changing a process. Firms then need stronger validation, clear human oversight and the ability to override or reverse an action.²³⁶

Ownership questions are moving with the technology. Interviewees described a reorientation in which data itself becomes the intellectual property (sensor records rather than patents) which raises the question of how it should be stored and managed. But valuable field data often rests on cloud infrastructure that is held or owned abroad. Interviewees reported unprecedented demand from clients for their own on-site data centres so that they can control the information themselves; some manufacturers described reluctance to send sensitive data to cloud AI services at all. Vendor lock-in, meanwhile, is a particular concern for foreign-owned sites whose corporate parent selects the provider.²³⁷ One interviewee, however, cautioned that these concerns often run ahead of where firms actually are,

arising before the underlying adoption has happened.²³⁸ Even so, the ownership question becomes harder to defer as connected products generate more data.

Existing provision addresses some of the security and intellectual-property components of this barrier. The Cyber Security Review Grant contributes 80% towards a defined €3,000 review against the National Cyber Security Centre framework, which provides a useful baseline. Access Advice: IP Start and IP Plus give firms structured intellectual-property advice, relevant where the question is who owns a model, a derived dataset or the telemetry a product generates. AIReady.ie and the further-education inventory cover awareness of responsible use and the EU AI Act, and Technology Ireland Digital Skillnet's leadership and data provision can help a firm build governance capability. The European Digital Innovation Hubs and Technology Centres described earlier offer environments in which a system can be tested before it reaches production.²³⁹

These measures strengthen a firm's defences, its intellectual-property position and its general governance knowledge. But they do not address the specific decisions that determine whether an application may run in production. Interviewees looking for a common expectation of what evidence is sufficient to validate a system influencing a quality, safety or process-control decision did not describe finding one, and the same appears to be true of a standard way to set the human-oversight threshold for a particular task and piece of equipment, or an independent service that will assess a vendor, a contract or a deployment choice on a firm's behalf. Interviewees instead described governance and compliance emerging as a business function in its own right, developed inside firms, alongside a gap in AI

Act education. One interviewee contended that the absence of a settled legislative and standards framework for safe AI use could act as a collective brake on adoption.²⁴⁰

What is missing is a practical route from safe experimentation to accountable production use. Smaller firms need independent help to assess vendors, contracts and deployment choices. Larger plants may draw on corporate standards but still need validation for the specific task and equipment, together with model monitoring, access controls and audit trails. A general governance template cannot tell a firm when a quality, safety or process-control decision is reliable enough to delegate.²⁴¹

Participants asked for clarity about what accountability and safe use require, made concrete through validation checklists and defined human-oversight thresholds for a specific task and piece of equipment. They also wanted independent assessment of vendors and applications, so that a firm comparing suppliers is not relying on the suppliers' own accounts. Approved-tool and data-use policies would then set the internal boundary – and meet the change-management need to tell staff at every level what is permitted and what must be checked. On infrastructure, interviewees asked for support for on-premises and edge AI, and for capital-grant rules to state plainly how models and computing hardware are treated, thereby easing sovereignty concerns. Locally hosted servers accessible through universities, technology centres and the digital innovation hubs would let a firm test without data leaving the organisation. Participants also sought stronger operational-technology cybersecurity support and clearer ownership rules for data, models and derived assets.²⁴²

5. Platform and supply chain dynamics: Building what no firm can build alone

Some constraints sit above the individual enterprise. Firms may need access to shared testbeds, representative data, research partnerships, common diagnostics and interoperable systems across supply chains. These shared resources and partnership arrangements are difficult for an individual manufacturer, particularly a smaller firm, to develop on its own.

Interviewees expect customers adopting AI to require matching digital maturity from their supply chains, and warned that multinationals will move to a supply chain that has those capabilities. The risk for a smaller supplier in Ireland is therefore not slow adoption but exclusion from a customer's connected production system — a position that is harder to win back than to hold.²⁴³

Ireland's institutional base is substantial, but more tailored towards supporting the intangible ecosystem infrastructure rather than the physical variety. Technology Gateways give firms open access to technological-university researchers and equipment, and Technology Centres connect groups of firms to shared research capacity. Innovation Vouchers offer a standard €10,000 route into the research system, with co-funded vouchers to €20,000, and Innovation Partnership Grants support company-driven projects with a research institution. For larger and more ambitious work, the RDI Fund, the Disruptive Technologies Innovation Fund and Horizon Europe provide routes into collaborative development. The European Digital Innovation Hubs described in barrier 3 add test-before-invest capacity, and their open-access role is intended to widen reach beyond the main agency client bases.²⁴⁴

Across these initiatives, interviewees described a coordination gap, indicating that maturity information sits separately with IDA Ireland, the European Digital Innovation Hubs and Irish Manufacturing Research, with no assembled national picture. One interviewee observed that the agencies are collectively holding a large amount of valuable data. Without a combined view, neither firms nor policymakers can see where the sector stands or which interventions are working. A related question was raised about why industry-academic collaboration is not happening at scale despite sustained investment in the research ecosystem. The institutional base also stops short of the firm: a testbed can show that a model works, but it cannot fund the integration and model maintenance inside the firm, or connect a supplier into a customer's systems.²⁴⁵

Participants proposed treating the coordination problem directly: a standard diagnostic available to all the agencies, and an anonymised national repository that would let maturity be tracked over time and inform policy.

Alongside it, they called for shared datasets, manufacturing demonstrators built around the existing testbed base, and explicit pilot-to-production pathways so that fewer proofs of concept end in the lab. Interviewees put particular weight on peer evidence: a firm describing its own project was thought more persuasive than any vendor account, so anonymised catalogues of credible use cases could prove valuable. Participants also called for stronger supplier outreach and coordinated action on grid, water and fibre. These system-level measures would complement rather than replace support for individual firms.²⁴⁶

Manufacturing: Food and Beverages

At a glance

Food and beverage manufacturing is grouped here as one subsector, but it holds businesses that work in very different ways. Dairy, meat, seafood, ingredients, packaged foods, brewing and distilling differ in what they make, how they make it, who they sell to and where their margin comes from. A high-volume dairy processor and a craft distillery face different problems and will find value in different places.

The enterprise base is just as varied. CSO recorded 2,451 enterprises in 2023, more than nine in ten of them employing fewer than 50 people. The result is a long tail of small manufacturers alongside a small number of large, capital-intensive plants.²⁴⁷

The chapter follows the chain from product, recipe and packaging development through sourcing, planning and production to food safety, quality, yield, labelling, distribution and customer channels. Primary agriculture, logistics, retail and foodservice sit outside the boundary, but enter the analysis where they shape inputs or routes to market.

Firm size and product mix affect where the value sits. In the near-term, the potential gains are operational: matching labour, ingredients, stock and line capacity more closely to demand, holding yield and quality steady, catching equipment and food-safety problems earlier, and cutting the administrative load around production. Thin margins give managers a strong reason to act. Supply chain belongs in that near-term set too. Demand moves quickly, deliveries are disrupted by events no one can forecast, and provenance requirements stretch sourcing along long routes – exposure that Ireland geography and dependence on trade only accentuate.

Over the longer-term, the benefits would be a business that adapts faster: quicker product and packaging development, closer coordination with retailers, and control that runs continuously rather than in periodic reviews. Adoption depends on digitised processes and standard ways of working, data that is consistent across sites, connected equipment, and a credible path to payback in a low-margin business.

The chapter separates what manufacturers in Ireland can deploy now from what firms, their value-chain partners and the wider support system still have to build.²⁴⁸

Opportunities

- **Plan production more closely to demand.** Better planning and scheduling protect throughput, yield and energy use, and matter most in a low-margin business where labour, ingredients and line capacity are the main costs.
- **Catch quality and food-safety problems earlier.** Continuous inspection identifies problems before product leaves the plant, replacing periodic sampling with constant measurement.
- **Forecast to adjust decisions.** Inventory and supply chain applications create value when a forecast changes an order, a shift or a route.

Barriers

- **A wrong first move is costly.** Firms know AI matters but not where to start. The sector lacks food-specific examples and vendor demonstrations do not reliably translate into live production.
- **Production systems are fragmented.** Equipment, quality, planning and finance data tend to sit in separate systems and sites, so questions are answered differently depending on where they are asked.

- **Rules are not clear before AI influences production.** Firms need to know what accountability and safe use require in a food-safety context before letting a model affect a process decision.

Potential interventions

- **Provide a staged adoption pathway.** A common diagnostic, sector- and size-specific mentoring, access to credible suppliers or solution patterns, and peer examples showing the business problem, the data required and the implementation effort.
- **Develop practical guardrails with regulators and industry.** Standard checklists and evidence templates rather than broad principles, giving firms a basis for assessing products and documenting decisions.
- **Build capability on the plant floor and give pilots an owner.** Short role-specific modules built around live production and quality problems, mentors working alongside internal teams, and support for the protected time or backfill needed to apply the learning — with each project given a named senior owner and a cross-functional group able to change the workflow.

How AI is impacting the value chain globally

The global use-case library maps 77 distinct applications across food and beverage manufacturing (see Appendix B), from forecast-led shift planning at an international bottler and sensor-equipped robot inspections at Cargill.²⁴⁹

Key areas of application

Applications now span the full food and beverage value chain, with workforce and finance providing the operating backbone.

Upstream, the work is in narrowing the field before anything reaches a laboratory. Kerry Group has been at this for several years, applying AI in research and development and taste development alongside manufacturing optimisation and predictive maintenance.²⁵⁰

In the **supply chain**, AI connects demand forecasts to inventory, procurement and replenishment. Kraft Heinz combines granular demand signals with planner judgement and customer inputs to create a stronger baseline forecast, leaving planners to manage exceptions rather than rebuild the plan. The gain comes not only from greater forecast accuracy, but from better decisions about what to buy, how much stock to hold and how to protect service without tying up unnecessary cash. In a sector shaped by perishability and volatile input costs, both excess and shortage are expensive.²⁵¹

Operations is the main concentration of activity, and the shift is from sampling to checking everything. One interviewee cited an example of vision systems used to predict the shelf life of individual watermelons, checking every fruit

(where previously manual inspection covered just one in a hundred) and cutting the waste that sampling lets through.²⁵² The same principle runs through maintenance and process control, where process and image data anticipate failures or defects and recommend adjustments that protect yield, consistency and ultimately margins. The same sensing extends to the equipment itself: vision, thermal and acoustic data gathered on routine rounds can pick up overheating, air leaks and unsafe conditions before they interrupt production. A deviation caught at that point never becomes discarded output or, worse, a food-safety incident.

Downstream, AI improves coordination with retailers and speeds up marketing, service and recall workflows. Unilever combines forecast, sales and inventory data with retail customers to create a shared view of demand and replenishment. This gives both sides a faster basis for deciding what to produce, move and restock.²⁵³ Other applications use governed company data to generate product content or help teams triage safety and labelling cases.²⁵⁴ None of these activities happen in a factory, but they all impact on-shelf availability, brand trust and recall costs.

Cross-cutting applications are less capital-intensive but often easier to adopt. One international bottling company combines production forecasts with employee skills, certifications, working-time rules and leave data to produce shift and annual-leave plans. Finance teams use similar techniques to assess price elasticity, identify margin leakage and improve cash forecasting. These functions are often practical entry points because their data

are relatively structured and the consequences of error are easier to contain than on a food-safety-critical production line.²⁵⁵ Assistive tools sit alongside them. Operational expertise in this sector is dispersed across technicians, quality teams, process engineers and supervisors, so a layer that explains a fault, retrieves the right maintenance instruction or presents exceptions for review has practical value at any size, particularly if it arrives inside software the firm already licences. Across all of these, AI changes the timing or quality of a decision rather than simply completing the same administrative task faster.

Differences across firm size

Most use cases in the library were built for large firms. They assume high-volume process data, connected machinery, integrated planning systems and enough throughput for a marginal gain in yield, waste or downtime to justify the cost.

Where the use case library does reach smaller producers, it reaches them through single bounded tasks rather than systems: grading green coffee beans from images, classifying blueberries by colour, size and softness, assessing milled-rice quality, distinguishing target bacteria from food debris under a microscope. These are less complex: they are tasks that might require just one camera and one decision, and affect one point on the line.

Smaller manufacturers may buy AI solutions rather than try to build them. Think of office assistants, forecasting and rostering tools, a vision check at a single workstation, and AI arriving inside the ERP, accounting or production software they already licence. Workshop participants tended to be direct about the requirement: an “out-of-the-box”

solution, which they named as the key thing micro and small firms need. Fewer systems and fewer approval layers can even mean that these firms can move quickly once a product is deemed to be credible. They also have lower levels of capital, talent and time, so they have to be much more selective than a large group would need to be; one interviewee described the need to be much clearer about what they are doing, while noting that smaller firms are used to operating that way.²⁵⁶

Medium and large firms have the data, the capital and the specialist staff. Their problem is integration. AI has to connect to ERP, manufacturing execution, quality, laboratory, warehouse and operational-technology systems. Medium-sized firms meanwhile are caught carrying the cost of that complexity but without the shared services or investment headroom of a large group.

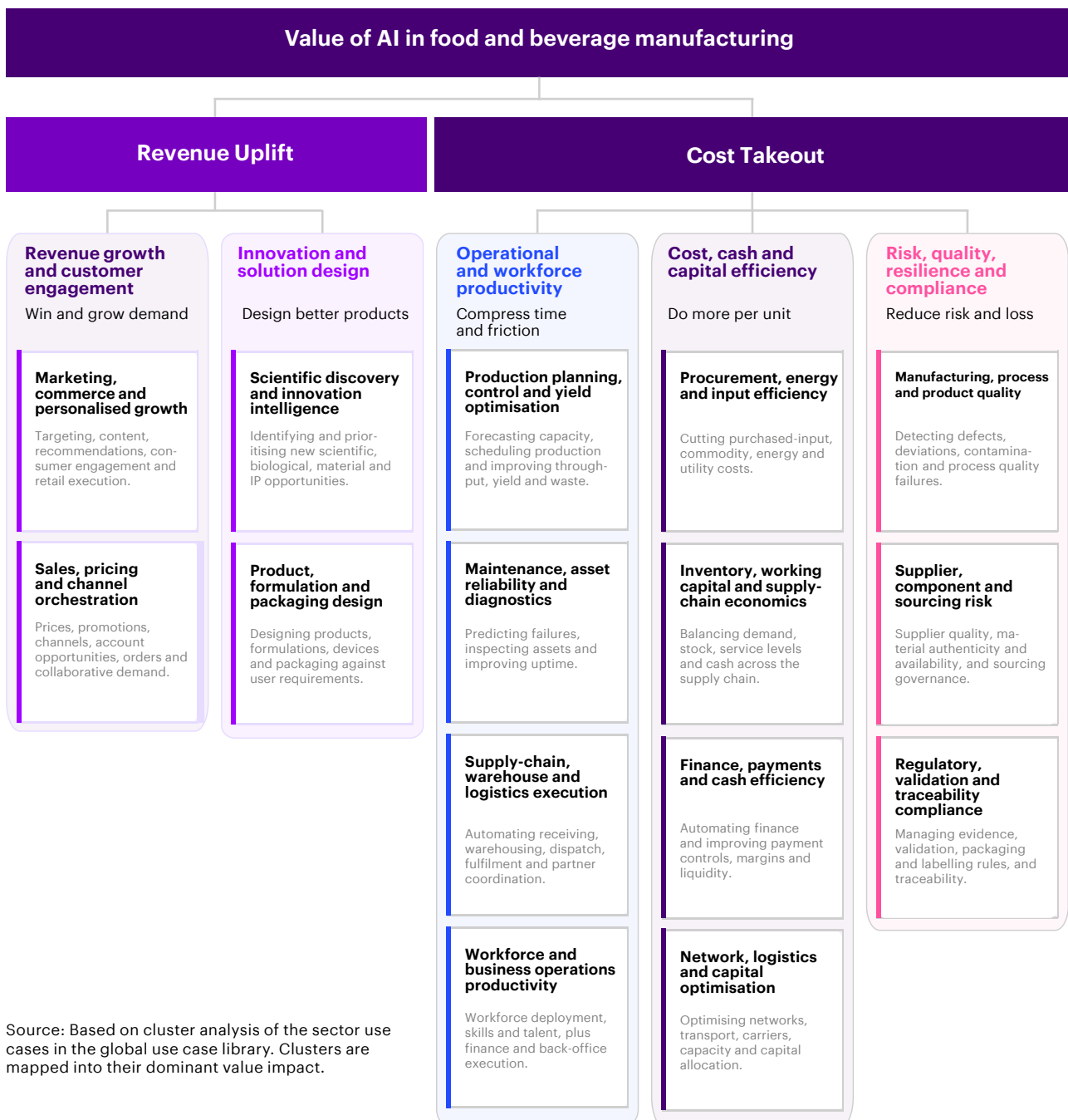
Multinational group membership is often an advantage. Interviewees described being part of a group as opening up access to case studies, pilots, procurement routes and internal best practice that an independent indigenous firm has to find for itself. One caveat to this, though, is that food is among the most localised industries. So, if AI rewards centralisation and scale, firms have to hold both global scale and local focus at once – a balancing act that is more of an issue compared with many other consumer goods industries.²⁵⁷

The implications for firms in the sector are therefore split. Smaller firms need embedded tools that demand little of their systems and prove themselves on a specific, bounded task. Complex plants, meanwhile, need data standardisation, system integration, and the discipline to carry a working pilot into production.

Key opportunities in Ireland

AI creates value in food and beverage manufacturing through two broad routes: helping firms grow revenue, and helping them expand and protect margin. The first covers innovation, product design, consumer targeting, pricing and channel performance. The second covers procurement, energy, inventory, production, maintenance, quality and supply-chain resilience. Across these two areas, the use cases were clustered into 15 opportunities.

Figure 23. AI value and opportunity tree in food and beverage manufacturing



Most of the immediate focus is on the cost side. Three in five of the mapped applications improve how efficiently and reliably firms produce, rather than what they can sell. This reflects the economics of the sector: margins are thin, volumes are high and repeated improvements in yield, waste, downtime and working capital compound into material gains over time.

It also reflects what firms can prove. A gain in yield, waste, energy or downtime is measured against a baseline the business already tracks, and the improvement can be attributed to the change that produced it. Revenue uplift cannot be isolated the same way: changes in sales following a reformulation or a targeting change sit alongside price, listings, promotion and competitor activity, and it is difficult to isolate and assign the credit. Workshop participants described some of the consequences, with internal champions unable to build a credible business case because the value proposition was unclear even to them, yet they are required to know the expected return to avoid the appearance of simply jumping on the AI bandwagon.

Revenue and commercial applications remain important, particularly for ingredient, nutrition, branded food and beverage businesses with strong sensory, laboratory and customer data. Equally, firms may also be more ready to invest when AI is connected to growth and better decisions than when it is framed purely as cost reduction.²⁵⁸

How the enterprise landscape shapes the priority opportunities in Ireland: Most firms are small, but production is concentrated in larger plants

Ireland's food and beverage sector is dominated by small businesses. CSO Business Demography recorded 2,451 enterprises in food, beverages and tobacco in 2023. Just over nine in ten employed fewer than 50 people, while only 60 firms were large. Those large firms accounted for 53.9% of people working in the subsector.²⁵⁹

This divide will shape AI adoption. Large plants generate more data, run more connected equipment and can spread the fixed costs of integration across greater volumes. They can justify predictive systems, machine vision, digital twins and multi-site planning. Smaller firms need tools that work within the software they already use, require limited integration and return clear value from a bounded task. Medium-sized producers carry more operational complexity than smaller businesses but lack the shared infrastructure, specialist teams and capital available to large groups.²⁶⁰

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: AI use rises sharply with firm size, while plant-level adoption remains limited

Digital readiness is mixed. Cloud computing is used by 72% of firms, below the manufacturing-wide rate of 78%. Enterprise resource planning systems are used by 42%, while 47% conduct internal data analytics. Only 11% use internet-connected sensors or smart devices.

The sector therefore has a stronger base in office and enterprise systems than in the connected production data needed for many factory-floor applications.

CSO data show that 23% of food and beverage manufacturers use at least one AI technology, compared with 21% across the manufacturing sectors in scope. Adoption rises from 14% among small firms to 27% among medium-sized firms and 64% among large firms. Micro enterprises, which account for nearly four in five businesses in the sector, are not covered by the survey, so the headline rate does not capture most firms in the sector.²⁶¹

The range of applications, and the proximity to core operations, also widens with firm size. Text, speech or code generation is the most common form of AI use, reported by 13% of firms, followed by workflow automation or decision support at 11%. Among small firms, text generation dominates and most other applications remain below 5%. Medium-sized firms report more workflow automation, along with some use in finance, cybersecurity and production. Large firms use AI across a wider set of functions: 48% in cybersecurity, 36% in workflow automation, 33% in finance and accounting, and 27% in production or service delivery.

Interviews describe a similar pattern. For much of the sector, current use means a general assistant such as Microsoft Copilot drafting documents, summarising information or supporting individual tasks.²⁶²

A small group is much further ahead. One large ingredients business has applied AI for several years across research and development, taste development, manufacturing optimisation and predictive maintenance.

Other examples include digital twins in new dairy plants, AI-assisted product development and remote monitoring of seafood stocks and feed.²⁶³

The main dividing line is whether processes are digitised and data is readily available. Firms with repeatable digital processes and consistent data can move from personal productivity into operational applications. Firms still relying on paper, spreadsheets, disconnected systems or knowledge held in people's heads cannot do this. One interviewee described the problem directly: "we haven't even digitised properly yet". Participants in the food and beverages workshop reached the same conclusion, noting that production-planning applications become practical only after processes have been digitised and clear standard operating procedures are in place.²⁶⁴

Priority opportunities

Five opportunities stand out for food and beverage manufacturers in Ireland. Four protect and expand margin by improving production, quality, stock and labour decisions. The fifth supports growth by speeding product and packaging development.

1. Production planning, control and yield optimisation: Better planning protects throughput, energy use and margin

Production planning, control and yield optimisation emerged as one of the strongest priorities because it bears directly on cost, energy, time and waste. By combining demand, recipe, line, maintenance and utility data, AI can help planners choose schedules and operating ranges that protect throughput and margin.

The case is strongest in high-volume activities such as dairy, meat, beverages, ingredients and packaged foods, where small losses repeat across long production runs. The opportunity is also open to smaller producers. A firm can start with one bottleneck, forecast or energy-intensive asset, provided the process is repeatable, its production history is usable and a named operator or manager owns the decision. Plants without those basics will first need to digitise the process and put robust standard operating procedures in place.²⁶⁵

2. Manufacturing, process and product quality: Continuous inspection catches problems before they become waste or recalls

Food safety and quality carry significant downside risk. A defect can become discarded output, a recall, lost shelf space or lasting brand damage. Workshop participants put it plainly: quality is everything in this sector.

AI-enabled inspection moves control from periodic sampling towards continuous observation, cutting recalls, waste and energy intensity while making output more consistent. KPM Analytics reads conveyor-line images of potatoes and similar free-flowing materials to identify foreign material and product defects, triggering automatic rejection or routing. Marel uses optical and line-performance data to improve the consistency and hygiene of poultry processing. Multimodal systems can also combine images with temperature, acoustic and equipment data to detect problems that no single signal reveals.²⁶⁶

Speed is the main challenge. Participants were clear that current solutions cannot yet perform at full rate on high-volume, high-speed lines, which puts the realistic near-term application on slower lines or at defined inspection points.

But beyond speed, the right approach depends on how standard the input process is rather than on scale alone. Where inputs and outputs are consistent, there is enough repeatable data to support vision and anomaly detection. Batch, craft or biologically variable processes need narrower models and more human review. Large plants can connect inspection to line control and quality-management systems. Smaller firms can begin with a camera-based check, laboratory decision aid or traceability service, particularly where the capability is embedded in equipment or software they already buy. All firms need representative data, traceability, validated thresholds, human authority over product release and clear accountability when the model is wrong.²⁶⁷

3. Inventory, working capital and supply chain economics: Forecasts create value when they change stock, sourcing and service decisions

Food demand can move quickly; inputs may be seasonal or perishable; and some ingredients come from a small number of distant sources. Unexpected events regularly disrupt deliveries, and Ireland's dependence on imports, exports and sea routes increases the exposure. AI can link demand and supply forecasts to stock policy, sourcing, logistics and production plans, and flag the disruption risks building behind them.

Scenario planning is where the change is most visible. Modelling a port delay, an ingredient shortage or a demand spike is now quick enough to run routinely rather than at fixed review points, so firms can prepare for disruption rather than absorb it. Interviewees described digital twins in new dairy plants being used to run through scenarios.

The value extends beyond forecast accuracy. Better decisions can reduce obsolete stock and emergency freight, protect service levels and reveal provenance or availability risks earlier. Large firms can plan across sites, suppliers and customers. Smaller firms can buy forecasting and inventory tools.²⁶⁸ In either case the forecast is only worthwhile if decisions are adjusted because of it.

4. Workforce and business-operations productivity: Better scheduling and less routine work can release scarce capacity

Food manufacturing is shift-based, often seasonal and dependent on scarce operational knowledge. AI can link demand to rostering, match skills and certifications to production needs, reduce routine administration and make approved instructions easier to retrieve. One international bottler, for example, combines forecasts, skills, leave and working-time rules in one scheduling workflow, allowing planners to manage exceptions instead of reconciling spreadsheets.²⁶⁹

This opportunity is open to firms of all sizes. A large plant can coordinate labour across lines and sites. A small manufacturer can adopt an embedded scheduling tool, automate commentary on management accounts or create an assistant restricted to approved procedures and training material.

The benefit doesn't come automatically though. Interviewees were emphatic that recovering a share of many people's time is not the same as removing cost, and that a programme presented as a saving can lose the backing of the workforce it depends on. The time has to be redirected to other work. They require accurate workforce data, agreed rules, sensible limits on employee monitoring and a clear explanation to staff of how the system will be used.

Firms also need to find the capacity to implement at all: interviewees described having no time for off-the-job training, so learning has to happen on the job.²⁷⁰

5. Product, formulation and packaging design: AI can test more product ideas with the same development capacity

Product innovation is where the growth route and Ireland's existing strengths overlap most closely. AI allows research and development teams to define and assess more formulations, flavours and packaging options before committing scarce laboratory, pilot-line or consumer-testing capacity. Interviewees described consumer simulation used to understand likely outcomes ahead of launch, and one large ingredients business running AI-assisted new product development – feeding customer requirements in at one end, and getting candidate products out at the other.

Ireland is well placed where manufacturers hold structured sensory, formulation, laboratory and consumer data alongside deep food knowledge, particularly in ingredients, nutrition, dairy and branded foods. Smaller firms can take part through shared research facilities, technology centres and focused analytical or generative tools – interviewees also pointed to scope for a convergence testbed drawing on Ireland's technology, food and life-sciences base. Success depends on disciplined product data, access to food-science and AI skills, clear rules on intellectual property, and a development process that turns faster exploration into better launch choices.²⁷¹

The consequences of not adopting AI

Slow adoption will usually show up first as a steady loss of margin. Competitors that forecast demand more accurately, reduce giveaway and waste, use less energy, avoid unplanned downtime and schedule labour better cope more easily with volatility and price pressure. In a high-volume, low-margin business, small differences in performance add up. Interviewees put the calculation plainly: the cost of not adopting already exceeds the cost of adopting. The sector is comfortable being a fast follower, but once a competitor has a working model the gap compounds rather than holds.²⁷²

Market access may also tighten. Retailers and business customers increasingly expect timely, structured information on stock, provenance, traceability, quality and delivery. A supplier that cannot provide it becomes harder to work with. Interviewees drew the parallel with emissions reporting, where suppliers risked being thrown out of global supply chains because they could not report.²⁷³

Late adopters risk losing ground in innovation. Firms that shorten formulation and packaging development can test more options, respond faster to demand and learn from each development cycle.

Interviewees also described AI beginning to make some development work newly viable, rather than merely faster, which widens the distance between firms that have the capability and those that do not.²⁷⁴

Interviewees described a three-way divide: large firms generally have greater capacity to invest, smaller firms tend to adopt selectively in response to immediate needs, while mid-sized producers can be less well served by existing support and market provision. Ownership does not map neatly onto this divide. Ireland has a number of large indigenous food manufacturers with the scale, international reach and organisational capability to invest in digitalisation and AI across global operations. The greater risk is that firms with weaker digital foundations, less investment capacity or less influence over their wider value chains fall behind, leaving them concentrated in lower-margin activities while more digitally mature firms capture a greater share of value. For foreign-owned subsidiaries, including parts of the drinks sector, a separate risk is that key technology, data and investment decisions may sit with headquarters outside Ireland.²⁷⁵

Barriers—and what could unlock adoption

Participants across the interviews, online consultation and workshops pointed to five connected barriers. Firms need a clear problem and business case, digitised processes and usable data, people who understand both the plant and the technology, clear ownership and time to change the work, and controls that match the consequences of error. Weakness in one area raises the cost and risk of the others. This is why a business can buy general-purpose licences or complete a technically successful pilot without changing yield, waste, downtime, labour productivity, quality or growth.²⁷⁶

Ireland already has a broad base of support for awareness, training, diagnostics, digitalisation, consultancy, research and selected capital investment. The more significant gaps arise later in the adoption journey: independent product advice, production-data remediation and line integration, protected implementation time, food-specific assurance, support for established rather than novel technology, recurring software costs and continuity from proof of value into normal operations.

Figure 24 summarises the chain from barrier to potential response. The sections that follow set out each barrier in turn, drawing on the workshop, the interview evidence and the supports currently available.

Figure 24. Barriers to AI adoption in food and beverage manufacturing: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Understanding Making a wrong first move less costly	Firms lack food-specific examples showing the full journey from use case to implementation, and vendor demonstrations do not translate reliably into live production.	Digital for Business, Digital Discovery, the Exploring Innovation Grant and the Food and Drink Ireland Skillnet programme cover diagnosis and business case. No impartial route stays with a firm through product comparison, proof of value and implementation.	■ A common diagnostic with sector and size-specific mentoring ■ Access to credible suppliers or solution patterns ■ Peer examples showing data, effort and measured outcome ■ Funding released in stages from proof of value into rollout
Data and digital foundations Addressing fragmented production systems	Firms often hold the data they need, but it sits in separate planning, production, laboratory, quality and maintenance systems using different definitions, and older equipment cannot share it.	Digital for Business, Digital Process Innovation, Capital Funding Support, FactoryxChange and the IDA Lean suite fund parts of the foundation. The accumulated engineering between them is not covered, and no common food-manufacturing data model exists.	■ Data preparation and integration treated as part of adoption ■ Standardised core product and asset records ■ Local or on-premise test environments for sensitive data ■ Interoperable pilots across manufacturers, suppliers and retailers
Skills and capability Building capability on the plant floor	Few people hold the horizontal view of how planning, production, quality, maintenance and commercial decisions affect one another. The requirement is a cross-functional team, not more trained individuals.	The Food and Drink Ireland Skillnet programme, Build Capability, Grad Start and the IDA Training Grant are substantial. Course availability is not the gap; applying learning to live production problems is.	■ Short role-specific modules built around live problems ■ Experienced mentors working alongside internal teams ■ Support for protected time or backfill ■ Pairing process experts with more AI-fluent employees
Leadership, strategy and ownership Making pilots more than an IT installation	AI initiatives sit with IT or operational technology rather than the business function, pilots are disconnected from key performance indicators, and technically successful projects never enter daily operations.	Lean for Business, Operational Excellence, Digital Process Innovation and the IDA Lean suite support process change, and Digital Process Innovation reaches internal implementation time. Coordination across providers is left to the firm.	■ A named senior owner with a measurable outcome ■ A cross-functional group with authority to change the workflow ■ A stage-gated model recognising protected time or backfill ■ Peer groups comparing problems that arise after a pilot
Trust, reliability and governance Establishing clear rules before AI influences production	Assurance must rise with the consequence of error. Firms are unsure when an AI-enabled process becomes a regulatory matter, and responsibility for food safety cannot be transferred to the provider.	The Cyber Security Review Grant, IP Plus and the EDIHs address component risks. Food-manufacturing-specific assurance, and regulator capability to assess it consistently, are missing.	■ Practical guardrails developed with regulators and industry ■ Standard checklists and evidence templates ■ Supervised demonstrators using realistic production data ■ Standard procurement clauses on data, ownership and audit rights

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Understanding: Making a wrong first move less costly

To deploy AI effectively, firms need to know what they are trying to improve, what data the application requires, what implementation will cost and how success will be measured. Across the sector, firms lack food-specific examples that show the full journey from use case to implementation, including the workflow, data requirements, cost and measured result. Even where relevant products exist, consultation responses highlighted the risk that vendor demonstrations do not translate reliably into live production environments.²⁷⁷

Existing supports comprise different routes for firms at different starting points. For micro and small indigenous manufacturers, Digital for Business provides an expert assessment of the firm's existing digital systems and opportunities. This can be followed by the Grow Digital Voucher, which provides 50% grant aid, from €500 up to €5,000, towards eligible software, training and IT configuration. For eligible Enterprise Ireland clients employing ten or more people, Access Advice: Digital Discovery provides three to seven days with an AI or digital expert, with support of up to 80% to a maximum of €5,000. Firms with a more developed opportunity can then use the Exploring Innovation Grant, which provides up to €35,000 for activities including feasibility work, prototypes and assessment of return on investment.²⁷⁸

The most directly sector-specific support is Food and Drink Ireland Skillnet's Strategic Management of AI and Digitalisation within the Food and Drink Industry. It helps to address many of the decisions at the heart of this barrier, including business outcomes, return on investment, prioritisation, data foundations, implementation planning and moving from pilot to scale. Foreign-owned manufacturers have

an alternative route through IDA: the Advanced Manufacturing Diagnostic can establish a site's digital and advanced-manufacturing maturity, while the Business Development Programme – Digitalisation Consultancy Grant can support development of a transformation roadmap, systems architecture, process maps and implementation plan, with eligible consultancy costs considered up to €300,000.²⁷⁹

These measures provide credible routes for diagnosing needs and developing a business case. But the remaining weakness flagged relates to what happens next. Firms still lack an impartial, food-and-beverage-specific route that stays with them through product comparison, testing vendor claims, live proof of value and implementation. The gap is particularly important for medium-sized firms, whose requirements can exceed a small voucher without having the resources of a multinational, and for projects based on buying and integrating an established product rather than undertaking qualifying R&D.

Participants therefore proposed a more staged adoption pathway: a common diagnostic, sector- and size-specific mentoring, access to credible suppliers or solution patterns, and peer examples showing the business problem, data required, implementation effort and measured outcome. Support would then be released in steps, so that a successful proof of value creates a defined route into integration and rollout. Smaller firms would be directed towards bounded products requiring limited integration, while more complex plants would receive support through the move from pilot into production.²⁸⁰

2. Data and digital foundations: Addressing fragmented production systems

Food manufacturers often have the data they need, but it sits in separate enterprise planning, production, laboratory, quality, maintenance, warehouse and spreadsheet systems.

Sites may use different definitions for the same product, asset or process. Older equipment may be electronic but unable to share data. Interviewees described legacy infrastructure, variable inputs and several versions of the same source data.²⁸¹

Weak foundations raise costs and reduce reliability. A forecast may not reconcile with stock records. A vision system may lack enough labelled examples. A maintenance model may fail to connect a sensor reading to the correct asset history. Small firms may still need basic digitisation. Larger plants face the harder task of connecting older production equipment with newer IT systems and standardising information across sites.²⁸² The issue also extends beyond individual sites and firms. Collaborative planning, traceability, provenance and supply-chain resilience depend on manufacturers, suppliers and retailers using common definitions and exchanging trusted information.²⁸³

Existing support can fund meaningful parts of this foundation. For micro and small indigenous manufacturers, Digital for Business provides an expert assessment of existing systems and digital gaps, while the Grow Digital Voucher can then provide 50% grant aid, from €500 up to €5,000, towards eligible software, training and IT configuration. These measures are most useful where the immediate requirement is basic digitisation or connection of a relatively small number of systems.²⁸⁴

For larger eligible indigenous firms, Digital Process Innovation is more closely matched to the implementation problem. It can support an internal implementation team, external expertise and project costs, with grant support of 50% of eligible expenditure up to €150,000. Capital Funding Support can contribute towards eligible production equipment, computers, software, licences and technology acquisition.

FactoryxChange, one of the European Digital Innovation Hubs, adds manufacturing-focused assessment and test-before-invest capability, allowing firms to examine new digital and connected-production approaches before committing to deployment.²⁸⁵

Foreign-owned manufacturers have a separate route through IDA. The Lean/Digitalisation suite provides progressively deeper support: LeanStart for an initial roadmap and improvement project, LeanPlus for a medium-scale digitalisation project and LeanTransform for a longer, multi-year transformation. The Business Asset Grant can also support eligible equipment and technology upgrades. These measures can therefore contribute to the systems, technology and organisational change surrounding a larger integration programme, subject to client and project eligibility.²⁸⁶

These supports can help firms assess their starting point, purchase selected technology and undertake defined digitalisation projects. But the main weakness is the accumulated work between those interventions: cleaning and reconciling source data, standardising identifiers, connecting older machinery, integrating production, laboratory and quality systems, validating interfaces and maintaining them when equipment or software changes. This is necessary engineering work, but it can be too substantial for a small voucher and may not involve the technical novelty required for an R&D instrument. Medium-sized firms are particularly exposed to this gap.

There is also a sector-level gap. The reviewed support landscape does not provide a common food-manufacturing data model or a coordinated mechanism for exchanging trusted product, production, traceability and supply-chain information between manufacturers, suppliers and customers. No individual firm can create that shared layer on its own.

Participants suggested that data preparation and integration should qualify as part of AI adoption. Support could cover data cleaning, standardisation of core product and asset records, basic recording practices, software, equipment and integration. Local or on-premise test environments would allow firms to work with sensitive production information. At the sector level, interoperable pilots could test how production, quality, traceability and retailer data move safely between organisations without requiring every firm to use the same platform.²⁸⁷

One participant also observed that the scale of support routes differs by whether the firm is indigenous or foreign-owned. Harmonising differences here to ensure that similar supports exist should be explored.²⁸⁸

3. Skills and capability: Building capability on the plant floor

The skills barrier extends well beyond general familiarity with AI. Employees across the business need enough understanding to use approved tools safely, recognise weak outputs and know when human judgement must prevail. Operators, engineers, quality specialists, supply-chain teams and managers need more applied knowledge of how AI changes the particular process or decision they own. A smaller group needs specialist capability in areas such as data engineering, AI, operational technology, cybersecurity and model evaluation.

The harder requirement is bringing these capabilities together. Moving beyond individual use cases requires people who understand how the business works across functions: how decisions in planning, production, quality, maintenance, supply chain and commercial teams affect one another. Workshop participants noted that relatively few people have this horizontal view of the business. External

specialists can supply technical expertise, but they cannot replace the internal process, product and customer knowledge needed to define the problem, interpret the result and redesign the workflow. In practice, the most effective model may be to pair experienced employees who understand the process with colleagues who are more confident using AI and data.²⁸⁹

Firm size influences the challenge. Micro and small manufacturers rarely have dedicated AI, data or transformation teams, and the employees with the most useful operating knowledge are often the hardest to release from day-to-day production. Medium-sized businesses may have IT and operational specialists but lack the person who can connect them across functions and lead implementation. Large groups can draw on central academies and specialist teams, but those capabilities may be spread across siloes and need to be assembled around the specific use case. Across firm sizes, the requirement is therefore not simply “more” AI-trained individuals, but a capable cross-functional team around the work.

Existing provision is strongest where training is linked to the business rather than to AI in the abstract. As with the first barrier identified, **Food and Drink Ireland Skillnet’s Strategic Management of AI and Digitalisation within the Food and Drink Industry** is directly relevant and sector-specific. It covers the technology landscape, business outcomes, data and analytics foundations, return on investment, prioritisation, implementation planning and scaling. This makes it particularly relevant to managers and implementation leads who need to connect AI with the wider operating model rather than simply understand individual tools.²⁹⁰

For eligible indigenous firms, **Enterprise Ireland’s Build Capability** provides a route for developing the organisation itself.

It can provide between €5,000 and €70,000 towards non-routine strategic training, explicitly including technology adoption, AI, automation, leadership and organisational development. This gives firms scope to build broader capability around a transformation rather than fund only an introductory course. Where additional capacity is required, Enterprise Ireland also has recruitment routes such as **Grad Start**, which can support eligible firms to bring graduates into defined growth projects. Foreign-owned IDA clients can use the **Training Grant**, which can provide up to 50% support for an agreed training plan, subject to a maximum grant of €3 million, and explicitly covers areas including AI, data analytics, IoT, robotics, leadership and change management.²⁹¹

These are substantial supports, but the main gap is not course availability. It is applying learning to live production problems. Current provision does not consistently give a quality manager, production supervisor or maintenance engineer role-specific learning around the AI application they are actually implementing, nor does it guarantee access to someone who combines AI expertise with food-manufacturing and operational experience. The cost of releasing experienced employees or backfilling shifts also remains largely outside the training offer. This is particularly significant for smaller firms, where the person who needs to learn and implement the technology may also be essential to keeping production running.²⁹²

Participants therefore favoured work-based learning over another layer of generic awareness. They proposed short, role-specific modules built around live production, quality, supply-chain and commercial problems; experienced mentors working alongside internal teams; and support for the protected time or backfill needed to apply the learning. Other suggestions included graduate and student placements, partnerships with research organisations and deliberately pairing experienced process experts with

more AI-fluent employees. The aim would be to leave the firm with a stronger implementation capability, rather than simply a larger number of employees who have completed an AI course.²⁹³

4. Leadership, strategy and ownership: Making pilots more than an IT installation

Moving from a successful pilot into normal operations is a capability in its own right. A pilot creates value only when a business leader owns the outcome, the underlying process can be changed, users know how to respond to the system and performance is measured against an operating or commercial result. Interviewees described the opposite pattern in food and beverage manufacturing: AI initiatives sitting with IT or operational technology rather than the business function, pilots disconnected from key performance indicators and technically successful projects that never become part of day-to-day operations.

The leadership and skills provision discussed under the previous barrier can help firms set direction. More directly relevant here are supports aimed at improving the underlying process and building implementation capacity. For micro and small firms, Lean for Business can help identify and implement improvements in how the business operates. For eligible Enterprise Ireland clients, Operational Excellence can support wider process and organisational transformation, while Digital Process Innovation can contribute to the practical work of implementation. Eligible Digital Process Innovation costs can include staff time within the internal implementation team, external expertise, overheads and project materials, with support of 50% of eligible expenditure up to €150,000. This is particularly relevant to a barrier where one of the main constraints is finding enough capacity inside the business to redesign the process while continuing to operate.²⁹⁴

For foreign-owned manufacturers, the IDA's Business Development Programme – Digitalisation Consultancy Grant can support development of a roadmap, operating model and implementation plan. The Lean/Digitalisation suite then provides progressively deeper support: LeanStart for a short improvement assignment, LeanPlus for a medium-scale digitalisation project and LeanTransform for a larger, multi-year transformation. These measures can help provide a route from defining the required operating change into a more sustained transformation programme, subject to IDA client and project eligibility.²⁹⁵

Many of the remedies that participants proposed sit within the firm. Each project should have a named senior owner, a defined process and measurable outcome, and a cross-functional group with authority to change the workflow. Employees need to know how the system will affect their role, when they are expected to review or challenge its output and how experienced process knowledge will be retained.

Participants also discussed where external support could help most here. They proposed a more embedded, stage-gated implementation model in which external support recognises the protected time or backfill required for employees to redesign the process, while an implementation adviser helps coordinate the hand-offs between business, technical, skills and funding providers. Peer groups could allow leaders to compare the practical problems that arise after a pilot, rather than only showcase successful demonstrations. This would place change management inside the deployment process rather than treating it as communication after the technology has been installed.²⁹⁶

5. Trust, reliability and governance: Establishing clear rules before AI influences production

Unlike a draft email or summary, which can be checked before use, an AI system that changes a process setting, contributes to a quality or product-release decision, supports a recall or controls access to confidential data can affect food safety and production continuity – with clear reputational and legal implications. The level of assurance therefore needs to rise with the potential consequence of error. Firms need to know what the system is allowed to do, what evidence supports its use, when a person must review its output and how an action can be stopped or reversed.²⁹⁷

As AI moves closer to production, practical assurance questions become more difficult. Interviewees were unsure when an AI-enabled process becomes a regulatory matter and whether relevant regulators and state bodies have the expertise and terminology to assess it consistently. At firm level, manufacturers need to determine who validates a model, what level of performance is sufficient, what records must be retained, how deterioration or drift will be detected, when a change requires revalidation and who is accountable if a recommendation contributes to an incorrect release, rejection or recall decision. These questions are relatively manageable where AI advises a person; they become more consequential where the system itself influences the production process.

The trust required also extends to the technology provider. Food manufacturers may be giving an external system access to confidential formulations, process information, quality records or other commercially sensitive data.

They need to understand key questions about that data use and storage: such as where it would be processed, whether any derived information can be reused, who owns a configured model, how information can be deleted and what happens if the supplier changes its service or terms. Cybersecurity is a large part of the same problem, particularly as AI connects enterprise systems with sensors and operational technology.

Large manufacturers can impose stronger procurement, security and validation requirements, but such controls invariably slow down deployment. Smaller manufacturers, meanwhile, are less likely to have dedicated legal, cybersecurity, data-governance or assurance functions and may therefore depend heavily on vendor claims. Whatever the size of the business, responsibility for food safety cannot be transferred wholesale to the technology provider when AI contributes to a consequential decision.²⁹⁸

Existing policy supports address some of these component risks. For eligible Enterprise Ireland clients, the Cyber Security Review Grant provides an 80% contribution towards a defined €3,000 review aligned with the National Cyber Security Centre framework. This can give a firm a structured assessment of its cyber readiness and identify actions needed before connecting new systems. IP Plus addresses a different part of the control environment, providing up to €35,000 for external intellectual-property advice and development of in-company capability. This can be relevant where firms need to clarify ownership and use of proprietary information, data or AI-related intellectual property in relationships with technology providers.

Technical expertise is also available through the European Digital Innovation Hubs. ENTIRE combines digital and sensor expertise with cybersecurity capability, while CeADAR provides AI and data-analytics expertise and can support experimentation and evaluation.

These services can help a manufacturer examine whether a proposed architecture or application is technically robust before deployment. IDA clients can also incorporate governance, cybersecurity and data questions into wider digitalisation and training programmes.²⁹⁹

These supports are useful building blocks, addressing individual aspects of assurance. But food-manufacturing-specific assurance was considered by participants to be needed. Participants called for practical guardrails developed with regulators, industry and technical experts rather than broad principles alone. Standard checklists and evidence templates would give firms a clearer basis for assessing products and documenting decisions. Participants also supported practical environments in which controls could be tested before an application influences live production. Supervised demonstrators or secure test environments could allow firms, technical experts and relevant authorities to examine a bounded use case using realistic production data and operating conditions. Standard procurement clauses could address the parallel provider risks around data use, model ownership, audit rights, updates, portability and incident responsibility. The objective would not be to transfer responsibility away from the manufacturer, but to give firms a clearer and more consistent basis for deciding when an AI-enabled process is safe to use.³⁰⁰

Manufacturing: Engineering

At a glance

Engineering manufacturing brings together six linked divisions: rubber and plastics; basic metals; fabricated metal products; electrical equipment; machinery and equipment; and machinery repair and installation. The chapter follows products from design and tooling through materials, machining, fabrication and assembly to distribution, installation, repair and aftermarket service.

For most firms, the immediate opportunity is operational: detecting defects before they cause scrap or rework, predicting equipment failure, accelerating machine programming and production scheduling, and reducing the documentation burden on engineers. The longer-term opportunity is to connect engineering, quality, production and service data so factories can adapt more quickly and firms that sell equipment can add remote diagnostics, predictive service and embedded intelligence to what they sell. Progress will be uneven.

Smaller firms often lack connected equipment, usable data and management capacity; larger brownfield plants face more complex integration, cybersecurity and governance problems. This chapter separates applications that firms can deploy now from those that depend on stronger data, integration and governance within firms and across the wider system.

Opportunities

- **Make quality and process performance visible early.** Detecting defects and process variation before they cause scrap or rework is the most immediate gain for firms of any size.
- **Shift maintenance from response to reliability.** Equipment condition and failure prediction reduce unplanned downtime, which is a major source of avoidable cost in machining and assembly.

- **Accelerate engineering and build aftermarket value.** AI can speed up setup and production preparation, and firms that sell equipment can add remote diagnostics and predictive service.

Barriers

- **Firms start without a measurable operating problem.** Adoption stalls where the use case is framed as a technology to try rather than a specific production problem.
- **The data does not reach the decision.** Smaller firms often lack connected equipment and usable data; larger brownfield plants face more complex integration, and neither can act on data that stays inside the machine.
- **The control model is undefined.** Connecting AI to production equipment raises cybersecurity, oversight and liability questions, and firms currently resolve ownership of models and derived data one contract at a time.

Potential interventions

- **Fund proof-of-value in stages.** An incremental roadmap in place of three-year all-or-nothing commitments: a first tranche for diagnosis, data assessment and a bounded pilot, with further support once a result and a credible plan exist.
- **Co-fund data and process clean-up.** Treated as an investment of time and expertise rather than a purchase, with capital support where major data infrastructure is needed.
- **Build the team around the use case.** Embedded mentors, whole-management-team programmes rather than a lone champion, co-funded hires, training attached to a real production problem, and protected time to apply it.
- **Give firms somewhere to see it working.** Test and pilot line facilities where an application can be seen operating and its requirements understood before committing to a plant deployment.

How AI is impacting the value chain globally

The 60 mapped applications across Engineering manufacturing range from AI-assisted Computer Numerical Control (CNC) programming to agentic manufacturing systems, which help configure and adapt production controls.

Key areas of application

Applications span the full value chain, with the most direct effects on product and process development, factory operations, maintenance and service.

Upstream, AI is shortening the path from design requirements to a manufacturable product. Models can analyse geometry, simulation results, material properties and production constraints, then generate or rank alternatives before a prototype is built. Eaton used generative design and manufacturability analysis to reduce the reported development time for a customised lighting product from as much as 16 weeks to two.³⁰¹ The same principle extends to process development: at Maki Precision Machining, the reported time required to produce a substantially complete first-pass CNC programme fell from hours to minutes, leaving the programmer to review and refine it.³⁰² Both applications resolve design and manufacturing choices earlier, before changes become expensive.

In the **supply chain**, AI turns fragmented supplier, order and inventory signals into earlier decisions. It can screen suppliers against capability and risk, read confirmations

and attachments, forecast component needs and flag imbalances before they interrupt production. Siemens used AI-enabled supplier scouting to reduce the time and workload involved in market screening across a large portfolio of sourcing projects.³⁰³ Procurement teams can therefore consider a wider supplier set and respond sooner when availability, price or risk changes.

Operations is the centre of gravity. Predictive models anticipate failure, computer vision detects defects, optimisation systems recommend process settings, and copilots support engineers and operators with code, diagnostics and instructions.³⁰⁴ Bosch's ViPAS system combines images, video and contextual information to guide inspection and identify defects that manual checks may miss or classify inconsistently.³⁰⁵ It turns quality control from a final gate into an earlier warning, allowing firms to correct drift before it becomes scrap, rework or customer failure.

Planning and control extend the same logic across the factory. Platforms such as Kinaxis rework schedules as demand, capacity, materials and orders change, while advanced process-control systems use live operating data to recommend or implement better settings.³⁰⁶ By linking decisions that are often made separately – what to run, on which asset, with which inputs and under what constraints – these systems protect throughput, yield and delivery performance.

Downstream, AI allows manufacturers to manage equipment performance over its working life rather than wait for failure. TK Elevator combines telemetry, service history, contracts and technician knowledge to prepare visits and capture what is learned afterwards. Its reported US deployment helped avoid unplanned visits and reduce callbacks per unit by 40%.³⁰⁷ For customers, this means higher uptime; for manufacturers, lower warranty costs and a stronger aftermarket relationship built on product data.

Cross-cutting applications are less sector-specific but often easier to adopt. AI can support skills matching, work instructions, accounts payable, job costing and margin analysis. Birmingham Fastener automated much of its routine invoice posting while improving capture of early-payment discounts.³⁰⁸ These applications create capacity without changing a production line. They can therefore provide a practical place to prove value and establish governance before AI is applied to safety- or quality-critical work.

The applications with the greatest potential do one of two things: they expand the set of engineering options a firm can evaluate, or they shorten the distance between a change in operating conditions and a production response. Upstream, design and materials systems search far larger option possibilities than engineers could test by hand, assessing alternatives against performance, cost and manufacturability constraints before a firm commits to a prototype or a production process. In operations, agentic systems can help configure and adapt production controls, while autonomous equipment combines perception, sensor data, geometry and safety constraints to carry out hazardous or precision tasks. Downstream, orchestration systems can interpret unstructured customer correspondence, retrieve enterprise context

and complete much of a transaction, carrying real operational authority across several systems. What these have in common is the connection between detection and action: a stand-alone alert or camera that does not inform an operating decision captures far less value.³⁰⁹

Differences across firm size

The mapped applications skew strongly towards medium and large firms. Plant-wide optimisation, closed-loop control, multi-site scheduling and advanced robotics assume connected equipment, extensive data, specialist staff and enough production volume to justify integration. Larger manufacturers are more likely to have those assets and to spread the cost across a larger production base. They also face governance, cybersecurity and procurement requirements that can slow deployment.

Applications relevant to smaller firms are concentrated in bounded tools that can be purchased rather than built: AI-assisted CNC programming, field-service copilots, finance automation and document generation. A small product company can also be AI-intensive where intelligence is embedded in what it sells. That is a different adoption profile from a small jobbing manufacturer operating older, disconnected equipment.³¹⁰

Technical availability does not guarantee a business case. Predictive maintenance pays where failure is costly and sufficient sensor and service data exist. Machine vision pays back more readily on a repetitive line with a stable image stream than in low-volume, highly customised production. The practical dividing lines are therefore not firm size alone, but whether the task is bounded, the data is available, the process repeats often enough and the firm can act on the result.

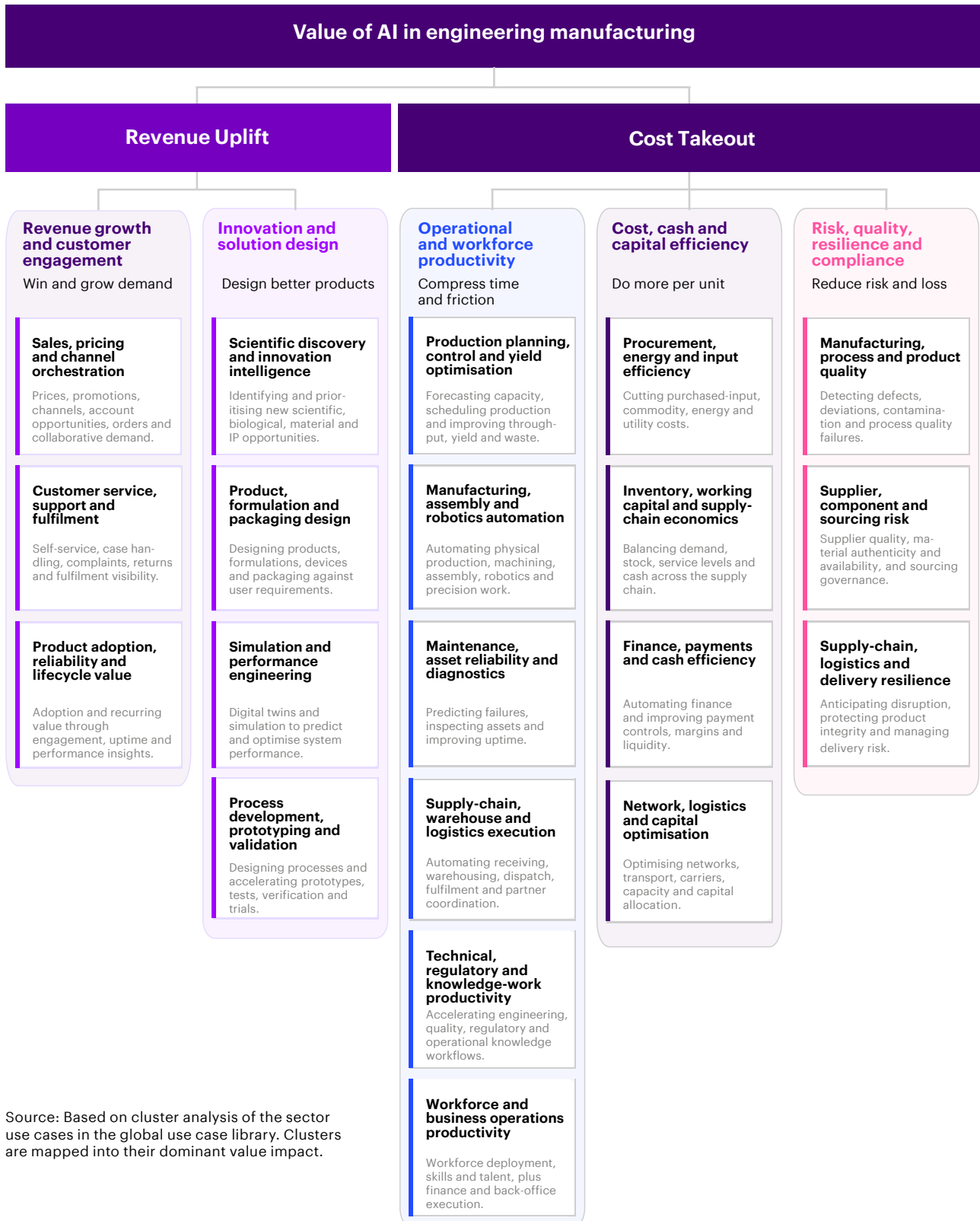
Key opportunities in Ireland

The 60 mapped Engineering use cases group into 20 opportunity themes across five common manufacturing clusters (see Figure 25). Two primarily create revenue uplift: Innovation and solution design, and Revenue growth and customer engagement. The other three primarily protect margin, cash and operational performance: Cost, cash and capital efficiency; Operational and workforce productivity; and Risk, quality, resilience and compliance.³¹¹

Revenue opportunities begin before production. AI can shorten product and process development by generating and testing designs, simulations and manufacturing approaches earlier. After sale, it can improve pricing, customer support and the use of installed-base data to increase service revenue. These applications matter most to firms that own a product, engineering intellectual property or an aftermarket relationship.

Cost takeout covers a wider range of the value chain because Engineering economics depend on throughput, yield, downtime, material use, working capital and quality. AI can improve procurement and inventory, automate finance, optimise production and logistics, raise asset reliability and identify defects earlier. The pattern holds when the analysis is limited to applications assessed as High or Transformative: most still concern operational performance, risk and cost. Growth opportunities remain material, but they are concentrated among firms with differentiated products or services to design, sell and support.³¹²

Figure 25. AI value and opportunity tree in engineering manufacturing



Source: Based on cluster analysis of the sector use cases in the global use case library. Clusters are mapped into their dominant value impact.

The map describes what AI can do across Engineering manufacturing. It does not tell a firm in Ireland what to do first. That depends on the firm's production environment, business model, position in the supply chain and digital foundations.

How the enterprise landscape shapes the priority opportunities in Ireland: A fragmented industrial base requires different adoption routes

Engineering manufacturing is a sizeable but highly fragmented enterprise base. Micro enterprises dominate numerically. In 2023, engineering manufacturing comprised 7,423 enterprises across the six divisions in scope. Micro firms accounted for 6,545, or 88.2%. SMEs represented 99.5% of enterprises and 77.6% of people working in the subsector; only 34 firms were large.³¹³ This gives engineering a markedly different enterprise structure from pharmaceuticals, medtech and electronics, where large multinational plants play a more prominent role. Food and drink also has a substantial indigenous base, including several Irish-owned multinationals, but engineering is more heavily weighted towards micro and small firms.³¹⁴

Scale changes what a firm can afford, but it does not determine how ready it is. A large plant can spread the cost of sensors, integration, cybersecurity and specialist skills across several lines or sites, but may face a difficult retrofit across legacy equipment. A small fabricator or repair business has less capital and management capacity, yet may be able to adopt a focused tool quickly. A small product company with connected equipment can therefore be further ahead than a much larger brownfield plant.

Where firms operate in the value chain matters too. Original equipment manufacturers can set digital requirements for suppliers; subcontractors may adopt in response to customer requirements; and repair businesses may acquire AI through field-service platforms rather than build it themselves. The adoption route therefore depends on business model, asset base and customer relationships as much as headcount.

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: Digital access is ahead of operational readiness

Around 14% of engineering enterprises use at least one AI technology, below the 21% across the manufacturing subsectors in scope. Around 81% have at least basic digital intensity and 79% use paid cloud computing, while 49% use ERP. The operational base is thinner: 29% conduct internal data analytics, 22% use business-intelligence software and 6% analyse data from smart devices or sensors. The survey excludes micro firms, which account for almost nine in ten engineering enterprises.³¹⁵

Reported AI use is about 11% among small firms and 20% among medium-sized firms, based on 189 and 69 enterprises respectively. The large-firm sample contains only 18 enterprises, so its percentage should not be reported. At overall subsector level, use remains concentrated in language and information tasks: around 7% report written-language analysis or data mining and 6% text, speech or code generation.³¹⁶

The qualitative evidence follows the same pattern. Most current use remains at individual or office level: summarising reports, recording minutes, drafting documentation and supporting routine analysis.

The online consultation also contains examples in customer support, machine programming, scheduling, predictive maintenance, quality, engineering support and compliance.³¹⁷

Use in core production is less common. In office systems, data are already digital and applications can often be bought as software. On the factory floor, machines may be electronically controlled without producing data that can be linked to enterprise resource planning, quality, engineering, scheduling, maintenance or customer-complaint systems. The problem is not access to a model. It is whether the firm can capture the relevant production data, connect it across systems and act on the result without weakening safety or cybersecurity.³¹⁸

The existing production environment also makes a difference. Some precision fabricators and machinery businesses are testing machine vision, predictive maintenance, AI-assisted computer-aided manufacturing and quality prediction. Others still need to standardise processes and organise basic data. A small company can embed AI in a connected product; a larger plant can hold much more data but face a harder retrofit across heterogeneous controllers, protocols and equipment generations.³¹⁹

These differences create three adoption routes. Most firms can begin with bounded applications that improve quality, maintenance, engineering and documentation. More mature plants can connect those applications across production and business systems. Product companies can

use connected equipment and service data to create aftermarket value. Agentic and physical AI require stronger integration and governance, while physical applications also require capital investment and safety assurance.

Priority opportunities

Read against Ireland's enterprise footprint and current maturity, the global opportunity map resolves into three practical routes. Most firms can begin with bounded applications that improve quality, maintenance, engineering and documentation. More mature plants can connect those applications across production and business systems. Product companies can pursue a different route again, embedding intelligence in equipment and using operational data to create aftermarket value.

The distinction is not simply one of timing. A ten-person product company with connected equipment may move faster than a large brownfield plant; a subcontract fabricator may adopt only where a customer, machine vendor or technology centre shows the way forward. What matters is how well the use case, the operating foundation and the firm's position in the value chain line up.

The five priorities therefore form a portfolio rather than a technology ladder. The first four address recurring production and engineering decisions; the fifth concerns firms that can use product and service data to create new value beyond the factory gate. Together, they separate what can be deployed now from what requires integration, coordination or a different business model.

1. Manufacturing, process and product quality: Make quality and process performance visible early

The Engineering workshop placed quality and process optimisation first. Participants felt that the initial opportunity map gave too much weight to planning and logistics and not enough to process monitoring, defect detection, root-cause analysis, predictive process control, yield optimisation and predictive maintenance. Engineers should retain authority over any resulting intervention.³²⁰

The value is created before a defect reaches the next operation. Catching it early avoids adding further material, labour and machine time to a part that may eventually be scrapped. Root-cause models can connect quality outcomes to material batches, machine settings, tool condition and upstream events that are difficult to reconcile manually. Bosch's multimodal inspection system illustrates the more advanced form of this approach. The retained precision-engineering evidence points to a more accessible starting point: models that identify whether a product is within an acceptable range before further value is added.³²¹

The application differs by production environment. High-volume plastics, metals and electrical-equipment plants can justify continuous vision and process monitoring because the same decision repeats at scale. A low-volume fabricator may gain more from targeted inspection at a critical operation or from analysing non-conformance and rework records. Repair and installation businesses can apply the same analytical approach to service quality and repeat visits.

Firms need stable process definitions, reliable measurement, labelled quality data and a route for the result to reach the engineer or operator who can act. The practical starting point is human-in-the-loop: identify the deviation, show its probable cause and recommend an intervention. Closed-loop control should follow only when the firm has shown that the model remains accurate as materials, tools and operating conditions change.

2. Technical, regulatory and knowledge-work productivity: Connect production and business data around critical decisions

Many Engineering firms do not lack information. They lack a timely and reliable way to connect it. The workshop's most ambitious proposal was to bring enterprise resource planning, quality, engineering, scheduling, complaints and operational data together around the decisions firms make each day.³²²

The credible version is not a chatbot placed over disconnected systems. It is a controlled data and workflow layer that retrieves information from source systems, matches records through common identifiers and shows the evidence behind each recommendation. It could connect a customer complaint to the relevant part, supplier, machine, inspection history and work instruction. It could also show a production manager how a late component will affect the schedule, inventory and customer delivery.

Kinaxis demonstrates the planning form of this model by linking demand, capacity, materials and order data so schedules can be revised when conditions change.

The broader opportunity is to apply the same logic across quality, engineering, maintenance and customer records. The aim is not to add another isolated application, but to improve a defined set of operational decisions.³²³

This priority is most relevant to medium and large plants with several enterprise and operational systems. A smaller manufacturer can begin with a controlled knowledge base spanning quotations, drawings, procedures and job records, or by connecting a small number of cloud applications used for accounts, customers and production. In either case, the prerequisites are common identifiers, access controls, data ownership and a clear account of who makes the decision. AI can help interpret and coordinate information; it cannot create interoperability where systems expose no reliable data or where the organisation has not agreed what the data mean.

3. Maintenance, asset reliability and diagnostics: Shift maintenance from response to reliability

Unplanned failure creates several costs at once: lost production, disrupted labour, emergency parts, missed deliveries and, in some environments, safety exposure. AI can use vibration, temperature, current, pressure, service history and operating context to detect deterioration and recommend an intervention before equipment fails.

The business case is not automatic. Predictive maintenance has been researched for many years but remains difficult to make consistently reliable.

Its value depends on the cost of failure, the quality and duration of the available data, and whether the firm has enough comparable assets or failure events from which to learn. For many SMEs, an OEM feature or purchased condition-monitoring service will be more realistic than an internally developed model.³²⁴

The most useful applications combine prediction with technician support. Siemens' maintenance copilot uses sensor data and maintenance knowledge to help diagnose problems and reduce time spent on reactive work.³²⁵ A plant can use the same approach to protect production uptime. Repair and installation businesses can use equipment histories and contextual guidance to prepare technicians better and reduce repeat visits.³²⁶

Firms should start with assets for which failure is expensive, instrumentation is feasible and the maintenance team can act on the result. Connected equipment is only one requirement. The firm also needs consistent asset identities, usable service records and clear ownership of the maintenance response. A prediction that does not trigger a maintenance decision produces another dashboard rather than an operational improvement.

4. Process development, prototyping and validation: Accelerate engineering, CNC programming and documentation

Engineering time is scarce, and much of it is spent searching for information, producing first-pass programmes and maintaining documentation. AI can generate and compare design options, accelerate simulation, produce an initial CNC programme, retrieve approved technical knowledge and draft manufacturing documents and work instructions.

The Engineering workshop identified documentation as an immediate opportunity because it absorbs skilled time without directly improving the product.³²⁷

The applications differ substantially in difficulty. A controlled copilot drawing on approved manuals and procedures can be deployed relatively quickly. AI-assisted computer-aided manufacturing requires reliable geometry, machine and tooling data, but the task remains bounded: as the Maki Precision example shows, the model produces a first-pass machining strategy for a programmer to check and refine. Generative design and physics-informed simulation require more demanding validation because the output can affect product performance, safety and manufacturability.

The benefit is not only faster execution. These systems can preserve knowledge that often sits with a small number of experienced engineers or technicians. A proven tool choice, machining method or service instruction can be made available at the point of work without assuming that documented knowledge replaces professional judgement.

Firm size changes the route to adoption. Small machinists can buy AI-enabled CAM tools; medium-sized manufacturers can build controlled engineering repositories; and larger product firms can connect design, simulation, manufacturing and lifecycle data. All require version control, approved sources, access rights and human review. A plausible instruction drawn from an obsolete drawing or unapproved process can be as dangerous as a fabricated answer.

5. Product adoption, reliability and lifecycle value: Use product data to build aftermarket value

Firms that own the product and customer relationship can use sensor, service and usage data to create recurring service value. Remote diagnostics, predictive service, parts planning and technician guidance allow the manufacturer to support equipment before a fault becomes a customer interruption.

The TK Elevator example described earlier shows the mechanism: equipment telemetry, service history and technician knowledge are combined to prepare visits and reduce avoidable callbacks. The Irish evidence also includes a small Engineering company embedding machine learning in its product, as well as the wider view that operational data is becoming an important source of intellectual property.³²⁸

Data-enabled service can strengthen customer retention, lower warranty costs, protect recurring revenue and differentiate an producer in Ireland from a lower-cost physical competitor. It can also improve future products by feeding field performance back into design and engineering. These benefits bring new responsibilities. The firm must establish rights over the data, secure the connected product, maintain the model and provide dependable support once the insight becomes part of the customer's operation.

Business model arguably has more of an impact than the number of employees. A small, digitally native product company may be ready to develop connected services while a much larger manufacturer remains unable to observe its installed base. A subcontractor that does not own the product or customer relationship may have no access to the required lifecycle data, however capable it is in production.

The frontier: where the sector is heading

At the frontier, design, production and service data form a continuous digital thread. AI searches large design and material spaces; physical AI carries out or supports precision tasks; agentic systems coordinate schedules and workflows; and process-control models adjust operating settings within defined limits. The international examples discussed above show the separate components of this model already being deployed.³²⁹

For plants in Ireland, the competitive advantage would likely come from faster product introduction, more stable yield and greater flexibility in producing smaller runs and more complex products. This is particularly relevant to advanced machinery, electrical equipment and high-value components.

Most plants are not yet ready to operate in this way. Brownfield equipment must be connected safely; product, asset and order identities must remain consistent across design, production and service; and cybersecurity must extend into operational technology. Managers must also define where a model advises, where it acts and who can override it. Capital investment alone will not solve these problems. Physical automation will not stabilise an inconsistent process, and agentic systems will not resolve inconsistent data or unclear ownership.

The near-term priorities above build the required foundations. A quality model creates labelled data and a feedback loop. A maintenance copilot improves asset histories. A CAM assistant structures machining knowledge. An integration pilot establishes common identifiers and access controls. Each can create value on its own, but the same assets also prepare firms for more integrated agentic and physical AI.

The consequences of not adopting AI

Slow adoption would first appear in rework, unplanned downtime, inventory, engineering hours and lead times. Firms that continue to manage quality, maintenance, scheduling and technical knowledge manually will carry higher costs and respond more slowly than competitors that identify problems earlier and coordinate decisions using current information.

The supply-chain risk is more immediate. Digitally integrated original equipment manufacturers and multinational customers increasingly expect suppliers to exchange data, respond to schedule changes and provide traceable quality information.

A supplier that cannot meet those requirements may be replaced even if its physical production remains competitive.³³⁰

The exposure differs by firm type. Micro and small subcontractors may lose access to higher-value work or remain confined to low-margin execution. Larger indigenous manufacturers may struggle to scale or defend export positions. Foreign-owned plants may lose internal mandates where peer sites demonstrate better productivity, automation and implementation capability. Product companies that do not use telemetry and service data may surrender aftermarket revenue to distributors, platforms or competitors.

Firms also face a strategic data risk. Product and process data can become an important source of intellectual property, particularly where they reveal how equipment performs in operation. Firms that do not control how those data are captured, hosted and reused may lose that asset. Firms that digitise without adequate cybersecurity, contractual protection and governance may expose trade secrets or operational technology. The sector therefore faces risks from both inaction and poorly controlled adoption.

At sector level, Ireland could end up with a small group of advanced plants and a supplier, installation and service base that cannot meet their digital requirements. Productivity gains would remain concentrated, smaller firms would be less able to participate in higher-value supply chains, and the national manufacturing base would become more dependent on technology, standards and decisions developed elsewhere.

Barriers—and what could unlock adoption

Engineering firms face five linked barriers. They need to identify a worthwhile problem, connect the data required to improve it, assemble the right team, finance deployment and define how the resulting system will be secured and governed. If any one is missing, adoption stops at a licence, a stand-alone tool or a pilot.

Ireland has support relevant to every one of these barriers. What the following sections examine is how far that support reaches into each: which measures address a barrier directly, what they can and cannot pay for, and where firms described the provision stopping short of the point at which a pilot becomes an operating capability.

Micro and small manufacturers have less management time, capital and internal expertise, and face greater risk when choosing a supplier. Medium and large plants can draw on more resources but must integrate AI across legacy equipment, enterprise systems and established governance processes. A small product company can therefore be further ahead than a much larger brownfield plant; a greater determiner than firm size is the production environment and business model.

Figure 26 summarises the chain from barrier to potential response. The sections that follow set out each barrier in turn, drawing on the workshop, the interview evidence and the supports currently available.

Figure 26. Barriers to AI adoption in engineering manufacturing: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Understanding Starting with a measurable operating problem	Firms buy licences and look for uses, or pick a broad ambition without specifying the asset, data and operational response. A failed first experiment then breeds wider scepticism.	AIReady.ie, Digital for Business, Digital Discovery, the IDA diagnostic and FactoryxChange all exist, but not as one engineering adoption route, and access depends on client status rather than fit.	■ A common diagnostic organised around a business decision ■ Pilots that set a baseline and end in a production decision ■ A casebook recording failed assumptions, not only successes ■ A signposted panel of manufacturing, OT and AI advisers
Data and digital foundations Connecting the data to the decision	The data usually exist but sit in separate systems with inconsistent identifiers, and a machine may be electronically controlled without exposing usable data to the plant.	Vouchers, Digital Process Innovation, capital grants and the Gateways fund systems and equipment, not the work of making existing records usable. Firms solve the same brownfield problem individually.	■ Data preparation and interfaces treated as part of adoption ■ Reference architectures linking data to a decision ■ A national dataset resource for training vision systems ■ Access to vetted OT and IT integration capability
Skills and capability Building the team around the use case	The team must understand the process, data, model, architecture, cybersecurity and the consequences of changing the decision. In larger plants that responsibility is split across five functions.	Skillnet, Build Capability, Key Manager Support and the IDA Training Grant are broad. Nothing provides protected implementation time or an assured route to mentors who know manufacturing and AI.	■ Training organised around roles and a live use case ■ Embedded mentors and whole-management-team programmes ■ Protected implementation time or backfill ■ Learning factories built against real equipment
Cost, funding and uncertain returns Funding the move from proof to production	The model is a small part of the cost. Connecting equipment never designed to be connected, proving reliability and lost line time can each exceed the software.	The mismatch is with the instruments, not their number: buying and integrating a proven system is too operational for R&D funding and too large for a voucher. Approvals run from weeks to a year.	■ A staged roadmap of proof-of-value experiments ■ A packaged AI accelerator call at genuine scale ■ Eligible costs covering integration, monitoring and staff time ■ Rapid, largely automated approval for small awards
Trust, reliability and governance Defining the control model before connecting AI to operations	Connecting a model to production equipment that was never built to resist attack changes the risk, and an agent with authority across systems can spread error before anyone intervenes.	Cyber reviews, IP advice and responsible-AI training cover the edges. There is no engineering route for secure OT deployment, model assurance, edge testing or contractual treatment of derived data.	■ Secure test environments and OT demonstrators ■ Approved-tool lists and human-override protocols ■ Standard contract clauses on derived data and model ownership ■ Clearer liability and accountability structures

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Understanding: Starting with a measurable operating problem

The engineering workshop considered identifying where AI creates value to be a key barrier. Many firms are already experimenting. What they lack is a clear production, engineering or service decision to improve, an owner for that decision and a result against which success can be judged. A pilot becomes useful only when its effect can be measured in terms such as yield, downtime, engineering output, lead time or service value.³³¹

Weak prioritisation produces two common failure modes. In the first, a firm purchases licences and asks employees to find uses for them. In the second, it chooses a broad ambition such as predictive maintenance or a digital twin without specifying the asset, data, workflow and operational response that would make the investment worthwhile. When the data or technology proves inadequate, the failed experiment can make the organisation more sceptical about AI generally.³³²

Support with this barrier is available. AIReady.ie offers a national awareness and self-assessment starting point, and for Local Enterprise Office (LEO) clients Digital for Business provides a consultant who assesses existing systems and produces a roadmap. Enterprise Ireland's Access Advice: Digital Discovery funds three to seven days of expert input at up to 80% and €5,000 for eligible Irish-owned manufacturers with ten or more employees – enough to define a credible next step. For foreign-owned sites, the IDA Advanced Manufacturing Diagnostic establishes a maturity baseline, and EDIH–FactoryxChange adds manufacturing-specific assessment and test-before-invest capacity. Where the question is strategic rather than technical, the Strategic Consultancy Grant can bring in external expertise to address a defined business issue.³³³

Two things limit what this achieves. These assets are not presented as a single engineering adoption route, and access depends on client status and firm type, so a firm's starting point determines which door is open to it rather than which door fits its problem. LEO also notes that AI capability among mentors is not yet consistently deep; an issue given that these mentors tend to be the first point of contact for micro firms.³³⁴

What participants described wanting, and did not describe finding, was comparable evidence from firms like themselves. Owner-managed firms are more likely to trust another manufacturer facing the same operating conditions than a generic technology presentation, yet firms with the strongest capabilities may be reluctant to share them. Examples exist across the Technology Centres, Gateways and hubs, but not in a form that lets a manufacturer compare the starting point, cost, workflow and result of a project undertaken by a peer with similar equipment and constraints. The same is true of independent advice: an adviser may understand AI without understanding machining, quality, maintenance or the constraints of a live industrial site, and there is no clearly signposted panel of advisers and integrators combining manufacturing, operational-technology and AI expertise.³³⁵

Participant proposals converged on a single route into adoption rather than a set of separate offers. Workshop participants asked for a national rollout of online or hybrid training to raise the base level of understanding, for awareness of how other SMEs are implementing AI, and for pilot use cases firms could examine directly. Interviewees put the emphasis on a common diagnostic organised around a business decision rather than technology maturity alone. Several argued that a pilot should establish a baseline before work begins and end with an explicit decision on whether

and how to enter production, so that the exercise resolves a real business question rather than simply demonstrating a tool. On the casebook idea, participants stressed that this should record failed assumptions and implementation problems alongside successful outcomes, since a collection of successes reads as promotion rather than credible evidence.³³⁶

2. Data and digital foundations: Connecting the data to the decision

The data required for AI often already exist, but not necessarily in a form that supports an operational decision. Machine signals, inspection outcomes, maintenance histories, drawings, schedules and customer complaints may sit in separate systems with inconsistent identifiers. A quality model cannot identify root causes if process settings cannot be linked to inspection results. Predictive maintenance cannot learn if sensor streams, work orders and failure records refer to the same asset in different ways.

The production environment makes this more difficult than regular office-based adoption. A machine may be electronically controlled without exposing usable data to the wider plant. Even where data can be extracted, connecting operational technology to enterprise systems introduces cybersecurity, latency and reliability requirements that do not arise when deploying a stand-alone office application.³³⁷

Firm size changes the form of the problem. Smaller manufacturers may operate older equipment, collect little structured data and have limited access to integration expertise. Larger brownfield plants hold more data but must connect heterogeneous controllers, protocols and equipment generations without disrupting production. Model performance

can also deteriorate as materials, tools and operating conditions change. A large data estate is therefore not necessarily a usable one.³³⁸

The diagnostic supports described in barrier 1 apply here too. Beyond them, the Grow Digital Voucher can contribute up to €5,000 towards software, training and IT configuration for Local Enterprise Office clients, and Digital Process Innovation is the most directly relevant measure: it can contribute 50% of eligible expenditure to a maximum grant of €150,000 and covers internal implementation time as well as external expertise. Capital Funding Support can reach €250,000 towards equipment, production software and licences, with the IDA Business Asset Grant providing up to €250,000 for foreign-owned sites, and the Business Development Programme's Digitalisation Consultancy Grant funding site architecture and implementation planning. EDIH-Data2Sustain and the Technology Centres and Gateways add research capacity, demonstrators and technical expertise a firm could not maintain internally.³³⁹

Two things fall outside what these measures reach. The first is the data itself. Support is available for systems, software and equipment, and much less for the work of making existing records usable: reconciling identifiers across ERP, quality, engineering and operational systems, cleaning histories, contextualising machine signals and maintaining those connections when software or firmware changes. A diagnostic may have limited value if a firm cannot then finance or source the remediation it identifies.

The second is the lack of shared patterns to work from. One interviewee observed that almost no firm in Ireland has achieved a unified namespace or equivalent shared data-format standard, though this was a contested view. Firms described solving the same brownfield integration problem individually, without

common reference architectures, an agreed production-data model, shared datasets for training vision systems, or an assured network of integrators competent to work safely on live operational equipment. In effect, each firm is paying to learn what others have already worked out.³⁴⁰

Support should therefore treat data preparation, process standardisation, interfaces and secure equipment connection as part of AI adoption rather than as preliminary work that firms must fund separately. Workshop participants proposed a national dataset resource for training systems (vision data, available through universities, was an example given) alongside practical supports such as mentors and worked examples addressing legacy equipment specifically. They also raised dependency on external AI providers as a concern in its own right, asking whether homegrown capability was possible. Reference architectures could show how common AI applications (e.g. to do with quality inspection, predictive maintenance, production scheduling and connected service) link data to a decision while preserving control of source systems. Technology centres and learning factories could test these patterns, maintain shared datasets where commercial and legal conditions permit, and give firms access to vetted OT/IT integration capability. Interviewees also proposed co-funded data and process clean-up (understood as an investment of time and access to expertise rather than a purchase) as well as capital support for major data infrastructure, on the grounds that the capital cost is beyond what individual firms can bear.³⁴¹

3. Skills and capability: Building the team around the use case

Engineering manufacturers need people who understand both the industrial process and the technology. As one workshop participant put it, “You need two skills: manufacturing skills plus the AI understanding.” In practice, the requirement is broader: the team must understand the process, data, model, systems architecture, cybersecurity and consequences of changing the decision.³⁴²

Micro and small firms rarely hold this combination internally. The owner-manager, operations lead or general IT provider must absorb the work alongside production, customers and cost control. Interviewees described AI competing for attention with firefighting and growth, and one pointed to a wider pattern in which tariffs, carbon border adjustment, skills shortages and cost-of-doing-business pressures all fall on the same small leadership team. AI then becomes one more demand on already-stretched managers. Meanwhile, medium and large plants may employ specialists, but responsibility is often divided among engineering, IT, operational technology, quality and cybersecurity. A technically successful pilot can remain local because nobody has the authority or capacity to turn it into standard work.³⁴³

Leadership and implementation are part of the same barrier. Workshop participants described the problem as the absence of a senior owner, with AI treated as an IT project rather than a business priority; they warned that bolting AI onto existing workflows leaves pilots in the lab. A machine-vision system creates value only if someone owns the response to a defect alert. A copilot only saves time if approved source material is maintained and staff know when to reject its answer. Equally, a predictive-maintenance model only makes a difference

if the relevant maintenance team can change plans based on its output. Training in the tool does not resolve these operating questions.³⁴⁴

Provision is broad. Skillnet Ireland's Industry 4.0 network offers AI MASTERY for Industry and a Diploma in Manufacturing Automation, Technology Ireland Digital Skillnet adds the AI Capability Accelerator for Senior Leaders and DataSMART for data capability among non-IT staff, and CILT Mobility and Supply Chain Skillnet covers applied AI in supply-chain management. AIReady.ie and Local Enterprise Office training provide entry-level routes.³⁴⁵

Where a firm needs to build or buy capability rather than send someone on a course, Enterprise Ireland's Build Capability grant can provide between €5,000 and €70,000 towards non-routine strategic training, Training Funding Support can cover change management and digitalisation, and Key Manager Support and Grad Start offer routes to recruit senior or graduate capability the firm cannot develop internally. For foreign-owned sites, the IDA Training Grant can provide up to 50% to a maximum of €3 million for eligible plans covering AI, data analytics and automation. Technology Centres, Gateways and the digital innovation hubs add demonstrator-based learning against real equipment.³⁴⁶

The issue is not the number of courses. Staff-release and hiring routes exist, but nothing provides a general mechanism for protected implementation time or backfill – and interviewees were clear that what they wanted was flexible, rapid, accessible skills funding rather than multi-year qualifications. Nor is there an assured route to mentors who combine manufacturing, AI and operational-technology experience; one interviewee argued that Enterprise Ireland should build its own AI

advisory capability rather than rely solely on external instruments. Workshop participants linked the gap to waste: without the skills to use the tools well, firms consume tokens, incur extra cost and get poor output. For larger plants, the problem is cross-functional: capability must join engineering, IT, OT, quality and cybersecurity rather than sit with a separate AI team.³⁴⁷

Participants' proposals centred on organising training around roles and live use cases. Operators need to understand alerts and escalation; engineers need to validate model behaviour; managers need to define ownership and benefits; and IT, OT, quality and cybersecurity teams need to agree how a solution enters production. Workshop participants proposed using the national training fund for AI-specific training, "learning factories" built on the Singapore model, and mentor evangelists who can carry credibility into firms. On the leadership side, they asked for best-practice examples that leaders could draw on directly. Interviewees proposed embedded mentors, whole-management-team programmes rather than a lone champion, co-funded hires and training that is attached to a real production problem. Protected implementation time would allow firms to apply the learning rather than return immediately to the day job.³⁴⁸

4. Cost, funding and uncertain returns: Funding the move from proof to production

Cost constrains firms in different ways. For a micro or small manufacturer, a software subscription, sensor package or consultancy project competes with immediate operating needs and carries uncertain payback. For a larger plant, the model itself may be a small part of the cost. The spending goes on connecting it to equipment that was never designed to be connected, proving it behaves reliably enough to act on, securing the route it opens into production, and then keeping it working as

tools, materials and conditions change. Time on the line lost during the changeover can cost more than the software.³⁴⁹

The problem is not simply a shortage of grants. It is a mismatch between the investment firms need to make and the instruments available. A project to purchase a proven system and connect it to legacy equipment may be too operational for an R&D grant, too large for a voucher or outside eligibility rules based on client status, export orientation, ownership, State aid or project size. Interviewees described needs being shoehorned into instruments that do not match them, with research and development support at rates around a quarter to a third of cost, and Digital Process Innovation capped at €150,000 and often constrained by de minimis limits. Neither is scaled to the data-storage, robotics and on-site infrastructure investments firms are now contemplating.³⁵⁰

Proofs of concept can make the problem worse when they are treated as the end of the project. A pilot may demonstrate that a model works on a bounded dataset. Production deployment requires data pipelines, interfaces, monitoring, retraining, operating ownership, cybersecurity and a change to standard work. Without these, firms accumulate demonstrations without building an operational capability.³⁵¹

The funding landscape has routes for feasibility, experimentation and larger transformation. For early work, the LEO Feasibility Study Grant can support up to 50% of eligible expenditure to a maximum of €15,000, the Exploring Innovation Grant provides up to €35,000, and Innovation Vouchers offer a standard €10,000 route into the research system. IDA RD&I Feasibility support, LeanStart, EDIH–FactoryxChange and the Technology Gateways add diagnostic and test-before-invest capacity. For larger or collaborative development, Innovation Partnership Grants, the RDI Fund and the IDA RD&I Grant apply. On the deployment

side, Digital Process Innovation, Operational Excellence, Capital Funding Support, the IDA Business Asset Grant and the Digitalisation Consultancy Grant can contribute to integration and equipment costs.³⁵²

The middle of the journey is where the struggle is. Buying an established system, connecting it to brownfield equipment and making it part of normal operations may not fit an R&D instrument or a small digital voucher. Recurring costs are harder still: some general provision may contribute to subscriptions, but nothing offers a consistent route for ongoing model use, monitoring and retraining. Administration compounds the problem. Interviewees reported grant processes running from several weeks to twelve months and argued that small awards should be turned around in one or two days and could even be largely automated. A slow or complex process can outweigh the value of a small grant altogether.³⁵³

Workshop participants pointed to Technology Centres and Gateways as important delivery routes alongside grant incentives, and identified the underlying difficulty as knowing how to assess potential impact and benefit in the first place. Participants proposed a staged model in response. One described a packaged AI accelerator call – bundles of work, clearly explained, at genuine scale. Others emphasised an incremental roadmap of proof-of-value experiments in place of three-year all-or-nothing commitments. A first tranche in the roadmap could fund diagnosis, data assessment and a bounded pilot. Further support would follow where the firm demonstrates an operating result and a credible implementation plan. Eligible costs should cover the whole of what deployment involves: not just the equipment and computing capacity, but the integration and security work to connect it, the monitoring to keep it reliable, and the staff time to change how people work.

The aim would be to ensure that projects get the level of support that they need: small pilots need proportionate and rapid approval, but larger projects need continuity across technical, capital and change support. This would help to de-risk defined business outcomes, while avoiding subsidy open-ended experimentation with AI.³⁵⁴

5. Trust, reliability and governance: Defining the control model before connecting AI to operations

Trust extends beyond whether a model produces an accurate answer. The workshop connected it to cybersecurity, governance, regulation, legal certainty and ownership of data and models. One participant captured the commercial issue directly: “We’re investing a huge amount in building these models and we don’t even know who owns the derived data.”³⁵⁵

The risk increases as AI becomes connected. Production equipment has usually been kept apart from corporate networks because it was not built to resist attack. Connecting a model to it changes that, and an ensuing compromise could stop a line or damage equipment. Meanwhile, an AI agent with authority across several systems can introduce and spread error before a person intervenes. A cloud service may process sensitive records. An apparently credible maintenance or production instruction may be based on incomplete or obsolete information. Workshop participants put the point more bluntly: models hallucinate, and staff need the skills to detect errors and fabricated data before acting on them. Trust is therefore partly a capability question – a plausible answer is harder to challenge than an obviously wrong one. The data-sovereignty concerns set out in the Computer and Electronics chapter apply here too, with firms uneasy about valuable data being held abroad.³⁵⁶

Firms therefore need more than a general responsible-AI policy. They need clarity and decisions on which tools are approved, what information can reach them, how a model’s performance is evaluated and recorded, and where the boundary sits between what the model can decide alone and what a person signs off. Agentic applications in particular need clear limits on what they can do. Physical applications meanwhile need greater safety assurance and a reliable means of stopping or overriding the system.

Some questions cannot be settled by one firm acting alone. Who owns a model built from a customer’s operational data, what a supplier may reuse it for, and whether it can be moved or deleted are commercial questions that firms currently resolve one contract at a time, at their own cost. How regulation applies in an industrial setting, and what assurance is sufficient before a model influences a production decision, are harder still: a firm that answers them for itself cannot know whether a regulator, insurer or customer will agree. Product companies face both: who may use the data their equipment generates, and what they owe a customer whose operation depends on a service they supply.

Existing provision addresses the edges of this barrier. Enterprise Ireland’s Cyber Security Review Grant contributes 80% towards a defined €3,000 review against the National Cyber Security Centre framework – a baseline assessment, though not one aimed at operational technology, and one interviewee noted it is promoted to firms regardless of whether they are adopting AI. Access Advice: IP Start and IP Plus provide structured intellectual-property advice, relevant where the question is who owns a model, a derived dataset or the telemetry a product generates.

Skillnet programmes and the further- and higher-education inventory cover responsible use and the EU AI Act, while EDIH-ENTIRE, EDIH-CeADAR and the Technology Centres and Gateways offer environments in which a system can be tested before it reaches production.³⁵⁷ Irish Manufacturing Research (IMR) has test and pilot line areas that are being established for engineering and broader manufacturing sectors. These are directly aimed at this stage, giving firms somewhere to see an application working and understand its requirements and risks before committing to deployment.³⁵⁸

These measures cover baseline cybersecurity, IP advice and general governance. But they are not an engineering-specific route for secure OT deployment, model assurance and continuing monitoring, local or edge testing, or contractual treatment of derived data and model ownership. Provider lock-in, service continuity and the regulatory questions raised above are similarly unresolved. Interviewees also questioned where a firm should turn for help. AI consultants were described as fluent in the terminology but ultimately selling something, when what manufacturers wanted was frameworks, tools and worked examples they could apply themselves. This compounds the difficulty, noted in barrier 1, of judging whether an adviser understands the industrial context at all. One interviewee put it more starkly: when a manufacturer and an adviser sit down to discuss AI, neither side yet has a worked-out method for the conversation. As they put it, nobody has the answers yet.³⁵⁹

The response should be proportionate to the application. A small firm using a documentation tool needs an approved-tool list, simple data rules and a clear review process. A plant connecting AI to production needs secure testing, OT architecture, monitoring, audit trails and human-override protocols. A product company needs those controls plus model and data clauses governing ownership and liability questions. Workshop participants summarised the requirement as secure AI platforms. Secure test environments and OT demonstrators could allow firms to evaluate applications without exposing production systems, while standard contract clauses would reduce the cost of resolving recurring data and model questions one agreement at a time. Interviewees also called for legislation on safe AI use, clearer liability and accountability structures, and protections around workforce data and monitoring.³⁶⁰

Tourism

At a glance

Tourism spans accommodation; food and beverage; travel agencies and tour operators; passenger transport and mobility; culture, sport and recreation; and attractions, activity providers and visitor experiences. The enterprise base is dominated by micro firms, and around half of sector revenue is earned between June and September.³⁶¹

AI's near-term value is mostly operational: helping firms match capacity, labour and other resources more closely to demand. A more strategic shift is also under way as AI starts to shape how travellers discover, compare and book destinations and individual tourism experiences. The main constraints in pursuing these opportunities are limited management time, fragmented systems, limited digitalisation and digital maturity across the sector, as well as destination-level visibility and shared data infrastructure problems that no single business can solve. This chapter looks at where firms can act now and where collective action is needed.

Opportunities

- **Improve commercial and operational performance.** The strongest near-term opportunities are in demand forecasting, pricing, rostering, inventory and waste management, and booking and service automation. These applications can help firms match rooms, labour, food, energy and transport capacity more closely to demand while reducing administrative work.
- **Remain visible and bookable as travel discovery changes.** Conversational search and AI-enabled travel assistants are increasingly influencing where people travel and what they book. Businesses need accurate, current and machine-readable information, including availability, location, accessibility and booking links. This enhanced business and destination-level information can also help surface regional and off-peak experiences.

- **Use customer information more effectively without losing the human character of tourism.** AI can support customer review analysis, personalisation and customer service, but should primarily remove administrative friction and give staff more time for the personal interaction, sharing of local knowledge and authenticity that remain central to the visitor experience.

Barriers

- **Understanding and management capacity are the most immediate constraints.** Many firms are experimenting with AI but have not embedded it in repeatable workflows. Micro firms in particular face limited owner-manager time, little specialist capability and seasonal pressure, making it difficult to identify where to start and implement change.
- **Digital foundations remain uneven.** More advanced applications depend on structured, connected data, yet many firms still use disconnected booking, customer, finance and workforce systems or rely on spreadsheets and manual processes.
- **Some barriers are sector-wide rather than firm-specific.** Individual businesses have limited influence over booking platforms and emerging AI intermediaries, and cannot by themselves create common destination information or interoperability standards. Firms also need practical guidance on supplier selection, customer data, GDPR, reliability and responsible use.

Potential interventions

- **Create a clearer path from awareness to implementation,** connecting Fáilte Ireland, LEO, Skillnet, CeADAR, EDIHs and other existing supports, with practical help matched to firm size and subsector.
- **Use peer demonstrators and hands-on implementation support** to show firms what comparable businesses have done, what it cost and what result it produced, while helping them move from assessment into a live use case.
- **Strengthen shared tourism data and AI discoverability,** across national channels such as discoverireland.ie and visitdublin.com, and monitor how Ireland, its regions and individual tourism businesses appear in AI-enabled search and trip-planning services.

How AI is impacting the value chain globally

The global use cases documented in the study's use-case library (see Appendix B) range from conversational assistants handling routine customer enquiries to platforms that support search, planning, booking and service across an entire trip. This range demonstrates the direction of travel: from isolated assistance at one touchpoint towards AI defining the end-to-end visitor journey.

Key areas of application

Upstream, AI is shortening the distance between market insight and offer design. It can analyse search behaviour, bookings, reviews and real-time context to support the development of products, itineraries and packages. One global travel platform, for example, translates a traveller's intent, budget and dates into a plan spanning flights, hotels and activities.³⁶² Museums are similarly using AI to analyse and forecast visitor trends and behaviour, helping inform decisions on programming, marketing and staffing.³⁶³

In the **supply chain**, AI can help firms identify and reduce waste. Restaurants are using computer vision to track discarded food and use the data to improve purchasing, preparation and menu design. This can reduce over-ordering, align production more closely with demand and identify recurring sources of waste.³⁶⁴

Day-to-day **operations** offer the broadest range of applications, many using established machine-learning techniques.

Tourism businesses must continually judge how much demand to expect, when and where it will arise, what price to charge and how much labour, stock and energy will be needed. AI can improve these decisions by combining more data and updating forecasts as conditions change. One airline, for example, weighs gate activity, crew schedules, taxi times, aircraft routing and weather in real time when deciding whether a departing flight should wait for connecting passengers.³⁶⁵ Visitor attractions are applying similar techniques to the customer experience: one uses computer vision to monitor queues and provide visitors with real-time wait times through its app.³⁶⁶

Downstream, AI is changing how firms acquire, serve and retain visitors. It is also becoming a new intermediary in discovery and distribution. One tour operator has made its hotels, experiences and trips available within a conversational AI application, allowing travellers to move from discovery towards booking without starting on the operator's own website. AI can also connect and personalise interactions after discovery.³⁶⁷ One hotel maintains a central guest profile so that preferences recorded at one point in the journey can inform later service.³⁶⁸ An airline has integrated an AI-enabled knowledge tool into reservation support, helping staff find the information needed to answer customer enquiries.³⁶⁹ Both examples use AI to connect interactions that would otherwise sit in separate systems or channels.

The visitor experience depends not just on embedding AI alongside frontline employees but also in **enabling functions**. Tools that support everything from routine administration to knowledge retrieval and review analysis aren't likely to transform the economics of a business in isolation. But collectively they can remove significant friction and build the habits, data quality and governance required for more consequential applications.

Differences across firm size

The use cases we identified primarily relate to large companies.³⁷⁰ Many are reliant on integrated reservation and customer systems, enough transactions to optimise decisions,

specialist staff and multiple sites over which to spread the cost. A hotel group can deploy a capability across several properties; a single guesthouse bears the full cost for one business.

The underlying business problems, however, are not confined to large enterprises. A twelve-room guesthouse, a visitor attraction and a two-vehicle tour operator must all price capacity, schedule staff, manage costs and respond to customers. What differs is how they can adopt AI. Smaller firms are more likely to use capabilities built into commercial software than bespoke systems requiring specialist staff, integration and large proprietary datasets.

Key opportunities for adopting AI in Ireland

AI creates value in tourism in two broad ways. The first is growth: helping firms design more relevant offers, improve discovery and booking, price capacity more effectively and strengthen customer relationships. The second is operating leverage: matching labour, food, energy, rooms, vehicles and visitor capacity more closely to demand, while reducing administration, waste,

risk and compliance costs. Figure 27 maps the areas in which AI-enabled applications can contribute to these outcomes. These are potential applications rather than ready-made capabilities: realising the value depends on the firm's starting point and will require changes to data, systems, processes, skills and governance.

Figure 27. AI value and opportunity tree in tourism

Illustrative AI-enabled opportunities. Realising value requires appropriate data, systems, process changes, skills and governance; requirements vary by application and firm.



The value tree shows what is possible across global tourism. Which opportunities are most relevant to Ireland depends on two features of the domestic sector: its highly dispersed enterprise base and uneven digital foundations.

How the enterprise landscape shapes the priority opportunities in Ireland: A fragmented enterprise base

Large enterprises represent only a small fraction of the sector. Around four in five accommodation and food-service enterprises employ fewer than ten people, while the proportion among travel agents and tour operators is higher still.³⁷¹ Attractions and activity providers can employ sizeable peak-season workforces, but employment is often highly seasonal. Ireland's Association of Visitor Experiences and Attractions (AVEA) reports that only 40% of staff at surveyed visitor attractions were employed full-time year-round.³⁷²

This structure shapes how firms can adopt AI. Larger operators can connect booking, customer, workforce and operational systems and spread investment across properties or routes. Small and micro firms are more likely to use AI capabilities built into the booking, pricing, accounting, rostering and communications systems they already use. They also have less management capacity for complex implementation, particularly during the peak season when around half of sector revenue is earned.

Some opportunities require action beyond the individual firm. Visitors experience search, transport, accommodation, attractions and local services as one journey, but the information supporting that journey is spread across businesses, destination management organisations, local authorities and public

agencies. Improving AI-mediated discovery or coordinating information across a destination therefore depends on shared data and interoperable systems.

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: Digital maturity makes sequencing decisive

Tourism accounted for 39% of the responses to the online consultation, the largest share of any sector. Around two-thirds of respondents described their businesses as 'digital' or 'connected', yet almost a quarter still relied mainly on paper records, spreadsheets or local files for operational data.³⁷³ A business may take online bookings and payments and maintain an active social-media presence while still managing rosters, suppliers, compliance and customer records manually.

AI adoption shows a similar pattern. Of the 87 tourism respondents who described their experience with AI, almost three-quarters were considering its use, using it informally or applying it only to individual tasks. Just 13 reported a formal pilot, an embedded workflow or a scaled AI-native model; ten reported no current use.³⁷⁴ Marketing and content creation were the most common applications, followed by administration, document handling and knowledge retrieval. Workflow automation was less common. Most firms have therefore yet to embed AI in the decisions that shape revenue, capacity and cost.³⁷⁵

These figures do not capture all adoption. AI is increasingly built into property-management, revenue-management and marketing platforms without being bought as a separate AI product. A firm using a public AI model to draft social-media content may count as an adopter without

changing how it operates. Another may use AI-enabled revenue-management software in a core commercial process without viewing it as an AI investment. The more useful distinction is between occasional use and AI embedded in a repeatable workflow or decision.

Firm size remains a strong dividing line. More than half of respondents from micro firms described themselves as early-stage or still digitalising, compared with only two of the 28 medium-sized respondents. Nineteen of the 40 micro firms relied mainly on paper, spreadsheets or local files for operational data; only one medium-sized firm did so.³⁷⁶ Maturity also varies across the value chain.³⁷⁷ Accommodation has relatively strong digital foundations for pricing, occupancy, energy and guest-service applications. Travel agents, tour operators and destination management organisations are more exposed to changes in how visitors discover and assemble trips. Passenger transport combines valuable operational applications with businesses that have yet to complete basic digitisation. Cultural, sports and recreational organisations see value in administration and audience insight, while placing greater weight on human interpretation and interaction. Attractions, visitor experiences and activity providers often face a more basic digital-readiness challenge, with some still digitising core booking and operational information before more advanced AI applications are practical.

The starting point therefore differs substantially across tourism. Some operators already have the systems and data to embed AI in pricing, forecasting and service workflows; others are still establishing basic digital processes. Firm size is an important part of that divide, but not the whole of it.

Priority opportunities

For Ireland, the opportunities fall into two broad areas. The first is operating leverage: matching rooms, labour, food, energy and transport capacity more closely to demand, while reducing administration. The second is market position: keeping businesses and destinations in Ireland visible, bookable and connected to customers as AI plays a larger role in travel discovery and distribution.

1. Digital acquisition, distribution and conversion: Become visible and bookable in AI-mediated discovery

The route from inspiration to booking is moving into conversational search. More than 30% of overseas travellers now use generative AI when researching a destination; among US visitors, Ireland's most valuable market, the figure is closer to one in two.³⁷⁸

This creates an opportunity and a risk. One interviewee saw a window for well-positioned smaller firms to win more direct sales. Others warned that as planning and transactions move into AI interfaces, businesses that are difficult to find, understand or book could lose visibility to competitors and intermediaries.³⁷⁹

The immediate task is straightforward: make tourism products easy for people and machines to find, understand and book. That means accurate descriptions, current availability, clear location and accessibility information, strong imagery and direct-booking links.

At a national level, owned channels are an important part of this infrastructure. Tourism Ireland promotes the island of Ireland in overseas markets through Ireland.com, while Fáilte Ireland's discoverireland.ie and visitdublin.com support domestic discovery. Ensuring that content across these channels is structured,

current and discoverable by AI systems can improve sector-wide visibility and help surface a broader range of regional and off-peak experiences, supporting the Tourism Policy Statement's objectives for regionality and extending the season. Destination management organisations and local authorities also need accurate, reusable information about Ireland's tourism offering across the channels travellers increasingly use.

2. Demand forecasting and commercial planning: Match capacity, price and staffing to demand

A room, seat, table, ticket or staff hour that goes unused cannot always be recovered later. AI can improve forecasts of demand and help firms decide how much capacity to make available, what to charge and what resources they need.

One medium-sized accommodation respondent described an AI-enabled system producing daily analysis of operations, revenue and turnover to support rate management and productivity.³⁸⁰ In passenger transport, better scheduling was highlighted freeing management time and improving the use of vehicles and drivers. Workshop participants also highlighted rostering, food waste, energy use and seasonal capacity planning.³⁸¹

These applications are especially useful in a sector exposed to seasonality, weather, events and short booking windows. By identifying shifts in demand earlier, firms can align labour and other inputs more closely to expected activity. At destination level, better demand insight can also help target quieter periods and make better use of existing capacity, supporting the National Tourism Policy Statement's priority to extend the tourism season and stimulate demand beyond the summer peak.³⁸²

3. Booking, ordering and service automation: Automate the administration around high-touch service

Routine enquiries, booking changes, quotations, invoices, compliance records and internal information searches consume staff time without necessarily improving the visitor experience.

Firms are already using AI for some of this work. Among consultation respondents describing AI applications, 17 referred to administration, documents or knowledge retrieval, 12 to workflow automation and nine to customer service. One micro tourism respondent reported saving time on customer emails and routine administration while stressing that personal service should remain human.³⁸³

For a small firm, this might mean an assistant that answers routine enquiries or drafts quotations from approved information. Larger operators can connect AI to reservation, customer and other systems so that requests can be completed rather than simply answered.³⁸⁴

The aim is to automate the administration around service, not the human interaction that gives much of tourism its value.

4. Personalisation, loyalty and journey value: Turn customer and review data into a more personal, authentic offer

Tourism businesses collect signals about what visitors ask for, buy, praise and dislike, but much of this information is scattered across booking systems, reviews, email and staff knowledge. AI can bring it together to identify recurring problems, summarise feedback, remember preferences and help staff decide what to do next.

The opportunity is to give staff better information while preserving the human character of the experience.³⁸⁵

Smaller firms can start with review and feedback analysis. More advanced personalisation, such as maintaining customer profiles and tailoring service across a journey, requires stronger consent, identity management and systems integration.

5. Enterprise platforms, data and systems integration: Build the shared data and integration layer that individual firms cannot create

Visitors experience transport, accommodation, attractions, events and local services as one journey. The information supporting that journey, however, is spread across businesses, destination management organisations (DMOs), local authorities and national agencies, often in different formats and updated at different times. DMOs and local authorities also commission or manage destination-level digital infrastructure, including wayfinding, connected trails and visitor-flow systems. AI can enhance these shared assets as well as individual business operations, making coordination, ownership and funding important parts of adoption at destination level.

AI-mediated search and trip planning work better when this information is accurate, current and reusable. More advanced coordination of availability, capacity and service also depends on systems being able to exchange information across different businesses. No individual tourism business can create that infrastructure. Workshop participants called for common data, better integration and shared pilots across subsectors.³⁸⁶

The answer is unlikely to be a single central platform replacing commercial systems. A more useful role is to establish common standards and infrastructure that allow existing systems to exchange reliable information. Visit Tampa Bay illustrates the principle: its destination-wide assistant can answer questions across channels because it draws on a managed information base.³⁸⁷ For Ireland, the goal is similarly to make tourism products easier to find, combine and book without expecting thousands of small firms to build their own data infrastructure.

The frontier: where the sector is heading

At the frontier, AI begins to connect the visitor journey rather than optimise individual steps. Travel assistants are moving from inspiration and itinerary generation towards searching inventory, comparing options, making bookings and managing changes through a single interface.³⁸⁸ Generative search is also changing discovery. As travellers increasingly ask AI systems where to go, what to do and what to book, visibility will depend on whether information about destinations and businesses is current, trustworthy, consistent and machine-readable.³⁸⁹

AI is also moving into service delivery. Live multilingual systems can reduce language barriers, while AI embedded in booking, property-management and communications platforms can move from answering questions to carrying out specific actions.³⁹⁰ Over time, these capabilities could connect activities that remain fragmented today: for example, changing a reservation after a disruption, notifying the traveller and updating the relevant systems.

More contextual assistants on phones and wearables could also support wayfinding, interpretation and translation during the visit.³⁹¹

The pace of this shift will depend on the sector's digital foundations. Agents need reliable data and permissioned access to inventory, payments and operational systems, alongside clear escalation rules and human oversight.

The competitive consequences of not adopting AI

Slow or shallow adoption could widen productivity and margin gaps. Firms using AI for forecasting, pricing, scheduling, energy management and service automation can make better use of capacity and management time. Firms that remain reliant on manual processes may find it harder to manage labour shortages, rising costs and seasonal demand.

Firms also risk becoming harder to find. As search and trip planning move towards conversational assistants, businesses with incomplete, inconsistent or poorly structured information may be omitted from recommendations or represented inaccurately.³⁹²

The risk is not evenly spread. If tourism information remains fragmented, AI-mediated planning may favour destinations and businesses with the strongest digital presence. Smaller cultural and recreational providers, less digitally mature regions and experiences without sophisticated booking systems could receive less exposure even when they match a visitor's interests. This creates a sector-level risk as well as a firm-level one: it could make it harder to deliver the Tourism Policy Statement's regionality objective by concentrating discovery and demand in already-visible destinations. Similar dynamics could reinforce seasonality if less prominent regional and off-peak experiences are harder for AI systems to find and recommend.

Barriers—and what would unlock adoption

Five constraints shape whether tourism firms can adopt AI effectively. Firms need to identify where the technology can create value and assign responsibility for implementation. They also need usable data and systems, the time and money to make changes, the ability to assess suppliers and platforms, and safeguards suited to the risks involved.

The barriers vary by firm size. Micro firms are more often constrained by limited time, weak digital foundations and uncertainty over what to buy. Medium and larger operators are more likely to face integration, organisational change and governance challenges. Existing supports address some of these barriers, but firms do not always find a clear route from identifying a use case to implementing and operating it safely.

Figure 28. Barriers to AI adoption in tourism: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Understanding Turning awareness into implementation	Firms can reach AI tools more easily than they can work out where to use them. Without a clear use case and owner, experimentation stays informal.	LearnIFI, existing Fáilte Ireland digital transformation supports, LEO programmes, Skillnet, AIReady.ie and CeADAR cover awareness well. The gap is between learning about AI and putting it to work in a specific subsector task.	- A short assessment routing firms by size and subsector - Help applying AI to one live process - A roadmap and cross-functional adviser for larger operators - Irish peer examples with cost and measured result
Data and digital foundations Putting AI inside the workflow	Micro firms still rely on paper, spreadsheets and local files. Larger operators hold more systems, but property-management, point-of-sale, HR, CRM and accounting data do not exchange easily.	Existing Fáilte Ireland digital transformation supports, Digital for Business, the Grow Digital Voucher and CeADAR address part of it. A diagnostic identifies weak data without cleaning it, and a voucher rarely covers migration or maintenance.	- A few well-structured processes for micro firms - Data clean-up, integration and access controls - Practical guidance on connecting common tourism systems - A sector-wide response on destination data and interoperability
Cost, funding and uncertain returns Making adoption investable	Adoption is a time multiplier before it is a time saver, and the months when forecasting and pricing pay most are those with least capacity to change systems.	LearnIFI, existing Fáilte Ireland digital transformation supports, LEO vouchers and Skillnet reduce direct costs. Management time, staff release, data preparation and recurring subscriptions fit none of them.	- Co-funding for owner or staff release and configuration - Support for integration or a project lead, not another licence - Greater use of the off-season for delivery - Funding staged against a familiar business measure
Platform and supply-chain dynamics Navigating a market firms do not control	Firms have little influence over the ranking rules and commercial models of the platforms that shape how they are found and booked, and little specialist procurement capability.	Fáilte Ireland guidance, LEO mentoring and the research infrastructure help in parts; Tourism Ireland supports the sector only indirectly. There is no recognised place to test product claims or compare exit terms.	- Vendor-neutral advice to help firms assess tourism technology and AI options - Standard procurement questions and model clauses - Product demonstrations on systems firms already operate - Monitoring how Irish firms appear in AI-enabled search
Trust, reliability and governance Making safe use practical	Safeguards should match what AI is allowed to do. Staff may already be using public tools without common rules, and customer-facing content must still carry accurate local information and the organisation's voice.	LearnIFI, AIReady.ie, CeADAR, Skillnet and the education inventory carry responsible-use material. What is missing is practical guidance for the decisions firms face day to day.	- An "everyday AI" policy pack for micro and small firms - Stronger controls for larger operators covering vendors, system access, testing and traceability - Higher-risk tool access tied to training - A responsible-AI clinic or controlled testing environment

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Understanding: Turning awareness into implementation

Tourism firms can access AI tools more easily than they can work out where to use them well. Many struggle to identify worthwhile use cases, assign responsibility and change the surrounding workflow. Smaller firms are especially constrained because they often have no specialist technology role and little management capacity to lead implementation. Without a clear use case and owner, experimentation tends to remain informal.

There is substantial support at the awareness stage. Fáilte Ireland's LearnFI platform provides free tourism and hospitality training, including practical AI content, while its digital transformation programmes combine training, mentoring and one-to-one guidance for eligible businesses. LEO programmes support digital assessment, training and mentoring; Skillnet offers tourism-related AI learning; AIReady.ie provides a national entry point; and CeADAR offers more specialist AI-readiness expertise.

The gap is between learning about AI and putting it to work. A webinar or assessment may raise awareness without leaving a firm with a prioritised use case, an accountable owner or a redesigned workflow. Generic training is also of limited value when firms need help applying AI to specific tasks in accommodation, attractions, food service or passenger transport.

Participants therefore favoured more hands-on support. Fáilte Ireland is already developing a digital and AI assessment in partnership with the European Digital Innovation Hubs Data2Sustain and CeADAR, which could help identify a firm's starting point and direct it towards support suited to its size and subsector. The next step is to ensure that assessment connects firms

to practical implementation support. A micro business might need help applying AI to one live process; a medium-sized operator may need a roadmap and an adviser who can work across functions. Peer examples could support both by showing what was changed, what it cost and what result it produced.

2. Data and digital foundations: Putting AI inside the workflow

AI is harder to embed when the information it needs is incomplete, poorly structured or spread across disconnected systems. For many micro and small tourism businesses, the problem still begins with basic digitisation: consultation and interview evidence points to continued reliance on paper, spreadsheets and locally stored files. Medium and larger operators tend to have more technology, but their property-management, point-of-sale, HR, CRM, accounting and marketing systems may not exchange information easily. This limits what AI can do. Drafting an email requires little operational data; forecasting, pricing, scheduling and workflow automation depend on information being structured, current and connected.

Existing supports address part of the problem. Fáilte Ireland's digital transformation programmes support digital assessment and digital development, including relevant systems training. Eligible LEO clients can use Digital for Business and the Grow Digital Voucher for digital assessment, software, training and IT configuration. CeADAR, Data2Sustain and other research and innovation infrastructure can support more advanced projects where firms meet the relevant criteria.

The gap is implementation depth. A diagnostic can identify weak data without taking action to ensure it is accessible and standardised. A voucher can support software acquisition without necessarily covering migration, integration, testing or ongoing maintenance. For larger firms, routine remediation of legacy technology may also sit awkwardly between standard digital support and programmes designed for genuine R&D.

Support should reflect these different starting points. Micro and small firms need help establishing a few well-structured digital processes and connecting commonly used tourism systems. Medium and larger operators may need support with data clean-up, integration, access controls and implementation. Shared destination-level data and interoperability require a separate sector-wide response rather than being left to individual firms. Making information on regional and off-peak products accurate, structured and reusable would also help ensure that these experiences can be surfaced through emerging AI-enabled discovery and planning channels.

3. Cost, funding and uncertain returns: Making adoption investable

Tourism firms often lack the capacity to implement the technology that could save them time. For an owner-manager, adoption means assessing products, preparing data, configuring systems, training staff and changing routines while still running the business. Workshop participants described AI experimentation as a potential “time multiplier” before it becomes a time saver.

Seasonality makes this harder. The months when forecasting, pricing and staffing are most valuable are also those when firms have least time to change systems.

Training seasonal workers can also bring a lower return where staff may not come back the following year.

The cost of adoption therefore extends well beyond the software licence. Data preparation, integration, staff release, supplier selection, testing and change management all require investment before benefits appear. Micro firms are particularly exposed to the risk of buying the wrong product; larger firms face greater costs from procurement, security, integration and organisational change.

Existing measures reduce some direct costs. LearnIFI provides free online training; Fáilte Ireland’s digitalisation supports combine diagnostics, expertise and capability building with grant assistance for eligible firms; LEO programmes offer digital assessment and the Grow Digital Voucher; Skillnet can subsidise training; and Enterprise Ireland and European programmes can support qualifying larger innovation projects.

The gap is in the ordinary costs of implementation. Management time, staff release, data preparation, integration and recurring subscriptions do not fit neatly into a training course, modest voucher or R&D programme. Support can also arrive at the wrong point in the tourism calendar.

Participants therefore called for support to extend further into implementation. For micro firms, co-funding could cover practical costs such as owner or staff release and configuration. Medium-sized firms may need help with integration or a project lead rather than another software licence. Delivery could also make greater use of the off-season.

Funding could be staged around evidence of value. An initial project could test a defined use case against a familiar business measure, such as time saved, occupancy, room rate, quotations completed, energy use or waste. Where relevant, projects could also measure whether AI helps attract demand outside peak periods or improve the visibility and use of regional capacity. Further support would follow where the results justified wider implementation.

4. Platform and supply chain dynamics: Helping firms navigate a market they do not control

Tourism businesses increasingly depend on digital platforms and systems to operate and reach customers. Property-management systems, booking engines, online travel agents, payment providers and emerging AI assistants can all shape how a firm is found, booked and paid.

For individual firms, this creates a purchasing challenge. Operators need to know whether a product works as promised, integrates with existing systems, handles their customer and other business data appropriately, complies with GDPR and other relevant data-protection requirements and remains affordable over time. Smaller firms have little specialist procurement capability. Larger organisations face more complex contracts, integration requirements and switching costs.

There is also a sector-wide challenge. Online travel agents (OTAs) already have significant influence over tourism distribution, and AI assistants may play a growing role in discovery, comparison and transactions. Individual firms in Ireland have little influence over the ranking rules, technical requirements or commercial models these systems use. Nor can any one operator create common standards or shared information across a destination.

Existing supports address parts of the problem. Fáilte Ireland provides practical digital guidance; LEO mentoring can offer independent business advice, although current AI capability among mentors is limited; and CeADAR, Data2Sustain, Technology Gateways and Technology Centres can provide specialist expertise for suitable projects. Tourism Ireland promotes the country in overseas markets, including through Ireland.com, and is increasingly using AI to enhance Ireland's visibility and competitiveness in overseas markets. Fáilte Ireland then plays a direct role in driving digital and AI adoption across the tourism sector through targeted supports, advisory services and capability-building initiatives for enterprises. Additionally, Fáilte Ireland leverages AI to enhance Ireland's visibility with domestic tourism audiences.

The gap is independent, vendor-neutral support for choosing technology and responding to market change. Firms say they lack a recognised place to test product claims, compare integration requirements or understand data rights, portability and exit terms. At a sector level, there is also no obvious mechanism for tracking how AI-mediated discovery is affecting the visibility of businesses and destinations in Ireland.

Participants therefore proposed a trusted, vendor-neutral advisory service rather than government endorsing particular technologies. A tourism technology and AI service could provide guidance tailored to subsector, firm size and digital maturity; publish standard procurement questions and model clauses covering data rights, portability, integration, security and exit; and demonstrate products using systems firms already operate. It could also track how businesses and destinations in Ireland appear in AI-enabled search and planning channels and coordinate shared work on data and interoperability.

5. Trust, reliability and governance: Making safe use practical

The safeguards around AI should reflect what it is allowed to do. Drafting content for human review carries less risk than accessing customer records, changing a price, taking a payment or giving safety-related advice.

Tourism businesses raised concerns about accuracy, privacy, cybersecurity, intellectual property and regulatory compliance. Informal use adds another risk: employees may already be using public AI tools without common rules or oversight. Cultural workshop participants described this kind of “shadow” use, while one transport organisation linked access to approved AI tools to compulsory training.

The response should be proportionate to firm size and risk. A microenterprise does not need complex assurance processes, but it does need clear rules on which tools can be used, what information can be entered, which outputs need checking and what to do when something goes wrong. Larger operators need the same foundations alongside vendor checks, access controls, testing and audit trails.

Existing provision includes responsible-AI content through LearnFI, AIReady.ie, CeADAR, Skillnet and further- and higher-education programmes. The gap is practical guidance for the decisions firms face in day-to-day operations.

Participants proposed tourism-specific guardrails. An “everyday AI” policy pack for micro and small firms could set out approved uses, rules for customer and commercial data, human-review requirements and incident procedures. Larger organisations would need fuller controls around vendors, access, testing and traceability. Access to higher-risk tools could also be tied to training.

Tourism has an additional concern: authenticity. AI can reduce administrative work and help staff make better decisions, but customer-facing content still needs to reflect accurate local information, the organisation’s voice and the character of the experience. Human review should be strongest where errors are hard to reverse or where interpretation and personal interaction are part of the product. A responsible-AI clinic or controlled testing environment could give firms independent advice before higher-risk applications go live.

Construction

At a glance

Construction in this chapter covers building construction, civil engineering and specialised trades, from design, building information modelling and estimating through materials and plant procurement, site delivery, handover and asset management. It is a €14.3 billion sector with more than 81,000 enterprises and 206,000 people – yet almost all firms are SMEs and most are microbusinesses.³⁹³ The practical AI opportunity is therefore principally about using better, easily adoptable tools to deliver projects with fewer overruns, less rework, safer sites, faster tenders and less administrative drag.

The longer-term prize is a structural change to how the sector operates: continuously monitored assets, generative design, adaptive programmes and greater automation of physical work. Those capabilities are already visible internationally, but they depend on data, capital, standards and professional governance that much of Ireland's fragmented project economy does not yet have. The chapter therefore separates what firms can use now from what clients, contractors and the wider ecosystem must build towards – and focuses as much on the route to adoption as on the technology itself.

Opportunities

- **Deliver projects with greater certainty.** Models trained on past project data can flag which activities are likely to slip while the outcome is still open, pre-empting overruns and rework.
- **Put the firm's own knowledge and commercial processes to work.** Document and contract interrogation, estimating and tendering are document-heavy, repeatable and self-contained — within reach of smaller firms through commercial software.
- **Improve safety and quality through monitoring.** Vision-based systems increase the chance of intervening before an incident rather than investigating one afterwards. Lighter-weight versions, such as defect detection from site photographs, are accessible today.

Barriers

- **Digital foundations are not in place.** Most firms lack the structured, reusable project data that useful AI depends on, relying instead on spreadsheets and tools that change between or even within projects.

- **Understanding, capacity and skills limit what firms can act on.** Awareness is often high, but firms lack a clear sense of where to start, initiatives stall where no one owns them, and time is limited.
 - **Contract structures and competitive silence work against adoption.** Liability raises the consequences of relying on an AI output, and cost-plus arrangements can mean a firm that invests to work more cheaply does not retain the benefit. Firms with useful applications treat them as commercial advantage, meaning firms with strong evidence are less likely to share it.
 - **Build capability through the routes the sector already uses.** Short, role-specific, use-case-led learning for owner-managers, project leaders, supervisors and trades, with training-time reimbursement so firms can release scarce staff.
 - **Address the sharing problem.** Confidential peer cohorts convened by a neutral body would let firms learn from each other without commercial exposure, supported by practical operating rules scaled to firm size.
 - **Use public procurement to set the standard.** The Capital Works Management Framework and BIM mandate can require consistent information through the chain, and client-led pilots and asset-monitoring demonstrators can be procured, with publication of use case details becoming a possible condition attached to public funding.
- Potential interventions**
- **Fund the data work.** Treat process mapping, data cleaning, integration and structuring of existing project records as eligible costs within adoption support, not preliminary work firms fund alone.

How AI is impacting the value chain globally

We mapped 62 distinct AI use cases across the construction value chain, drawn from global evidence – ranging from the prosaic, such as Comfort Systems NW³⁹⁴ using AI to turn a technician's raw notes into a structured job report, to the frontier, such as Sekisui House using AI to inspect every modular component on an offsite factory line before dispatch.³⁹⁵ These are drawn from the study's global AI use-case library, described in Appendix B.

Key areas of application

The use cases fall across the whole value chain with a small number of cross-cutting applications in finance, HR and sustainability.

In **upstream** work, AI is being deployed to do the early design thinking: generating and testing options faster than a human team alone. The Swedish firm, Skanska, has used Spacemaker's AI platform to analyse, simulate and visualise

alternative massing options against physical site data, zoning regulations and environmental obstacles in the early phases of residential development, enabling the firm to evaluate far more design alternatives.³⁹⁶

In the **supply chain**, gains have been captured from forecasting and anticipating problems before they appear – in the plant and equipment fleets construction runs on, for example. The French company, Vinci Construction, for instance, reads machinery telematics to predict component failures before they happen, so maintenance is scheduled ahead of a breakdown.³⁹⁷ At the other end of the scale sits work a small firm could adopt immediately: photographing an equipment nameplate to identify the asset and auto-populate its part and service details, removing a routine source of error and delay in the field.

Operations is a rich field. Some of the clear use cases are in safety, where AI, for example, analyses site imagery to assess safety and prevent risks. Site camera feeds can be read in real time to detect missing protective equipment, fall risks and exclusion-zone breaches as they occur, though deployment of such tools requires issues relating to privacy, consent and surveillance are addressed in advance.³⁹⁸

Downstream, AI keeps finished assets running by turning live sensor data into foresight about what will need attention and when. The British firm, Network Rail, for instance, has used a rail digital twin of the Severn Tunnel (constructed in 1886) to forecast maintenance needs, so work is scheduled when required; site visits have since been reduced by 50%.³⁹⁹

Differences across firm size

The mapped use cases skew toward larger firms: the majority are most relevant to large enterprises, with a smaller set centred on medium firms and relatively few whose primary relevance is to smaller firms. This is not because the underlying tasks are absent in smaller firms but because the data infrastructure, capital and specialist capability that the use cases assume tend to be concentrated in larger organisations. The clearest exceptions, where the applications have genuine micro-firm relevance, are the lighter-weight assistive and generative tools, such as document and contract assistance, which need little bespoke data or integration and can be bought as commercial software rather than built.

The pattern signals a risk that AI exacerbates disparities in productivity between large contractors and the small firms and subcontractors that make up most of the sector.

Key opportunities in Ireland

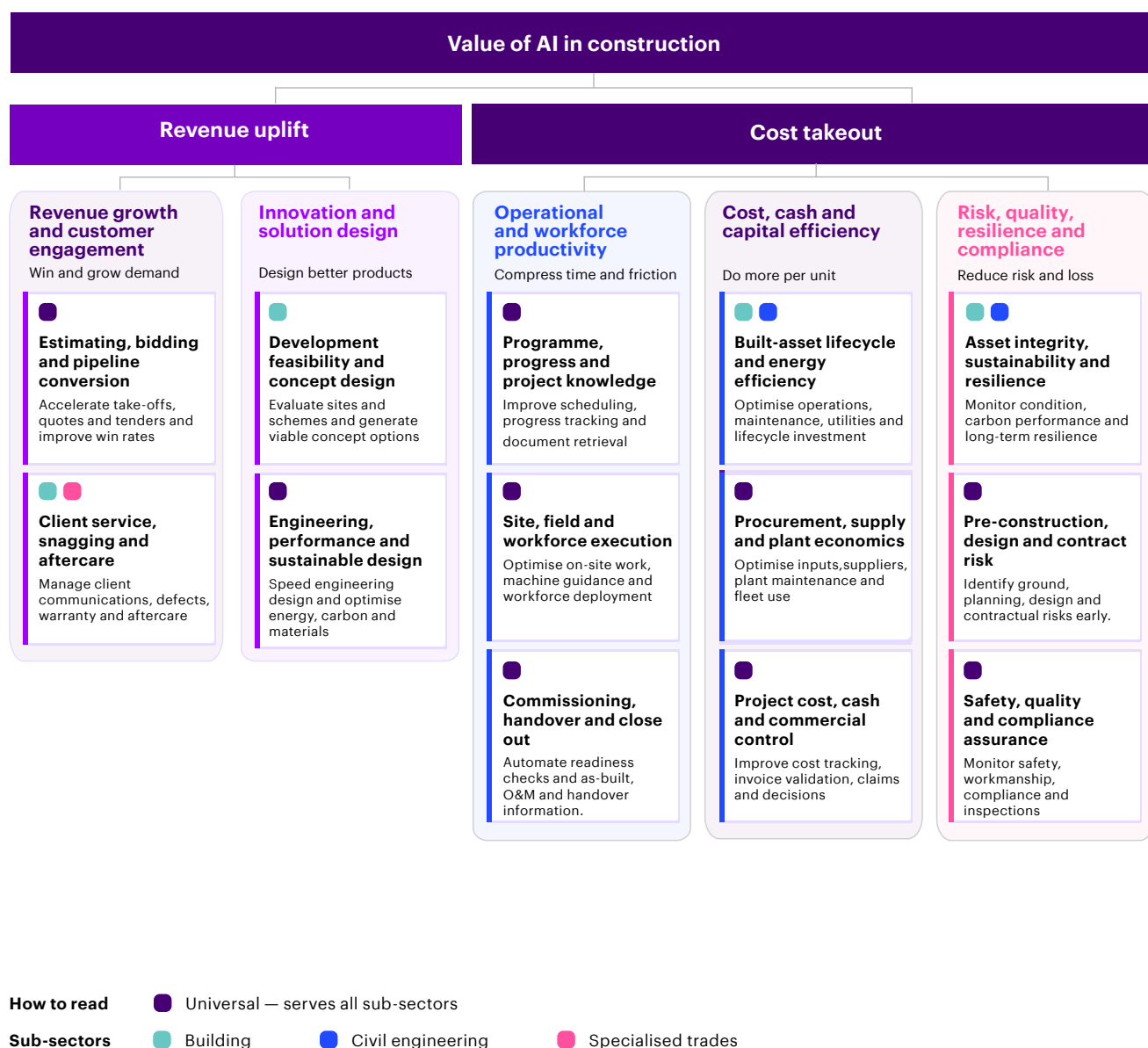
The construction use cases were grouped into 13 opportunity themes, which sit within five clusters and divide between two basic kinds of value: revenue uplift and cost takeout (see Figure 29).

Revenue uplift covers two of the five clusters. Revenue and customer growth is about winning and growing demand: preparing estimates, quotes and tenders faster, winning more work and improving customer service and aftercare. Innovation and solution design is about designing better: assessing sites, developing viable concepts and creating better designs with improved cost, energy, carbon and material performance.

Cost takeout covers the other three. Operational and workforce productivity saves time and reduces friction across scheduling, site work, staffing, document management and project handover. Cost, cash and capital efficiency is about doing more per unit – improving procurement, equipment use, cash flow, project cost and energy efficiency. Risk, quality, resilience and compliance reduces risks relating to safety, design, contracts and compliance.

Our evaluation of global use cases across the value chain indicates that the weight of construction's AI value sits firmly on the cost side: roughly three in four of the mapped use cases fall under cost takeout rather than revenue uplift. This aligns with the view that the sector's economics turn on delivery certainty, margin protection and risk avoidance, rather than on customer-facing differentiation.

Figure 29. AI value and opportunity tree in construction



Source: Based on cluster analysis of the sector use cases in the global use case library. Clusters are mapped into their dominant value impact.

The opportunities in this chapter fall across two “horizons”. The first covers applications firms in Ireland can act on with the data, systems and skills most already have. These improve the reliability and efficiency of existing work (i.e. fewer overruns, less rework, safer sites, faster tendering) and are set out under *Priority opportunities* below. The second covers applications that would transform how the sector designs, builds and maintains assets, including continuous monitoring of built assets, generative design and robotics. These are real and already operating internationally, but depend on data foundations, capital and specialist capability that are not yet widespread in Ireland. These are set out in a section on the frontier, below. The two horizons describe capability as much as they do timing: for Ireland’s largest contractors and infrastructure clients, parts of the second horizon are already arriving, while for most smaller firms they depend on foundations not yet in place.

How the enterprise landscape shapes the priority opportunities in Ireland: Construction is project-based and requires a different approach

Construction in Ireland represents a large, dispersed universe of businesses. The sector is dominated by micro enterprises. Enterprises with fewer than ten people accounted for 97% of all construction enterprises in 2023 (78,361 firms). Adding small and medium-sized enterprises brings the share to 99.96% of enterprises.⁴⁰⁰

Most people in the sector work in small businesses, 58% in micro enterprises and over 91% in SMEs. However, just 30 large enterprises

employ almost 9% of the workforce (18,135), giving them an important role in driving AI adoption.⁴⁰¹

A micro or small firm is unlikely to commission a bespoke model or integrate several project systems. It will adopt AI when useful capability appears in estimating, accounting, scheduling, document or field-service software it already trusts – and when the result is visible in hours saved, bids submitted or rework avoided. Larger firms can connect data across projects and functions, but face longer procurement, security and change processes. They are also well-positioned to act as catalysts across their supply chains, by encouraging suppliers to introduce innovative solutions and sharing AI tools, knowledge and good practice with partners.

The project is as important as the enterprise. Site cameras, common data environments, progress monitoring and digital handover are usually commissioned by the client or main contractor, while subcontractors work inside the resulting system. In a fragmented supply chain, adoption can therefore be pulled from the top rather than purchased independently by every firm. Public clients and major contractors have particular leverage because the information standards and contractual requirements they set can diffuse through the chain.⁴⁰²

This also means that several of the most strategic opportunities cannot be solved by one business. Common data definitions, portable project records, consistent planning information, assurance rules and incentives for sharing lessons sit at sector or client level. Without that common layer, firms may buy more tools while the project remains fragmented.

How current levels of digital maturity and AI adoption shape the priority opportunities in Ireland: Businesses need to adopt AI at a pace that matches their digital readiness

The official statistics reveal construction to be among the lower-adopting sectors. This fits a pattern: the nature of construction work (i.e. bespoke, site-specific projects, fragmented supply chains, and thin margins that limit investment in process change) tends to mean the sector has not captured the productivity gains seen in manufacturing and other industries. That is a growing issue now, because Ireland faces sustained, large-scale demand for housing and infrastructure at the same time as acute labour and skills constraints, which limit the extent to which output can be raised by adding people. This amplifies rather than diminishes the case for AI: where headcount cannot readily expand, technologies that raise output per person become correspondingly more valuable.⁴⁰³

According to CSO data, 9.3% of construction enterprises use at least one AI technology, placing the sector below the five manufacturing subsectors in scope (20.5%). Digital readiness is uneven rather than uniformly low. Paid cloud computing is widespread at approximately 81%, showing that firms have adopted digital services where they see immediate value and where the tool fits how the sector already works. Adoption is thinner in the systems that generate and organise usable data: 21.8% of enterprises perform data analytics internally and 11.8% use business intelligence software. Other adoption metrics may need care in how they are interpreted. Customer relationship management software (11.1%) and internet-connected sensors or smart devices (1.3%) may currently have limited applicability for firms that are predominantly small, whose customers tend to

be small and repeatable in number, and whose work is typically carried out on temporary sites. Low adoption may not matter here as much as the gap between widely adopted digital services and the structured, connected project data that many higher-value AI applications require.

AI adoption varies sharply by firm size. 7.8% of small enterprises report using at least one AI technology, compared with 17.6% of medium-sized enterprises and 56.9% of large enterprises. The large-firm rate is more than seven times the small-firm rate. Since the applications driving adoption in large contractors address problems common across the sector, this gap likely reflects differences in capacity to adopt rather than in the value available to be captured for smaller firms.

Separate Credit Demand Survey evidence reinforces the picture of limited AI diffusion among construction SMEs. Among 177 construction respondents, 89.3% reported no use of AI technologies in the production of goods or provision of services between 2022 and 2024. Near-term investment intentions are also weak: only 10.0% plan to invest in AI between 2025 and 2027, while 75.8% report no planned investment and 14.1% remain unsure. The CDS results also identify material capability and trust barriers. 39.3% of respondents agree or strongly agree that cybersecurity or other security concerns are a barrier to using AI, 34.2% identify the cost of staff training, and 29.8% identify the skills of their existing workforce. These results suggest that low adoption cannot be explained solely by direct technology cost: security, workforce capability and the cost of building that capability are also significant concerns.⁴⁰⁴

Deployment of individual AI technologies remains limited in the construction sector. Written-language analysis/data mining is the

most prevalent measured technology at 6.4%, while individual rates for other technologies remain below 4%. Adoption among small enterprises is particularly narrow, with written-language analysis/data mining at 5.8%, machine learning at 2.0%, and most other individual measures at very low levels.

Again, the profile varies considerably with firm size. Among medium-sized enterprises, 17.6% report AI use in administration and management, while written-language analysis/data mining reaches 9.0%, suggesting that internal administrative activity is an important area of deployment. Among large firms, AI use extends across a substantially wider range of technologies and business functions. In terms of business purpose, 50.9% report AI use in ICT security and 34.7% in administration and management. Among specific technologies, workflow automation reaches 38.8%, written-language analysis/data mining 36.6%, and text, speech or code generation 36.4%.

Interviewees and workshop attendees largely confirmed this picture. Participants consistently describe a current state of early, uneven adoption. Most firms are at the “bought Copilot licences” stage⁴⁰⁵ or are using basic assistants on a phone.⁴⁰⁶ Only a small minority have any real data or AI understanding, which is often equated with ChatGPT; one interviewee estimated that only around 5–10% of firms have an understanding of their data and AI.⁴⁰⁷ And digital maturity falls sharply among the micro companies at the ends of supply chains, with interviewees describing subcontractors who do not use email⁴⁰⁸ and firms still coordinating projects over WhatsApp.⁴⁰⁹ Adoption is

nonetheless described as changing rapidly year-on-year,⁴¹⁰ with a trajectory from curiosity, to generative tools, to emerging agentic use.⁴¹¹

Getting the order right is therefore important, if companies want to see impact. The immediate step is task assistance around information already available: finding a clause, drafting a tender, producing a site record or summarising a meeting. The next step is to connect those applications to repeatable project workflows and reliable data. Only then can firms and clients move towards continuous prediction, autonomous coordination and lifecycle intelligence. Each stage creates value, but confusing them encourages firms to buy technology before the process beneath it is ready.

Priority opportunities

Viewed against Ireland’s enterprise footprint and maturity, and bringing together the global use-case evidence, interviews and workshop discussion, the near-term opportunities for construction in Ireland are mostly about doing existing work with less waste: fewer overruns, less rework, safer sites, faster tendering, and better use of what the firm already knows.

Interviewees and workshop participants were clear-eyed about which of the two horizons described above presents the greater immediate opportunities for Ireland’s construction sector. Recognising that the sector is dominated by small, digitally immature firms, they broadly accepted that the immediate opportunity for most companies

lies in efficiency and streamlining, with more transformative applications to follow once the foundations are in place.

1. Pre-construction, design and contract risk and Project cost, cash and commercial control: Making better use of existing knowledge

This theme cuts across the whole value chain: most construction firms cannot get at what they already know. The problem is mundane and expensive – one interviewee described staff spending hours hunting for a single document.⁴¹² Staff mobility compounds it, since project knowledge held by individuals is often lost when they move jobs. The opportunity, framed in the civil engineering workshop as the sector's greatest, is to properly understand a company's accumulated knowledge and put that expertise to work, building what one interviewee called the "compounding intelligence" of lessons learned across projects rather than relearning them each time.⁴¹³

Two applications follow, one on each horizon. The first is document and contract interrogation: asking natural-language questions across contracts, specifications and project records and getting answers with the source passage cited, which cuts both wasted search time and missed contractual obligations. Participants in the specialised trades workshop proposed this, describing a repository holding the company's own commercial and regulatory knowledge so that employees could retrieve what they needed directly. They judged it "simple to do" and saw it as especially valuable for onboarding, getting a new recruit to the information they need far more quickly. The second, which demands more data integrity and digital foundations, is real-time connected "control tower" dashboards

of project performance, drawing on a single source of project data so that decisions rest on current information rather than on outdated reporting cycles.⁴¹⁴

2. Programme, progress and project knowledge: Getting projects to finish on time and on budget

An emphasised opportunity is using AI to tackle and pre-empt overruns and rework. This affects the core value chain rather than the back office. This is the difference between a marginal administrative saving and a change in project economics.⁴¹⁵ One interviewee pointed to industry evidence that the overwhelming majority of large capital projects finish late,⁴¹⁶ and almost all require follow-up work;⁴¹⁷ rework avoidance by itself presents a large, recoverable pool of value. According to research that Accenture published in 2025, 92% of infrastructure and capital project fail to deliver expected outcomes on time and on budget.⁴¹⁸

The international evidence shows what this looks like in practice: models trained on large bodies of past project schedules now forecast which activities on a live project are most likely to slip, letting commercial teams intervene while the outcome is still open rather than absorbing the cost after it is locked in. For Ireland, where a large housing and infrastructure pipeline is being delivered through a fragmented, multi-tier contracting chain, greater delivery certainty is arguably the single most valuable thing AI can offer.

It is also the opportunity most dependent on foundations the sector has yet to build. Forecasting which activities will slip requires consistent, structured records across past and

current projects, and most firms' project data does not exist in that form. The barriers section returns to this in detail. The point here is that construction's largest AI opportunity is gated by digitisation and data standardisation rather than by the availability of AI itself.

3. Site safety, quality and regulatory assurance and Site, field and workforce execution: Improving site safety and waste monitoring

Participants also returned repeatedly to safety and waste – two enduring concerns in the construction sector that AI can address directly. Vision-based systems deployed on a site increase the chance someone intervenes before an incident rather than investigating one afterwards. The same capability applied to lean principles allows firms to track waste of motion and material on site, turning a discipline that has depended on periodic manual observation into something measured continuously.⁴¹⁹

These applications have requirements though, determining who can realistically deploy them. Continuous site monitoring depends on camera and sensor coverage across an active site, the connectivity to move that data off it, and a platform capable of analysing video at volume. (Multiple non-technical requirements around privacy, consent and information storage need to be resolved up front as well.) That is a site-level investment rather than a firm-level one – and on most projects the site is controlled by the main contractor or client rather than by the subcontractors working on it. For most companies in Ireland, therefore, the safety benefit will arrive through the chain, as something a main contractor deploys and its subcontractors work within. That is consistent with the main-contractor-led pattern interviewees described, in which

large contractors set the standard and smaller firms follow.⁴²⁰

Monitoring therefore shows both the horizons of priorities mentioned above (i.e. improving existing work vs transforming the sector) operating inside a single activity. The site-wide version belongs to the second; but lighter-weight versions of the same idea sit firmly on the first, and are within reach of smaller firms today. Defect and quality detection, for instance, can work from simple photographs taken on site – rather than a fixed, continuously-operating camera – which brings it within reach of small and medium firms wanting to catch workmanship problems at the point of installation rather than at handover. For the trades in particular, the most accessible applications need little more than a phone: turning a technician's spoken notes into a structured job report complete with photos and readings, or retrieving the right schematic and repair steps on a device in the field. These are straightforward near-term opportunities that reduce waste for the firms that make up most of the sector, and demand little by way of digital foundation beyond a smartphone.

The worker productivity debate

Seen in this light, an apparent disagreement in the evidence resolves itself. One interviewee was sceptical that current tools could do much for the productivity of a skilled tradesperson – it is hard to see how a welder is made twice as effective by AI.⁴²¹ Others argued almost the opposite: with labour scarce, there is little fear of AI displacing anyone, and interviewees reported that well-designed tools (whether to do with voice capture, spoken notes, or information retrieval rather than reading static text) are often welcomed by site workers for

whom the written and administrative side of the job is often the least comfortable part.⁴²² Both are right about different things. AI is not about to make the physical trade materially faster; what it can do is strip out the documentation, search and coordination burden that surrounds the trade – which is where the applications cited above pay off.

4. Estimating, bidding and pipeline conversion: Winning work

AI can provide immediate support in winning new work. It can help businesses prepare estimates and tenders and turn more opportunities into contracts. Workshop participants described tendering automation as an active area of experimentation in the sector, driven by the cost of bidding rather than by client demand. And because the task is document-heavy, repeatable and largely self-contained, it is within reach of smaller firms through commercial software rather than bespoke development.⁴²³

It may not be the most complex application of AI in construction, but it is one that participants recognised as being adoptable and paying back fast for a small firm. Small trade contractors internationally are already generating job-ready estimates from job scope and live pricing data, quoting while the enquiry is still fresh rather than days later, while larger bid teams draft first-pass tender responses from past submissions in hours instead of days. In a sector where the bid is often written after hours by an owner-manager who has a full to-do list, that represents a potentially significant change.

The frontier: where the sector is heading

More advanced AI applications are currently most accessible to larger, well-resourced firms. Internationally, AI is being used to analyse sensor data from bridges, tunnels and railways, helping detect deterioration early. It is also being used to generate and assess design options quickly against site and environmental requirements. Given the scale of Ireland's infrastructure pipeline, these applications could help extend asset life and reduce the long-term cost of maintaining buildings and infrastructure. However, they require integrated data and specialist expertise that most smaller firms do not yet have.

The civil engineering workshop offered caution here: participants felt the main challenge to reaching this frontier relates to change management.⁴²⁴ The possible construction applications that AI can unlock are therefore often not about AI alone. Rather, such use cases depend on revisions to governance and accountability and the willingness to change how work is done. For smaller firms there are also more fundamental constraints. Firms already stretched to deliver current workloads have limited time and capability to spare for change of this kind, whatever its potential or eventual value.

In reality, the two horizons of AI opportunities are connected. The data discipline built while chasing first-horizon gains – structured job records, consistent project data, a single source of truth – is the same foundation the transformative applications require. Firms that treat efficiency adoption as an end in itself will likely improve margins. Those that treat it as foundation-building will be the ones able to move when the frontier becomes affordable.

The consequences of not adopting AI

Participants in interviews and workshops were forthright about what happens to firms that move slowly. On larger infrastructure projects, the risk is straightforwardly competitive: firms in Ireland fall behind international rivals bidding for the same work.⁴²⁵ Because construction is delivered through fragmented multi-tier chains, a slow-moving firm also caps the pace of those above and below it – which gives faster-moving partners an incentive to switch it out of the chain altogether.⁴²⁶

Losing competitiveness would be especially problematic in Ireland. Participants view the country's high-tech construction sector – the firms exporting design, engineering and contracting services into technically demanding projects such as data centres and pharmaceutical facilities – as genuinely strong internationally, but frame AI adoption as

substantially defensive: as one put it, the sector needs to stay ahead of American and European competition.⁴²⁷ Ireland is also characterised as considerably more fragmented than comparable Western peers, which makes the chain dynamics more acute than elsewhere.⁴²⁸

Regulatory requirements are tightening in parallel. The public sector BIM mandate, introduced into the Capital Works Management Framework from January 2024, currently applies at high project thresholds but extends across all public sector projects by 2028, raising the prospect that SMEs which do not catch up will simply be locked out of public tenders.⁴²⁹ And for firms with export ambitions, AI fluency is becoming a condition of entry rather than a differentiator: much of Ireland's high-tech construction export activity now serves data-centre and hyper-scaler clients, who will likely come to expect their partners to be AI-capable.⁴³⁰

Barriers—and what would unlock adoption

Construction firms face a series of connected barriers to adopting AI. They need a clear problem and an owner for it, reliable data and digital systems, enough time and a credible business case, project rules that allow value to be captured, and safeguards for confidentiality, safety and professional accountability. If any of these is missing, adoption stalls or remains a small-scale trial.

Each link in that chain has a corresponding support need. Ireland has provision at each point, but it is unevenly distributed: strongest in awareness, training, basic digitalisation and access to expertise, and thinner where firms need protected implementation time, systems integration, sector standards, contract reform and construction-specific assurance. The table below sets out each barrier alongside its current coverage and potential response.

Figure 30. Barriers to AI adoption in construction: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Data and digital foundations Building the digital core the sector lacks	Most firms rely on spreadsheets and tools that change between projects, so project data is not captured in reusable form. A firm cannot skip a generation of digitalisation and arrive at working AI.	Digital for Business, the Grow Digital Voucher, Built to Innovate, the EDIHs and Construct Innovate cover parts of the foundation. Support for software does not by itself create an implementable project.	- Data preparation and integration treated as part of adoption - Common information patterns aligned with BIM, cost and carbon - Interoperable projects testing those patterns - Live standards monitoring while projects are under way
Skills and capability A new gap layered onto existing shortages	Demand for AI capability sits on top of existing shortages in roles such as architectural technology and quantity surveying, and a project-based workforce makes sustained capability-building harder.	CitA Skillnet, Build Capability and Key Manager Support connect learning to construction work. Courses may not fit construction roles, and firms struggle to release staff from live projects.	- Short role-specific learning led by a live use case - Training-time reimbursement or backfill - Vetted webinars and supplier question checklists - Bridge roles, internal champions and peer learning
Understanding Willing but unsure where to start	Awareness is high but firms do not know what AI can do for them. Initiatives stall where a deputised individual has no mandate, and owners fear a wrong decision more than no decision.	The AI and Digital Pathfinder, Business Navigator and Strategic Consultancy Grant give routes to advice, alongside CIF and Lean Construction Ireland material. Momentum after that first engagement is what is missing.	- One visible route with a short assessment and named owner - An honest-broker adviser panel without reselling incentives - A case library showing effort, cost, result and failure points - Senior-leadership workshops and protected implementation time
Platform and supply-chain dynamics Contractual caution combined with competitive silence	Liability makes caution rational: the downside of an error is allocated by contract while the upside may accrue elsewhere. Firms with the strongest evidence are the least willing to share it.	Construct Innovate, Innovation Partnership and the DTIF support joint work. Shared data rights, procurement incentives, professional assurance and construction-specific governance are unresolved.	- Client-led pilots spanning several tiers of the chain - Consistent BIM, cost, carbon and handover requirements - Model clauses on data access, derived models and exit - A construction-focused AI Act awareness campaign
Cost, funding and uncertain returns Firm-wide investment justified one project at a time	Spending is organised by project, not firm, so central investment is hard to secure. The people who could build a solution may command higher salaries than the owner-manager earns.	The Grow Digital Voucher, Build Capability and the research instruments offset parts of the cost. Benefits often cross organisational boundaries, which a firm-level grant cannot correct.	- Staged co-funding released against a measured result - Eligible costs covering data, integration, staff time and recurring spend - Shared demonstrators across comparable firms - Value measured in estimating hours, rework, defects and safety

Source: Accenture analysis of interview register, industry consultation, workshop and policy compendium. Gaps in sector support and potential responses are participant-informed suggestions.

1. Data and digital foundations: AI needs a digital core the sector lacks

A common refrain is that construction firms have not yet built the “digital core” on which useful AI depends. Rather than integrated systems that capture construction project data in a structured, reusable form, most firms rely heavily on spreadsheets and on tools that change between – or even within – projects. This means that the data that would make AI impactful in a construction sector context is typically not yet available in the right form; instead it remains fragmented and unstructured.⁴³¹ As one of our interviewees put it you can “spend 3 hours... looking for one PDF.”⁴³²

Interviewees framed this as a sequencing problem as much as a technology one: a firm cannot skip a generation of digitalisation and expect to arrive at working AI, and even large contractors often lack the foundations to do so.⁴³³ The sector is seen as materially behind manufacturing on this dimension (which itself has not solved the data challenges).⁴³⁴

As one interviewee described it, much of the time “we are talking about digitisation, not AI”.⁴³⁵

Current provision covers important parts of this foundation, with different supports relevant at different levels of digital maturity. For eligible micro and small firms, Digital for Business provides an expert assessment of the firm’s existing digital systems and opportunities and produces a digital roadmap. Firms that complete this process can access the Grow Digital Voucher, which provides 50% grant support, from €500 up to €5,000, towards eligible software, training and IT configuration.

These measures are most relevant where the immediate requirement is basic digitisation, more consistent digital working or adoption and configuration of established software.⁴³⁶

For firms seeking to improve the underlying construction process, a relevant, sector-specific support is Built to Innovate. It supports productivity improvement through areas including Lean, Modern Methods of Construction, digital tools and process innovation. It can therefore help firms improve and digitise the processes on which more advanced AI applications will ultimately depend. But the programme is focused on residential construction, so is unlikely to be able to serve as a universal digitalisation route for the whole sector.⁴³⁷ Build Digital offers a broader construction-specific route focused on digital ways of working. It supports firms in adopting digital technologies and information management standards, and provides practical tools and guidance.⁴³⁸ Because its focus is information management, it can help with the more foundational digital and data problems that interviewees describe.

For more technically demanding data problems, the Data2Sustain and CeADAR European Digital Innovation Hubs provide access to data, digitalisation and AI expertise, including opportunities to assess and test technologies before wider investment. Their capability is cross-sector rather than construction-specific, but the Construction Industry Federation (CIF) has begun connecting its members to these bodies through webinars. Construct Innovate provides a construction-specific route into applied research and collaborative innovation, and is the more established sectoral channel. These supports are particularly relevant where firms or groups of firms need

to test interoperability, develop reusable information structures or explore how data can move between systems and organisations, rather than simply purchase an existing software product.⁴³⁹

But support that exists for software or equipment does not by itself create an implementable project. Firms must still map the process, prepare and label data, connect systems, define access rights, change working practices and keep the project running while the implementation takes place.

Participants proposed treating data preparation and integration as part of AI adoption rather than as preliminary work that firms must fund alone. Eligible expenditure would include process mapping, data cleaning, configuration, interfaces and the work required to structure existing project records. At sector level, public clients and industry bodies could develop common information patterns aligned with BIM, cost, carbon and handover requirements and test them through interoperable projects, potentially drawing on the information management standards and implementation resources available through Build Digital. A live standards-monitoring mechanism could identify naming and data-quality problems while projects are under way. The objective is not one national software platform, but information that can move reliably between the commercial systems already in use.⁴⁴⁰

2. Skills and capability: A new skills gap layered onto shortages the sector already has

Construction firms need more than general familiarity with AI. Owner-managers must be able to identify a useful application and assess a supplier. Project and commercial leaders must understand how the tool affects a process or decision. Firms also need genuine technical

capability in data, integration, cybersecurity and governance. Most do not currently have this and will need to develop it or bring it in from outside. Above all the sector needs hybrid roles combining that technical capability with construction knowledge, since neither a construction professional without data skills nor a data specialist without site experience are well-positioned to manage a workable application alone.

The gap appears at both firm and sector level. Some owner-managers are reluctant to expose uncertainty or engage with a subject they do not understand. Firms that decide to proceed then struggle to find people who can translate a construction problem into a working solution. This demand sits on top of existing shortages in roles such as architectural technology and quantity surveying. A temporary, project-based workforce makes sustained capability-building harder.⁴⁴¹ These shortages cut both ways. The same scarcity that makes capability-building harder also raises the return on anything that reduces the labour needed per unit of output.⁴⁴²

Construction has a relatively strong sector-specific training offer. CitA Skillnet's AI Core Skills for Construction provides a route into practical AI use in a construction context, while its M365 Copilot Training addresses the use of AI within office and productivity tools already familiar to many firms. These sit alongside broader Skillnet programmes, but are particularly relevant because they begin to connect AI learning with construction work rather than treating it as a generic technology subject.⁴⁴³

For eligible Enterprise Ireland clients, the support can go beyond attendance on an individual course. Build Capability can provide between €5,000 and €70,000 towards eligible non-routine strategic training, including digital technology, AI, automation, leadership and organisational development. Training Funding Support can also support areas such as leadership, change management, digitalisation and systems improvement. Where the challenge is not an absence of training but of a person capable of leading a significant change programme, Key Manager Support can help an eligible firm recruit senior capability. These measures are therefore most relevant to firms that have moved beyond introductory awareness and need to build or bring in the capability required to implement AI in the business. Where a firm is ready to redesign a process rather than train individuals, Digital Process Innovation can contribute 50% of eligible expenditure to a maximum grant of €150,000, and covers internal implementation time alongside external expertise and project costs. That makes it the most directly relevant instrument where the main issue is the availability of the firm's own people rather than access to training.⁴⁴⁴

At the micro and small end, Local Enterprise Office training and mentoring remain an entry route, but AI capability among LEO mentors is considered to be more limited.⁴⁴⁵ More generally, the availability of programmes does not necessarily mean they meet construction firms' needs. Courses may not be tailored to construction roles, may have limited capacity or uptake, and firms may struggle to release staff from live projects to attend them. Long programmes are difficult for owner-managers and operational staff to commit to. Yet introductory learning, by contrast, does not give a firm continuing access to integration, deployment and model-management expertise.

The gaps therefore relate to fit, absorption and application. Firms need learning around a live construction task rather than detached from the work. They also need bridge roles that combine construction processes with AI, data and systems knowledge. Building that capability will also mean attracting people the sector has not traditionally competed for. Interviewees described firms that cannot specify such a role, let alone price it: the salary required can exceed what the owner-manager pays themselves, and firms do not know what questions to ask to make the right hire. The relationship also runs in both directions, with workshop participants noting that visibly modern digital tools and working practices are themselves becoming a condition of attracting and retaining staff in a sector already competing hard for people.⁴⁴⁶ Smaller firms are unlikely to employ all those capabilities directly and need access to trusted external expertise after the initial training ends.

Participants proposed short, role-specific and use-case-led learning for owner-managers, project leaders, supervisors and trades. The construction Skillnet networks already report rising demand for AI content, with waiting lists on some programmes, and offer an existing channel to scale. Training-time reimbursement or backfill would allow firms to release scarce staff without losing a productive day. Strengthening AI capability among Local Enterprise Office mentors would improve the entry route for micro and small firms. Vetted webinars and question checklists could help firms assess suppliers and advisers. Internal champions, peer learning and links with universities, Technology Gateways and applied-research centres could provide continued support around implementation.⁴⁴⁷

There is also a case for building this capability through the routes the trades themselves use. Embedding AI content in construction apprenticeships and Education and Training Board provision would mean new entrants arriving with it rather than acquiring it later. It would also reach decision-makers, since many owner-managers came up through apprenticeships rather than third level. Proposed owners for this activity included SOLAS, LEOs, the ETBs and the construction Skillnet networks.⁴⁴⁸

3. Understanding: Willing, but unsure where to start

Even where firms are willing, many struggle to translate general interest into concrete action. General or vague awareness that AI can add value is often high; what firms lack is a clear sense of where to start and how to move from broad ambition to a specific first step.⁴⁴⁹ As one of our interviewees put it, often “they just don’t know what AI can do.”⁴⁵⁰

Bandwidth and inertia compound the problem. Smaller firms in particular are time-poor, with neither the spare hours for basic training nor the headspace to plan.⁴⁵¹ Many owners, meanwhile, are wary of committing, feeling that making the wrong decision could be worse than making no decision at all.⁴⁵²

Where initiatives do begin, they frequently stall because no one owns them: without genuine leadership buy-in, isolated prototypes fail to gain traction, and a deputised individual with no real mandate cannot carry them forward.⁴⁵³

Workshop participants were also clear that AI’s potential would only be realised if leaders took ownership of its use and roll-out. Leadership was needed both to drive adoption and to manage the compliance risks that could arise if the technology was handled clumsily.⁴⁵⁴ Similarly, participants from civil engineering firms placed governance and professional accountability above all else, estimating that “70% of this is change management; the technology is only 30%.”⁴⁵⁵

Existing supports can help firms turn broad interest into a more concrete starting point. For eligible Enterprise Ireland clients, the AI and Digital Pathfinder is designed to help companies navigate the available AI and digital supports and identify an appropriate next step. Where the challenge is broader than choosing a technology, the Mentor Network/Business Navigator provides access to experienced business guidance, while the Strategic Consultancy Grant can support eligible SMEs to bring in external expertise to address a significant strategic issue. Together, these measures provide routes from initial uncertainty towards a clearer business priority, external advice and a company-level plan.⁴⁵⁶

Formal supports are complemented by industry-led resources. Interviewees referred to Construction Industry Federation guidance and an AI policy template, regional digital outreach and Lean Construction Ireland case studies. These are not public-policy supports, but they provide construction-specific guidance and examples that can help firms understand how AI and digital tools might apply in their own operating context.⁴⁵⁷

These supports can help firms identify a starting point and access external advice. The remaining challenge is sustaining momentum after that initial engagement. Interviewees described initiatives stalling where leadership ownership was weak, while smaller firms in particular lack the time and capacity to keep an implementation moving alongside immediate project demands. The gap identified by participants was therefore less another awareness intervention than continued support to turn an initial use case or roadmap into action.

Participants proposed one visible route into construction AI adoption. A short assessment would identify the firm's digital starting point, business problem and appropriate level of support. A microbusiness might receive a live-task clinic and a simple product recommendation. A medium-sized firm might receive a roadmap and mentor. A large contractor might need cross-functional governance and an integration plan. Every engagement would end with a named internal owner, one measurable use case and follow-on support through implementation.

The same route should include independent advice and peer evidence. Interviewees proposed an honest-broker panel of advisers without reselling incentives, practical checklists for assessing suppliers, confidential forums where firm leads can compare experience, and a construction-specific library of results. Case studies should show the workflow, implementation effort, cost, result and failure points rather than simply promote the technology. Short senior-leadership workshops and protected implementation time would make the pathway usable in firms dominated by immediate project demands.⁴⁵⁸

4. Platform and supply chain dynamics: Contractual caution combines with competitive silence

This barrier has two linked roots: contracts and competition. Construction is delivered through temporary coalitions of clients, designers, contractors, subcontractors and suppliers whose systems, incentives and responsibilities differ. At the same time, professional duty of care and contractual liability increase the consequences of relying on an AI-generated output.

Interviewees described an adversarial, contract-heavy sector in which fear of litigation discourages information-sharing.⁴⁵⁹ Civil engineering participants asked how professionals could use AI while retaining legal responsibility for engineering decisions. Building construction participants returned to the same issue in contractual terms: when an AI-supported decision is wrong, someone must accept responsibility.⁴⁶⁰ Some interviewees went further, proposing that the contractual framework itself be examined as a barrier to AI adoption, and describing construction as a legal minefield. Caution of this kind can also become institutionalised, as the layer of cross-certification and paperwork built up following the mica and pyrite defective blocks scandal illustrates.⁴⁶¹

Commercial incentives can reinforce caution. Under a cost-plus arrangement, a contractor that invests to deliver work more cheaply may not retain the financial benefit.⁴⁶² The downside of an error is allocated by contract, while the upside of experimentation may accrue to the client or another firm in the chain. This makes caution rational. Standards also develop more slowly than the technology – workshop participants pointed to a three-to-five-year timeframe for their development⁴⁶³ – leaving firms without settled rules for new tools.

Competitive sensitivity then limits diffusion. Firms that have developed useful applications may treat them as a commercial advantage and avoid discussing them with domestic competitors.⁴⁶⁴ Interviewees reported greater reluctance to share AI experience than they had seen with earlier lean practices.⁴⁶⁵ The combined effect is a sector whose incentives point away from experimentation, and in which the firms with the strongest evidence are often the least willing to provide the examples that would help others act.⁴⁶⁶

Existing supports provide some routes for firms to work together on technical problems. Construct Innovate provides a construction-specific setting for collaborative research and innovation, bringing firms together with research expertise around areas including digital adoption and new construction methods. Enterprise Ireland's Innovation Partnership Programme can support companies to work with Irish research institutions on company-driven research towards new or improved products, processes or services. For larger and more ambitious projects, the Disruptive Technologies Innovation Fund can support collaborative development and commercialisation of potentially disruptive technologies.⁴⁶⁷

These supports can help firms experiment jointly, develop technology and test new approaches. But firms still face unresolved questions around shared data rights, the allocation of cost and benefit, procurement incentives, contractual responsibility and professional assurance. There is also no consensus on a construction-specific framework setting out how firms should approach project-data confidentiality, model validation, human oversight and liability when

AI contributes to a professional or technical decision. What firms describe needing is a set of practical operating rules. A small contractor needs to know which tools are approved, what information must never be entered, when an output must be checked and how an error should be reported. A large contractor needs those rules plus inventories of models and vendors, access controls, testing, audit trails and clear contractual responsibility. General governance awareness does not answer those questions in a construction setting. Some workshop participants added that the practical implications of the EU AI Act were themselves poorly understood, and called for a substantial awareness-raising effort akin to the campaign around GDPR.⁴⁶⁸

Participants proposed action at project and sector level, including shared standards and expectations for AI across clients, contractors and suppliers.⁴⁶⁹ Developing model contract provisions is important. Clauses covering project-data access, derived models, the status of AI-assisted decisions, responsibility and exit could be drafted for the public works contracts and offered to the bodies publishing the standard forms used on private projects, so the same questions are answered whichever contract governs a project. Professional indemnity needs settling alongside this: an engineer or architect who remains legally responsible for a decision cannot rely on a tool whose use may not be insured, so professional bodies and insurers would need to agree how AI-assisted work is covered.⁴⁷⁰

The public client already holds the relevant instruments. The Capital Works Management Framework and the public sector BIM mandate could require consistent information through the chain, extending beyond BIM to cost, carbon and handover information.

Client-led pilots on live National Development Plan projects could bring several tiers of the value chain into the same project, testing both the technology and the contractual arrangements required to use it. Procuring asset-monitoring demonstrators on public infrastructure would test applications at a scale no individual firm can justify.⁴⁷¹

A proportionate governance offer would provide simple policies and checklists for micro and small firms and fuller model, vendor and assurance controls for larger organisations. A construction-focused AI Act and data-security campaign could build basic awareness and translate general obligations into practical steps. Professional bodies, insurers, clients and regulators could jointly develop guidance and controlled test environments for high-consequence applications.

The sharing problem needs a direct answer too. Interviewees were consistent that construction firms learn best from other construction firms, and that a high-value intervention would be a facilitated peer forum in which a designated person from each firm could discuss progress and mistakes without commercial exposure. Convening this through a neutral body is key: firms will not disclose to competitors, but are more likely to do so with an honest broker. Sector-credible case reporting is the goal, with examples anonymised or drawn from overseas markets where Irish deployments are too sensitive to publish. Participants saw a role for government in convening these actors and helping to remove impediments to the efficient flow of useful information across the sector.⁴⁷²

Public funding could also deploy a lever that voluntary sharing does not possess. Where a pilot or demonstrator is publicly supported, publication of the workflow, cost, effort and

result could be made a condition of the award. This would enable the development of a body of sector-credible evidence that does not depend on any firm volunteering its own commercial advantage.⁴⁷³

5. Cost, funding and uncertain returns: Firm-wide investment is hard to justify one project at a time

Finally, the economics of the sector can conspire to make investment hard to justify.

Margins are thin and spending is organised around individual projects and programmes rather than the firm as a whole, so it is difficult to secure the central, firm-wide investment that building an AI capability requires. Where a business case can be made at all, it tends to be justified within the bounds of a single programme.⁴⁷⁴

The cost of actually bringing in the skills required adds to this problem: the skilled people who could build or run a solution can often command higher salaries than the owner-managers themselves earn, which makes hiring for the capability difficult in the first place.⁴⁷⁵

This difficulty is amplified by the limited availability of domestic reference points. Workshop participants pointed out that without a credible Irish example to benchmark against, the value of a given investment is, in participants' words, "very hard to define".⁴⁷⁶ This echoes the problem raised in the previous barrier about firms having few incentives to share their success stories.

For micro and small firms, the Grow Digital Voucher – mentioned above in barrier 1 – provides the clearest direct route towards alleviating the cost of adopting an established digital tool. As mentioned, this provides 50% grant support, from €500 up to €5,000, towards eligible software, training and IT configuration, which could be meaningful for a small or micro firm considering a first investment.⁴⁷⁷

For eligible Enterprise Ireland clients, several measures can reduce the cost of the people and expertise needed around an implementation. Build Capability – mentioned in Barrier 2 – can provide between €5,000 and €70,000 for non-routine strategic capability development, including digital technology, AI and automation. The Training Funding Support, Key Manager Support, and Strategic Consultancy grant (all also mentioned in Barrier 2) can also tip the investment case when it comes to training or bringing in key skills. These measures can offset parts of the wider implementation cost, even if they are not complete dedicated grants for purchasing and deploying an AI system.⁴⁷⁸

More substantial funding is available where the project involves genuine innovation or technical uncertainty. The Research, Development and Innovation Fund, Innovation Partnership Grants, the Disruptive Technologies Innovation Fund and Horizon Europe provide routes into research, demonstrators and

collaborative technology development. These could be valuable where a construction firm is developing a genuinely new product, process or capability.⁴⁷⁹

One issue is that the economics can be misaligned across the project chain. The firm paying for a tool may not capture all the benefits if a client, main contractor or later project stage receives the value. A firm-level grant cannot by itself correct that incentive. Equally, awareness of what is out there is not strong – both on the support side, and on the emerging regulatory side – and firms can struggle to identify which programmes are relevant to the project they are trying to deliver.

Participants proposed staged co-funding. A first tranche would cover diagnosis and a bounded pilot. Further support would follow when the firm demonstrated a result and a credible implementation plan. Eligible costs would include data preparation, integration, staff time, training and an initial period of recurring expenditure, not only the software purchase.

Participants also called for independent advice alongside funding, so that firms can assess the business case and compare suppliers without relying solely on vendor claims. Shared demonstrators can spread the cost of testing common applications across comparable firms. Where benefits cross organisational boundaries, contracts or payment mechanisms may need to reward the party making the investment. Results should also be measured in construction terms (such as estimating hours, schedule variance, rework, defects, or safety events) rather than through a general maturity score.⁴⁸⁰

Part 2:

Adapting to AI-driven transformation in ICT services

Part 1 looked at how firms can use AI. Part 2 turns to the firms whose products and services are themselves being reshaped by it.

The issue for ICT services is broader than productivity. AI is changing what firms sell, how they build and deliver it, how they charge, which capabilities command a premium and who controls the customer relationship. Part 2 is organised around these shifts, reflecting the approach taken in the ICT workshop, which focused on business models, competitive dynamics and emerging sources of value.

Part 2 covers ICT-enabled services and SaaS separately because of the distinct challenges the two segments face.

For **ICT-enabled services**, AI puts pressure on the labour-based delivery model. Automating parts of delivery can reduce team sizes and weaken the link between headcount and revenue. Value shifts towards reusable assets, platforms, orchestration (i.e. coordinating and managing how multiple AI models, applications, data sources and agents work together to complete a task), governance and deep industry expertise. ICT-enabled services firms must also determine how much of the productivity gain they can retain rather than pass to clients through lower prices.

For **SaaS firms**, AI is weakening some traditional sources of advantage. Software is becoming cheaper and faster to build, features easier to copy and the interface less central as agents become a new route to the user. Traditionally, SaaS vendors derived much of their advantage

from controlling the user interface and owning the customer relationship. Instead of opening and navigating a specific application, users may increasingly ask an AI agent to perform tasks on their behalf, reducing the importance of the software interface itself. As per-seat pricing comes under pressure, defensibility shifts towards proprietary data, domain knowledge, embedded workflows, and trusted integration. It also comes from control of the agent layer – the software layer through which AI agents access and coordinate underlying applications and interact with users. If agents become a primary interface for accessing software, strategic value may accrue to the firms that control this interaction layer, because they can influence how users access services, how workflows are orchestrated and where customer relationships are maintained. This could intensify competition between SaaS providers, enterprise platforms and AI providers for control of the agent interaction layer.

The chapters assess how these shifts are playing out globally, what they mean for ICT-enabled services and SaaS firms and the wider ecosystem in Ireland, where the strongest opportunities lie, what could prevent ICT-enabled services and SaaS firms from adapting and where policy may have a role.

Figure 31 summarises how these different pressures are changing the sources of value, commercial models and competitive risks in the two segments.

Figure 31. AI is reshaping SaaS and ICT-enabled services in different ways

	ICT-Enabled Services	SaaS
Main disruption	AI can automate more routine delivery work, such as coding, testing and support. This reduces the labour needed for some projects and puts pressure on models built around large teams and billable hours.	AI agents can complete tasks without users interacting as much with individual applications. At the same time, AI-assisted development makes some software features faster and cheaper to reproduce, putting pressure on seat-based pricing and feature-led differentiation.
More defensible sources of value	Domain expertise, reusable IP, integration and orchestration capability, governance and ongoing operational responsibility	Domain knowledge, proprietary or rights-cleared data, embedded workflows and position in transaction-critical processes
Commercial shift	From predominantly effort-based pricing towards managed, usage, output and outcome-linked models	From predominantly per-seat subscriptions towards hybrid subscription, usage, task and outcome models
Where new value is emerging	More value is shifting to work that is harder to automate: redesigning processes, integrating AI with existing systems, developing reusable tools and IP, and operating and governing AI once it is in production.	New value is emerging in software that applies AI to specific industries and workflows, helps customers use AI safely, and connects or controls agents across existing systems. Firms can also differentiate through trusted data and deep domain knowledge.
Key transition risk	The provider remains concentrated in commoditised, labour-intensive delivery	The product becomes easier to replace or loses its position in the customer workflow

Common to both: defensibility moves from what is easy to reproduce towards domain depth, data, integration and responsibility for operating AI reliably in live business environments.

Source: Accenture analysis based on the global evidence cited in the previous section.

ICT-enabled services

ICT-enabled services in this chapter covers firms providing technology advice, systems integration, cloud and data implementation, digital transformation, managed IT and cybersecurity services and application support. Unlike SaaS firms, which primarily sell software products, these businesses earn most of their revenue from advice, implementation and ongoing services. Proprietary tools, platforms and other assets that can be used across clients are, however, becoming a more important part of their business models.

Ireland's sector includes indigenous and internationally owned consultancies, managed-service providers, system integrators, cybersecurity specialists and other technology-services firms. These firms work closely with global cloud providers, enterprise software vendors and AI companies (including foundation model developers and companies providing AI platforms and tools), and serve clients in sectors such as financial services, life sciences and manufacturing. The sector is dominated by small firms: micro firms account for 94% of active enterprises. However, medium and large firms, while accounting for only around 1.2% of firms, employ approximately 57% of people in this sector.⁴⁸¹

AI is shifting where value is created in the sector. It can automate or augment activities at the core of the services being sold, including coding, testing and application support, putting pressure on business models that depend heavily on large delivery teams and billable hours. At the same time, enterprise adoption of AI is creating demand for services such as process redesign, systems integration, coordination of AI agents, governance and ongoing operations.⁴⁸² ICT-enabled services

firms can therefore play an important role in helping other sectors implement, govern and operate AI. Their ability to benefit will depend partly on whether they can use their industry expertise, technical capabilities and client relationships to develop tools, software components and standardised approaches that can be used across multiple clients, as well as managed services that generate ongoing revenue. This would reduce their reliance on bespoke services that require more people to deliver each additional project.

This chapter first examines how these changes are affecting delivery models, competition and sources of revenue globally, before assessing the opportunities, barriers and policy priorities for ICT-enabled services firms in Ireland.

How AI is transforming the ICT-enabled services sector globally

AI is changing ICT-enabled services in five main ways: service delivery and the workforce; sources of value and differentiation; commercial models and client relationships; the boundaries between clients, ICT-enabled services firms and technology providers (including cloud providers, enterprise software vendors, AI platforms and foundation model providers); and trust, governance and delivery configuration.

AI is changing service delivery and how firms organise work

ICT-enabled services firms increasingly use AI for activities such as coding, testing and automated review, reducing the amount of routine delivery work that requires human effort. Gartner predicts that 90% of enterprise software engineers will use AI code assistants

by 2028, up from less than 14% in early 2024.⁴⁸³ For some types of work, this may allow firms to deliver with smaller teams and fewer junior execution roles, increasing demand for experienced technical, industry and client-facing skills.

The implications extend beyond headcount. Junior execution roles have traditionally provided an important route for staff to learn. If AI absorbs more of this work, firms will need alternative ways to develop future senior talent.

The skills mix is also changing. ICT-enabled services firms need people who can combine technical capabilities with industry knowledge and commercial awareness to apply AI to client processes and business outcomes.

Service delivery is becoming more asset- and IP-based

AI is making it easier for ICT-enabled services firms to turn project knowledge and specialist expertise into reusable delivery assets (tools, processes, templates, software components, datasets, AI models or methodologies). Instead of recreating these capabilities for each engagement, firms can deploy them across multiple clients, making reusable IP a more important source of differentiation. IDC forecasts that ICT-enabled services firms will deliver around 30% of global IT services as modular, platform-enabled products by 2029.⁴⁸⁴

However, greater use of reusable assets does not remove the need for advisory, integration and transformation services. Clients still need support to strengthen their data and technology foundations, redesign processes and decide where and how to use AI. This includes matching model capability to the value and risk of the task (i.e. not every task needs to use the most powerful model) and

managing consumption and usage over time, to ensure costs remain sustainable.⁴⁸⁵ As AI moves beyond pilots and demos and into operational (or “production”) environments, this also creates recurring requirements around agent orchestration, evaluation, governance, model management and performance monitoring.

The result is a delivery model that combines reusable IP with higher-value advisory and ongoing managed services, supporting more recurring revenue.

Commercial models and performance measurement are shifting away from effort-based structures

Outcome-based (the customer pays for a business result rather than for the number of staff or hours worked) and managed-service models (where the customer pays for the provider to take ongoing responsibility for operating and delivering a service, rather than simply supplying technology or staff) are not new, but AI is weakening the link between labour effort and value delivered. For ICT-enabled services firms whose revenues remain closely tied to billable time or headcount, this creates an immediate commercial tension: using AI to complete work faster can reduce the amount they can bill unless the commercial model changes. This is likely to increase the diversity of commercial models rather than lead to a wholesale shift to outcome-based pricing.

Time-and-materials and fixed-fee contracts will remain appropriate for some work, while recurring fees may become more important for managed AI services and reusable IP. Usage- or transaction-based charges may suit services where firms can reliably measure consumption (for example per AI query, per

number of documents analysed, per hour of AI processing) or results. This makes performance measurement increasingly important, as ICT-enabled services firms need to demonstrate value through metrics such as productivity, quality and service levels rather than effort alone.

AI is also making the cost base more variable. Delivery costs are linked to compute and inference, which vary based on AI model choice and agent activity (amount and complexity of work being performed by AI agents), among other factors.⁴⁸⁶ The research found that ICT-enabled services firms are paying increased attention to AI “token” consumption, which is a measure of how much text and data an AI model processes, and where greater consumption corresponds with higher costs. As these ICT-enabled services firms gain a better understanding of which customers and tasks consume the most resources, they can more accurately assess their costs and increasingly charge based on usage.⁴⁸⁷ ICT-enabled services firms need to manage pricing, cost to serve (what it costs the provider to deliver the service-including AI model costs, computing resources, staff oversight and infrastructure) and contractual risk together, ensuring that commercial models reflect both the value delivered and the underlying economics of AI-enabled delivery.

The boundaries between clients, ICT-enabled services firms and technology providers are shifting

AI is changing who performs different parts of technology delivery. Clients can use AI to carry out routine development, support and operational work internally, although larger enterprises generally have greater capacity to do so.

At the same time, large cloud and AI platform providers are increasingly offering consulting, implementation and business services that were traditionally provided by ICT-enabled services and consulting firms, while AI-native specialists can compete in focused areas with leaner delivery models and fewer legacy structures.

Workshop participants highlighted that clients are bringing more routine AI-enabled work in-house and using smaller teams. They did not, however, see this as removing the need for external ICT-enabled services firms: clients still require support with more complex architecture, integration, governance and operating-model decisions.⁴⁸⁸

For existing ICT-enabled services firms, this changes how they need to demonstrate their value. Supplying capacity or implementing individual technologies becomes less differentiated where clients or technology providers more broadly (including firms that provide the underlying technology platform, software, cloud infrastructure or AI models) can perform more of that work themselves.⁴⁸⁹ ICT-enabled services firms that remain concentrated in routine, labour-intensive delivery may therefore find themselves competing increasingly on price for work that clients, enterprise software and platform vendors or AI-native competitors can automate, productise or bring in-house. By contrast, ICT-enabled services firms can retain higher-value work where they combine deep knowledge of a client’s industry and business processes with reusable IP, integration capability and ongoing responsibility for operating AI systems.⁴⁹⁰

Trust, governance and sovereignty are becoming more important to service design and delivery

As AI becomes embedded in managed services and business-critical processes, clients increasingly expect ICT-enabled services firms to demonstrate security, auditability and regulatory compliance alongside technical performance. Workshop participants identified continuous AI governance as an emerging service area.⁴⁹¹

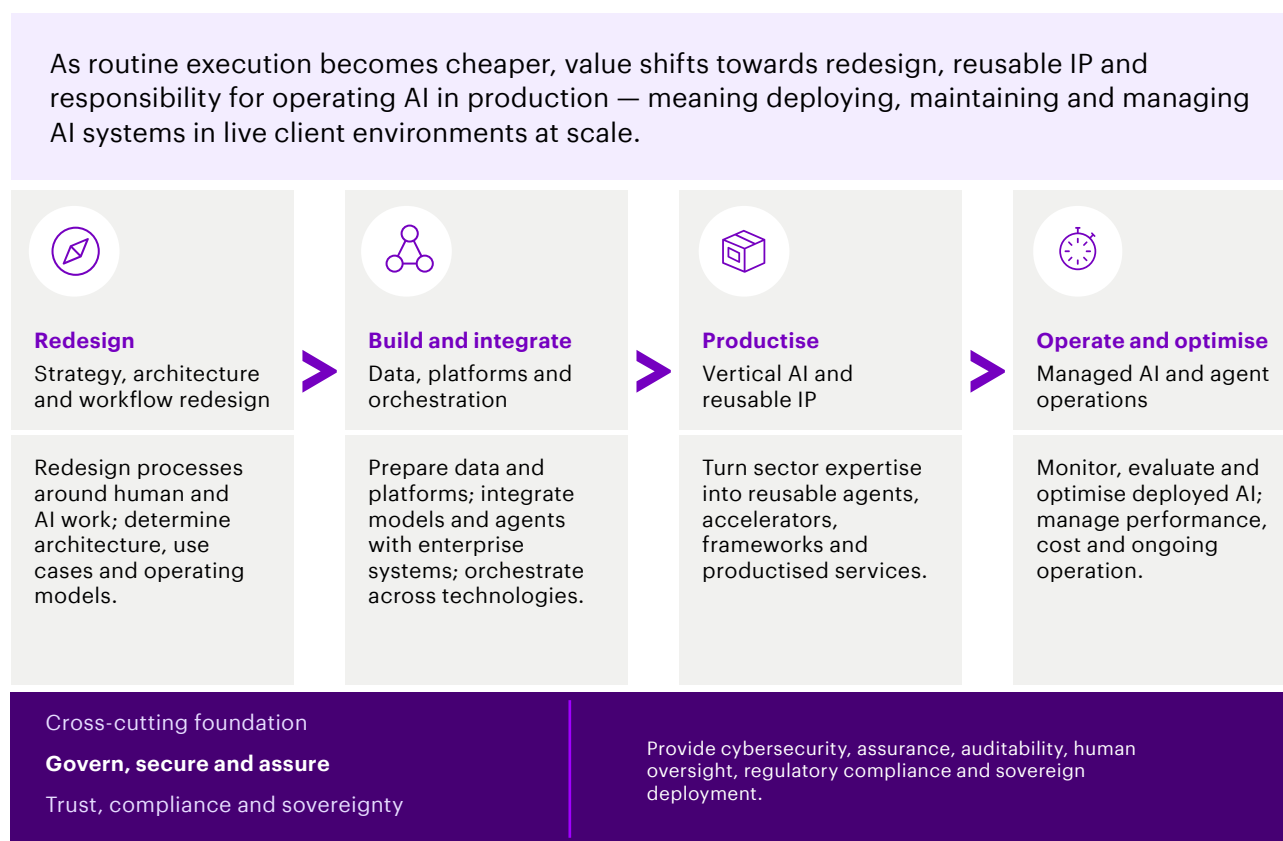
Concerns over data and AI sovereignty are also shaping how AI services are designed and operated.⁴⁹² AI sovereignty refers to the degree of control and strategic autonomy an actor retains over the AI capabilities, data, infrastructure and technology dependencies on which it relies. It can operate at different levels. At the national level, sovereign AI refers to a country's efforts to build or secure access to the AI infrastructure, capabilities and industry needed to strengthen competitiveness, resilience and national interests, while reducing critical dependencies on foreign technologies. At the enterprise level, AI sovereignty concerns an organisation's ability to retain appropriate control over its data, models, infrastructure and external technology dependencies (e.g. including cloud providers, AI platforms and foundation model providers and enterprise software vendors). This includes control over where data and workloads are processed, who can access them, how models and services are deployed, and the ability to maintain continuity or move between providers. This study focuses primarily on the latter definition of sovereignty.

Sovereignty does not necessarily mean that all data and computing must be located in Ireland. Some organisations may require EU-based data storage and clear controls over access, while more sensitive or regulated activities may require regional or private deployment, stronger control over data and access, model portability and continuity arrangements, as well as greater clarity over how external technology providers, including cloud providers, AI platforms and foundation model providers use proprietary data and derived IP. Across Europe, 62% of organisations are seeking sovereign solutions, rising to 72% in Ireland, although the level of sovereignty required varies by use case.⁴⁹³ The issue is particularly relevant to regulated and data-sensitive sectors.

Increasing requirements around data sovereignty, AI deployment and regulatory compliance may create opportunities for ICT-enabled services firms for specialist services which help organisations manage these challenges. This could create additional demand for ICT-enabled services firms that can design and operate private or hybrid systems and provide skilled local or regional expertise, especially in regulated sectors, particularly where regulatory oversight, client proximity and local knowledge are important.

New opportunities for ICT-enabled services firms in Ireland

Taken together, the global changes described above are creating new sources of value across the ICT-enabled services market. As routine execution becomes increasingly automated, providers can move into higher-value work connected to process redesign, and AI operations and governance (see Figure 32).

Figure 32. Where AI is creating new value for ICT-enabled services providers globally

Source: Accenture analysis.

Against this global backdrop, the question for Ireland is where its ICT-enabled services firms can build a defensible position.

A small number of global hyperscalers, AI platform and AI model providers dominate key layers of the AI technology stack on which other organisations rely on to adopt, integrate and operate AI effectively. Firms in Ireland are unlikely to compete directly in developing large-scale infrastructure or general-purpose models.

The stronger opportunity for ICT-enabled services firms lies in helping organisations adopt and operate AI effectively. This includes services such as governance, compliance, security, systems integration and model

portability. ICT-enabled services firms in Ireland can build on their experience in regulated sectors, their position within the EU and their close links to global technology companies. These strengths are harder to replicate than general technical delivery and can help firms compete in areas where clients need sector knowledge, regulatory understanding and trusted implementation.

The interviews, workshop discussions and input from the online consultation support this assessment and point to four opportunities that stand out: trusted, governed and sovereign AI services; reusable sector-specific AI assets and services; international AI deployment; and managed AI and agentic operations.

Build trusted and governed AI services

Ireland's EU position, cybersecurity capability and experience serving regulated industries create an opportunity for ICT-enabled services firms to specialise in making AI usable in environments where trust, control and regulatory compliance are critical. Relevant services include regional or private deployment, access and policy controls, model and agent evaluation, continuous monitoring, audit trails, human-oversight design, data and IP controls, and portability and continuity planning.

Demand from regulated and IP-intensive clients strengthens this opportunity, as indicated in other sections of this report, including medical technology and pharmaceutical manufacturing. Interviewees highlighted growing interest in private and local models where firms are reluctant to expose proprietary data to commercial LLMs.⁴⁹⁴ Workshop participants similarly identified opportunities for Irish-based ICT-enabled services firms to help clients retain greater control over sensitive data and AI systems, reduce their reliance on a single technology provider, ensure their services can continue if a technology provider fails or changes its terms, and protect their intellectual property.⁴⁹⁵

This opportunity for Irish-based ICT-enabled services firms lies in providing governance and compliance services around globally supplied AI technologies, rather than providing the underlying infrastructure or models themselves. ICT-enabled services in Ireland do not need to reproduce every layer of the global AI stack but can instead help use global and open technologies in ways that meet European regulatory requirements and the needs of regulated and IP-sensitive industries. Cybersecurity, data and cloud specialists, consultancies and systems integrators serving regulated clients are particularly well placed.

Smaller firms can compete by specialising in particular areas of AI governance, compliance, security or risk management, rather than trying to provide a full range of AI services; medium and large ICT-enabled services firms are better placed to build repeatable services for complex, multi-jurisdiction deployments.

Turn sector expertise into reusable AI assets and services

The global shift towards more IP-led delivery creates a particular opportunity for ICT-enabled services firms in Ireland with deep expertise in financial services, life sciences, pharma and medtech. Rather than repeatedly selling that expertise through bespoke projects, firms can turn it into reusable agents, assurance frameworks and managed services that they can deploy across clients.

Workshop participants identified industry expertise and proprietary IP as important sources of differentiation, particularly in pharma and financial services.⁴⁹⁶ As access to underlying AI models becomes more widely available, ICT-enabled services firms can differentiate themselves through their understanding of a client's processes, regulatory environment and operating context.

The opportunity is particularly relevant for sector-specialist consultancies, digital-transformation providers and application-service firms with deep knowledge of specific workflows. Micro and small firms can build specialist solutions for narrowly defined client problems; medium-sized firms can build on established client relationships and sector expertise to develop more scalable offerings; and large firms can use the same assets across broader portfolios and markets.

Use Ireland as a base for international AI deployment

Ireland hosts many of the multinational technology providers described above (cloud providers, enterprise software vendors, AI platforms and foundation-model providers), alongside large multinational ICT-enabled services firms and internationally connected enterprise operations (businesses in Ireland that are part of global networks and serve customers, suppliers or operations across multiple countries). This creates an opportunity to act as a European deployment base for AI. Irish-based teams can take AI technologies developed globally and adapt them for different regulatory, data, language and operating environments before supporting deployment across other countries or regions.

Interview evidence shows Irish-based teams in existing operations already develop and test products for multiple countries from a single location.⁴⁹⁷ As AI adoption grows, this role could become more important, creating opportunities for Irish-based ICT-enabled services firms to help global organisations and internationally connected enterprises adapt, test, govern and deploy AI solutions across European markets. Irish-based ICT-enabled services firms with expertise in EU regulation, data governance, localisation and implementation may be particularly well positioned to support clients operating within, or seeking to enter, the European regulatory environment.

This opportunity is most relevant to ICT-enabled services firms that help clients implement and run technology across different platforms and markets. Large and multinational ICT-enabled services firms are better placed to lead complex, multi-country AI deployments. Medium-sized ICT-enabled services firms can compete by helping clients integrate AI technologies from different vendors and applying their knowledge of specific industries or business functions. As AI

adoption grows, this could enable them to enter new markets where tailored, sector-specific AI solutions are required. Smaller firms are more likely to participate through focused specialist expertise or by working alongside technology providers and large ICT-enabled services firms. Their opportunities may include areas such as AI governance, compliance, security, assurance and risk management, where specialist expertise can be applied across markets.⁴⁹⁸

For ICT-enabled services firms in Ireland, the opportunity is to secure a larger share of the higher-value work involved in adapting, integrating, deploying and operating AI across European and other international markets.

Develop managed AI and agentic operations services

As enterprises move AI agents and models into real-world operating environments, they need ongoing support to keep them reliable, secure, governed and cost-effective. This goes beyond the initial implementation or pre-deployment assurance. Providers need to monitor, evaluate and update models and agents; manage permissions and access; control usage and costs; and maintain evidence for governance, audit and regulatory purposes.

Evidence from Irish-based enterprises suggests that these capabilities remain immature. In Ireland, only one in ten organisations surveyed by Accenture reported embedding AI in core operations with measurable P&L impact, while 54% of executives said their organisation was not ready to integrate AI agents with core systems and more than half said they were not ready to supervise agents in real time.⁴⁹⁹

Workshop participants similarly identified continuous operational governance and real-time oversight of agents as emerging service areas.⁵⁰⁰ ICT-enabled services firms in Ireland could

therefore develop managed offerings covering model and agent monitoring, evaluation, incident management, cost optimisation and lifecycle management.

This is distinct from initial assurance or deployment: ICT-enabled services firms can take ongoing responsibility for keeping AI systems operating within agreed performance, cost and control limits. These services can generate recurring revenue after implementation and give ICT-enabled services firms an ongoing role in the performance of the client's business processes.

Barriers to AI-enabled transformation and value capture — and how they could be overcome

The main barriers concern ICT-enabled services firms' ability to convert AI into sustainable service models, combine specialist AI expertise with company and sector knowledge, redesign

how they organise and deliver work, put reliable data and governance in place, and manage dependence on global technology platforms.

The national enterprise support landscape for ICT-enabled services firms is broad, but access and fit vary by firm type, ownership and stage of the transition. LEO supports are primarily relevant to micro and small indigenous firms, Enterprise Ireland supports eligible Irish-owned firms, and IDA programmes support eligible foreign-owned clients operating or investing in Ireland. As a result, the practical fit of individual supports depends on the commercial, technical and implementation needs of the firm.

Figure 33 illustrates the main barriers to AI-enabled transformation and value capture for ICT-enabled services firms, the support currently available to them and potential additional interventions, based on input from workshop and interview participants.

Figure 33. Barriers to AI adoption in ICT-enabled services: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Service model, pricing and value capture Help firms redesign the service model, pricing and value capture	As routine work is completed faster or by smaller teams, firms must reprice services, protect margins and move from labour-led delivery towards reusable assets and managed services. AI costs and returns add risk, and micro and small firms can least absorb failed pricing experiments.	EI Strategic Consultancy, Operational Excellence and Digital process Innovation supports, LEO grants and IDA business-development, digitalisation and Lean supports cover elements of service redesign and experimentation. No clear services-specific pathway brings together service-portfolio redesign, pricing and cost-to-serve, reusable IP and validation with a paying client.	- Service model diagnostics with specialist pricing and commercial advice - Support for developing and commercialising reusable tools and standardised AI-enabled service components - Co-funded early client deployments to demonstrate commercial value and build reference cases - AI vouchers covering expert advice, integration, secure tools and change management

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Skills, domain expertise and talent pipeline Build hybrid technical, domain and commercial capability	Firms need people who combine enterprise AI architecture, cloud and data engineering with commercial judgement and client process knowledge. Generic AI literacy is not enough; deeper AI specific expertise that can be combined with internal, client and sector knowledge is in short supply. Implementation capacity is limited, and smaller firms cannot hold specialist roles internally or easily finance them.	Skillnet programmes span foundational to specialist AI skills; Training Funding Support, Build Capability, Grad Start and PhDStart assist training and hiring; CeADAR, the EDIHs and Innovation Vouchers open access to external expertise. The gap is depth, domain fit and workplace application, not the existence of courses.	- Advanced short form micro-credentials beyond AI literacy - Structured workplace learning applied to live client work - Closer alignment between higher education and industry needs - Co-funded specialist hires with attraction and retention measures
Leadership and organisational redesign Support providers to redesign their own leadership and operating models	The task is redesigning delivery, roles, accountability and decision making, not only choosing technology. Senior management understanding of AI architecture and governance is limited, and smaller firms lack management bandwidth while large firms face approval layers and legacy processes.	Key Manager Support, the Dynamic Leadership Development Programme, Spotlight on Skills, the AI Capability Accelerator for Senior Leaders and change management training are available. These provide training and tools, but do not leave firms with the internal ownership, decision making authority or dedicated time needed to sustain change after support ends.	- Leadership programmes on architecture, investment and governance decisions - Diagnostics for operating model and role redesign - Clear cross-functional ownership and decision rights - Practical peer examples from comparable firms
Data readiness, trust and operational governance Create repeatable data, trust and operational governance approaches	Providers work across many client systems, so delivery depends partly on client readiness. Weak data quality, unclear access rights and poor governance stop pilots scaling, and successful pilots have been abandoned where data was not trusted. Shadow AI adds security exposure.	CeADAR, Data2Sustain, DataSMART and IDA digitalisation support help firms assess data strategy and architecture, including weaknesses in client data environments. The Cyber Security Review Grant and EDIHENTIRE address security and privacy risks across client systems. No support covers the continuous cross-client assurance providers need: data quality, lawful access, explainability, oversight and drift.	- Governed pilots in realistic client conditions, giving frameworks firms can replicate across deployments - Practical templates covering the AI Act, GDPR, IP and assurance, for use across multiple client engagements - Shared test environments and assurance standards providers can reference to build client confidence - Governance capability embedded in technical and delivery teams to guide clients through compliance
Technology-provider dependency and regulatory coordination Strengthen portability, continuity and regulatory coordination	Firms depend on cloud providers, software vendors, AI platforms and model developers to build and operate AI for clients, creating exposure to pricing, continuity, data control and lock-in, including where the client holds the contract. Regulated engagements add requirements on data location, portability and overlapping regimes. Smaller firms have the least bargaining power.	EDIHs including CeADAR, ENTIRE and Data2Sustain, Technology Centres and Gateways provide AI, data, cybersecurity and testing expertise. The ICHEC-led AI Factory Antenna strengthens access to AI compute and secure testing. IP Start and IP Plus address IP protection, while Digital Process Innovation, IDA Digitalisation Consultancy and EI and IDA capital supports fund eligible investment.	- Guidance on portability, multiprovider architecture and provider exit planning - Model contractual approaches covering continuity, data use and IP - Guidance on using alternative, open-source or domain specific models - Coordinated regulatory guidance, with clearer routes across overlapping requirements

1. Service-model, pricing and value-capture: Help firms redesign the service model, pricing and value capture

Converting AI-enabled productivity into a sustainable commercial model remains a key challenge.

As AI enables firms to complete routine work faster or with smaller teams, firms need to rethink how they price services, protect margins and shift from bespoke labour-led delivery towards reusable assets and managed services. Workshop participants expected some routine activity to move in-house and competition to shift towards architecture, governance, cybersecurity, strategic advice and domain expertise. Interviewees also highlighted uncertainty over AI costs and returns, with growing scrutiny of token consumption and other usage costs.⁵⁰¹

Micro and small firms have the least capacity to absorb failed pricing experiments or finance reusable assets before revenue is proven. Medium firms may be particularly exposed because they need to redesign services while maintaining existing delivery revenues. Large firms have greater investment capacity but face more complex portfolio, contracting and workforce transitions.

Existing supports address several elements of this transition. Enterprise Ireland's Strategic Consultancy, Operational Excellence and Digital Process Innovation supports can assist with strategy and service transformation, while innovation and R&D measures provide routes to experimentation and reusable asset development. LEO grants provide relevant support for eligible micro and small firms, while IDA Business Development, Digitalisation Consultancy, Lean for Global Business Services

and related RD&I supports cover strategy, operating-model change and new-service development for foreign-owned firms. These supports can fund individual elements of the transition, including strategy, process redesign, experimentation, reusable assets, skills and technical development. The remaining gap is one of fit and continuity: there is no clear services-specific pathway that brings together service-portfolio redesign, pricing and cost-to-serve, workforce change, and validation of the new model with paying clients.

Participants suggested that enterprise support agencies, working with relevant industry bodies and specialist advisers, could provide diagnostics to help ICT-enabled services firms redesign their services and commercial models; specialist pricing and commercial advice; financial support for time-limited projects with clients to test new AI-enabled services and demonstrate measurable value; and support to develop reusable tools and service components that can be applied across multiple clients and brought to market.⁵⁰²

2. Skills, domain expertise and talent pipeline: Build hybrid technical, domain and commercial capability

Firms can struggle to develop and scale AI services because they lack people with specialist AI expertise combined with company knowledge and an understanding of client sectors and processes.

AI capabilities and skills continue to grow and become more embedded across the labour force in Ireland, where AI skills concentration is 1.4 times the global average, placing it in a joint 4th position globally in 2025, up from the 10th place in 2016.⁵⁰³ Ireland also ranks 4th globally for net inflows of AI-skilled workers, reflecting its open labour market and reliance on international talent.

For ICT-enabled services firms, however, the main constraint is not general AI awareness. Firms need specialist expertise in areas such as enterprise AI architecture, cloud, data engineering and cybersecurity, combined with knowledge of their own business and their clients' sectors and processes.⁵⁰⁴

Micro and small firms cannot maintain all specialist roles internally and are most exposed to the cost of external expertise. Medium firms face intense competition for experienced staff while needing several capabilities at once. Large firms can invest more deeply but must build capability across larger delivery teams, client sectors and geographies.

Existing provision is broad. Skillnet programmes cover foundational, applied and specialist AI skills; Enterprise Ireland's Training Funding Support, Build Capability, Grad Start and PhDStart can support training and hiring; and CeADAR, EDIHs, Innovation Vouchers and collaborative R&D programmes provide access to external expertise.

The main gap is in the depth and sector relevance of training, and in helping firms apply it in the workplace. Firms may also struggle to identify the right programme or route into support. Existing courses alone will not create enough people who can combine specialist technical skills with an understanding of clients and sectors.

Participants proposed advanced short-form micro-credentials, structured workplace learning, closer alignment between higher education and industry, co-funded specialist hires and stronger talent-attraction and retention measures.⁵⁰⁵

3. Leadership and organisational redesign within ICT-enabled services firms: Support providers to redesign their own leadership and operating models

ICT-enabled services firms need to adapt their operating models as AI changes how services are delivered.

ICT-enabled services firms need to choose and adopt the right technology while also changing how they organise work as AI automates more routine activities. This includes redesigning delivery teams, roles, accountability and decision-making. Workshop participants highlighted limited senior-management understanding of AI architecture, infrastructure and governance, and said firms often underestimate the organisational change required.⁵⁰⁶

In micro and small firms, the constraint is often management bandwidth and dependence on a small number of decision-makers. Medium firms must coordinate transformation while continuing to service existing clients. Large firms face slower decision-making, more approval layers and greater difficulty aligning AI investment across business units and legacy processes.

Existing supports address different parts of this leadership and organisational challenge. For eligible Enterprise Ireland clients, Key Manager Support can help firms recruit senior leadership to drive change, while Spotlight on Skills helps senior leaders identify future capability needs and develop a company skills plan. Technology Ireland Digital Skillnet's AI Capability Accelerator for Senior Leaders focuses specifically on how executives make decisions and work with AI.

For IDA clients, Lean/Digitalisation programmes and the Training Grant can support wider process redesign, business transformation and change-management capability.⁵⁰⁷

Current supports do less to address the management conditions needed to sustain change: clear decision rights and accountability, effective portfolio governance, protected management time and clear ownership once an intervention ends.

Workshop and consultation participants proposed leadership programmes to help senior teams make decisions about AI technology implementation, investment and governance; diagnostics to help firms redesign roles and clarify responsibility for AI across business and technical teams; and practical examples from peer firms.⁵⁰⁸

4. Data readiness, trust and operational governance: Create repeatable data, trust and operational-governance approaches

Differences in client data, systems and governance make AI-enabled service delivery harder to standardise and scale.

ICT-enabled services firms often work across clients with very different data quality, legacy systems, access controls and governance arrangements. While these weaknesses sit primarily within client organisations, they create a provider-side barrier because firms must repeatedly assess and adapt their delivery approach to each environment. This increases delivery costs, makes implementation less predictable and limits the extent to which AI-enabled services can be standardised and scaled.

Workshop participants treated data readiness and trust as inseparable and cited examples of organisations abandoning technically successful pilots because they did not trust the underlying data or their ability to manage risks such as hallucinations, IP issues and data leakage.⁵⁰⁹ Interviewees similarly highlighted inappropriate model choice, weak data foundations and access-control failures.⁵¹⁰

Smaller providers may lack dedicated data-governance, cybersecurity or assurance functions and can be disproportionately affected by enterprise-client requirements. Medium-sized firms need repeatable controls that can be applied across a growing client base, while large firms face the complexity of maintaining consistent standards across multiple clients, jurisdictions and technology environments.

Existing supports cover parts of the provider capability required to manage this challenge. CeADAR, Data2Sustain, DataSMART and IDA digitalisation support can assist with data strategy and architecture, while the Cyber Security Review Grant and EDIH-ENTIRE address security and privacy. Innovation partnerships, Technology Gateways, EDIHs and R&D supports also provide routes to testing and validation.

Providers still lack a consistent, reusable approach to ongoing AI assurance across client deployments. They need practical ways to assess data quality and access rights, test accuracy and controls, and monitor changes in model performance over time. Existing supports do not yet provide a consistent framework that ICT-enabled services firms can readily apply across different client environments.

Consultation participants called for shared tools and frameworks that ICT-enabled services firms could use across client deployments, including common standards, practical guidance and test environments. These would help providers manage recurring data, security, privacy and assurance requirements more consistently and reduce the need to develop bespoke approaches for each client.⁵¹¹

5. Technology-provider dependency and regulatory coordination: Strengthen portability, continuity and regulatory coordination

ICT-enabled services firms need to manage dependence on global technology providers while delivering services that meet client requirements for control, continuity and compliance.

ICT-enabled services firms rely on cloud providers, enterprise software vendors, AI platforms and foundation model developers to design, integrate and operate AI solutions for clients. This provides access to advanced technologies and infrastructure, but can also create dependencies. These dependencies can relate to provider pricing, service continuity, data control and the ability to move workloads between providers. They can affect the ICT-enabled services firm even if the client holds the underlying technology contract, because the firm's architecture, integrations, skills and managed services may be built around particular technology environments.

For regulated and data-sensitive clients, ICT-enabled services firms may also need to support requirements around where data and workloads are processed, who can access them, portability and continuity. Firms may have to navigate the EU AI Act, data protection,

cybersecurity requirements and sector-specific regulation. Interviews also highlighted regulatory uncertainty and the complexity of navigating multiple regulatory regimes.⁵¹²

Workshop evidence similarly identified platform dependence as a risk, including concerns about provider continuity and what happens if a technology supplier is no longer available.⁵¹³ Interviews reinforced these concerns, highlighting constraints arising from reliance on cloud providers and control over proprietary data, and the complexity of navigating regulatory uncertainty and multiple regulators. Interview evidence specifically identified compute access for smaller firms and technology-sovereignty and cloud-procurement uncertainty as issues.⁵¹⁴ Workshop participants also raised uncertainty over the ownership and protection of AI-generated or AI-trained assets as a key concern and called for clearer guidance on IP in AI-enabled environments.⁵¹⁵

The implications vary by firm size. Micro and small firms have less negotiating power with major technology providers and fewer resources to maintain expertise across several platforms. Medium-sized firms can differentiate by integrating technologies from different providers – although they then also face the cost of maintaining that capability. Large firms have greater negotiating and engineering capacity, but must manage more complex cross-border, regulatory and technology environments.

Existing supports address parts of this barrier. EDIHs, including CeADAR, ENTIRE and Data2Sustain, together with Technology Centres and Technology Gateways, provide access to AI, data and cybersecurity expertise and testing. Access to compute for development and testing is available through three linked routes. Ireland's AI Factory Antenna, led by ICHEC

with CeADAR as core partner and co-funded by the EuroHPC Joint Undertaking and the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS), is Ireland's gateway to the European AI Factories network. Through its links with AI Factory France and the Luxembourg AI Factory, it gives start-ups, SMEs, researchers and public bodies access to AI-optimised high-performance computing, an AI sandbox and secure data environment, technical expertise and training. ICHEC, Ireland's national centre for high-performance computing, operates the National HPC Service and leads NCC Ireland, the national HPC competence centre, which supports SMEs in using advanced computing. CeADAR provides applied AI expertise and proof-of-concept support, operates a smaller shared compute platform for industry projects, and is an enterprise-facing route into the Antenna. The Antenna only launched on 1 July, so some participants in this study may not have been aware of it. Enterprise Ireland's IP Start and IP Plus address aspects of intellectual-property protection, while Digital Process Innovation, IDA's Business Development Programme (Digitalisation Consultancy Grant), Enterprise Ireland's Capital Funding Support and IDA's Business Asset Grant can support eligible digitalisation, architecture and technology investment. These measures address important

elements of the barrier. But they do not in themselves provide common approaches to provider portability, continuity, exit planning or regulatory coordination.

The remaining gap is therefore about these issues. Potential responses could include practical guidance on moving workloads or models between providers, provider-exit and continuity planning, contractual treatment of data and IP, and clearer coordination between regulators, enterprise agencies and industry.

Interview participants pointed to stronger regulatory coordination as an important part of the response. They proposed earlier engagement with regulators through regulatory sandboxes and a visible AI Office that could provide clearer and more consistent guidance across regulatory requirements.⁵¹⁶ Consultation participants proposed practical measures to reduce dependence on external technology providers, including access to secure European test and deployment environments, support for open-source and smaller domain-specific models, and practical guidance on managing provider dependency. As the AI Factory Antenna addresses part of the infrastructure and testing need, the remaining gap is more clearly around helping firms manage provider dependency and retain greater flexibility in their technology choices.⁵¹⁷

SaaS

SaaS in this report covers product-based software businesses that develop and deliver applications to customers, typically through cloud-based subscription or usage models. This includes horizontal products used across industries and vertical products designed for specific industries or workflows.

Ireland's SaaS landscape combines a substantial foreign-owned base of global software companies, many of which use Ireland for EMEA headquarters, product engineering, sales and customer-success functions, with a smaller but highly internationalised group of indigenous firms.

Indigenous SaaS companies raised a record €364.8 million in venture funding in 2025.⁵¹⁸ The sector is also highly skewed by firm size: in 2023, micro firms accounted for 92% of SaaS enterprises but only 17.7% of people, while medium and large firms represented 2.5% of enterprises but around 67% of people.⁵¹⁹ These differences shape firms' capacity to invest in AI, proprietary assets and international expansion.

AI is changing the economics and competitive dynamics of the SaaS sector. Software is moving beyond helping users perform tasks towards carrying out more of the work on their behalf. At the same time, AI-assisted development is reducing the cost and time required to reproduce some software functionality, while new AI features can increase computing and operating costs. These shifts are putting pressure on firms that compete mainly through product features, as well as on per-user pricing models and the predictability of software margins.

For SaaS firms in Ireland, the core question is what will remain a durable source of value as AI capabilities become more widely available. Firms will increasingly need to turn their knowledge of particular industries and workflows, proprietary data and customer relationships into products and services that are harder to replicate.

This chapter examines how these changes are reshaping SaaS products, competition and value creation globally, before assessing the opportunities, barriers and potential policy needs of SaaS firms in Ireland.

How AI is transforming the SaaS sector globally

AI is reshaping SaaS across five linked dimensions: what software does for customers; commercial and revenue models; cost and margin structures; sources of differentiation; and firms' positions within wider AI ecosystems.

AI is changing what software does for customers

SaaS products have traditionally encoded workflows into applications that help users perform defined tasks. AI agents are increasingly able to carry out parts of those workflows directly and across multiple applications, shifting value from helping users complete work towards performing more of the work themselves.⁵²⁰ This puts greater pressure on products whose value lies mainly in routine workflow coordination, information retrieval or functionality that agents or natural-language interfaces can reproduce. Gartner forecasts that 40% of enterprise applications will include task-specific AI agents by the end of 2026, up from less than 5% in 2025.⁵²¹ Products built around proprietary data or embedded in critical business workflows are likely to be more resilient.

Commercial models are evolving as AI changes what customers value and what they are willing to pay for

Per-seat subscription models were designed around human users accessing software directly. As AI agents take on tasks on behalf of users, customers may need fewer individual software accounts even if they continue to get significant value from the product. This weakens the link between the number of users and the value delivered, putting pressure on traditional per-seat subscription models.

Gartner estimates that up to \$234 billion of enterprise application software spending could be exposed to this form of “agentic arbitrage” by 2030, as agents reduce the need for users to access applications directly.⁵²²

AI is therefore increasing pressure on per-seat pricing and accelerating experimentation with hybrid models that combine subscriptions with usage-, task- or outcome-based charges. The challenge is broader than pricing alone, because firms need to determine what customers are paying for, how to measure the value created by AI and how revenue models align with changing patterns of software use. The transition is likely to be harder for products whose revenue remains closely tied to named-user access, while products already priced around transactions, usage or measurable outputs may adapt more readily.⁵²³

AI is making SaaS cost structures and margins less predictable

Traditional SaaS models have benefited from relatively low incremental delivery costs once software is developed. AI-enabled products add variable costs associated with model inference, for example, with these costs rising as usage increases.

As a consequence, some AI-native products have materially lower gross margins than those historically associated with SaaS. ICONIQ reported average AI-product gross margins of 41% in 2024 and 45% in 2025, with 52% projected for 2026 (although margins vary significantly by business model and architecture).⁵²⁴ This makes unit economics, model choice, architecture and usage controls increasingly important alongside revenue growth.

Competing on product features alone is becoming harder

AI-assisted development is reducing the cost and time required to reproduce some software features and interfaces, increasing competitive pressure and weakening the number and range of features as a durable source of differentiation. This increases the importance of proprietary data, deep industry knowledge and embedded workflows.

The advantage depends not only on access to data, but on whether firms manage that data well and combine it with the business context and practical knowledge that AI systems need to interpret and act on it effectively.⁵²⁵ Adding a copilot or embedded assistant to an existing product may therefore do little to protect its position if the underlying workflow and value proposition remain easy to replicate. More defensible products are likely to combine industry-specific knowledge and data with deep integration into workflows, systems and transaction points that are difficult for customers or competitors to replace.

AI is changing where SaaS products sit in the customer workflow

SaaS firms increasingly depend on cloud providers and foundation-model providers for computing infrastructure and access to advanced AI models. Their dependence on broader AI platforms varies: some use external platforms for development, deployment, model management and governance, while others build more of these capabilities themselves.

At the same time, AI agents are creating a more interconnected software environment by connecting enterprise applications and data to carry out tasks across several systems, rather than operating within a single application.⁵²⁶ This increases the need for SaaS products to work

as part of a wider set of AI tools and business systems. Users may interact less directly with individual SaaS products, even where those products continue to provide important data and functionality. This can potentially lead to the SaaS provider losing control of the customer relationship and some of its competitive advantage.

Competition is also extending into the tools that connect AI models with applications, data and workflows. SaaS firms, cloud companies and other AI technology providers are seeking to control the orchestration and agent layer by developing AI platforms, orchestration capabilities and AI agents. This places them in more direct competition for control of the user experience and workflow layer. Together, these developments increase some SaaS firms' dependence on external technology providers giving greater influence to the AI platforms that mediate between users and individual SaaS applications. As a result, SaaS firms may face growing challenges in maintaining control of customer relationships, access to data and product differentiation.

However, this does not mean established SaaS applications will simply disappear. Many are deeply embedded in customer operations and can be costly and difficult to replace. The risk is that a SaaS product may remain important in the background, while an AI agent or other AI platforms become the main way the customer interacts with the service. For SaaS providers, this could weaken the direct customer relationship and make it harder to earn revenue from the parts of the workflow that increasingly take place outside their product.

Opportunities for SaaS firms in Ireland

Against this global backdrop, the question for Ireland is where SaaS firms can build a defensible position. For most SaaS firms in Ireland, the strongest opportunities are likely to lie in developing AI-enabled software applications and specialised platforms for particular sectors and workflows, rather than competing in foundation models, general-purpose AI platforms or large-scale computing infrastructure. Firms in Ireland can build on the country's internationally connected technology ecosystem and its expertise in sectors such as financial services and life sciences, combining widely available AI capabilities with sector knowledge, established customer workflows and access to international markets.

Based on interviews, workshop discussions and input from the online consultation, four opportunities stand out: specialised applications, trusted AI, specialist agent applications and integration, and international scaling through Ireland's technology ecosystem. These build on Ireland's sector expertise, regulated-market position and internationally connected technology ecosystem.

Develop specialised AI applications for particular sectors

SaaS firms in Ireland can build specialised AI products around industries where they have strong customer knowledge and sector expertise. Ireland's base in financial services, life sciences and other regulated or complex sectors can support applications that combine widely available AI models with proprietary or rights-cleared data and sector-specific knowledge.

Firms with relevant access to customer, transaction or workflow data may also be able to develop benchmarking, predictive insights and other intelligence services alongside the core product. Workshop participants emphasised the value of knowledge built through experience of particular industries and processes: as access to underlying AI models becomes more widespread, firms that can turn what they have learned through customer relationships and workflows into their products may have a more durable source of differentiation.⁵²⁷

This opportunity takes different forms by firm size. Micro and small firms may benefit from lower development costs and their ability to target focused niches; medium-sized firms can combine established customer relationships knowledge with greater product capacity; and large firms can reuse data and sector capabilities across broader product portfolios.

Compete in trusted and governed AI

As enterprises deploy AI more widely, they will need software that helps them monitor, govern and assure AI systems. This is particularly true of generative AI and AI agents, where real-time monitoring will become increasingly important for managing risk and meeting regulatory requirements. Ireland's EU position and experience serving regulated industries support the development of trusted AI products for European enterprise customers.

This opportunity is particularly relevant for SaaS firms serving regulated or enterprise customers. Smaller firms may compete in focused governance, security or compliance niches, while medium and large firms are better placed to build assurance capabilities that can be applied across products, customers and jurisdictions.

Provide specialised AI agents and integration for particular workflows

As enterprises deploy AI agents across existing applications, they will need solutions that connect agents to business systems, data and workflows and enable them to take actions and execute processes across those systems. Large global technology and enterprise-software companies are likely to lead the development of general-purpose AI platforms that connect and coordinate agents across systems.

For the broader SaaS base in Ireland, the stronger opportunity is therefore likely to lie in developing or enabling agents that perform specific business processes across existing applications and systems. This could include embedding agents within specialist processes, connecting them to relevant enterprise systems and applying the business rules and operational context needed for them to take actions reliably across a workflow.

Firms whose products are already embedded in core systems, data and workflows are particularly well placed, as they can provide the integrations, business rules and operational context that agents need to act across systems. Medium and large firms may be better positioned to support complex workflows spanning several systems, while smaller firms can focus on narrower task-specific agent applications and integrations.

Workshop participants similarly identified agentic AI as an opportunity for cross-system coordination, while emphasising that Ireland's advantage lies in developing applications that use sector knowledge and customer context, rather than competing directly in general-purpose AI platform development, AI infrastructure or foundation model development.⁵²⁸

Use Ireland's technology and AI ecosystem to support international scaling

Ireland's concentration of global cloud and technology companies may give indigenous SaaS firms access to infrastructure, specialist expertise, commercial partnerships and international distribution channels. Firms can use these relationships to accelerate development and market access while retaining control of strategically important assets such as customer relationships, proprietary data and core workflows.

This is particularly relevant for indigenous SaaS firms seeking to scale internationally. Micro and small firms can use technology partnerships to access capabilities and markets they could not build independently; medium-sized firms can use deeper platform and commercial partnerships to expand internationally; and large firms can develop broader ecosystem relationships while maintaining control of strategically important assets.

Common barriers to AI-enabled transformation and value capture

The main barriers concern firms' ability to redesign products and commercial models, build the skills and leadership needed to make the transition, establish trusted data and product-assurance practices, navigate regulation and procurement, and manage their dependence on global AI and cloud providers.

Existing provision is broad but fragmented across client groups and stages of the transition: LEO supports primarily serve micro and small indigenous firms, Enterprise Ireland supports eligible Irish-owned firms, and IDA programmes serve foreign-owned clients. Formal eligibility for a programme does not necessarily mean that it addresses the specific commercial, assurance or implementation needs of an AI-enabled SaaS firm.

Figure 34 summarises the key barriers to AI-enabled transformation and value capture for SaaS firms, the support currently available to firms in Ireland and potential additional interventions, based on input from workshop and interview participants.

Figure 34. Barriers to AI adoption in SaaS: how they constrain firms, what provision covers, and what interventions could unlock adoption

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Business model and product transition Rethink what is sold, how it is priced and what it costs to deliver	Agents weaken the value of named user access and shift it towards completed tasks, while inference, monitoring and evaluation add variable costs. Firms must decide what stays differentiated and whether pricing can carry a less predictable cost base.	The Strategic Consultancy Grant, Business Navigator, Exploring Innovation, Innovation Vouchers, the RDI Fund, LEO grants and IDA Business Development Programmes each cover part of the transition. None combines product, pricing, unit economics and contract expertise, or funds repeated commercial experiments.	• A structured transition pathway with specialist product and pricing advice • Help modelling AI cost-to-serve and securing a paid first deployment • Clearer AI treatment in the R&D tax system, plus scale-up finance • Link programme measures to commercial outcomes such as deployed products, retained IP and export revenue, not pilot numbers alone

Barrier	How it constrains adoption	Current support coverage	Potential interventions
Skills and transformation capacity Develop multi-disciplinary transformation capacity	Transformation needs product leaders who see how AI changes pricing, technical teams strong in architecture and security, and managers able to decide on investment and governance. Specialist talent is expensive and transformation fatigue is widespread.	Key Manager Support, leadership programmes and the AI Capability Accelerator build management capability, while Training Funding Support, Build Capability, Grad Start and Skillnet cover technical skills. Training individuals does not create teams able to redesign product, engineering, sales and governance together.	- Shorter technical deep dives and micro-credentials - Co-funded specialist hires - Whole leadership team programmes and university-industry links - Vetted advisers and examples of firms that have made the transition
Data, trust and product assurance Establish a repeatable product assurance route	Enterprise and regulated buyers expect evidence of security, model behaviour, oversight and monitoring. Weak data management is a root cause of low confidence in outputs, and co-pilots have exposed information that access controls had not protected.	CeADAR, Digital Discovery, Data2Sustain, DataSMART and IDA digitalisation supports assist data readiness, while the Cyber Security Review Grant and EDIH-ENTIRE address security. No repeatable assurance pathway covers evaluation, oversight and model monitoring across customers.	- Secure test environments with redteaming and independent evaluation - Common evaluation methods for Alenabled products - Practical templates for data rights, human oversight and model monitoring - Reusable controls that scale across a growing customer base
Navigating regulation, procurement and market access Translate requirements into approvals and paid adoption	Firms must handle the AI Act, data protection, cybersecurity, IP, liability and supplier assurance at once, with differing interpretations and multiple regulators. Compliance costs fall before revenue, and procurement can be too rigid for AI native suppliers.	AIReady.ie, the AI and Digital Pathfinder, Digital Discovery, Business Navigator, IP Start, IP Plus and EDIH-CeADAR provide awareness and advice. The gap is regulatory translation and route to market: early regulator engagement and a co-ordinated interface are missing.	- Clear and coordinated regulatory guidance through the AI Office of Ireland - Self-assessment tools and model clauses on data, IP, liability and audit - Standards conformance support and proportionate supplier checks - Innovation friendly procurement with a route to paid deployment
Dependence on AI platforms, models and cloud infrastructure Retain control while relying on global providers	Reliance on cloud and foundation model providers exposes firms to changes in pricing, availability, data location and switching costs. Some firms also depend on general purpose AI platforms for development, orchestration and deployment; others build these themselves. Dependency matters most where product architecture, economics or customer workflows rely on one provider.	Enterprise Ireland, IDA, LEO, Technology Centres, Gateways and EDIHs route firms to investment, R&D and testing. ICHEC provides national high-performance computing infrastructure and expertise. The AI Factory Antenna is Ireland's gateway to the European AI Factories network, giving access to AI optimised HPC, secure testing and data environments, expertise and support. CeADAR provides applied AI expertise for developing, testing and deploying solutions; ENTIRE provides cybersecurity expertise.	- Guidance on designing products that can move between cloud, AI platform and model providers - Practical approaches to provider exit, continuity and contractual protections - Support for portability and common standards where firms cannot solve switching alone - Access to private, local or EU based computing where required - Better access to secure European test environments and domain specific or open source models

1. Business model and product transition: Rethink what is sold, how it is priced and what it costs to deliver

To capture AI opportunities, firms need to rethink what they sell, how they earn revenue from it and the economics of delivering it.

The challenge for SaaS firms is to adapt their products and commercial models while continuing to fund the transition. This may

require repeated experimentation before firms know which propositions customers will pay for and whether they can be delivered profitably.

Workshop participants identified business-model disruption as the leading SaaS barrier and emphasised the need for continued product-market and business-model experimentation.⁵²⁹ Interviewees similarly highlighted pressure on established SaaS revenue models, uncertainty over pricing

and AI costs, and particular vulnerability among medium-sized firms.⁵³⁰ Consultation respondents reinforced these concerns, citing recurring model costs, proliferation of competing AI products, and the cost of securing and delivering the first credible customer deployment.⁵³¹

Micro and small firms can change direction relatively quickly but have limited financial capacity for repeated experimentation and may struggle to finance a first credible customer deployment. Medium-sized firms are particularly exposed because they must transform an established product and customer base without the financial capacity of larger firms. Large firms have greater resources but face more complex product portfolios, internal coordination and the risk that new AI products reduce revenue from existing products.

Existing support covers many individual components of the transition. Enterprise Ireland provides strategy and leadership support through the Strategic Consultancy Grant, Mentor Network/Business Navigator and related leadership programmes; feasibility and experimentation through Exploring Innovation Grant and Innovation Vouchers; and deeper transformation or growth through Digital Process Innovation, Operational Excellence, the RDI Fund and relevant scale-up and finance measures. LEO Feasibility, Priming and Business Expansion Grants provide earlier-stage routes for eligible micro and small firms. For foreign-owned clients, IDA's Business Development Programmes can support strategic and digital transformation work, while RD&I measures can support qualifying technical development.

The main gap is that firms may need several types of support at the same time and over a sustained period. Existing consultancy,

innovation and R&D measures do not necessarily bring together the combined product, pricing, sales, technical and customer-contract expertise required for a significant AI-related product and business-model transition. These commercial decisions remain with the firm, but public support can help firms access specialist expertise and, where eligible, support the technical experimentation and implementation needed to test new AI-enabled products and propositions.

Participants proposed a structured programme of support combining specialist product and pricing advice, peer learning and business-model experimentation, alongside help to understand the cost of delivering AI-enabled products and secure a first paid customer deployment. Other suggestions included clearer treatment of AI development under the R&D tax system, greater access to finance to move from early deployment to commercial scale, practical examples from other markets and measures of success linked to deployed products, retained IP and export revenue rather than the number of pilots.⁵³²

2. Skills and transformation capacity: Develop multidisciplinary transformation capacity

Firms may lack the specialist skills and organisational capacity needed to carry out AI transformation.

SaaS transformation requires more than AI engineering. Product leaders need to understand how AI changes the customer proposition and pricing; technical teams need strong architecture, data and security skills; and management teams need to make informed decisions on investment, governance and organisational redesign. These capabilities also need to be combined with sector and business-process knowledge.

Interview participants highlighted limited organisational capacity to implement AI at scale, expensive specialist talent and a lack of clear examples of what effective product and business-model redesign looks like.⁵³³ Workshop participants identified limited C-suite understanding of AI infrastructure and governance, and the scale of organisational change required, as significant barriers, particularly where firms are trying to transform existing products. Participants also highlighted transformation fatigue, particularly in organisations already coming through major digital-transformation programmes.⁵³⁴

Micro and small firms may lack dedicated specialist roles, while the people needed to lead transformation are also responsible for day-to-day product development, customers and sales. Medium-sized firms may have established functional teams but insufficient capacity to coordinate simultaneous product, commercial and governance change. Large firms can employ deeper specialist capability, but coordination and decision rights across products and business units become more important constraints.

Existing support is relatively broad including Key manager support, leadership programmes, Spotlight on Skills and the AI Capability Accelerator for Senior Leaders, which address management capability, while Training Funding Support, Build Capability, Grad Start, IDA Training Grants and Skillnet programmes support technical and applied skills. Lean and digitalisation support can also help firms redesign processes and delivery methods.

The main gap is in helping firms combine and apply these skills in practice. Training individual employees does not itself create the multidisciplinary teams or management capacity needed to redesign products, engineering, sales and governance together.

Interview participants proposed shorter technical deep-dives and micro-credentials, co-funded specialist hires, whole-leadership-team programmes, closer university-industry collaboration, vetted advisers and practical examples of firms that have successfully made the transition.⁵³⁵

3. Data, trust and product assurance: Establish a repeatable product-assurance route

Moving from a working AI feature to a trusted enterprise product remains a key challenge.

AI-enabled SaaS products depend on usable, governed data and the ability to demonstrate that outputs are accurate, secure and appropriately controlled. This is particularly relevant for products sold to large enterprises or regulated sectors, where buyers expect evidence of security, model behaviour, human oversight or ongoing monitoring.

Workshop participants linked trust directly to data management, identifying poor data management as a root cause of low confidence in AI outputs and supporting controlled deployment and systematic testing.⁵³⁶

Interview participants similarly treated data and trust as closely connected, describing projects being set back by poor model choice, weak data foundations and early copilots

exposing information that existing access controls had not adequately protected.⁵³⁷ Consultation participants also highlighted the need for representative data, evaluation and assurance before AI-enabled products move into production.⁵³⁸

Micro and small firms can face significant fixed costs in building enterprise-grade security, governance and evaluation before securing sufficient customer revenue. Medium-sized firms need controls that can be reused across a growing product and customer base. Large firms have greater governance resources but must apply consistent controls across more products, data environments and jurisdictions.

Existing supports address different parts of the challenge. For example, CeADAR, Digital Discovery, Data2Sustain and IDA digitalisation supports can assist with data readiness, strategy and architecture, while DataSMART can strengthen data capability. The Cyber Security Review Grant and EDIH-ENTIRE address security and cyber readiness, and Innovation Partnerships, Technology Gateways and relevant R&D supports provide routes to testing and validation.

The main gap is a consistent approach to assuring AI-enabled products before and after deployment. Current provision does not establish a common approach to evaluation, security, human oversight and model monitoring that firms can apply consistently across customers and deployment.

Consultation and workshop participants proposed secure environments where firms can test AI systems before live deployment;

independent testing to identify weaknesses, security risks or unintended behaviour; common methods for assessing performance and reliability; and practical templates covering data rights, human oversight and ongoing monitoring.⁵³⁹

4. Navigating regulation, procurement and market access: Translate requirements into approvals and paid adoption

Firms may struggle to turn regulatory requirements into clear steps for product approval, procurement and customer adoption.

SaaS firms need to navigate AI regulation, data protection, cybersecurity, IP, liability and enterprise procurement requirements simultaneously. Compliance and supplier-assurance requirements can impose significant costs before firms generate revenue from new AI-enabled products. Interviewees emphasised uncertainty over differing interpretations of the EU AI Act, downstream liability and the complexity of navigating multiple regulatory bodies.⁵⁴⁰ Workshop participants also argued that public procurement can be too rigid for smaller or AI-native suppliers and that technical and regulatory communities need to work more closely together.⁵⁴¹

Micro and small firms are disproportionately affected by these upfront compliance, certification and supplier-assurance costs. Medium-sized firms may need to repeat assurance work as they enter additional sectors and markets. Large firms have stronger legal and compliance functions but face greater complexity across products and jurisdictions.

Existing provision can help firms understand and navigate parts of the regulatory and market-access landscape. AIReady.ie, the AI and Digital Pathfinder, Digital Discovery, Mentor Network/Business Navigator, IP Start, IP Plus and EDIH – CeADAR provide awareness, signposting and advice on digital, IP and related regulatory issues. LEO training, mentoring and feasibility supports provide an entry point for micro and small firms, while IDA Business Development and Digitalisation Consultancy programmes can support strategy and implementation planning for foreign-owned clients. Education provision also includes courses on AI law, ethics, security and responsible innovation.

Two gaps remain: helping firms interpret regulatory requirements in practice and helping them move from demonstrating a product to securing customers. Interviewees highlighted the value of early engagement with regulators and a more coordinated regulatory interface.⁵⁴²

Workshop and consultation participants called for a clearer and more coordinated route for firms seeking regulatory guidance. This need is now partly addressed by the AI Office of Ireland, which acts as the single point of contact and central coordinating authority for implementation of the EU AI Act. Participants also proposed practical self-assessment tools and model clauses covering data, IP, liability and audit, alongside support to meet relevant standards. They also favoured more proportionate supplier checks and procurement approaches that give firms a clearer route from demonstrating a product to securing a paid deployment.⁵⁴³

5. Dependence on AI platforms, models and cloud infrastructure: Retain control while relying on global providers

Reliance on global AI technology providers can limit firms' control over costs, data and important parts of their products.

SaaS firms increasingly depend on cloud infrastructure and foundation-model providers for computing capacity and access to advanced AI models.

Some also rely on general-purpose AI platforms for development tools, model management, orchestration, security, governance and deployment. This dependence is more variable: some SaaS firms use these platforms to add AI capabilities without building these capabilities themselves, while others develop more of these capabilities in-house. These external services give firms access to advanced models, computing capacity and development tools without having to build and operate all of these capabilities themselves, but can also expose them to changes in provider pricing, service availability, data-location arrangements and switching costs.

Interviewees expressed concerns about compute and energy access for smaller firms, cloud and model deployment and the need to redesign data and infrastructure for AI workloads.⁵⁴⁴ Consultation respondents also identified provider dependence, pricing and continuity risk, as well as the capital cost of private, local or on-premises deployment where this is required by the product or customer.⁵⁴⁵ Workshop participants did not see hyperscale infrastructure or foundation model development as areas in which firms in Ireland should compete directly, emphasising instead

the importance of building differentiated applications while retaining control over strategically important data, IP and customer relationships.⁵⁴⁶

Micro and small firms benefit most from external cloud, model and AI-platform services but have the least negotiating power and may find switching providers difficult. Medium-sized firms can become particularly exposed once product architecture and economics depend materially on one provider. Large firms have more leverage, negotiating power, and engineering capacity to build their own AI platform and orchestration capabilities, but must manage dependencies across larger product portfolios and markets.

Existing supports address several of the infrastructure and experimentation needs identified by firms. Enterprise Ireland Capital Funding Support, the RDI Fund, the Disruptive Technologies Innovation Fund, Technology Centres, Technology Gateways and EDIHs can support eligible equipment, R&D, experimentation and collaboration. IDA Business Asset, Digitalisation Consultancy and qualifying RD&I supports provide corresponding routes for foreign-owned clients.

Ireland's AI Factory Antenna, led by ICHEC with CeADAR as core partner, gives Irish firms access to AI-optimised high-performance computing, secure testing and data environments, and technical expertise through the European AI Factories network. ICHEC's national HPC services and CeADAR's applied AI expertise and smaller-scale compute provide further routes for development and testing (see ICT-enabled services barrier 5).

The remaining issue is therefore less a general shortage of infrastructure than firms' ability to manage their dependence on external providers. This includes reducing unnecessary reliance on a single cloud, model or AI-platform providers, moving data and services when they need to switch provider, and maintaining continuity if a provider withdraws a service or materially changes its terms. Some of these issues, particularly making it easier to move services between technology platforms, cannot be addressed by individual firms acting alone.

Existing supports can fund qualifying technology investments, experimentation or R&D projects, but provide limited support for firms managing dependencies. Firms may need guidance and common approaches for designing products that can move between providers, planning for provider exit or failure, and securing appropriate contractual protections. They may also need access to private, local or EU-based computing where customers or products require it. These issues often depend on common standards, infrastructure and market arrangements.

Workshop and consultation participants called for better access to secure European test and deployment environments, support for open-source and smaller domain-specific models, and practical guidance on managing provider dependency.⁵⁴⁷ Interviewees also highlighted the need for affordable compute access for smaller firms.⁵⁴⁸ While ICHEC and the AI Factory Antenna address part of the infrastructure need, other proposals focus on helping firms design products that can use or move between several cloud, AI platform or foundation-model providers and maintain service continuity if a provider becomes unavailable.

Appendices

Methodology and detailed sector analysis

Appendix A: Detailed methodology

1. Study design, scope and analytical logic

This study used a mixed-methods research design combining structured desk research, official statistics, an open enterprise consultation, expert interviews, sector workshops and analysis of existing policy and enterprise supports. These evidence streams were developed in parallel and brought together through triangulation, rather than treated as independent exercises.

The analytical approach reflected the distinction between the two parts of the study.

Part 1, covering Manufacturing, Tourism and Construction, focused on the adoption of AI within firms' existing activities and value chains. The analysis therefore began with the activities undertaken across each sector value chain, identified potential AI use cases within those activities, and considered which applications appeared most relevant to the Irish enterprise base. These findings were then used to identify priority opportunities, barriers to adoption and associated support needs.

Part 2, covering ICT services, addressed a different question: how AI is changing the structure and economics of the sector itself. The analysis therefore focused on transformation in business models, value creation and capture, competitive dynamics and firms' positions within global digital ecosystems. Software-as-a-Service (SaaS) and ICT-enabled services were examined separately because the mechanisms through which AI is affecting the two segments differ.

Across both parts, the study distinguished between micro enterprises with fewer than 10 employees, small enterprises with 10–49 employees, medium-sized enterprises with 50–249 employees and large enterprises with 250 or more employees. Firm size was considered throughout the analysis where the evidence permitted.

The research was iterative. Initial desk research established structured analytical maps of global AI adoption and transformation. Interviews, consultation responses and workshops

provided evidence on how these developments were being experienced in Ireland and allowed emerging findings to be tested and refined. Official statistics were used to establish the characteristics and digital starting point of the Irish enterprise base. Existing policy supports were subsequently considered against the barriers and needs identified through the research.

The purpose of this design was not to produce a single quantitative model of AI adoption or impact. Rather, it was to combine different

forms of evidence to identify where AI could create value, how relevant those opportunities were to the Irish context, what might prevent firms from capturing them, and where enterprises perceived residual support needs.

1.1 Operationalisation of the study objectives

For Part 1, the study objectives were translated into a four-stage analytical approach.

Objective	Methodological approach
Assess how AI is affecting Manufacturing, Tourism and Construction value chains globally and where it could create value	Structured value-chain evidence mapping of global AI use cases, classified using common AI and value-chain frameworks and accompanied by an assessment of potential impact
Identify the most relevant opportunities for Ireland and the implications for firms of different sizes	Assessment of global use cases against the Irish enterprise context; indicative relevance scoring; opportunity clustering; expert interviews; enterprise consultation; sector workshops; and subsequent triangulation with official statistics
Identify barriers and constraints to adoption	Bottom-up coding of barriers raised through interviews, consultation and workshops, followed by synthesis into a common barrier framework and qualitative prioritisation
Examine the policy implications	Review of existing supports against priority barriers, combined with stakeholder evidence on perceived gaps and types of support considered helpful

Part 2 followed a similar logic but replaced the value-chain use case as the primary analytical unit with the transformation dynamic.

Objective	Methodological approach
Assess how AI is transforming ICT services globally	Structured desk research into transformation trends affecting SaaS and ICT-enabled services, covering business models, value creation, competitive dynamics and ecosystem position
Assess the implications for firms in Ireland and competitiveness	Translation of global transformation dynamics into an Ireland-specific assessment, supplemented by official statistics and stakeholder evidence
Identify opportunities for firms in Ireland to adapt and capture value	Identification of opportunities relating to products and services, business models, higher-value activities and emerging value pools, refined through interviews and the ICT workshop
Identify barriers to responding to AI-driven transformation	Bottom-up analysis of barriers raised through stakeholder research and application of the common barrier framework
Examine policy implications	Review of relevant existing supports and stakeholder-perceived residual gaps using the same broad approach as in Part 1

2. Common analytical concepts and frameworks

A set of common analytical frameworks were used to provide consistency across sectors while allowing the unit of analysis to differ between Part 1 and Part 2.

2.1 Value-chain framework

For Manufacturing, Tourism and Construction, each sector was represented through a value-chain structure extending from upstream activities through inputs and supply chains, core operations or service delivery, and downstream activities. Cross-cutting corporate functions such as human resources, finance and IT were incorporated where relevant.

The value-chain framework provided a consistent way of locating AI applications within the activities undertaken by firms. It also reduced the risk that the research would concentrate only on prominent or well-publicised applications of AI by systematically covering the full range of sector activities.

2.2 AI taxonomy

AI applications were classified across several dimensions. These included the technical capability being employed, the underlying AI method, the business function or use context, the business purpose and the modality through which AI was applied.

The final report distinguishes between modalities including **predictive and analytical AI, generative AI, assistive or copilot applications, agentic AI, multimodal AI and physical AI**.

Autonomous AI is also included in the use case mapping, but given it is a descriptor of capabilities rather than a distinct modality, we do not include it as a separate category in the final report. Modality categories are analytical aids rather than mutually exclusive technological classifications. A single use case can therefore exhibit several characteristics.

The taxonomy was adapted during the research to reflect the technologies encountered in the evidence base and the framing used in the final report. Predictive and analytical AI, for example, was deliberately included because it remains foundational to many AI use cases. Physical AI, meanwhile, is sometimes referred to within report in instances where the dominant feature of the use case is that the AI system perceives, reasons about or acts within the physical environment.

2.3 Use-case formulation

Part 1 use cases were expressed using a common structure to make applications comparable across different sectors and value-chain activities. The standard formulation was as follows:

“This use case uses AI to [analyse/process] [data] in order to [output/insight], which enables [functional change/decision], resulting in [performance improvement], leading to [value creation].”

This common structure was used to distinguish the technical application of AI from the business outcome or opportunity associated with it.

2.4 Opportunity framework

Individual use cases were grouped into progressively broader levels of opportunity.

The analytical hierarchy was that individual AI use cases rolled up into sector-specific opportunity sub-clusters, which in turn fed into five common value clusters, which themselves fell into two overarching value themes.

The five common value clusters, within two broader value themes, were as follows:

Value theme	Common value cluster	Principal source of value
Revenue Uplift	Revenue growth and customer engagement	Increasing sales, improving conversion or strengthening customer interaction and retention
Revenue Uplift	Innovation and solution design	Accelerating or improving the development of products, services and solutions
Cost Takeout	Operational and workforce productivity	Improving the efficiency, capacity or effectiveness of operational processes and employees
Cost Takeout	Cost, cash and capital efficiency	Reducing direct cost or improving the utilisation of financial and physical assets
Cost Takeout	Risk, quality, resilience and compliance	Reducing risk, improving quality or increasing operational and regulatory resilience

The intermediate opportunity clusters were sector-specific to ensure they were relevant and recognisable to sector stakeholders, given that sector participants often describe AI opportunities in terms that are concrete to their business problems rather than abstract value categories.

2.5 Barrier framework

The final analysis organises barriers into four common groups:

- **Strategy and financial** barriers concern the business case for adoption, access to finance and investment, strategic clarity and the ability to identify appropriate applications.
- **Organisational** barriers concern leadership, workforce capability, skills, operating models, culture, change management and the organisational capacity required to deploy and scale AI.

- **Technology and ecosystem** barriers cover data, digital infrastructure, systems integration and legacy technology, as well as dependencies on suppliers, platforms, partners and wider sector infrastructure.
- **Safety, security and trust** barriers concern cybersecurity, privacy, responsible AI, regulatory uncertainty, reliability, transparency and confidence in the use of AI.

These groups were not imposed deductively as a fixed coding framework at the start of the research. As described below, in Section 7 of the appendix, they emerged through synthesis of more granular barriers identified through the stakeholder evidence.

3. Part 1: global AI use-case research

3.1 Structured value-chain evidence mapping

The global research for Manufacturing, Tourism and Construction was undertaken as a structured value-chain evidence-mapping exercise, rather than as a conventional literature review.

For each sector, researchers first developed a map of the principal activities undertaken from upstream to downstream. These activities formed the analytical map in the search for use cases, with each activity represented in the underlying analytical workbook.

Researchers then worked systematically through the value chain to identify credible evidence that AI was being, or could plausibly be, applied to each activity. The objective was to establish the potential areas for application of AI across the sector, rather than to estimate the prevalence of individual use cases. The maps are therefore not representative of how AI is being used in global value chains, but provides examples of where it can be used based on where it has been used.

Evidence was drawn principally from global company disclosures and credible industry sources describing the deployment or piloting of AI. Engineering, scientific, academic and specialist industry publications were also used to identify emerging applications, including applications at pilot or experimental stage.

Evidence from AI technology or solution providers could also be included where it provided sufficiently specific evidence of an application.

Where multiple distinct AI applications related to the same value-chain activity, these were recorded as separate use cases. Conversely, some value-chain activities remained without a mapped use case where the research did not identify sufficiently relevant evidence. “Empty” activities meant that no suitable sector-specific evidence was identified through the exercise; it did not mean that AI could not potentially be applied to that activity.

3.2 Inclusion threshold and interpretation

The evidence threshold reflected the exploratory purpose of the exercise. A use case did not need to be demonstrated at scale before it could be included. A credible company disclosure, industry or research publication, or sufficiently specific solution-provider example could establish that an application had been deployed or tested in practice or was at a minimum revealed to be technically plausible.

Inclusion in the use-case library therefore does not imply that an application is widely adopted, commercially mature, economically viable for all firms or associated with proven returns on investment.

The study did not undertake independent technical feasibility studies, estimate the implementation cost of individual use cases or quantify the realised financial impact associated with each application (beyond capturing any value claims that were asserted).

Instead, the use-case evidence was used to establish where AI could plausibly play a role and the type of value that application might create.

3.3 Standardisation and assessment

Each identified application was converted into the common use-case structure described above (see 2.3) and classified against the relevant value-chain activity and AI taxonomy.

Researchers also made an indicative assessment of the potential impact associated with each use case. This judgement was informed principally by the underlying evidence and the nature of the activity being transformed, including the mechanism through which the use case could affect productivity, revenue, cost, quality, risk or other dimensions of performance.

These assessments represent analytical judgement, rather than quantified business cases. Their purpose was to support comparison and subsequent opportunity clustering.

The analysis moved from identifying activities across each sector value chain to finding credible global evidence of AI applications within those activities. These applications were then standardised into comparable use cases, assessed using expert judgement for their potential impact, and grouped into broader opportunity areas.

Initial sector research and classification was undertaken by a researcher working on the relevant sector and was subsequently reviewed by a second researcher with relevant sector expertise.

4. From global use cases to Irish priority opportunities

The global use-case library established where AI could potentially be applied. A further stage was required to assess which applications appeared most relevant to the characteristics of Irish enterprises.

4.1 Indicative relevance scoring

Each use case was assessed across four dimensions:

- **Existing AI adoption.** Available Eurostat evidence on AI adoption within the relevant sector and within Ireland more generally was used to provide an indication of the digital and AI starting point from which firms would be adopting the application.⁵⁴⁹
- **Fit with the Irish firm-size structure.** The likely firm-size profile associated with a use case was considered against both the distribution of enterprises and the distribution of economic activity across firm-size categories in the sector.
- **Use-case complexity and accessibility.** Complexity was assessed from the number of technical AI capabilities and modalities involved. Applications drawing on a greater number of capabilities or modalities were treated as more complex and, consequently, less accessible for adoption.
- **Potential impact.** The impact assessment developed during the global use-case research was incorporated as an indication of the scale of value potentially associated with the application.

Each component was scored (in a common 1–100 scale), and the four scores were then averaged to produce an indicative composite relevance score for each use case. Greater complexity resulted in a lower accessibility component of the score.

This composite measure was a structured heuristic, not a statistically validated index or predictive estimate of return on investment. Its purpose was to introduce consistency into the initial comparison of a large number of heterogeneous use cases.

This scoring is also not referenced in the report because its purpose was to feed into sector workshop validation discussions (see below), not to reflect a final result.

4.2 Opportunity clustering and prioritisation

Individual use cases were grouped into sector-specific opportunity clusters on the basis of the business problem addressed and the source of value created. Average relevance scores within these groups helped provide an initial indication of the relative relevance of different opportunity areas.

The quantitative scoring did not determine the final opportunities mechanically. Expert interviews were conducted in parallel and provided an independent qualitative evidence stream on where firms and sector specialists considered AI capable of creating value in Ireland.

The emerging opportunity clusters and the findings from the interview programme were then brought into the sector workshops. Workshop participants were asked to review the identified opportunities, challenge their relevance to Ireland, identify omissions and help distinguish higher-priority areas.

The final selection and prioritisation of opportunities therefore reflected a synthesis of the global use-case evidence, the indicative relevance assessment, the characteristics of the Irish enterprise base, expert interviews and workshop discussion. Analyst judgement was used to determine the final set of opportunities judged to provide the most coherent and important account of the potential for AI within each sector.

The final priorities should consequently be interpreted as evidence-informed but judgement-based findings, rather than the output of a mechanical ranking exercise.

4.3 Risks of non-adoption and uneven adoption

The research also considered the potential implications of firms adopting AI slowly, partially or unevenly.

These issues were explored principally through expert interviews, where participants discussed the potential consequences of different patterns of adoption for individual enterprises and for the wider sector. Relevant implications were also raised and tested during workshop discussions.

The resulting analysis therefore reflects stakeholder evidence interpreted alongside the identified opportunities and competitive dynamics. It should not be understood as a quantified forecast or separate risk model.

5. Part 2: ICT structural-transformation analysis

5. Part 2: ICT structural-transformation analysis

The analytical approach for ICT services differed from the value-chain methodology used for Manufacturing, Tourism and Construction.

Part 2 examined how AI is changing the structure and economics of ICT services themselves, including business models, sources of value and competitive dynamics. The primary unit of analysis was therefore a transformation dynamic, rather than an AI use case located within an existing value-chain activity.

5.1 Transformation mapping

The analysis treated SaaS and ICT-enabled services separately, reflecting differences in the way AI is affecting the two segments. A structured transformation map was developed for each.

The desk research was organised around common dimensions of transformation, including changes in:

Transformation dimension	Principal question
Business models	How is AI changing the way ICT firms structure and monetise their offerings?
Value creation, delivery and capture	Where is value moving, and how is AI changing the activities through which firms create and retain it?
Competitive dynamics	How is AI affecting entry barriers, market structure and the balance between incumbents and new entrants?
Sources of competitive advantage	Which assets, capabilities or forms of differentiation are becoming more or less defensible?
New opportunity areas	Which new products, services, markets or forms of activity are emerging?
Value-chain and ecosystem position	How is AI changing firms' relationships with platforms, hyperscalers, infrastructure providers, customers and other ecosystem actors?

Within these dimensions, researchers identified more specific global transformation dynamics and trends through desk research. As in Part 1, the framework provided the analytical search space and encouraged researchers to work systematically across different forms of transformation.

For each dynamic, the analytical workbook recorded the nature of the change, the relevant AI characteristics, whether it represented an opportunity, threat or both, its potential significance and an indicative time horizon.

5.2 Translation to the Irish context

The global transformation map was subsequently translated into an Ireland-specific assessment.

For each dynamic, researchers considered the potential implications for firms in Ireland, relevance to firms of different sizes, consequences for competitiveness and value creation, and the opportunities available to firms to adapt.

Opportunities were considered through four broad forms of adaptation: the development of new products or services; new or adapted business models; movement into higher-value activities; and access to new value pools.

The assessment also considered the wider digital ecosystem in which Irish ICT firms operate. Platforms, cloud infrastructure providers and hyperscalers were therefore included where they materially affected competitive conditions or the positioning of firms in Ireland, even where those actors did not

fall within the core SaaS or ICT-enabled-services segments themselves.

Expert interviews provided a parallel evidence stream on the transformations, opportunities and competitive risks facing Irish ICT enterprises. The emerging analysis was then tested through the ICT workshop, where participants considered the relevance of identified global trends to Ireland over the coming three to five years, challenged the emerging assessment and identified additional implications.

The final selection and prioritisation of transformation dynamics followed the same broad principle as Part 1: desk-research evidence, the Irish enterprise context, interviews and workshop findings were synthesised, with analyst judgement used to determine the set of trends judged most material to Ireland.

The final findings should therefore be interpreted as evidence-informed analytical judgements rather than as the result of a mechanical trend-ranking model.

6. Stakeholder research

Stakeholder research was used throughout the study to test and enrich the desk-research findings, identify barriers and support needs, and understand differences between the experience of different types of firms.

Three principal mechanisms were used: an open online enterprise consultation, expert interviews and four sector workshops. These methods served complementary purposes and were not designed to produce statistically representative estimates.

6.1 Open enterprise consultation

An open online consultation provided an additional route for enterprises to contribute evidence on AI adoption, opportunities, barriers and support requirements.

The consultation was hosted online by Accenture and was open from 13 July to 28 July 2026. DETE managed dissemination through relevant enterprise agencies, industry bodies

and stakeholder networks. Any company operating in Ireland was eligible to participate, with screening questions used to identify respondents falling within the sectors and enterprise groups covered by the study.

The consultation collected structured information on respondents' sector and subsector, firm size, organisational role and location, together with self-reported indicators of digital maturity and data-management practices. Respondents were also asked about the actual or anticipated effects of AI on areas including revenue, profitability, productivity, employment and the development of new business models, products and services.

The final consultation dataset contained 272 valid responses overall. Of these, 208 were classified within the four sectors covered by the study: 106 in Tourism, 52 in ICT Services, 39 in Manufacturing and 11 in Construction.

Response bases differ across individual questions because not every respondent provided a valid or substantive answer to every item. Where consultation findings are reported quantitatively, the valid response base for the relevant question is therefore stated.

Open-text questions provided qualitative evidence on current uses of AI and emerging opportunities, barriers to adoption or transformation, and existing or desired policy support. Responses were coded into a structured evidence register using the same broad analytical architecture as the interview evidence.

The consultation was self-selecting and was not designed to be statistically representative of the Irish enterprise population. Responses were not weighted to the population structure. Percentages and subgroup comparisons are therefore descriptive of the firms responding to the consultation and should not be interpreted as population estimates. Open-text findings were used principally to corroborate, challenge and enrich findings from the other evidence streams.

6.2 Expert interviews

The study included 30 interviews involving 35 participants across Manufacturing, Tourism, Construction and ICT services. Interviews took place between 6 and 27 July 2026. Participants included enterprise agencies and policy stakeholders, industry representative bodies and sector specialists.

The interview programme was designed to be goal-directed rather than statistically representative. Its purpose was to capture a body of informed perspectives on the opportunities associated with AI, the practical barriers faced by enterprises, sector-level constraints and the forms of support considered most valuable.

Interviews were semi-structured and generally lasted between 30 and 45 minutes. They were all conducted online through Microsoft Teams. Most interviews involved two members of the research team.

The research distinguished between different forms of interview record. Where a verbatim transcript was available, direct quotations could be traced to that transcript. Where researchers produced a reconstructed record from contemporaneous notes, the record was used as a detailed analytical account but was not treated as inherently verbatim. Notes-only interviews were similarly used for thematic analysis, with direct quotation limited to wording that had been captured sufficiently accurately at the time.

With the assistance of AI tools, but with the human researcher always in the lead, interview evidence was converted into a structured register containing discrete observations. Relevant fields included the sector and participant lens, analytical theme, value-chain stage where applicable, firm size, barrier classification, whether a constraint operated principally at firm or sector level, the strength of the signal, and evidence provenance.

The register allowed recurring findings to be compared across interviews and sectors while retaining links to the underlying source material.

6.3 Sector workshops

Four sector workshops were conducted across 24 and 25 July 2026, covering each of Manufacturing, Tourism, Construction and ICT services.

Across the workshops, 175 participants took part: 93 enterprise participants, 42 participants from policy bodies or enterprise agencies, 31 from trade or industry organisations and nine Accenture industry or AI specialists.

The Manufacturing and ICT workshops were conducted in person at The Dock, Accenture's innovation hub in Dublin. The Tourism and Construction workshops were conducted virtually through Microsoft Teams. Workshops used multiple facilitators and note-takers from the project team.

For Manufacturing, Tourism and Construction, the first part of each workshop presented emerging findings on global AI use cases and the potential opportunity areas for Ireland. Participants were asked to consider the relevance of these opportunities to the Irish sector, their relative ease of adoption, omissions from the emerging analysis and which opportunities appeared most important.

The second part focused on barriers. Participants reviewed the emerging barriers, discussed their causes and the types of firms affected, identified additional constraints and considered which issues most warranted attention.

The ICT workshop was adapted to reflect the different analytical framing of Part 2. Participants reviewed emerging global AI-driven transformation trends, considered their relevance to Ireland over the following three to five years and discussed the resulting implications, opportunities and barriers for Irish ICT firms.

The workshops were designed as evidence-validation and enrichment exercises, not as representative consultations or formal consensus-building exercises. Workshop prioritisation was one input into the final analysis rather than the deciding vote or a statistical ranking.

7. Barrier identification and prioritisation

Barrier analysis was deliberately more bottom-up than the use-case research.

The broad categories contained in the study specification provided initial orientation, but the research did not begin by forcing stakeholder evidence into a fixed framework. Instead, barriers were identified principally from what firms, experts and other stakeholders raised through the interviews and workshops, with the open consultation providing an additional source of corroboration and evidence.

Individual barrier observations were coded into a structured evidence register. The provisional coding scheme used during the early stages of the research contained more granular categories.

As the evidence accumulated, recurring patterns were synthesised into the final four-group framework of Strategy and financial; Organisational; Technology and ecosystem; and Safety, security and trust. Relevant observations coded before this framework was finalised were subsequently grouped onto the final reporting structure.

As such, the analysis sequence began with the barriers and constraints raised through stakeholder interviews, consultation responses and workshops. These observations were initially coded inductively, before recurring themes were identified and synthesised into the common barrier framework used in the final report.

This approach allowed the four groups to provide a consistent structure for reporting and cross-sector comparison without presenting them as top-down hypotheses that were imposed in advance on the evidence.

Barrier prioritisation was qualitative rather than a mechanical scoring exercise. Researchers considered the frequency with which a barrier arose, the strength with which participants described it, its prominence during workshop discussions and the wider implications of the barrier. From this set of inputs, analyst judgement was then applied to determine which issues would receive the greatest emphasis in the final report.

Frequency was treated as an indicator of salience within the evidence base, not as an estimate of population prevalence. A barrier raised less frequently could still be considered important where it represented a material structural constraint or had significant implications for a particular firm-size group or subsector.

The analysis also distinguished, where possible, between barriers operating primarily at firm level and those arising from wider sector or ecosystem conditions.

8. Quantitative and CSO analysis

Official statistics were used to establish the structure of the Irish enterprise base, assess firms' broader digital starting point and provide quantitative evidence on existing adoption of AI and related technologies.

The quantitative analysis drew on multiple datasets rather than attempting to combine them into a single synthetic measure of AI maturity. The principal sources included CSO Business Demography data, the Annual Business Survey of Economic Impact, CSO Information Society Statistics, the Digital Intensity Index, CSO measures of AI technology use and business functions, the Credit Demand Survey, relevant Eurostat evidence and Digital Decade indicators.

Different datasets were used for different analytical purposes.

Enterprise structure data were used to examine the number and distribution of firms and economic activity by sector and enterprise size.

Digital readiness was examined through indicators such as the Digital Intensity Index, use of cloud computing, data analytics and other digital technologies. The Digital Intensity Index captures the number of specified digital practices used by an enterprise and was treated as an enabling measure of digital adoption rather than as direct evidence of deep AI integration or realised business impact.

AI adoption was examined using available measures of whether firms used one or more forms of AI technology and, where available, the business functions in which those technologies

were deployed. The analysis considered breadth and depth of adoption but did not construct a formal statistical AI-maturity index.

These indicators were interpreted together with the qualitative evidence rather than collapsed into a single score.

Official data were mapped to the closest available sector definitions. For Manufacturing, Construction and ICT Services, established NACE sector classifications provided the principal basis of analysis.

Manufacturing data does not include data for the Medical Devices sub-sector. Tobacco is included in the Food and Beverages Manufacturing sub-sector.

Tourism does not correspond to a single NACE division and therefore required the use of relevant constituent activities or sector proxies. Results for Tourism should consequently be interpreted as an approximation of the enterprise population relevant to the study rather than a perfectly bounded statistical sector.

Firm-size analysis followed the study definitions of micro, small, medium and large enterprises.

The principal CSO enterprise technology survey covers enterprises with ten or more persons engaged. Micro enterprises are therefore not represented in the main AI-adoption estimates derived from this source.

Where possible, the study used other sources, including the Credit Demand Survey and the stakeholder research, to provide additional signals on the experience of micro firms. These sources have different populations and methodologies and were therefore interpreted separately rather than merged statistically with the principal CSO survey.

For subgroup estimates based on survey samples, approximate standard errors and margins of error were used where appropriate to indicate the degree of sampling uncertainty. Because respondent-level survey weights and full sample-design parameters were not available to the research team, these calculations used a simple-random-sampling

approximation and should be regarded as indicative rather than as exact design-based confidence intervals.

Particular caution was applied to small sector-by-size subgroups. Suppressed values in official datasets were not inferred or reconstructed, and percentages of zero or 100 within small observed samples were not interpreted as evidence of population certainty.

Quantitative evidence was therefore deployed as a supplementary input to this study. It was used alongside interviews, consultation responses and workshops to provide context and triangulation rather than as a sole basis for assessing sector maturity or opportunity.

8.1 Sources: the datasets used and what each supports

Source	Reference period	What it supports in this report	Principal limitation
CSO Business Demography (BRA31)	2023	Number of active enterprises and persons engaged, by sector and employment size	The open data used in this study do not separately identify medical devices; food and beverages includes tobacco; the full tourism grouping cannot be constructed on a directly comparable basis; tourism enterprise estimates are therefore based on the best available constituent-industry data and proxies
Annual Business Survey of Economic Impact (ABSEI)	2024	Value added and exports by employment size in manufacturing, ICT services and construction	Covers agency-assisted client companies only, not the sector population
CSO Survey on ICT Usage and E-commerce in Enterprises 2025	Reference year 2024	Digital technology use, digital intensity, AI technology adoption and AI use by business function	Covers enterprises with ten or more persons engaged; sample designed at NACE two-digit level

Source	Reference period	What it supports in this report	Principal limitation
Credit Demand Survey	2025 wave, covering 2024; AI question covering 2022 to 2024	AI use, investment intentions and attitudes among micro, small and medium enterprises	SME survey with no large-firm band; sector coverage is asymmetric
Eurostat and European Commission Digital Decade indicators	2025 and 2026	Ireland's digital skills position and SME digital intensity relative to the EU	Different bases and vintages from the national survey evidence
Accenture <i>Generating Impact</i> research	Fielded February to March 2026	Individual generative-AI use, organisational readiness and executive perspectives	Proprietary research with a small Irish subsample

8.2 Sector definitions and firm size

Official data were mapped as closely as possible to the sectors defined for this study. Manufacturing, construction and ICT services are based on established NACE classifications. Tourism does not correspond to a single NACE sector and therefore requires a statistical proxy.

Manufacturing is analysed both as the full NACE Section C and as the five subsectors in scope for this study:

- chemicals and pharmaceuticals (C20 and C21);
- food and beverages (C10 and C11);
- computer, electronic and optical products (C26);
- medical devices (C32.5); and
- engineering (C22, C24, C25, C27, C28 and C33).

The five-subsector grouping is a study construct rather than an official NACE aggregate. This distinction affects some results. In the enterprise technology survey, for example, 17.9% of enterprises across the full manufacturing sector reported using AI, compared with 20.5% across the five subsectors in scope. The report identifies which aggregate is being used wherever the distinction is relevant. A combined computer, electronic and optical products and medical-devices grouping (C26 and C32.5) is also used in some analysis where required to address statistical-disclosure constraints.

The coverage of medical devices differs between datasets. The open CSO Business Demography data used in this study do not separately identify medical devices, so manufacturing enterprise and employment figures drawn from that source cover four of the five subsectors. Business Demography also includes tobacco alongside food and beverages. The enterprise technology survey does include medical devices separately, and its

food and beverages grouping covers C10 and C11 only. These limitations are identified where the relevant statistics are presented.

ICT services covers computer programming, consultancy and related activities under NACE J62. The study distinguishes product-based Software-as-a-Service (J62.01) from ICT-enabled and managed digital services (J62.02, J62.03 and J62.09). Some source statistics are available only for the broader Information and Communication sector (NACE Section J). Where these are used, they are labelled accordingly; Section J and J62 are not treated as interchangeable.

Construction covers NACE Section F: construction of buildings (F41), civil engineering (F42) and specialised construction activities (F43). Subsector results are reported where sample sizes permit.

Tourism requires a different approach.

The study's analytical scope follows the tourism characteristic industries commonly used in international tourism statistics and Tourism Satellite Account (TSA) methodologies. It covers accommodation; food and beverage services; selected passenger transport and rental activities; travel agencies and tour operators; cultural activities; and sport and recreation. Organisation of conventions and trade shows (N82.30) is not typically included within this core set of tourism characteristic industries and was therefore outside the defined scope of the study. This is a methodological boundary rather than an assessment of the importance of business events to the wider tourism economy.

NACE classifies enterprises by the activity they undertake, whereas tourism is defined partly by who consumes that activity. No enterprise-level

statistical source used in this study can isolate the visitor-driven share of activity across the full tourism scope. For the enterprise technology analysis, the study therefore uses a proxy comprising:

- accommodation (I55.10, I55.20 and I55.30);
- food and beverage services (I56.10 and I56.30);
- selected passenger transport (H49.10, H49.32, H49.39, H50.10, H50.30 and H51.10);
- travel agencies and tour operators (N79.11, N79.12 and N79.90); and
- selected rental activities (N77.11, N77.12 and N77.21).

This proxy has two limitations. First, it includes all enterprises in these activities rather than only the share of their activity generated by visitors. Second, it is narrower than the study's analytical tourism scope, as equivalent enterprise-technology data are not available for cultural activities, visitor attractions and all sport and recreation activities. The CSO Business Demography data used for cross-sector firm-size analysis also do not allow the complete tourism grouping to be constructed on a directly comparable basis. Tourism statistics are therefore labelled according to the population they cover rather than treated as estimates for a single, consistently bounded statistical sector.

The tourism data landscape is also evolving. A Data and Insights Delivery Stream was established on 29 July 2026 under the Tourism Policy Oversight Group as part of the implementation of *A New Era for Irish Tourism*. This work includes strengthening the evidence base underpinning tourism policy and may result in revised datasets or methodologies

covering the number and economic contribution of tourism-related enterprises and their digital and AI adoption. The tourism-related enterprise estimates used in this study therefore represent the best available proxies at the time of analysis.

8.3 Firm size and survey coverage: definitions, denominators and the micro-enterprise gap

For this report, firm size is defined by the number of persons engaged: micro enterprises have fewer than ten; small enterprises have 10–49; medium-sized enterprises have 50–249; and large enterprises have 250 or more.

The principal CSO enterprise technology survey covers enterprises with ten or more persons engaged. Micro enterprises are therefore outside its scope and are not represented in adoption estimates derived from it. This is a significant limitation in Ireland, where 92.6% of active enterprises had fewer than ten persons engaged in 2023. References in this report to “all surveyed enterprises” consequently mean all enterprises within the survey population, not all enterprises in the economy.

The Credit Demand Survey and stakeholder research provide additional evidence on micro firms. These sources have different populations, definitions and methodologies and are interpreted separately rather than combined with the enterprise technology survey. Figures for micro firms cannot be compared directly across the two surveys because micro enterprises are absent from the enterprise technology survey. Small-firm estimates should also not be joined into a single series because the datasets use different questions, samples and methods.

Three denominator conventions affect interpretation of the enterprise technology survey. AI questions are routed to enterprises that employ staff and have internet access, so reported AI-adoption rates are calculated across enterprises meeting those conditions within the relevant sector or size class. The AI technology question also includes a “none of the above” option, which is not shown as a separate category in this report.

The follow-up questions on the business functions in which AI is used were designed for enterprises reporting at least one AI technology. The percentages supplied for this analysis are nevertheless calculated relative to all enterprises eligible to answer the AI technology question. Business-function percentages are therefore shares of all eligible enterprises, not shares of AI adopters. For example, a figure of 7.3% for administrative use of AI in tourism means 7.3% of eligible tourism enterprises, rather than 7.3% of tourism enterprises that use AI. Exhibits using these measures state this convention.

8.4 Survey coverage and uncertainty

Sector and firm-size estimates based on survey samples are subject to sampling uncertainty. Where useful, the report shows approximate standard errors or 95% margins of error to indicate the scale of that uncertainty. Respondent-level survey weights and the full sample-design parameters required to calculate exact design-based confidence intervals were not available to the research team, so these estimates use a simple-random-sampling approximation and should be treated as indicative.

Particular caution is applied to small sector and firm-size subgroups. Suppressed values in official datasets are not inferred or reconstructed, and percentages of zero or 100% in small observed samples are not interpreted as evidence that the same result applies to the wider population.

The quantitative evidence is therefore used to establish the enterprise landscape, indicate broad differences in digital maturity and adoption, and test findings from the wider research. It is interpreted alongside the interviews, online consultation and workshops rather than used on its own to rank sectors or determine their readiness for AI.

9. Policy and support analysis

DETE supplied policy compendiums and inventories of existing enterprise supports relevant to the study. These materials were used to understand the support environment surrounding the barriers identified through the stakeholder research.

At sector level, the analysis followed three broad stages.

1. The report sets out the barrier, based on evidence from interviews, consultation responses and workshop discussions.
2. The policy evidence is then used to identify examples of existing programmes or supports whose stated purpose or activities are relevant to addressing that barrier.
3. Finally, these examples are considered alongside stakeholder testimony to identify perceived residual gaps: areas where firms or other participants reported that support was missing, insufficient, poorly matched to their needs or otherwise not resolving the barrier to adoption that they experienced.

The cross-sector policy discussion follows the same logic at a higher level. The four principal barrier groups provide the organising framework, after which examples of policies and

enterprise supports intended to address those broad issues are considered.

The analysis is descriptive rather than evaluative. It identifies visible provision and its stated relationship to the needs identified through the research, but it does not independently assess programme quality, take-up, capacity, cost, accessibility for individual firms, effectiveness or impact.

A mapped policy therefore indicates potential relevance rather than demonstrating that a barrier has been adequately resolved. Similarly, a stakeholder-perceived gap does not necessarily demonstrate that no relevant policy exists. In some cases, the coexistence of apparently relevant provision and continuing stakeholder concerns may point to issues of awareness, accessibility, fit, depth or continuity, but the study did not independently determine which of these mechanisms explains the gap.

Potential responses discussed in the sector chapters principally reflect the types of support that stakeholders indicated would be helpful. They should therefore be understood as evidence about residual support needs rather than as the result of a formal policy-options appraisal or cost-effectiveness assessment.

10. Evidence integration, review and quality assurance

Quality assurance was embedded throughout the research process rather than being applied only to the final report.

As a general principle, substantive analytical outputs were subject to second-person review, so that important classifications and interpretations were seen and challenged by more than one member of the research team.

In addition, generative AI tools were used throughout the research process as supporting analytical tools. Depending on the task, they were used to help check, synthesise, structure, interpret or critique research material and emerging analysis. Their role was assistive rather than autonomous: a human researcher remained responsible for directing each task, assessing the relevance and reliability of source material, reviewing AI-generated outputs, resolving ambiguities and making all substantive analytical judgements. AI-generated material was therefore not treated as an independent source of evidence or as a substitute for researcher review.

For the global use-case analysis, initial research and classification were undertaken by a sector researcher and reviewed by a second researcher with relevant sector expertise. This provided a check on source interpretation, the formulation and classification of use cases and judgements about their potential relevance and impact.

Most expert interviews were attended by two members of the project team, providing a shared basis for interpreting the discussion. The use of structured evidence registers subsequently allowed individual observations to be compared across participants and traced back to the underlying interview material.

Emerging opportunities and barriers were converted into materials for the sector workshops. Multiple project-team members participated in the facilitation and documentation of these sessions, allowing preliminary interpretations to be tested both against external stakeholder views and internally across the research team.

Sector chapters were developed through an iterative drafting and review process involving multiple researchers. Each chapter received review by more than one team member and included input from at least one subject-matter expert with relevant sector knowledge.

A DETE Steering Group provided governance, advice and challenge throughout the study. The Steering Group reviewed interim findings, contributed relevant contextual knowledge and helped assess whether the research remained aligned with the study objectives and sector context. Its role as a group was treated as part of the study's governance and sense-checking process rather than as a separate evidence source.

But multiple individual Steering Group members also participated in interviews and/or workshops, and their contributions through those activities formed part of the relevant stakeholder evidence base. At the review stage, Steering Group members also provided written comments on the draft report. Most concerned drafting, emphasis, balance or factual accuracy and are not separately cited. Where a comment introduced substantive sector knowledge that had not emerged from the interviews, workshops or open consultation, it is cited in the report as Steering Group review input. Such input was treated as expert contextual evidence.

Across the study, final findings were developed by triangulating global desk research, official statistics, interviews, the open enterprise consultation, workshops and policy evidence. No single source was expected to answer every analytical question.

Where evidence streams diverged, the differences were considered explicitly rather

than automatically reconciled. For example, a technology could appear technically mature in the global use-case evidence while stakeholders continued to identify significant practical barriers to adoption in Ireland. Such differences were treated as analytically meaningful.

Researcher judgement was therefore an important element of the study, particularly in the grouping and prioritisation of opportunities, transformation trends and barriers. Generative AI supported parts of this process by helping researchers interrogate, compare and challenge evidence, but responsibility for interpretation and final conclusions remained with the research team. That judgement was exercised within a process of second-person review, multi-researcher synthesis, source traceability and cross-method triangulation.

Detailed analytical workbooks and evidence registers were retained separately to preserve source-level traceability behind the findings presented in the report.

11. Assumptions and limitations

The methodology was designed to provide a robust evidence base on a rapidly changing technology and enterprise landscape, but several limitations are important when interpreting the findings.

11.1 Global use cases indicate potential application rather than prevalence

The Part 1 use-case library was designed to map the potential application space for AI across each sector value chain.

The presence of a use case therefore establishes that there is credible evidence of a plausible application and potential source of value. It does not demonstrate that the application is widely adopted, technically or commercially feasible for every enterprise, or already delivering realised benefits at scale.

The study did not (and could not) independently validate claims made in company, industry or solution-provider evidence, nor did it undertake technical feasibility assessments or calculate the implementation cost or return on investment associated with individual use cases.

11.2 Impact and opportunity assessments involve analytical judgement

Assessments of potential impact and relevance are intended to support structured comparison. They are not forecasts of realised economic value.

The relevance scoring (of 1-100) used in Part 1 is a heuristic combining several dimensions of relevance. Its components and aggregation are not a statistically validated measurement model. The final opportunity priorities were consequently determined through triangulation and expert judgement rather than by the scores alone.

The same applies to Part 2. Working assessments and priority indicators helped researchers organise the evidence, but the final selection of material transformation trends reflects qualitative synthesis rather than a formal predictive model.

11.3 Stakeholder research is qualitative and non-representative

The expert interview sample was purposively selected and the workshops were designed to provide informed validation and challenge. Neither should be interpreted as representative of all enterprises in the relevant sectors.

The open enterprise consultation broadened the stakeholder evidence base but was self-selecting and unweighted. Its quantitative results describe the participating enterprises rather than the Irish enterprise population as a whole.

Frequency of mention in interviews, consultation responses or workshops is therefore treated as an indicator of salience within the study evidence rather than as a statistical estimate of the prevalence of a view or barrier.

11.4 Quantitative datasets have different coverage, timing and statistical universes

The official datasets used in the study were developed for different purposes and do not have identical sector definitions, reference periods or enterprise populations. They were therefore interpreted as complementary evidence rather than combined into a single maturity index.

The main CSO enterprise technology statistics exclude micro enterprises, while Tourism requires the use of a composite or proxy sector definition. The statistical proxy used for enterprise-technology analysis is narrower than the study's analytical tourism scope because equivalent enterprise data are not available for all activities. Estimates of the size and characteristics of the tourism enterprise base are also subject to ongoing methodological development. DETE and the CSO are reviewing the available tourism data through the Tourism Policy Oversight Group's Data and Insights Delivery Stream, and future datasets or methodologies may produce revised estimates. The figures in this report therefore reflect the best available evidence at the time of analysis. Subgroup estimates can also be subject to substantial sampling uncertainty.

More granular CSO evidence became available after the initial Part 1 relevance exercise and workshops. Eurostat evidence therefore informed the original pre-workshop scoring, while the later CSO evidence was incorporated into the final sector analysis rather than retrospectively changing the original scoring process.

11.5 Policy mapping identifies visible provision rather than policy effectiveness

The policy analysis establishes where existing supports appear relevant to the barriers identified by firms and where stakeholders perceive residual needs.

It does not assess whether individual supports are sufficiently well known, accessible, adequately resourced, appropriately targeted or effective in changing enterprise behaviour. The apparent absence of a mapped support should similarly be interpreted as an absence within the evidence reviewed, not as proof that no relevant intervention exists.

11.6 Future-facing findings are indicative rather than predictive

AI technology and markets are evolving rapidly. Assessments concerning the likely evolution of AI capabilities, longer-term transformation of business models or the implications of emerging forms of AI should therefore be interpreted as evidence-informed scenarios and analytical judgements, rather than probabilistic forecasts.

The same qualification applies to the discussion of the consequences of non-adoption, partial adoption or uneven adoption. These findings draw principally on stakeholder evidence and the broader opportunity and competitive analysis rather than on an econometric estimate of future losses.

These limitations mean that the study should be read as a structured assessment of the direction, relevance and relative significance of AI opportunities, transformation dynamics, barriers and support needs in Ireland. Its strength lies in the combination of multiple complementary forms of evidence and the systematic testing of findings across them, rather than in any single dataset or model.

Appendix B: Evidence base

1. Purpose and citation conventions

This appendix provides a pseudonymised record of the principal primary research and non-public supporting evidence used in the study. It accompanies Appendix A, which explains how the different evidence sources were collected, analysed, triangulated and quality-assured.

Stable source identifiers allow findings in the report to be traced to the underlying research interaction without identifying individual participants or publishing confidential research records. For interviews, the identifiers used throughout the research have been retained. Workshops are cited by sector and breakout group, and each group also carries a short source identifier used in the internal research record.

Detailed transcripts, interview notes, coded evidence registers, consultation coding records and analytical workbooks form part of the study's internal research record and are not published. Citations in this report therefore identify the underlying interview, workshop, consultation or source material rather than

individual data points (contained as rows in an Excel workbook) within those internal records.

An observation recorded internally as CON-03-12, for example, appears in this report as Interview CON-03. Where several coded observations come from the same interview, the interview is cited once. The more granular links between findings, coded observations and underlying transcripts or notes are retained within the internal evidence trail for review and fact-checking.

The interview list is pseudonymised rather than anonymised: the research team retains the ability to link each identifier to its underlying research records. Participant and organisation names are omitted below, and participant descriptions are given at a level intended to convey the perspective represented without unnecessarily identifying the individual.

Published external evidence (such as CSO and Eurostat statistics, or company disclosures) is not reproduced in this appendix. Those sources are cited conventionally in the main report.

2. Expert interviews

The study included 30 semi-structured interviews involving 35 participants, conducted between 6 and 27 July 2026. The interviews provided perspectives from research and technology organisations, enterprise and sector agencies, industry representative bodies, sector specialists and Accenture subject-matter experts.

Some interviews were designed around a particular sector or subsector, while others provided a cross-sector perspective relevant to several parts of the study. The identifiers below are the published reference for evidence drawn from these discussions.

2.1 Interview coverage

Study area	Interviews	Participants
Manufacturing (and specific subsectors)	13	15
Construction	5	6
Tourism	4	5
ICT services	3	3
Cross-sector	5	6
Total	30	35

2.2 Pseudonymised interview register

Interview ID	Study area / principal lens	Participant type	Participants
MFG-01	Manufacturing – cross-sector manufacturing	Research and technology organisation	1
MFG-02	Manufacturing – cross-sector manufacturing	Research and technology organisation	1
MFG-03	Manufacturing – advanced manufacturing and industrial solutions	State enterprise agency	1
MFG-04	Manufacturing – technology, R&D and manufacturing systems	Research and technology organisation	1
MFG-05	Manufacturing – innovation, R&D and multinational enterprise perspective	State enterprise agency	1
MFG-06	Manufacturing – engineering and industrial products	State enterprise agency	1
FOOD-01	Manufacturing – food and drink	Industry representative body	3
FOOD-02	Manufacturing – food and drink, including dairy	State enterprise agency	1

Interview ID	Study area / principal lens	Participant type	Participants
FOOD-03	Manufacturing – food and beverage	Accenture subject-matter expert	1
FOOD-04	Manufacturing – food, drink and consumer goods	Accenture subject-matter expert	1
MED-01	Manufacturing – medical devices	State enterprise agency	1
PHARMA-01	Manufacturing – pharmaceuticals and life sciences	Accenture subject-matter expert	1
LS-01	Manufacturing – life sciences and health technology	State enterprise agency	1
CON-01	Construction – major projects and data-centre infrastructure	Accenture subject-matter expert	1
CON-02	Construction – major infrastructure	Accenture subject-matter expert	1
CON-03	Construction – high-tech construction and indigenous exporters	State enterprise agency	1
CON-04	Construction – specialist contracting	Industry representative body	1
CON-05	Construction – homebuilding, modern methods of construction and digitalisation	State enterprise agency	2
TOUR-01	Tourism – sector-wide and destination perspective	Industry representative / sector specialist	2
TOUR-02	Tourism – sector development	State tourism body	1
TOUR-03	Tourism – passenger transport	Accenture subject-matter expert	1
TOUR-04	Tourism – digital and AI adoption among destination and experience providers	Accenture subject-matter expert	1
ICT-01	ICT services – sector-wide transformation	Industry representative body	1
ICT-02	ICT services – fintech, cybersecurity and enterprise solutions	State enterprise agency	1
ICT-03	ICT services – technology and multinational enterprise perspective	State enterprise agency	1
XS-01	Cross-sector – applied AI and data capability	Research and technology organisation	2
XS-02	Cross-sector – small firms	Industry representative body	1
XS-03	Cross-sector – foreign direct investment and multinational enterprises	State enterprise agency	1
XS-04	Cross-sector – enterprise AI strategy and traded sectors	State enterprise agency	1
XS-05	Cross-sector – micro and small enterprises	Local enterprise delivery body	1

The research retained different forms of interview record, including verbatim transcripts, reconstructed records and contemporaneous written notes. These provenance distinctions are held internally and were taken into account when evidence was analysed and quoted, as described in Appendix A. The table above therefore identifies the research interaction rather than the form of the underlying record.

Where a finding is supported by more than one interview, all material interviews are cited together:

Interviews MFG-01, MFG-04, MFG-06.

Where a direct quotation appears, the underlying research record was checked to confirm that the wording is supported by the relevant provenance record.

3. Sector workshops

Four sector workshops were conducted across 24 and 25 July 2026. They brought together 166 external participants from enterprises, policy and enterprise agencies and industry representative organisations, together with nine Accenture industry or AI subject-matter experts, giving 175 participants overall.

The Manufacturing and ICT workshops were held in person at Accenture's innovation hub in Dublin.

The Tourism and Construction workshops were conducted virtually through Microsoft Teams.

Participants worked in sector or subsector breakout groups so that emerging findings could be tested against the characteristics of different parts of each sector. The groups are named below as they appear in citations, together with the short source identifier used in the internal research record.

3.1 Workshop coverage

Workshop ID	Sector	Format	Participants			
			External participants	Accenture SMEs	Total participants	Breakout groups
WS-MFG	Manufacturing	In person	46	3	49	5
WS-TOUR	Tourism	Virtual	48	1	49	6
WS-CON	Construction	Virtual	45	3	48	5
WS-ICT	ICT services	In person	27	2	29	3
Total			166	9	175	19

Across the four workshops, the 166 external participants comprised 93 enterprise participants, 42 representatives of policy bodies or enterprise agencies and 31 representatives of trade or industry organisations.

3.2 Manufacturing workshop breakout groups

Breakout group as cited	Source ID	External participants
Manufacturing – Pharmaceuticals & Chemicals	WS-MFG-PHARMA	8
Manufacturing – Medical Devices	WS-MFG-MEDDEV	8
Manufacturing – Computer and Electronics	WS-MFG-COMP	8
Manufacturing – Engineering	WS-MFG-ENG	9
Manufacturing – Food and Beverages	WS-MFG-FB	13
Total		46

3.3 Tourism workshop breakout groups

Breakout group as cited	Source ID	External participants
Tourism – Accommodation	WS-TOUR-ACCOM	9
Tourism – Food and Beverage Services	WS-TOUR-FB	8
Tourism – Transport, Travel & Tour Operators Group 1	WS-TOUR-TTTO1	8
Tourism – Transport, Travel & Tour Operators Group 2	WS-TOUR-TTTO2	6
Tourism – Cultural	WS-TOUR-CULT	10
Tourism – Sports and Recreation	WS-TOUR-SPORT	7
Total		48

3.4 Construction workshop breakout groups

Breakout group as cited	Source ID	External participants
Construction – Building Construction Group 1	WS-CON-BUILD1	9
Construction – Building Construction Group 2	WS-CON-BUILD2	9
Construction – Civil Engineering	WS-CON-CIVIL	9
Construction – Specialised Trades Group 1	WS-CON-SPEC1	9
Construction – Specialised Trades Group 2	WS-CON-SPEC2	9
Total		45

3.5 ICT services workshop breakout groups

Breakout group as cited	Source ID	External participants
ICT – SaaS Companies	WS-ICT-SAAS	9
ICT – ICT-Enabled Services Group 1	WS-ICT-EN1	9
ICT – ICT-Enabled Services Group 2	WS-ICT-EN2	9
Total		27

Where evidence relates to a particular breakout group, the group is cited by name:

Workshop: Manufacturing – Engineering.

Where a finding reflects the workshop more generally, or emerged through plenary discussion and synthesis across several groups, the whole workshop is cited instead:

Workshop: Manufacturing sector workshop.

Workshop participant counts are not votes or statistical sample sizes. As Appendix A describes, the workshops were designed to validate, challenge and enrich the emerging findings rather than to establish representative levels of support for individual propositions.

4. Open enterprise consultation

The open enterprise consultation was hosted online by Accenture between 13 and 28 July 2026, with dissemination managed by DETE through enterprise agencies, industry bodies and relevant stakeholder networks.

The final dataset contained 272 valid responses, of which 208 fell within the four sectors directly covered by the study.

4.1 Consultation response base

Source ID	Sector	Valid respondents
CONS-MFG	Manufacturing	39
CONS-TOUR	Tourism	106
CONS-CON	Construction	11
CONS-ICT	ICT services	52
CONS-OTHER	Other sectors	64
CONS-ALL	All responses	272

The consultation contained both structured and open-text questions. Valid response bases differ across individual measures, because respondents did not necessarily answer every question substantively. Structured findings are unweighted throughout and describe the participating firms rather than the enterprise population as a whole.

Quantitative findings carry the relevant response base with the citation:

Open enterprise consultation, Tourism respondents (n=106).

Open-text responses provided qualitative evidence on current uses of AI, opportunities, barriers and support needs. Where the report

describes a pattern across those responses, the citation names the consultation and the relevant respondent base rather than the internal coding register:

Open enterprise consultation, manufacturing respondents.

Where a single response is quoted or discussed as an individual example, the citation uses the stable pseudonymous identifier retained in the research record, in the form CONS-####. This appendix does not reproduce a respondent-level list, since doing so would add limited analytical value and could increase disclosure risk. The mapping from consultation identifiers to raw responses and coded observations is held internally.

5. Steering Group review input

Steering Group members provided written comments on the draft report during August and early September 2026. Most addressed drafting, emphasis, balance and factual accuracy and are not separately cited. A small number introduced substantive sector knowledge not otherwise present in the primary

research, and these are cited in the report as Steering Group review input. Consistent with the conventions set out above, individual reviewers are not named, and the link between each citation and the underlying comment is retained in the study's internal research record.

6. Policy and enterprise-support materials

The policy analysis drew on compendiums, inventories and supplementary material supplied by DETE describing existing enterprise supports and related AI, digitalisation, skills, innovation and business-transformation provision.

These materials are the cited source. In this report they appear as: "Policy compendium".

The relevant programmes described in the prose are then provided in the footnotes.

These policy compendium materials were used descriptively, as explained in Appendix A. Their inclusion indicates that provision was visible in the material reviewed; it does not establish programme awareness or impact.

7. Global AI use-case library

As laid out in Appendix A, the study compiled a library of AI use cases documented across the value chains of each sector in scope, drawn from published company disclosures, vendor and technology-provider material, industry reporting and academic research. Its purpose was to establish what is already commercially demonstrable internationally, not to measure adoption in Ireland.

For each application, the library records the value-chain stage and activity it belongs to, the primary AI modality it relies on, its assessed

impact on value creation, the firm sizes to which it is most relevant, and the company or companies associated with it.

Library coverage

Company examples in the sector chapters are drawn from this library. Each rests on a public source, and that source is cited in the main report; the library identifier is not reproduced in the report itself.

Source ID	Sector or subsector	Applications documented
UC-PHARMA	Manufacturing – pharmaceuticals and chemicals	62
UC-MEDDEV	Manufacturing – medical devices	59
UC-ELEC	Manufacturing – computer and electronics	57
UC-FOOD	Manufacturing – food and beverages	77
UC-ENGIN	Manufacturing – engineering	60
UC-CON	Construction	62
UC-TOUR	Tourism	150
Total		527

Where the report instead describes a pattern across the library (e.g. how documented applications distribute across value-chain stages, firm-size relevance, AI modalities or assessed impact) the library is the source, and an example citation is as follows:

Use case library analysis, medical devices.

Assessments of impact on value creation and of firm-size relevance are analytical judgements made by the research team against the documented characteristics of each application. They indicate what the documented applications imply about where value is concentrated, not observed outcomes for firms in Ireland.

8. Relationship between published citations and the internal evidence trail

The source identifiers in this appendix provide the public-facing level of traceability for the study. More granular evidence records are retained separately for internal review and fact-checking.

For interviews, each coded observation retains its original identifier and its link to the interview from which it was derived. Thus, for example, MFG-01-06 and MFG-01-07 remain distinct analytical observations internally but both map to the published source MFG-01.

The same principle applies to workshop notes and consultation responses. Published references identify the underlying research interaction at the most useful level for the reader, while internal records retain the more detailed link to individual observations, quotations, question responses and source records.

This approach allows the published report to avoid references to unpublished analytical workbooks while preserving a more detailed evidence trail for review.

References

- 1 Eurostat, *Skills for the digital age*, 2025 data, dataset isoc_sk_dskl_i21.
- 2 Enterprise digital-intensity results are from DETE/CSO analysis of the Survey on ICT Usage and E-commerce in Enterprises 2025
- 3 Central Statistics Office, ICT Usage by Enterprises, Information Society Statistics – Enterprises 2023-25. The survey covers firms with at least ten persons engaged, meaning that the 20% figure is not an economy-wide enterprise adoption rate and does not describe Ireland’s large population of micro firms.
- 4 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026, pp. 10, 16 and 46. The Irish employee sample comprised 194 respondents in 2026 and 409 in 2024
- 5 CSO, Business Demography (BRA31), 2023.
- 6 DETE analysis of the Credit Demand Survey, Question 76, weighted results for micro enterprises: Construction valid n=109; Manufacturing valid n=94. The question covers AI use over 2022–2024. The Credit Demand Survey and the CSO enterprise survey use different questions, sector mappings, weighting methods and firm-size definitions, so their figures should not be joined into a single series.
- 7 Open enterprise consultation. The consultation contained 272 valid completed responses and was self-selected and unweighted. The results are descriptive and should not be interpreted as population estimates.
- 8 CSO, data from *Survey on ICT Usage and E-commerce in Enterprises* (2025), AI analysis by sector prepared for DETE. Covers enterprises with ten or more persons engaged. Manufacturing is high-level manufacturing, sector C; construction is NACE F; tourism is a proxy grouping following Fáilte Ireland’s definition (covers accommodation; food and beverage services; selected passenger transport and rental activities; travel agencies and tour operators; cultural activities; and sport and recreation). The statistical tourism proxy is narrower than the study’s analytical tourism scope because equivalent enterprise data are not available for all activities.
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- 23 OECD, ‘The agentic AI landscape and its conceptual foundations,’ OECD Artificial Intelligence Papers No. 56, February 13, 2026 ([The agentic AI landscape and its conceptual foundations | OECD](#)).
- 24 Use case library analysis, all sectors.
- 25 Central Statistics Office, *Business in Ireland 2023 – Insights on the Lifecycle of Businesses*, 15 December 2025.

- 26 CSO, BRA31, *Business Demography NACE Rev. 2 by Activity and Employment Size*, 2023, compiled in the project's sectoral profiles. Manufacturing comprises chemicals and pharmaceuticals; food, beverages and tobacco; computer, electronic and optical products; and engineering. Medical devices are not separately identifiable in the open BRA31 data.
- 27 CSO data provided by the Department of Enterprise, Tourism and Employment; [A New Era for Irish Tourism: National Tourism Policy Statement](#), 2025, pp. 11–14. Tourism-related enterprise estimates are currently being reviewed by the Department of Enterprise, Tourism and Employment's Tourism Unit and the Central Statistics Office. A new Data and Insights Delivery Stream was established on 29 July 2026 under the Tourism Policy Oversight Group as part of the implementation of *A New Era for Irish Tourism*. This work is intended to strengthen the evidence base for tourism policy and may lead to revised datasets or methodologies covering the number and economic contribution of tourism-related enterprises, as well as their digital and AI adoption. The figures used in this report therefore represent the best available proxy at the time of writing, based on NACE-code methodology and consistent with the approach used elsewhere in the sector analysis.
- 28 CSO, *Business Demography (BRA31)*, 2023
- 29 Irish Tourism Industry Confederation and TOPOSOPHY, [Irish Tourism and the AI Journey: The Impact of Artificial Intelligence on Irish Tourism](#), May 2026. The survey covered 73 organisations associated with ITIC; 62% reported using AI in day-to-day operations, 52% described their adoption as early or experimental and 5% as extensively integrated. For comparison, DETE/CSO analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025* estimates AI use at 14.9% for the tourism proxy (n=225). The CSO-based estimate covers enterprises with ten or more persons engaged and excludes micro enterprises. Tourism is a constructed proxy comprising selected accommodation, food and beverage, passenger-transport, rental, and travel-agency and tour-operator activities rather than a single NACE sector. The statistical proxy used for enterprise-technology analysis is narrower than the study's analytical tourism scope because equivalent enterprise data are not available for all activities.
- 30 ibid
- 31 See Appendix A of this report. The quantitative analysis draws on multiple datasets rather than combining them into a single synthetic measure of AI maturity. The principal CSO enterprise technology survey excludes micro enterprises, while the Credit Demand Survey and stakeholder research cover different populations and use different methodologies. They are therefore interpreted separately and triangulated with interviews, consultation responses and workshops.
- 32 Eurostat, *Skills for the digital age*, 2025 data, dataset isoc_sk_dskl_i21.
- 33 Enterprise digital-intensity results are from DETE/CSO analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*
- 34 Central Statistics Office, *ICT Usage by Enterprises*, Information Society Statistics – Enterprises 2023–25. The survey covers firms with at least ten persons engaged, meaning that the 20% figure is not an economy-wide enterprise adoption rate and does not describe Ireland's large population of micro firms.
- 35 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026, pp. 10, 16 and 46. The Irish employee sample comprised 194 respondents in 2026 and 409 in 2024
- 36 The Working in Ireland Survey, [Gen AI Use in Work: its reach, effects, risks and limits. Findings from the Working in Ireland Survey, 2025](#).
- 37 CSO, *Business Demography (BRA31)*, 2023.
- 38 DETE analysis of the Credit Demand Survey, Question 76, weighted results for micro enterprises: Construction valid n=109; Manufacturing valid n=94. The question covers AI use over 2022–2024. The Credit Demand Survey and the CSO enterprise survey use different questions, sector mappings, weighting methods and firm-size definitions, so their figures should not be joined into a single series. They nevertheless point in the same direction: excluding micro firms leaves out a materially less mature part of the enterprise base.
- 39 [Expert Group on Future Skills Needs, Skills Insights Note 2026-3 The Irish Labour Market and AI in 2026](#)
- 40 *AI Maturity Outputs*, 7 August 2026, Table 4.
- 41 Open enterprise consultation. The consultation contained 272 valid completed responses and was self-selected and unweighted. The digital-readiness cross-cut uses n=271 for firm size; the connected and integrated group contained 59 respondents and the basic or mainly analogue group 21. The relationships are descriptive and do not establish causality or population prevalence
- 42 DETE Enterprise Survey 2026
- 43 DETE/CSO analysis
- 44 DETE/CSO preliminary manufacturing-subsector analysis
- 45 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026 . The task-based estimates combine occupational data, AI-capability mapping and empirical usage evidence. They are scenario-based and use broad occupational groupings that do not correspond exactly to this study's sector definitions
- 46 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026. The executive survey was conducted in February–March 2026 and included 57 respondents from the Republic of Ireland, with representation across mid-market and large enterprises.
- 47 We estimate the proportion of working time in scope for AI augmentation using a task-based framework that integrates occupational data, AI capability mapping and empirical usage evidence. Tasks are assessed against critical human inputs (judgement, unpredictability, accountability, implicit knowledge and risk) and mapped to relevant AI modalities. Task-level estimates are then aggregated to the occupational level using task frequency weights. To estimate potential economic value by industry, we connect task-level AI performance to financial outcomes across two channels: time savings and quality improvements. These are translated into industry-level estimates using occupational composition, wage benchmarks and revenue data. We model adoption trajectories using diffusion-style curves calibrated to observable readiness signals, reflecting that value accrues over time rather than immediately. Results are presented across two lenses: AI-driven labour impact and AI-driven revenue uplift. All outputs are scenario-based and should be interpreted as potential value under stated assumptions; actual outcomes depend on execution, governance and sustained adoption.
- 48 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026.
- 49 Accenture, [Generating Impact: Turning frontier AI capabilities into frontline productivity and growth in Ireland](#), 2026.
- 50 Interview CON-01.
- 51 Open enterprise consultation, small tourism enterprise, travel and tour operations.
- 52 Goldman Sachs Research, [AI Agents Forecast to Boost Tech Cash Flow as Usage Soars](#), 20 May 2026 ([AI Agents Forecast to Boost Tech Cash Flow as Usage Soars | Goldman Sachs](#)). Goldman Sachs estimates that agentic-AI token consumption will increase 24-fold between 2026 and 2030, reaching approximately 120 quadrillion tokens per month.

- 53 Accenture analysis and client experience, 2026. Accenture estimates that 10–20% of enterprise tasks across industries require frontier or near-frontier model capability. Application of model routing, tuning and workflow redesign reduced annual AI expenditure by 68% for one telecommunications operator. ([AI Tokenomics for Enterprise Value | Accenture](#))
- 54 Open enterprise consultation, small tourism enterprise, accommodation and sports or recreation
- 55 Interviews MFG-03, TOUR-01.
- 56 Open enterprise consultation, large construction supplier or manufacturer. The response identified interconnected data, skills, cost, governance and organisational barriers and described scaling across a multi-site organisation as the central challenge.
- 57 Interviews MFG-01, MFG-04, XS-02
- 58 Azmia Riaz, ‘We started seeing people with six fingers’– Dublin pub bans AI posters to support independent artists’, 23 June 2026 ([‘We started seeing people with six fingers’– Dublin pub bans AI posters to support independent artists | Irish Independent](#))
- 59 Accenture Research analysis of DETE policy compendium.
- 60 Department of Enterprise, Tourism and Employment, ‘Granting funds that may involve State Aid’ ([Granting funds that may involve State Aid - DETE](#)); Commission Regulation (EU) 2023/2831 on de minimis aid ([Regulation - EU - 2023/2831 - EN - EUR-Lex](#)); European Commission, ‘State aid Regulations’ ([Regulations - Competition Policy - European Commission](#)). The general de minimis ceiling is €300,000 to a single undertaking over any three-year period. AI adoption does not have a separate general exemption category and must fit an applicable State aid route.
- 61 Revenue, ‘Capital allowances and deductions’ ([Capital allowances and deductions](#)); ‘Revenue, Research and Development (R&D) Corporation Tax Credit – Qualifying criteria’ ([Qualifying criteria](#)). Capital allowances may apply to qualifying expenditure on assets including computer software and plant and machinery. To qualify for the R&D Corporation Tax Credit, activities must meet specified criteria, including seeking scientific or technological advancement.
- 62 Construction workshop.
- 63 Use case library analysis, pharmaceuticals and chemicals.
- 64 Extremes cited: [Moderna](#); [Amgen](#)
- 65 See: [Exscientia](#)
- 66 See: [Qualifyze](#)
- 67 See: [Roche](#)
- 68 See: [Merck](#)
- 69 See: [Boehringer Ingelheim](#); [Moderna](#)
- 70 Use case library analysis, pharmaceuticals and chemicals.
- 71 Use case library analysis, pharmaceuticals and chemicals.
- 72 BRA31 – Business Demography NACE Rev. 2 by Activity and Employment Size, 2023.
- 73 Expert Group on Future Skills Needs (2024), [Skills for Biopharma :Researching and Forecasting the Current and Future Skills Needs of the Biopharma Sector in Ireland to 2027](#)
- 74 Central Statistics Office, preliminary analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*, supplied to the Department of Enterprise, Tourism and Employment, 21 July 2026. The tabulations cover enterprises with ten or more persons employed and do not include micro enterprises. Results are preliminary; subgroup samples are small and margins of error are substantial, so the figures should be treated as directional.
- 75 Interview PHARMA-01.
- 76 Interview PHARMA-01.
- 77 Interviews MFG-01, MFG-04, MFG-05.
- 78 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 79 Interview PHARMA-01.
- 80 See: [Aizon](#); See: [Zydus Lifesciences](#)
- 81 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 82 Interview PHARMA-01; Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 83 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 84 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 85 Interview PHARMA-01.
- 86 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 87 See: [Boehringer Ingelheim](#); Interview PHARMA-01.
- 88 See: [Exscientia](#); [Amgen](#); [Nature](#); [Roche](#); [Controlant](#)
- 89 Interview PHARMA-01.
- 90 Interview PHARMA-01.
- 91 Workshop: Manufacturing – Pharmaceuticals & Chemicals. Interview MFG-05.
- 92 Open enterprise consultation, manufacturing respondents. Interview PHARMA-01.
- 93 Policy compendium. Open enterprise consultation, manufacturing respondents. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 94 Interviews MFG-01, MFG-05.
- 95 Allotrope Foundation, [Allotrope Data Format](#); SiLA, [SiLA 2 Standard](#); OPC Foundation, [Laboratory and Analytical Device Standard](#). The available Irish evidence does not establish the extent of adoption of these standards in Irish plants.
- 96 Policy compendium: Local Enterprise Offices, Digital for Business; Grow Digital Voucher (up to €5,000 towards eligible software, training and IT configuration following a Digital for Business assessment). Policy compendium: Enterprise Ireland, Capital Funding Support (maximum grant €250,000); Cyber Security Review Grant (80% contribution towards a defined €3,000 review). Policy compendium: IDA Ireland, Business Asset Grant (up to €250,000 under de minimis rules).
- 97 Policy compendium: Pharmaceutical Manufacturing Technology Centre; Technology Gateway PMBrc – Pharmaceutical & Healthcare; EDIH – CeADAR; EDIH – FactoryxChange.
- 98 Interview MFG-05; Interview LS-01; Open enterprise consultation, manufacturing respondents.
- 99 Workshop: Manufacturing – Pharmaceuticals & Chemicals; Interviews MFG-04, MFG-05.
- 100 Interviews LS-01, MFG-02, MFG-05, PHARMA-01. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 101 Workshop: Manufacturing – Medical Devices. Interviews MED-01, MFG-04.
- 102 Policy compendium: Skillnet Ireland – Bio Pharma Chem Skillnet, UCD PA Diploma in Artificial Intelligence for Business; UCD PA Skill Sprints in Change Management & AI, Generative AI, Boosting Productivity with AI, and AI Prompt Engineering with Microsoft 365 Copilot; Industry 4.0 Skillnet, AI MASTERY for Industry; Technology Ireland Digital Skillnet, AI Capability Accelerator for Senior Leaders and DataSMART. Skillnet inventory point-in-time, validated 17 July 2026.

- 103 Policy compendium: Enterprise Ireland, Build Capability (€5,000–€70,000 for non-routine strategic training); Training Funding Support; Spotlight on Skills; Key Manager Support. Policy compendium: IDA Ireland, Training Grant (up to 50%, maximum grant €3 million).
- 104 GMP is a regulatory framework governing how medicines and their ingredients are manufactured, covering premises, equipment, personnel, documentation, validation and quality control, and enforced in Ireland by the Health Products Regulatory Authority under EU law.
- 105 Workshop: Manufacturing – Pharmaceuticals & Chemicals. Interviews MFG-01, MFG-04, PHARMA-01.
- 106 Workshop: Manufacturing – Pharmaceuticals & Chemicals. Interview PHARMA-01.
- 107 Policy compendium: Enterprise Ireland, Cyber Security Review Grant; Access Advice: IP Start; Innovation Partnership Programme; Exploring Innovation Grant. Policy compendium: IDA Ireland, RD&I Feasibility Grant. Policy compendium: Further and Higher Education AI inventory, AI Legal and Ethical Considerations (non-exhaustive, point-in-time).
- 108 Interview PHARMA-01; Interviews MFG-02, MFG-05; Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 109 Steering Group review input
- 110 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 111 Interviews MFG-01, MFG-02.
- 112 Interviews MFG-02, MFG-05, PHARMA-01. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 113 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 114 Policy compendium: Enterprise Ireland, AI and Digital Pathfinder tool; Access Advice: Digital Discovery (up to 80% grant aid to a maximum of €5,000 for three to seven days of expert support); Strategic Consultancy Grant/Strategic Consultancy Assignment; Digital Process Innovation (50% of eligible expenditure, maximum grant €150,000, covering internal implementation time, external expertise and project costs); Operational Excellence.
- 115 Policy compendium: IDA Ireland, Advanced Manufacturing Diagnostic; Business Development Programme – Digitalisation Consultancy Grant (consultancy costs considered up to €300,000); Lean/Digitalisation – LeanStart, LeanPlus and LeanTransform.
- 116 Steering Group review input
- 117 Workshop: Manufacturing – Pharmaceuticals & Chemicals. Interview LS-01.
- 118 Interview PHARMA-01; Open enterprise consultation: manufacturing respondents; Interview MFG-05.
- 119 Interviews MFG-04, MFG-05, PHARMA-01. Workshop: Manufacturing – Pharmaceuticals & Chemicals. Open enterprise consultation: manufacturing respondents.
- 120 Interviews LS-01, MFG-01, MFG-05. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 121 Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 122 Policy compendium: Local Enterprise Offices, Feasibility Study Grant (up to 50% of eligible expenditure, maximum €15,000); Priming Grant; Business Expansion Grant. Enterprise Ireland, Exploring Innovation Grant (maximum €35,000); Innovation Vouchers (standard €10,000, co-funded to €20,000); Innovation Partnership Grants; RDI Fund; Capital Funding Support. Disruptive Technologies Innovation Fund; Horizon Europe.
- 123 Policy compendium: IDA Ireland, RD&I Grant and RD&I Feasibility Grant; Business Asset Grant; Training Grant. Eligibility for RD&I support requires compliance with EU State Aid rules and recognised research and development definitions, and does not extend to adoption of an available product.
- 124 Interviews LS-01, MFG-05. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 125 Interviews MFG-01, MFG-04, MFG-05, PHARMA-01. Workshop: Manufacturing – Pharmaceuticals & Chemicals.
- 126 Use case library analysis, medical devices.
- 127 Eurostat, *Structural Business Statistics*, 2024, medical and dental instruments and supplies.
- 128 See: [NuVasive](#)
- 129 See: [Geistlich Pharma](#)
- 130 See: [BD](#)
- 131 See: [Cognex](#)
- 132 See: [Siemens Healthineers](#)
- 133 See: [Abbott](#); [Johnson & Johnson](#)
- 134 See: [Siemens Opcenter](#); [Cognex](#); [Siemens Healthineers](#)
- 135 Use case library analysis, medical devices.
- 136 Use case library analysis, medical devices.
- 137 Eurostat, *Structural Business Statistics*, 2024, medical and dental instruments and supplies.
- 138 Eurostat, *Structural Business Statistics*, 2024, medical and dental instruments and supplies.
- 139 Department of Enterprise, Tourism and Employment, Annual Business Survey of Economic Impact 2024, medical devices. ABSEI covers agency-assisted firms rather than the full enterprise population; excluding micro firms, its coverage of medtech is comparatively strong.
- 140 Workshop: Manufacturing – Medical Devices. Interview MFG-05.
- 141 Central Statistics Office, preliminary analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*, supplied to the Department of Enterprise, Tourism and Employment, 21 July 2026. The tabulations cover enterprises with ten or more persons employed and do not include micro enterprises. The medical-devices sample contains 31 enterprises; the small-firm estimate is suppressed because the subgroup contains four respondents. Results are preliminary and should be treated as directional. Steering Group review input.
- 142 Interview MED-01.
- 143 Workshop: Manufacturing – Medical Devices.
- 144 Workshop: Manufacturing – Medical Devices.
- 145 Interview MFG-05.
- 146 Interview MFG-05.
- 147 Workshop: Manufacturing – Medical Devices.
- 148 Interview MED-01. Workshop: Manufacturing – Medical Devices.
- 149 See: [Cognex](#); [Laerdal](#)
- 150 Workshop: Manufacturing – Medical Devices.
- 151 See: [Workday](#); [Abbott](#)
- 152 Interview MED-01.
- 153 Workshop: Manufacturing – Medical Devices.
- 154 Interview MED-01.
- 155 Workshop: Manufacturing – Medical Devices.
- 156 See: [Geistlich Pharma](#)
- 157 See: [Siemens Opcenter](#); [Siemens Healthineers](#)
- 158 Interview MED-01.
- 159 Interview MED-01.

- 160 Interview MED-01.
- 161 Interviews MFG-05, MFG-03.
- 162 Workshop: Manufacturing – Medical Devices. Interview MED-01.
- 163 Workshop: Manufacturing – Medical Devices. Policy compendium.
- 164 Steering Group review input.
- 165 Workshop: Manufacturing – Medical Devices.
- 166 Policy compendium: Enterprise Ireland, AI and Digital Pathfinder tool; Access Advice: Digital Discovery (up to 80% grant aid to a maximum of €5,000 for three to seven days of expert support; eligible Irish-owned manufacturing firms with ten or more employees, and high-potential start-ups); Digital Process Innovation (50% of eligible expenditure, maximum grant €150,000, covering internal implementation time, external expertise and project costs). Policy compendium: IDA Ireland, Business Development Programme – Digitalisation Consultancy Grant (consultancy costs considered up to €300,000). Policy compendium: EDIH – FactoryxChange.
- 167 Interview MED-01.
- 168 Workshop: Manufacturing – Medical Devices. Interview MED-01. Interview MFG-05. Steering Group review input.
- 169 Workshop: Manufacturing – Medical Devices.
- 170 Interview MED-01.
- 171 Policy compendium: Local Enterprise Offices, Digital for Business; Grow Digital Voucher (up to €5,000 towards eligible software, training and IT configuration following a Digital for Business assessment). Policy compendium: Enterprise Ireland, Capital Funding Support (maximum grant €250,000); Cyber Security Review Grant (80% contribution towards a defined €3,000 review against the National Cyber Security Centre framework). Policy compendium: IDA Ireland, Business Asset Grant (up to €250,000 under de minimis rules).
- 172 Policy compendium: research and technology infrastructure – Irish Manufacturing Research; CeADAR; MCC; Technology Gateways MET – Medical Technology and Smarter Factory; EDIH – ENTIRE.
- 173 Workshop: Manufacturing – Medical Devices. Interviews MFG-04, MFG-05.
- 174 Workshop: Manufacturing – Medical Devices. Interview MED-01.
- 175 Policy compendium: Skillnet Ireland – Irish Medtech Skillnet, Data Analytics & Machine Learning (delivered with TUS Shannon, based on industrial datasets); Software as a Medical Device Suite of Micro Topics; Industry 4.0 Skillnet, Diploma in Manufacturing Automation and AI MASTERY for Industry; Technology Ireland Digital Skillnet, AI Capability Accelerator for Senior Leaders.
- 176 Policy compendium: Enterprise Ireland, Build Capability (€5,000–€70,000 for non-routine strategic training); Training Funding Support; Grad Start; Key Manager Support. Policy compendium: IDA Ireland, Training Grant (up to 50%, maximum grant €3 million). SOLAS. DFHERIS.
- 177 Workshop: Manufacturing – Medical Devices.
- 178 Workshop: Manufacturing – Medical Devices; Interview MED-01.
- 179 Workshop: Manufacturing – Medical Devices.
- 180 Policy compendium: Local Enterprise Offices, Feasibility Study Grant (up to 50% of eligible expenditure, maximum €15,000). Policy compendium: Enterprise Ireland, Exploring Innovation Grant (maximum €35,000); Innovation Vouchers (standard €10,000; co-funded up to €20,000); RDI Fund.
- 181 Policy compendium: IDA Ireland, RD&I Grant and RD&I Feasibility Grant; eligibility requires compliance with EU State Aid rules and recognised research and development criteria, and excludes adoption of an available product.
- 182 Interview MED-01; Interview MFG-05; Workshop: Manufacturing – Medical Devices.
- 183 Workshop: Manufacturing – Medical Devices; Interview MED-01; Interviews MFG-04, MFG-05.
- 184 Workshop: Manufacturing – Medical Devices.
- 185 Policy compendium: Enterprise Ireland, Cyber Security Review Grant; Innovation Partnership Programme; EDIH – ENTIRE. Policy compendium: Skillnet Ireland, Irish Medtech Skillnet – Software as a Medical Device Suite of Micro Topics. Policy compendium: Technology Gateway PMBrc – Pharmaceutical & Healthcare. Policy compendium: Further and Higher Education AI inventory (non-exhaustive, point-in-time).
- 186 Interview MED-01; Interview MFG-05; Interview MFG-02.
- 187 Workshop: Manufacturing – Medical Devices; Interview MED-01; Interviews MFG-01, MFG-02.
- 188 The chapter covers NACE C26 (manufacture of computer, electronic and optical products) and follows the value chain from electronics and semiconductor design, PCB and product engineering, firmware and embedded software through component sourcing, surface-mount assembly, production, test, inspection and yield optimisation to distribution, technical support and repair. Embedded software is included where it forms part of product development and manufacturing; software and ICT services, electrical equipment outside C26 and the other manufacturing subsectors addressed separately in the study are excluded.
- 189 Central Statistics Office, [BRA31 – Business Demography NACE Rev. 2](#), 2023. Enterprise and employment figures are for 2023.
- 190 Workshop: Manufacturing – Computer and Electronics.
- 191 See: [AMD](#); [Synopsisys](#). Use case library analysis, computer and electronics.
- 192 See: [Altium](#); [Synopsisys](#).
- 193 See: [Synopsisys](#).
- 194 See: [Siemens](#)
- 195 See: [Panasonic](#).
- 196 See: [Intel](#).
- 197 See: [Pegatron](#). Outcomes in the source are company-/vendor-reported.
- 198 See: [Dell](#).
- 199 See: [AMD](#). The outcome is vendor-reported.
- 200 Interviews MFG-01, MFG-02, MFG-03, MFG-04.
- 201 See: [Synopsisys](#); [EmbedGenius: Towards Automated Software Development for Generic Embedded IoT Systems](#); [Linxens](#).
- 202 See: [ASMPT](#); [Omron](#); [Siemens](#).
- 203 See: [Linxens](#).
- 204 Central Statistics Office, [BRA31 – Business Demography](#), 2023, manufacture of computer, electronic and optical products, active enterprises and persons employed by employment-size class. Calculations are unweighted shares from the published counts
- 205 Department of Enterprise, Tourism and Employment, Annual Business Survey of Economic Impact 2024, computer, electronic and optical products. ABSEI covers agency-assisted firms, not the full enterprise population.

- 206 Central Statistics Office, preliminary analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*, supplied to the Department of Enterprise, Tourism and Employment, 21 July 2026, Tables 9, 13 and 17. The tabulations cover enterprises with ten or more persons engaged and therefore exclude micro enterprises. Estimated AI use in computer, electronic and optical products was 36.4%, compared with 20.5% across the five manufacturing subsectors in scope. Text, speech or code generation was reported by 19.9% of enterprises and written-language analysis or data mining by 16.8%; image, video or audio generation, workflow automation and machine learning each ranged between 13% and 15%. The firm-size samples were small — 19 small, 13 medium-sized and seven large enterprises — so size comparisons, including the 42.9% reported use of AI in R&D and innovation among large firms, should be treated as indicative. The Digital Intensity Index measures the presence of specified digital technologies and practices; it does not establish that production systems and data are integrated
- 207 Central Statistics Office, preliminary analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*, supplied to the Department of Enterprise, Tourism and Employment, 21 July 2026, Tables 9, 13 and 17. (See above)
- 208 Central Statistics Office, preliminary analysis of the *Survey on ICT Usage and E-commerce in Enterprises 2025*, supplied to the Department of Enterprise, Tourism and Employment, 21 July 2026, Tables 9, 13 and 17. (See above)
- 209 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-01, MFG-02, MFG-03, MFG-04, MFG-05.
- 210 Workshop: Manufacturing – Computer & Electronics.
- 211 See: [Omron](#); [Koh Young](#); [Intel](#); [Applied Materials](#).
- 212 Workshop: Manufacturing – Computer & Electronics.
- 213 Workshop: Manufacturing – Computer & Electronics.
- 214 See: [GitHub](#); [Eightfold](#); [AMD](#).
- 215 See: [Synopsis](#); [Cadence](#); [Altium](#); [GitHub](#).
- 216 See: [EmbedGenius: Towards Automated Software Development for Generic Embedded IoT Systems](#); [Siemens](#); [Siemens](#); [Panasonic](#); [Cisco](#).
- 217 Workshop: Manufacturing – Computer & Electronics.
- 218 Interviews MFG-03, MFG-05. These are retained manufacturing-wide rows describing customer and multinational supply-chain expectations.
- 219 Workshop: Manufacturing – Computer & Electronics (understanding recorded as a precursor barrier; recorded causes included digital literacy and knowing where the firm stands, and the absence of a playbook). Interviews MFG-02, MFG-03, XS-02. Interview evidence is manufacturing-wide rather than specific to computer and electronics manufacturing.
- 220 Interviews MFG-04, MFG-05. Open enterprise consultation: Computer and electronics respondents, valid n=3, one of which contained no substantive open-text evidence; responses are used illustratively and not as a basis for prevalence claims.
- 221 Policy compendium: AIReady.ie. Enterprise Ireland, AI and Digital Pathfinder tool; Access Advice: Digital Discovery (up to 80% grant aid to a maximum of €5,000 for three to seven days of expert support); Strategic Consultancy Grant. IDA Ireland, Advanced Manufacturing Diagnostic; Business Development Programme – Digitalisation Consultancy Grant (consultancy costs considered up to €300,000).
- 222 Policy compendium: Local Enterprise Offices, Feasibility Study Grant (up to 50% of eligible expenditure, maximum €15,000). Enterprise Ireland, Exploring Innovation Grant (maximum €35,000); Digital Process Innovation (50% of eligible expenditure, maximum grant €150,000, covering internal implementation time, external expertise and project costs); Capital Funding Support (maximum grant €250,000). IDA Ireland, Business Asset Grant (up to €250,000 under de minimis rules).
- 223 Policy compendium: IDA Ireland, RD&I Grant; eligibility requires compliance with EU State Aid rules and recognised research and development definitions, and does not extend to adoption of an available product. Interview MFG-05. Workshop: Manufacturing – Computer & Electronics.
- 224 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-04, MFG-05, XS-03, XS-04.
- 225 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-01, MFG-02, MFG-03, MFG-04, MFG-06, XS-01.
- 226 Policy compendium: Skillnet Ireland — MIDAS Electronic Systems Skillnet (Analog IC Design CPD, Digital Design Fundamentals, Learning to Programme in Python, Embedded C and C++); Industry 4.0 Skillnet (AI MASTERY for Industry, Diploma in Manufacturing Automation); Technology Ireland Digital Skillnet (AI Capability Accelerator for Senior Leaders, DataSMART); CILT Mobility and Supply Chain Skillnet. AIReady.ie. Further and Higher Education AI inventory (non-exhaustive, point-in-time). Skillnet provision validated at a point in time and tied to participating networks.
- 227 Policy compendium: Enterprise Ireland, Build Capability (€5,000–€70,000 for non-routine strategic training); Training Funding Support; Spotlight on Skills; GradStart; PhDStart; Operational Excellence. IDA Ireland, Training Grant (up to 50%, maximum grant €3 million); Lean/Digitalisation.
- 228 Interviews ICT-03, MFG-01, MFG-03.
- 229 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-01, MFG-02, MFG-04, XS-02.
- 230 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-01, MFG-02, MFG-03, MFG-04, MFG-05.
- 231 Interviews MFG-04, MFG-05. Workshop: Manufacturing – Computer & Electronics.
- 232 Policy compendium: Local Enterprise Offices, Digital for Business; Grow Digital Voucher (up to €5,000 towards eligible software, training and IT configuration following a Digital for Business assessment).
- 233 Policy compendium: EDIH – ENTIRE; EDIH – FactoryxChange; MCCi; Technology Gateways; Enterprise Ireland, Cyber Security Review Grant (80% contribution towards a defined €3,000 review against the National Cyber Security Centre framework).
- 234 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-03, MFG-05, XS-03.
- 235 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-02, MFG-03, MFG-04, MFG-05.
- 236 Interviews MFG-01, MFG-02, MFG-04. Workshop: Manufacturing – Computer & Electronics.
- 237 Interviews MFG-02, MFG-05, MFG-06.
- 238 Interview MFG-04.

- 239 Policy compendium: Enterprise Ireland, Cyber Security Review Grant (80% contribution towards a defined €3,000 review against the National Cyber Security Centre framework); Access Advice: IP Start and IP Plus. AIReady.ie. Skillnet Ireland, Technology Ireland Digital Skillnet. European Digital Innovation Hubs; Technology Centres. Further and Higher Education AI inventory (non-exhaustive, point-in-time).
- 240 Interviews MFG-01, MFG-05.
- 241 Workshop: Manufacturing – Computer & Electronics. Interviews MFG-01, MFG-04, MFG-05.
- 242 Interviews MFG-01, MFG-02, MFG-04. Open enterprise consultation, manufacturing respondents.
- 243 Interviews MFG-03, MFG-05.
- 244 Policy compendium: Enterprise Ireland, Technology Gateways; Technology Centres; Innovation Vouchers (standard €10,000, co-funded to €20,000); Innovation Partnership Grants; Research, Development and Innovation Fund. Disruptive Technologies Innovation Fund; Horizon Europe. European Digital Innovation Hubs.
- 245 Interview MFG-05.
- 246 Interviews MFG-03, MFG-05. Open enterprise consultation, manufacturing respondents.
- 247 CSO, BRA31 – Business Demography NACE Rev. 2 by Activity and Employment Size, 2023. Note: Tobacco is included with Food and Beverages in C10-C12
- 248 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 249 See: [Swire Coca-Cola](#); [Cargill](#).
- 250 Interview: FOOD-01
- 251 See: [Danone](#); [Kraft Heinz](#).
- 252 Interview FOOD-01.
- 253 See: [Unilever](#);
- 254 See: [Kraft Heinz](#); [Marketpoint](#).
- 255 See: [Swire Coca-Cola](#); [European Brewery](#); [U.S. Food & Beverage Brand](#).
- 256 Interviews FOOD-01, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 257 Interviews FOOD-01, FOOD-04.
- 258 Interviews FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 259 CSO, BRA31 – Business Demography NACE Rev. 2 by Activity and Employment Size, 2023.
- 260 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04. Use case library analysis, food and beverages.
- 261 DETE/CSO preliminary analysis, food and beverages, AI_ANY. Total valid n=90; small n=43; medium n=14; large n=33.
- 262 Interviews FOOD-02, FOOD-03. Workshop: Manufacturing – Food & Beverages.
- 263 Interviews FOOD-01, FOOD-02.
- 264 Interviews FOOD-01, FOOD-02. Workshop: Manufacturing – Food & Beverages.
- 265 Interview FOOD-01. Workshop: Manufacturing – Food & Beverages.
- 266 Workshop: Manufacturing – Food & Beverages. See: [Marel](#); [KPM Analytics](#).
- 267 Workshop: Manufacturing – Food & Beverages. Interview FOOD-01.
- 268 Workshop: Manufacturing – Food & Beverages. Interviews FOOD-01, FOOD-02.
- 269 Workshop: Manufacturing – Food & Beverages. See: [Swire Coca-Cola](#).
- 270 Workshop: Manufacturing – Food & Beverages. Interviews FOOD-02, FOOD-04.
- 271 Interviews FOOD-01, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 272 Interviews FOOD-01, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 273 Interview FOOD-02.
- 274 Interview FOOD-04.
- 275 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04.
- 276 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 277 Interviews FOOD-01, FOOD-02, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 278 Policy compendium: Local Enterprise Offices, *Digital for Business*; *Grow Digital Voucher*. Policy compendium: Enterprise Ireland, *Access Advice: Digital Discovery*; *Exploring Innovation Grant*. Digital for Business provides an expert review of existing digital systems and opportunities; the Grow Digital Voucher provides 50% grant aid, from €500 up to €5,000, for eligible software, training and IT configuration following a completed Digital for Business project. Access Advice: Digital Discovery provides three to seven days of external AI or digital expertise, with support of up to 80% to a maximum of €5,000 for eligible firms; Exploring Innovation Grant can provide up to €35,000 for strategy, feasibility, prototypes and return-on-investment assessment.
- 279 Policy compendium: Skillnet Ireland, Food and Drink Ireland Skillnet, Strategic Management of AI and Digitalisation within the Food and Drink Industry. Policy compendium: IDA Ireland, Advanced Manufacturing Diagnostic (AMD); Business Development Programme (Digitalisation Consultancy Grant). The Skillnet programme covers business outcomes, return on investment, prioritisation, data and analytics foundations, implementation planning and scaling. The IDA Advanced Manufacturing Diagnostic provides a maturity assessment, while the Digitalisation Consultancy Grant can support a transformation roadmap, systems architecture, process maps and implementation plan, with eligible consultancy costs considered case by case up to €300,000.
- 280 Interviews FOOD-01, FOOD-02, MFG-02, MFG-04, MFG-06. Workshop: Manufacturing – Food & Beverages.
- 281 Interviews FOOD-01, FOOD-02, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 282 Interviews FOOD-01, FOOD-02, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 283 Interviews FOOD-02, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 284 Policy compendium: Local Enterprise Offices, *Digital for Business*; *Grow Digital Voucher*. Digital for Business provides an expert assessment of existing systems and digital opportunities. Following a completed Digital for Business project, the Grow Digital Voucher provides 50% grant aid, from €500 up to a maximum of €5,000, towards eligible software, training and IT configuration.
- 285 Policy compendium: Enterprise Ireland, *Digital Process Innovation*; *Capital Funding Support*; EDIH – *FactoryxChange*. Digital Process Innovation can support an internal implementation team, external expertise and project materials, with grant support of 50% of eligible expenditure up to €150,000. Capital Funding Support can contribute towards eligible production equipment, computers, software, licences and technology acquisition. FactoryxChange provides manufacturing-focused digital assessment and test-before-invest support.

- 286 Policy compendium: IDA Ireland, *Lean/Digitalisation – LeanStart; Lean/Digitalisation – LeanPlus; Lean/Digitalisation – LeanTransform*; Business Asset Grant. The Lean/Digitalisation suite provides progressively deeper support from an initial roadmap and improvement assignment through medium-scale digitalisation and multi-year transformation. The Business Asset Grant can contribute towards eligible equipment and technology upgrades.
- 287 Interviews FOOD-01, FOOD-02, MFG-02, MFG-04, MFG-06. Workshop: Manufacturing – Food & Beverages.
- 288 Steering Group review input.
- 289 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 290 Policy compendium: Skillnet Ireland, Food and Drink Ireland Skillnet, *Strategic Management of AI and Digitalisation within the Food and Drink Industry*. The programme covers the technology landscape, business outcomes, data and analytics foundations, return on investment, prioritisation, implementation planning and scaling.
- 291 Policy compendium: Enterprise Ireland, *Build Capability; Grad Start*. Policy compendium: IDA Ireland, *Training Grant*. Build Capability provides between €5,000 and €70,000 for eligible non-routine strategic training, including technology adoption, AI, automation, leadership and organisational development. Grad Start can support eligible firms to recruit graduates for defined growth projects. IDA's Training Grant can provide up to 50% support, subject to a maximum grant of €3 million, for eligible training plans covering areas including AI, data analytics, IoT, robotics, leadership and change management.
- 292 Policy compendium: Skillnet Ireland and Enterprise Ireland skills and capability provision. Interviews FOOD-02, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 293 Interviews FOOD-01, FOOD-02, FOOD-03. Workshop: Manufacturing – Food & Beverages.
- 294 Policy compendium: Local Enterprise Offices, *Lean for Business*. Policy compendium: Enterprise Ireland, *Operational Excellence; Digital Process Innovation*. These measures support process improvement and wider organisational and digital transformation. Digital Process Innovation can include staff time within the internal implementation team, external expertise, overheads and project materials, with grant support of 50% of eligible expenditure up to €150,000.
- 295 Policy compendium: IDA Ireland, *Business Development Programme – Digitalisation Consultancy Grant; Lean/Digitalisation – LeanStart; Lean/Digitalisation – LeanPlus; Lean/Digitalisation – LeanTransform*. The consultancy programme can support development of a digital transformation roadmap, operating model and implementation plan. The Lean/Digitalisation suite provides progressively deeper support, from a short improvement assignment through medium-scale digitalisation to a multi-year transformation.
- 296 Interviews FOOD-01, FOOD-02, FOOD-04, MFG-01, MFG-02, MFG-03, MFG-04. Workshop: Manufacturing – Food & Beverages.
- 297 Interviews FOOD-01, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 298 Interviews FOOD-01, FOOD-03, FOOD-04, MFG-01, MFG-02, MFG-04. Workshop: Manufacturing – Food & Beverages.
- 299 Policy compendium: Enterprise Ireland, *Cyber Security Review Grant; IP Plus; EDIH – ENTIRE; EDIH – CeADAR*. The Cyber Security Review Grant provides an 80% contribution towards a defined €3,000 review aligned with the National Cyber Security Centre framework. IP Plus can provide up to €35,000 for external intellectual-property advice and development of in-company capability. ENTIRE combines digital, sensor and cybersecurity expertise, while CeADAR provides AI, data-analytics, experimentation and evaluation capability. Policy compendium: IDA Ireland, *Business Development Programme; Training Grant*, which can incorporate governance, cybersecurity and data considerations within wider transformation activity.
- 300 Interviews FOOD-01, FOOD-02, FOOD-03, FOOD-04. Workshop: Manufacturing – Food & Beverages.
- 301 See: [Eaton](#). Outcome reported by the technology provider.
- 302 See: [Maki Precision Machining](#). Outcome reported by the technology provider
- 303 See: [Siemens](#). Outcome reported by the technology provider
- 304 See: [Schaeffler and Siemens](#).
- 305 See: [Bosch](#)
- 306 See: [Kinaxis](#); [Schneider Electric](#)
- 307 See: [TK Elevator](#)
- 308 See: [Birmingham Fastener](#). Outcome reported by the technology provider
- 309 See: [Schneider Electric](#).
- 310 Interview MFG-06. See: [Maki Precision Machining](#); [PTC](#); [Oracle](#).
- 311 Use case library analysis, engineering.
- 312 Use case library analysis, engineering.
- 313 Source limitation recorded in the supplied workbook and the Engineering QA ledger. Exact-boundary persons-engaged and Gross Value Added totals were not available across all six divisions.
- 314 Central Statistics Office, BRA31, Business Demography NACE Rev. 2, 2023, engineering aggregation covering NACE C22, C24, C25, C27, C28 and C33.
- 315 DETE/CSO preliminary analysis of the Survey on ICT Usage and E-commerce in Enterprises 2025, engineering. AI use valid n=276; Digital Intensity valid n=278. The survey excludes micro enterprises.
- 316 DETE/CSO preliminary analysis of the Survey on ICT Usage and E-commerce in Enterprises 2025, engineering. AI use valid n=276; Digital Intensity valid n=278. The survey excludes micro enterprises.
- 317 Interviews MFG-01, MFG-03. Workshop: Manufacturing – Engineering. DETE Enterprise Survey 2026, Manufacturing – Engineering respondents, unweighted base 15; item-level valid bases vary.
- 318 Interviews MFG-01, MFG-05. Workshop: Manufacturing – Engineering.
- 319 Interviews MFG-03, MFG-04, MFG-05, MFG-06.
- 320 Workshop: Manufacturing – Engineering.
- 321 Workshop: Manufacturing – Engineering. Interview MFG-03. See: [Bosch](#).
- 322 Workshop: Manufacturing – Engineering.
- 323 See: [Schaeffler and Siemens](#); [Kinaxis](#); [Tata Steel](#).
- 324 Workshop: Manufacturing – Engineering. Interviews MFG-02, MFG-03, MFG-06.
- 325 See: [Siemens](#)
- 326 See: [TK Elevator](#); [Siemens](#).
- 327 Workshop: Manufacturing – Engineering. Interview MFG-03. See: [Maki Precision Machining](#).
- 328 Interview MFG-06. See: [PTC](#); [TK Elevator](#); [PTC](#); [Siemens](#).
- 329 See: [Siemens](#); [Physics-informed air-cooler optimisation study](#); [HRL Laboratories](#); [Schneider Electric](#); [ABB](#); [Bosch](#); [Schneider Electric](#); [Kinaxis](#); [Danfoss](#).
- 330 Interviews MFG-03, MFG-05.

- 331 Workshop: Manufacturing – Engineering. Interviews MFG-03, MFG-04.
- 332 Interviews MFG-02, MFG-03, MFG-04.
- 333 Policy compendium: AIReady.ie. Local Enterprise Offices, Digital for Business. Enterprise Ireland, Access Advice: Digital Discovery (up to 80% grant aid to a maximum of €5,000 for three to seven days of expert support); Strategic Consultancy Grant. IDA Ireland, Advanced Manufacturing Diagnostic. EDIH–FactoryxChange.
- 334 Policy compendium: Local Enterprise Offices.
- 335 Workshop: Manufacturing – Engineering. Interview MFG-03.
- 336 Workshop: Manufacturing – Engineering. Interviews MFG-02, MFG-03, MFG-05.
- 337 Workshop: Manufacturing – Engineering. Interview MFG-01.
- 338 Interviews MFG-01, MFG-05.
- 339 Policy compendium: Local Enterprise Offices, Grow Digital Voucher. Enterprise Ireland, Digital Process Innovation (50% of eligible expenditure, maximum grant €150,000, covering internal implementation time); Capital Funding Support (maximum grant €250,000). IDA Ireland, Business Asset Grant (up to €250,000 under de minimis rules); Business Development Programme – Digitalisation Consultancy Grant. EDIH–Data2Sustain; Technology Centres; Technology Gateways.
- 340 Interviews MFG-01, MFG-05.
- 341 Workshop: Manufacturing – Engineering. Interviews MFG-02, MFG-03, MFG-04, MFG-06.
- 342 Workshop: Manufacturing – Engineering. Direct quotation recorded in the contemporaneous workshop note.
- 343 Interviews MFG-02, MFG-03, MFG-06.
- 344 Workshop: Manufacturing – Engineering. Interview MFG-04.
- 345 Policy compendium: Skillnet Ireland – Industry 4.0 Skillnet (AI MASTERY for Industry, Diploma in Manufacturing Automation); Technology Ireland Digital Skillnet (AI Capability Accelerator for Senior Leaders, DataSMART); CILT Mobility and Supply Chain Skillnet (Applied AI in Supply Chain). AIReady.ie. Local Enterprise Offices, training and development programmes. Skillnet provision validated at a point in time and tied to participating networks.
- 346 Policy compendium: Enterprise Ireland, Build Capability (€5,000–€70,000 for non-routine strategic training); Training Funding Support; Key Manager Support; Grad Start. IDA Ireland, Training Grant (up to 50%, maximum grant €3 million); Lean/Digitalisation. Technology Centres; Technology Gateways; European Digital Innovation Hubs. Further and higher education provision recorded at a point in time and non-exhaustive.
- 347 Workshop: Manufacturing – Engineering. Interviews MFG-01, MFG-06.
- 348 Workshop: Manufacturing – Engineering. Interviews MFG-01, MFG-02, MFG-03, MFG-04, MFG-05.
- 349 Workshop: Manufacturing – Engineering. Interviews MFG-02, MFG-05, MFG-06.
- 350 Interviews MFG-05, MFG-06.
- 351 Interviews MFG-04, MFG-05.
- 352 Policy compendium: Local Enterprise Offices, Feasibility Study Grant (up to 50%, maximum €15,000); Priming Grant; Business Expansion Grant; Grow Digital Voucher. Enterprise Ireland, Exploring Innovation Grant (maximum €35,000); Innovation Vouchers (standard €10,000); Innovation Partnership Grants; RDI Fund; Digital Process Innovation; Operational Excellence; Capital Funding Support. IDA Ireland, RD&I Feasibility Grant; RD&I Grant; Business Asset Grant; Business Development Programme – Digitalisation Consultancy Grant; Lean/Digitalisation – LeanStart and LeanTransform. EDIH–FactoryxChange; Technology Centres; Technology Gateways.
- 353 Interviews MFG-04, MFG-05, MFG-06.
- 354 Workshop: Manufacturing – Engineering. Interviews MFG-04, MFG-05, MFG-06.
- 355 Workshop: Manufacturing – Engineering. Direct quotation recorded in the contemporaneous workshop note.
- 356 Workshop: Manufacturing – Engineering. Interviews MFG-02, MFG-06. Interview evidence on data sovereignty is manufacturing-wide and is developed in the computer and electronics chapter.
- 357 Policy compendium: Enterprise Ireland, Cyber Security Review Grant (80% contribution towards a defined €3,000 review against the National Cyber Security Centre framework); Access Advice: IP Start and IP Plus. Skillnet Ireland, AI Capability Accelerator for Senior Leaders and AI MASTERY for Industry. AIReady.ie. EDIH – ENTIRE; EDIH – CeADAR; Technology Centres; Technology Gateways. Further and higher education provision recorded at a point in time and non-exhaustive. Interview MFG-03.
- 358 Steering Group review input.
- 359 Interview MFG-06.
- 360 Workshop: Manufacturing – Engineering. Interviews MFG-01, MFG-02, MFG-04, MFG-06.
- 361 Department of Enterprise, Tourism and Employment, *A New Era for Irish Tourism: National Tourism Policy Statement*, 2025, pp. 11–14.
- 362 See: [PhocusWire, “Trip.com Group launches Trip.Planner”](#).
- 363 See: [MuseumNext](#).
- 364 See: [GreenLodgingNews](#).
- 365 See: [PR Newswire](#).
- 366 See: [Ticket Fairy](#).
- 367 See: [TUI Group](#).
- 368 See: [Hotel Online](#).
- 369 See: [Simple Flying](#).
- 370 Accenture Research analysis of tourism use cases.
- 371 Data on tourism provided by Department of Enterprise, Tourism and Employment, *A New Era for Irish Tourism: National Tourism Policy Statement*, 2025, pp. 11–14..
- 372 See: Association of Visitor Experiences and Attractions, *Annual Business Survey 2025*, [2025_AVEA_Members_Survey_Final.pdf](#)
- 373 Open enterprise consultation, Tourism respondents.
- 374 Open enterprise consultation, Tourism respondents
- 375 Interviews TOUR-01, TOUR-02, TOUR-04.
- 376 Open enterprise consultation, Tourism respondents.
- 377 Interviews TOUR-01, TOUR-02, TOUR-03.
- 378 Irish Tourism Industry Confederation and TOPOSOPHY, *Irish Tourism and the AI Journey: The Impact of Artificial Intelligence on Irish Tourism*, May 2026 ([ITIC_AI_Report_Toposophy_Final](#))
- 379 Interviews TOUR-02, TOUR-04 Workshop: Tourism – Transport, Travel & Tour Operators Group 1; Workshop: Tourism – Transport, Travel & Tour Operators Group 2; Workshop: Tourism – Accommodation.
- 380 Open enterprise consultation, medium-sized accommodation enterprise.
- 381 Interviews TOUR-02, TOUR-03 Workshop: Tourism – Accommodation; Workshop: Tourism – Sports & Recreation; Workshop: Tourism – Transport, Travel & Tour Operators Group 1.

- 382 Department of Enterprise, Tourism and Employment, *A New Era for Irish Tourism: National Tourism Policy Statement, 2025 (A New Era for Irish Tourism: National Tourism Policy Statement)*
- 383 Open enterprise consultation, Tourism respondents. The micro-enterprise example is anonymised and self-reported.
- 384 Open enterprise consultation, Tourism respondents.
- 385 Interviews TOUR-01, TOUR-02, TOUR-04 Workshop: Tourism – Accommodation; Workshop: Tourism – Cultural; Workshop: Tourism – Sports & Recreation.
- 386 Workshop: Tourism – Cultural; Workshop: Tourism – Transport, Travel & Tour Operators Group 1; Workshop: Tourism – Transport, Travel & Tour Operators Group 2.
- 387 See: [Simpleview, Visit Tampa Bay](#).
- 388 See: [OpenAI](#); [Booking.com](#).
- 389 Irish Tourism Industry Confederation and TOPOSOPHY, *Irish Tourism and the AI Journey: The Impact of Artificial Intelligence on Irish Tourism*, May 2026 ([ITIC_AI_Report_Toposophy_Final](#)).
- 390 See: [Booking.com](#); [Sabre](#).
- 391 See: [Google](#); [Google](#).
- 392 Interviews TOUR-01, TOUR-02, TOUR-04; Workshop: Tourism.
- 393 The chapter covers NACE F41 (construction of buildings), F42 (civil engineering) and F43 (specialised construction activities), and follows the value chain from design, building information modelling and estimating through procurement and on-site delivery to handover and asset management. Central Statistics Office, BRA31 – Business Demography NACE Rev. 2, 2023; Central Statistics Office, Construction: A National Accounts Perspective 2024. Enterprise and employment figures are for 2023; Gross Value Added is for 2024.
- 394 See: [Comfort Systems NW reduces warranty expenditures by 10% to 20% with visual proof of work | XO Customer Stories](#)
- 395 See: [Japan's Sekisui House Runs Fully Automated Prefab Factories With AI Quality Control – and Is Now Bringing the Model to the US and Australia](#)
- 396 See: [Skanska](#)
- 397 See: [How VINCI Construction harnesses artificial intelligence to further performance? - VINCI Construction](#)
- 398 Workshop: Construction – Specialised Trades Group 1. Steering group review input.
- 399 See: [Network Rail Built Digital Twin to Modernize Tunnel Maintenance](#)
- 400 CSO [BRA31 - Business Demography NACE Rev 2 - Dataset - data.gov.ie](#)
- 401 CSO [BRA31 - Business Demography NACE Rev 2 - Dataset - data.gov.ie](#)
- 402 Interviews CON-01, CON-02, CON-04, CON-05. Workshop: Construction – Building Construction Group 2; Workshop: Construction – Civil Engineering; Workshop: Construction – Specialised Trades Group 2.
- 403 Steering group review input
- 404 DETE analysis of the Credit Demand Survey, Construction SMEs, weighted n=177, Questions 76, 79 and relevant barrier items. The AI-use question covers 2022–2024. The survey uses a different population and methodology from the CSO enterprise survey.
- 405 Interview CON-02
- 406 Interview CON-03
- 407 Interview CON-01
- 408 Interview CON-01
- 409 Interview CON-04
- 410 Interview CON-04
- 411 Interview CON-04
- 412 Interview CON-01
- 413 Interview CON-01 Workshop: Construction – Civil Engineering
- 414 Workshop: Construction – Specialised Trades Group 2. Interview CON-03.
- 415 Interview CON-02
- 416 Interview CON-01
- 417 Interview CON-02
- 418 Accenture (2025). [Blueprint for Success](#). This point about the capital project performance is also made in Flyvbjerg, Bent and Dan Gardner (2023), *How Big Things Get Done*.
- 419 Interview CON-05
- 420 Interview CON-04
- 421 Interview CON-02
- 422 Interview CON-05
- 423 Workshop: Construction – Specialised Trades Group 2; Interview CON-03
- 424 Workshop: Construction – Civil Engineering
- 425 Workshop: Construction – Specialised Trades Group 2
- 426 Interviews CON-02, CON-05
- 427 Workshop: Construction – Specialised Trades Group 2
- 428 Workshop: Construction – Building Construction Group 2
- 429 Interview CON-04. Office of Government Procurement, *Public Sector BIM Adoption Timeline*, Capital Works Management Framework, URL: <https://cwmf.gov.ie/en/resources/bim/public-sector-bim-adoption-timeline/>
- 430 Interview CON-03
- 431 Interviews CON-02, CON-05 Workshop: Construction – Building Construction Group 2
- 432 Interview CON-01
- 433 Interview CON-03
- 434 Interview CON-05
- 435 Interview CON-03
- 436 Policy compendium: Local Enterprise Offices, Digital for Business; Grow Digital Voucher. Digital for Business provides eligible micro and small firms with an expert assessment of their existing digital systems and opportunities and a roadmap for further digitalisation. Following completion of Digital for Business, the Grow Digital Voucher provides 50% grant aid, from €500 up to €5,000, towards eligible software, training and IT configuration.
- 437 Policy compendium: Enterprise Ireland, Built to Innovate. Built to Innovate supports construction-sector productivity improvement through areas including Lean, Modern Methods of Construction, digital tools and process innovation.
- 438 See [Build Digital](#)
- 439 Policy compendium: EDIH – Data2Sustain; EDIH – CeADAR; Construct Innovate. Data2Sustain provides data and digitalisation expertise, while CeADAR provides AI and data-analytics expertise and opportunities to assess and experiment with digital technologies. Construct Innovate provides a construction-specific route to applied research and collaborative innovation. Interview CON-04.

- 440 Interviews CON-01, CON-02, CON-04. Workshop: Construction – Building Construction Group 2; Workshop: Construction – Civil Engineering; Workshop: Construction – Specialised Trades Group 2. Open enterprise consultation respondents also raised structured data, ICMS3, BIM, integration funding and sector standards; valid bases are too small for prevalence claims.
- 441 Interview CON-05
- 442 Steering Group review input
- 443 Policy compendium: Skillnet Ireland, CitA Skillnet, AI Core Skills for Construction; M365 Copilot Training. Skillnet offers construction-specific provision alongside wider programmes in AI, data and leadership.
- 444 Policy compendium: Enterprise Ireland, Build Capability; Training Funding Support; Key Manager Support. Build Capability can provide between €5,000 and €70,000 for eligible non-routine strategic training, including digital technology, AI, automation, leadership and organisational development. Training Funding Support covers areas including leadership, change management, automation, digitalisation and systems improvement. Key Manager Support can assist an eligible firm to recruit senior capability required for a significant change or productivity programme. Digital Process Innovation provides 50% of eligible expenditure to a maximum grant of €150,000, covering internal implementation time, external expertise and project costs.
- 445 Interview XS-05.
- 446 Interview CON-03; Workshop: Construction – Specialised Trades Group 2; Workshop: Construction – Building Construction 1.
- 447 Interviews CON-01, CON-03, CON-04, CON-05. Workshop: Construction – Building Construction Group 2; Workshop: Construction – Civil Engineering; Workshop: Construction – Specialised Trades Group 1; Workshop: Construction – Specialised Trades Group 2.
- 448 Steering Group review input; Interview CON-03
- 449 Interview CON-05
- 450 Interview CON-01
- 451 Interview CON-04
- 452 Interview CON-03
- 453 Interview CON-03
- 454 Workshop: Construction – Specialised Trades Group 1
- 455 Workshop: Construction – Civil Engineering
- 456 Policy compendium: Enterprise Ireland, AI and Digital Pathfinder tool; Mentor Network/Business Navigator; Strategic Consultancy Grant/Strategic Consultancy Assignment. The AI and Digital Pathfinder helps eligible companies navigate the AI and digital support landscape and identify an appropriate next step. Mentor Network/Business Navigator provides experienced business guidance. The Strategic Consultancy Grant can support eligible SMEs to engage external expertise on a significant strategic issue; broad strategic use is available to SMEs, while large-company eligibility is more restricted.
- 457 Interviews CON-03, CON-04, CON-05. Interviewees referred to Construction Industry Federation guidance, an AI policy template, regional digital outreach and Lean Construction Ireland case studies. These are complementary industry-led resources rather than public supports established in the reviewed Policy Compendium.
- 458 Interviews CON-01, CON-02, CON-03, CON-04, CON-05. Workshop: Construction – Building Construction Group 2; Workshop: Construction – Specialised Trades Group 1; Workshop: Construction – Specialised Trades Group 2.
- 459 Interviews CON-01, CON-05
- 460 Workshop: Construction – Civil Engineering; Workshop: Construction – Building Construction Group 2
- 461 Interview CON-05
- 462 Interview CON-02
- 463 Workshop: Construction – Building Construction Group 2
- 464 Interviews CON-03, CON-04
- 465 Interview CON-05
- 466 This pattern is not universal. Lendlease, for example, spun out its Podium digital platform into a standalone customer-facing software business. This does not amount to open peer sharing, but it illustrates another route through which proprietary capability can diffuse: commercialising it rather than keeping it solely for internal use. See: Lendlease Podium website, *Podium Landing Page*; Bird & Bird ATMD, *Bird & Bird ATMD acts for Podium in US\$15.2M Series A-1 funding*, 6 December 2024.
- 467 Policy compendium: Enterprise Ireland, *Construct Innovate; Innovation Partnership Grants; Disruptive Technologies Innovation Fund*. Construct Innovate provides a construction-specific route into collaborative research and innovation. The Innovation Partnership Programme supports Irish-based companies working with Irish research institutions on company-driven research towards new or improved products, processes and services. The Disruptive Technologies Innovation Fund supports larger collaborative projects developing and commercialising potentially disruptive technologies.
- 468 Policy compendium: Enterprise Ireland, *Construct Innovate; Innovation Partnership Grants; Disruptive Technologies Innovation Fund*; European Digital Innovation Hubs and Technology Centres. Workshop: Construction – Specialised Trades Group 1, which called for greater awareness of the practical implications of the EU AI Act.
- 469 Workshop: Construction – Building Construction Group 1
- 470 Steering Group review input
- 471 Steering Group review input
- 472 Interviews CON-01, CON-02, CON-03, CON-04, CON-05. Workshop: Construction – Building Construction Group 2; Workshop: Construction – Civil Engineering; Workshop: Construction – Specialised Trades Group 2.
- 473 Steering Group review input
- 474 Interview CON-02
- 475 Interview CON-03
- 476 Workshop: Construction – Specialised Trades Group 2
- 477 Policy compendium: Local Enterprise Offices, Digital for Business; Grow Digital Voucher. Following completion of a Digital for Business assessment, the Grow Digital Voucher provides 50% grant support, from €500 up to €5,000, towards eligible software, training and IT configuration. The measure is principally relevant to eligible micro and small firms.
- 478 Policy compendium: Enterprise Ireland, Build Capability; Training Funding Support; Key Manager Support; Strategic Consultancy Grant/Strategic Consultancy Assignment. Build Capability provides between €5,000 and €70,000 towards eligible non-routine strategic capability development, including digital technology, AI and automation. Training Funding Support covers areas including digitalisation, systems improvement and change management. Key Manager Support can contribute towards a senior hire needed for a significant change programme, while Strategic Consultancy support can help eligible SMEs obtain external expertise on a significant strategic issue.

- 479 Policy compendium: Enterprise Ireland, *Research, Development and Innovation Fund; Innovation Partnership Grants; Disruptive Technologies Innovation Fund; Horizon Europe*. These instruments provide routes into qualifying research, collaborative development, demonstrators and technically uncertain projects.
- 480 Interviews CON-02, CON-03, CON-04. Workshop: Construction – Specialised Trades Group 2. Open enterprise consultation, construction respondents.
- 481 CSO. Business in Ireland – Business demography NACE
- 482 Workshop: WS ICT – ICT-enabled services 1.
- 483 [Gartner](#)
- 484 IDC. FutureScope: Worldwide Services Predictions 2026.
- 485 Accenture. AI is not your P&L. Most companies are only reading half of it (AI Tokenomics for Enterprise Value), 29 July 2026
- 486 Accenture. AI is not your P&L. Most companies are only reading half of it (AI Tokenomics for Enterprise Value), 29 July 2026
- 487 Interviews ICT-01-06; ICT-03-12
- 488 Workshop: ICT-ICT-enabled services Group 1; Group 2
- 489 Workshop: ICT-ICT-enabled services Group 1; Group 2; Gartner. I&O talent in the AI era: smarter insourcing vs outsourcing [link](#); IDC. From labour arbitrage to platform-led outcomes [link](#)
- 490 Gartner. Managed services disruptions: surviving an AI agent dominated market; IDC. How Agentic AI is rewriting the IT services playbook; Gartner. Services disruption trend, 2025: curb revenue cannibalisation from AI.
- 491 Workshop: ICT-ICT-enabled services Group 1
- 492 Workshop: ICT-ICT-enabled services Group 1; Interviews ICT-01; ICT-03
- 493 Accenture. Sovereign AI: own your AI future. [link](#)
- 494 Interview ICT-03
- 495 Workshop: ICT-ICT-enabled services Groups 1, 2
- 496 Workshop: ICT-ICT-enabled services Group 2
- 497 Interviews ICT-01; ICT-03
- 498 Workshop ICT-ICT-enabled services Group 1; Group 2
- 499 Accenture. Generating impact. 2026
- 500 Workshop ICT-ICT-enabled services Group 1
- 501 Interviews ICT-01, ICT-03
- 502 Open enterprise consultation
- 503 See: [Expert Group on Future Skills Needs](#)
- 504 Workshop: ICT – ICT-Enabled Services Group 1; Workshop: ICT – ICT-Enabled Services Group 2
- 505 Interviews ICT-01, ICT-03. Open enterprise consultation.
- 506 Workshop: ICT – ICT-Enabled Services Group 1; Workshop: ICT – ICT-Enabled Services Group 2
- 507 Policy compendium: Enterprise Ireland, IDA, Skillnet
- 508 Open enterprise consultation
- 509 Workshop: ICT – ICT-Enabled Services Group 1; Workshop: ICT – ICT-Enabled Services Group 2
- 510 Interviews ICT-02, ICT-03
- 511 Open enterprise consultation.
- 512 Interviews ICT-01; ICT-03
- 513 Interviews ICT-01, ICT-03
- 514 Interviews ICT-01; ICT-03; ICT-02; ICT-03
- 515 Workshop: ICT – ICT-Enabled Services Group 1; Workshop: ICT – ICT-Enabled Services Group 2
- 516 Interviews ICT-01; ICT-03
- 517 Open enterprise consultation
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- 527 Workshop: ICT – SaaS Companies
- 528 Workshop: ICT – SaaS Companies
- 529 Workshop: ICT – SaaS Companies
- 530 Interviews ICT-01; ICT-02; ICT-03
- 531 Open enterprise consultation
- 532 Interviews ICT-01; ICT-02. Workshop: ICT – SaaS Companies
- 533 Interviews ICT-01, ICT-02, ICT-03
- 534 Workshop: ICT – SaaS Companies
- 535 Interviews ICT-01, ICT-02, ICT-03. Open enterprise consultation. Workshop: ICT – SaaS Companies.
- 536 Workshop: ICT – SaaS Companies.
- 537 Interviews ICT-02, ICT-03, ICT-03
- 538 Open enterprise consultation.
- 539 Interviews ICT-01, ICT-03. Open enterprise consultation. Workshop: ICT – SaaS Companies.
- 540 Interviews ICT-01, ICT-02, ICT-03
- 541 Workshop: ICT – SaaS Companies
- 542 Interviews ICT-01, ICT-03
- 543 Open enterprise consultation
- 544 Interview ICT-01, ICT-03
- 545 Open enterprise consultation
- 546 Workshop: ICT – SaaS Companies
- 547 Workshop: ICT – SaaS Companies; Open enterprise consultation
- 548 Interview ICT-01, ICT-02
- 549 Eurostat evidence was used in this stage because the more granular CSO analysis used later in the study was not yet available before the sector workshops. More detailed CSO evidence subsequently became available and was incorporated into the final sector analysis. This later evidence broadly supported and refined the interpretation of sector maturity and firm-size differences; it was not retrospectively substituted into the original scoring exercise.

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