

Cloud Computing in Ireland: Challenges and Opportunities

Peter Hyland C00274825

Cloud Computing in Ireland: Challenges and Opportunities

Peter Hyland – C00247825 SETU Carlow

Abstract

This paper, informed by a keen interest in Ireland's evolving digital landscape, investigates the multifaceted domain of cloud computing within the nation. Ireland has strategically positioned itself as a significant hub for cloud services in Europe, attracting substantial investment from leading global technology corporations and thereby catalysing the expansion of its digital economy. This growth trajectory is largely attributable to the increasing digitalisation of businesses, supportive governmental policies, and robust foreign direct investment. However, this advancement is not without its impediments. Ireland confronts considerable challenges, including the mounting pressure on its national electricity grid, a discernible shortage of professionals with specialised technological skills, and persistent concerns regarding data security and governance. Conversely, these challenges are juxtaposed with significant opportunities for continued growth, technological innovation, and broad economic benefits – prospects that Ireland is poised to capitalise upon. These opportunities are particularly pertinent for small and medium-sized enterprises (SMEs) transitioning to cloud-based operations, the modernisation of public sector services, and the adoption of emergent technologies. This paper undertakes a comprehensive analysis of these opportunities and challenges, presenting an overview of the current state and exploring the potential future trajectory for cloud computing in Ireland.

Index Terms—Cloud Computing, Ireland, Data Centres, Digital Transformation, Economic Development, Electricity Infrastructure, Skills Gap, Cybersecurity.

I. Literature Review

The body of research addressing cloud computing in Ireland is derived from a diverse range of sources, including governmental reports, detailed industry analyses, and academic studies. Publications from IDA Ireland, for instance, consistently underscore the nation's appeal for digital infrastructure investment, which has culminated in the establishment of numerous large-scale data centres (IDA Ireland, n.d.). Concurrently, the Department of Enterprise, Trade and Employment (2022) has articulated governmental strategies for digital transformation, positioning cloud computing as a pivotal enabler of this agenda.

Industry-specific analyses, such as those conducted by firms like EY Ireland (2023; 2024), delve into cloud adoption rates among Irish enterprises, with a particular focus on SMEs. These studies observe an increasing uptake of cloud services, while also identifying persistent barriers, including concerns about implementation and operational costs, apprehensions related to data security, and a deficit in requisite expertise. Quantitative data from the Central Statistics Office (CSO, 2024a) on Information and Communication Technology (ICT) usage by enterprises provides an invaluable statistical foundation for understanding these trends.

Key government publications, notably "Harnessing Digital — The Digital Ireland Framework" (Government of Ireland, 2022), articulate ambitious objectives for digitalisation and the widespread adoption of cloud technologies. These strategic aims are bolstered by targeted initiatives designed to facilitate their achievement. Furthermore, parliamentary briefings, such as those provided by the Oireachtas Library & Research Service (2024), address specific emergent challenges, particularly the inherent tension between the expansion of data centre operations and the nation's climate action commitments.

A recurrent and critical theme within the existing literature is the substantial challenge posed by the energy consumption of data centres and its consequential impact on the stability of Ireland's national electricity grid and its capacity to meet climate obligations. This paper aims to build upon this existing body of research by providing an updated and integrated synthesis, with a particular emphasis on the dynamic interplay between the opportunities afforded by cloud computing and the infrastructural and strategic challenges that must be navigated.

II. CLOUD COMPUTING LANDSCAPE IN IRELAND

A. Market Overview

Ireland's cloud computing market is characterised by its dynamism and consistent growth, with significant adoption observed across public, private, and hybrid cloud deployment models. Major global cloud service providers, including Amazon Web Services (AWS), Microsoft Azure, and Google Cloud, have made substantial infrastructural investments, establishing significant data centre operations, predominantly concentrated in the Greater Dublin area (IDA Ireland, n.d.). The adoption of cloud solutions is not confined to the technology sector; industries such as finance, public administration, healthcare, and manufacturing are increasingly leveraging cloud technologies to enhance their operations and service delivery.

B. Government Initiatives and Strategy

The Irish Government has proactively fostered a digital-first environment, exemplified by its comprehensive digital strategy, "Harnessing Digital — The Digital Ireland Framework." This strategic blueprint aims to establish Ireland as a leading digital economy within Europe. Key targets within this framework include achieving 75% of enterprises utilising cloud computing, Artificial Intelligence (AI), and big data by the year 2030, alongside promoting a "cloud-first" paradigm for the delivery of public services (Government of Ireland, 2022). To support these ambitions, initiatives such as the Digital Transition Fund, which allocates €85 million for the period up to 2026, have been implemented to assist businesses, particularly smaller companies, in their digital transformation endeavours (Department of Enterprise, Trade and Employment, 2023).

C. Infrastructure

Ireland has emerged as one of Europe's foremost locations for data centre infrastructure, with the Dublin region, in particular, recognised as a primary data centre hub. As of early 2024, reports

indicated the operation of approximately 82 data centres nationwide, with numerous additional facilities either under construction or having received planning approval (Oireachtas Library & Research Service, 2024). This significant concentration of digital infrastructure is underpinned by Ireland's excellent international connectivity, facilitated by extensive sub-sea fibre optic networks. While these facilities are integral to the delivery of cloud services, their density presents considerable challenges, most notably for the national energy grid and its capacity management (Mason Hayes Curran, 2025).

Mapping Ireland's data centres

Our team mapped data centres believed to be operational using planning records and web sources.



[Image Reference - https://www.thejournal.ie/investigates-data-centres-6554698-Nov2024/](https://www.thejournal.ie/investigates-data-centres-6554698-Nov2024/)

III OPPORTUNITIES FOR CLOUD COMPUTING IN IRELAND

A. Economic Growth and Innovation

Observations from various innovation hubs across Ireland confirm that cloud platforms are instrumental in providing businesses of all scales with access to advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT). This democratisation of technological resources empowers indigenous Irish technology firms to develop innovative solutions and compete effectively on a global stage, leveraging scalable cloud-based infrastructure. The sustained investment in cloud facilities not only attracts significant foreign direct investment (FDI) but also stimulates the creation of high-value employment opportunities in specialised fields including cloud architecture, cybersecurity, and software development.

B. Accelerating SME Digital Transformation

Small and medium-sized enterprises (SMEs) constitute a vital component of the Irish economy, and cloud computing presents them with substantial transformative potential. Discussions with numerous small business owners reveal a common narrative: cloud services enable access to enterprise-grade IT capabilities without the need for prohibitive upfront capital expenditure on hardware and software (Digital4Business, 2023). The inherent scalability of cloud services empowers SMEs to enhance operational efficiency, explore and penetrate new markets, and fortify their resilience against unforeseen business disruptions (Digital4Business, 2023).

C. Modernising Public Sector Services

The Irish Government's "cloud-first" policy, as articulated in strategic documents like "Connecting Government 2030," is geared towards the delivery of more efficient, responsive, and citizen-centric public services. The adoption of cloud technologies within the public sector offers manifold benefits, including enhanced data management capabilities, improved inter-agency collaboration and information sharing, and the provision of more scalable and robust platforms for digital service delivery. A report by Technology Ireland, as highlighted in business media (BusinessNews.ie, 2023), estimated that a 10% increase in public sector cloud adoption could yield annual economic benefits approaching €473 million, concurrently reducing ICT-related energy consumption by as much as 80%.

D. Leadership in Sustainable Cloud and Green Technologies

Insights from sustainability-focused conferences and industry discussions highlight Ireland's considerable potential to establish itself as a leader in the domain of sustainable cloud computing. Possessing significant renewable energy resources, particularly wind power, the country has an opportunity to differentiate its cloud offerings through the promotion and implementation of green data centre practices. Several major cloud providers have already made substantial commitments to powering their Irish operations with renewable energy sources. Furthermore, innovative approaches, such as the utilisation of waste heat generated by data centres for district heating systems, demonstrate promising potential for enhancing energy efficiency and reducing the overall carbon footprint of the sector (Electricity Association of Ireland, 2025).

IV. CHALLENGES TO CLOUD ADOPTION AND GROWTH IN IRELAND

A. Electricity Infrastructure and Energy Constraints

A prevalent concern, frequently articulated by data centre operators and energy sector analysts, pertains to the strain on Ireland's electricity infrastructure. Data centres accounted for approximately 18% of Ireland's total metered electricity consumption in 2022, a figure that rose to 19.4% (often rounded to 20% or 21% in various reports when including transmission losses and other factors) of gross inland electricity consumption in 2023 (CSO, 2024b; Oireachtas Library & Research Service, 2024). Projections from EirGrid suggest that this demand could escalate significantly if current growth trajectories continue unabated (Oireachtas Library & Research Service, 2024). In response, the Commission for Regulation of Utilities (CRU) has implemented more stringent connection criteria for new data centres, and EirGrid has indicated a pause on new grid connections in the Dublin area until at least .Addressing this critical challenge necessitates substantial investment in renewable energy generation, comprehensive reinforcement of the national grid, and the promotion of more geographically distributed data centre developments alongside energy-efficient designs.

B. Digital Skills Gap

Despite Ireland's well-educated workforce, conversations with recruitment specialists and industry surveys consistently reveal a persistent shortage of personnel with specialised digital skills, particularly in advanced cloud computing disciplines. There are notable deficits in areas such as cloud architecture, DevOps engineering, cloud-focused cybersecurity, and data science. A survey conducted by Morgan McKinley (2024) found that a significant percentage of hiring managers identified the lack of skilled candidates as their principal recruitment challenge. This prevailing skills shortage can impede the ability of businesses to

fully leverage cloud technologies, potentially slowing the pace of innovation and digital transformation across the economy.

C. Cybersecurity and Data Governance

The increasing adoption of cloud services inherently brings with it heightened cybersecurity concerns. As organisations migrate critical business operations and sensitive data to cloud environments, they become exposed to an evolving landscape of sophisticated cyber threats, including ransomware, advanced persistent threats, and data breaches. An industry survey highlighted by Auxilion (2023) indicated that 33% of Irish IT leaders identified ransomware/malware and data loss/theft as their foremost security concerns associated with cloud computing. Ensuring the implementation of robust security postures, maintaining data integrity, and adhering to stringent data protection regulations, such as the General Data Protection Regulation (GDPR), remain significant and ongoing challenges for many organisations.

V. USE CASES

A. Public Sector Innovation

Central Statistics Office Modernisation: The Central Statistics Office (CSO) has been actively engaged in transforming its operational processes through extensive digitalisation. This includes leveraging cloud technologies for the administration of business surveys and the development of digital components for the national census (CSO, 2024a). This strategic shift from traditional paper-based methodologies to more efficient digital data collection and processing has demonstrably improved the timeliness, accuracy, and overall quality of national statistical outputs.

Revenue Commissioners Online Services (ROS): The ROS platform serves as a prominent example of how critical public services can be successfully delivered at scale through online channels. Handling millions of tax filings, payments, and citizen interactions annually, its robust and increasingly cloud-influenced infrastructure showcases the capability for sensitive government services to operate digitally with high levels of reliability, security, and user accessibility.

VI. DISCUSSION AND FUTURE OUTLOOK

The exploration of Ireland's cloud computing landscape reveals a nation at a critical juncture, balancing substantial opportunities with significant challenges. The issue of energy infrastructure capacity has consistently emerged from research and expert consultations as the most pressing concern. While simply curtailing data centre development is not economically viable given their strategic importance, unconstrained growth poses an undeniable risk to the stability and sustainability of the national electrical grid.

A nuanced and balanced approach is imperative. This must involve an acceleration of renewable energy generation, in line with the national target of achieving 80% renewable electricity by 2030, coupled with strategic investment in grid modernisation and smart grid technologies. Furthermore, promoting energy-efficient data centre designs, encouraging on-site generation, and exploring innovative solutions such as waste heat recovery for district heating are crucial components of a sustainable path forward. The government's stated preference for data centre developments that can demonstrate additionality to renewable energy supply signifies a move in a sensible direction (Department of Enterprise, Trade and Employment, 2022).

The digital skills gap necessitates sustained and targeted investment in education and vocational training programs. While visits to technical colleges and universities across Ireland indicate

promising initiatives, there is a clear need for enhanced collaboration between academic institutions and industry stakeholders to cultivate the specialised cloud skills that the market urgently requires.

Looking towards the future, hybrid and multi-cloud strategies are anticipated to become increasingly prevalent as organisations seek to optimise workloads across diverse environments, balancing cost, performance, and security considerations. Edge computing, driven by the proliferation of IoT applications and the demand for low-latency processing, is also expected to emerge as a significant complementary trend. The emphasis on sustainable cloud solutions will undoubtedly intensify, propelled by a combination of regulatory pressures, corporate social responsibility mandates, and increasing environmental awareness.

Ireland possesses the inherent potential to be not merely a consumer and host of cloud technologies but also a significant innovator in the field. This is particularly true in areas such as sustainable data centre operations, the development of specialised cloud services for regulated industries (e.g., finance and healthcare), and the ethical application of AI for broader societal benefit. The realisation of this potential, however, is contingent upon a coordinated and concerted effort involving government, industry, and the research and education communities.

VII. CONCLUSION

This examination of cloud computing in Ireland delineates a dynamic and evolving ecosystem that has played a pivotal role in establishing the nation as a prominent digital economy in Europe. The opportunities for sustained economic growth, the comprehensive digitalisation of SMEs, the modernisation of public sector service delivery, and innovation in sustainable technology are substantial and warrant vigorous pursuit.

Nevertheless, the attendant challenges – most notably the constraints on energy infrastructure, persistent shortages of specialised skills, and evolving cybersecurity concerns – demand urgent and strategic interventions. The strain imposed on Ireland's electricity grid by the escalating energy demands of data centres represents arguably the most critical challenge, one that must be addressed through innovative, sustainable, and integrated energy strategies.

Thanks in part to the presence of many different multinationals Ireland is well poised to be a global leader in the cloud computing space. Ireland's continued success in the next phase of cloud evolution will be contingent upon fostering robust collaborative efforts between governmental bodies, industry stakeholders, and academic institutions. The objective must be to cultivate a supportive yet responsible environment that encourages sustainable growth and innovation. By proactively addressing its challenges and strategically leveraging its inherent strengths, Ireland is well-positioned to continue to thrive as a significant, innovative, and responsible participant in the global cloud computing landscape.

VIII. REFERENCES

- Auxilion (2023). *Dark Web Access: Cloud Concern for One-Third of Ireland's IT Leaders*. 7 September. Available at: <https://www.auxilion.com/news/access-from-the-dark-web-is-a-cloud-concern-for-a-third-of-it-leaders-in-ireland> (Accessed: 28 April 2025).
- BusinessNews.ie (2023). 'Cloud-first vision for Ireland can streamline public services and boost economy'. *Digital Transformation Q3 2023*. Available at:

<https://www.businessnews.ie/digital-transformation/>
(Accessed: 5 May 2025).

- Central Statistics Office (CSO) (2024a). *Information Society Statistics - Enterprises 2023*. 10 January. Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-isse/information societystatistics-enterprises2023/> (Accessed: 15 April 2025).
- Central Statistics Office (CSO) (2024b). *Electricity and Gas Prices, July - December 2023*. 25 April. Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-egp/electricityandgaspricesjuly-december2023/> (Accessed: 1 May 2025).
- Department of Enterprise, Trade and Employment (2022). *Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy*. July. Available at: <https://enterprise.gov.ie/en/what-we-do/supports-for-smes/digital-transformation/digital-transition-fund/> (Accessed: 22 April 2025).
- Department of Enterprise, Trade and Employment (2023). *Digital Transition Fund*. Available at: <https://enterprise.gov.ie/en/what-we-do/innovation-research-development/digital-transition-fund/> (Accessed: 10 May 2025).
- Digital4Business (2023). *The Benefits of Cloud Computing for SME's*. 14 December. Available at: <https://digital4business.eu/the-benefits-of-cloud-computing-for-smes/> (Accessed: 30 April 2025).
- Electricity Association of Ireland (EAI) (2025). *Programme for Government 2025: The Role of Data Centres in Ireland's Energy Landscape*. January. Available at: <https://www.eaireland.com/insights-from-the-programme-for-government-the-role-of-data-centres-in-irelands-energy-landscape/> (Accessed: 7 May 2025).
- EY Ireland (2023). *Tech Leaders Outlook Survey 2023*. April. Available at: https://www.ey.com/en_ie/newsroom/2023/04/businesses-in-ireland-to-double-down-on-investment-in-proven-technologies (Accessed: 18 April 2025).
- EY Ireland (2024). *How sustainability and AI top Irish tech leaders' agenda*. May. Available at: https://www.ey.com/en_ie/insights/consulting/how-sustainability-and-ai-top-irish-technology-leaders-agenda (Accessed: 9 May 2025).
- Government of Ireland (2022). *Harnessing Digital — The Digital Ireland Framework*. 1 February. Department of the Taoiseach. Available at: <https://www.gov.ie/en/publication/adf42-harnessing-digital-the-digital-ireland-framework/> (Accessed: 25 April 2025).
- IDA Ireland (n.d.). *Data Centres*. Available at: <https://www.idaireland.com/industries/technology/data-centres> (Accessed: 2 May 2025).
- Mason Hayes Curran (2025). *Data Centres in Ireland — Energy Concerns*. 23 January. Available at:

<https://www.mhc.ie/latest/insights/data-centres-in-ireland-energy-concerns> (Accessed: 16 May 2025).

- Morgan McKinley (2024). *Ireland Salary Guide 2024*. <https://www.morganmckinley.com/ie/article/skills-shortage-impacting-technology-growth-in-ireland>. (Accessed: 11 May 2025).
- Oireachtas Library & Research Service (2024). *Spotlight: Data centres and energy*. 23 July. Houses of the Oireachtas. Available at: https://data.oireachtas.ie/ie/oireachtas/libraryResearch/2024/2024-07-23_spotlight-data-centres-and-energy_en.pdf (Accessed: 13 May 2025).