



Rialtas na hÉireann
Government of Ireland

Focus on Technology

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Technology

Description

The Technology sector is diverse and includes activities such as manufacture of devices and components, creation of applications for smart devices, and storage and analysis of the data generated. This broad scope means there is significant variety in the types of organisations involved, from small start-up companies established in the last few years, to large multi-national companies, established decades ago.

The technology sector can be subdivided as follows:

- i. Software products and services, including development of on-premises and internet/cloud-based applications, mobile apps, networks and analytics tools.
- ii. Electronics, hardware and firmware, including semiconductors, integrated circuits, networking, computing, storage and end-user devices and appliances.
- iii. Digital Platforms, technology-enabled business models that create value by facilitating exchanges and sharing business services between two or more interdependent groups comprising of companies, people, data, processes and things enabling the digital ecosystem. Digital platforms serve to create digital market places,¹ social media platforms and activities involved in the collaborative (sharing) economy.
- iv. IT Services including: technology installation, integration, testing and monitoring services; specialised consulting (such as Security and User Experience Design) and; software/hardware design and development services and data processing and business process outsourcing.
- v. Data Analytics and AI.

Technological developments impact upon all business, sectors and society, bringing radical changes in production processes, services, consumer interfaces and value chains, as well as driving the development of new markets.

Digital transformation and disruptive technologies are transforming the nature and profile of the technology sector itself, blurring lines of market segmentation, enabling the creation of digital market places, social media platforms, crowd sourcing platforms and re-defining competitive rules.

¹ A digital marketplace is a virtual trading environment that enables value exchange between buyers and sellers. CIOs that are building and expanding a digital business can use digital marketplaces to derive value from their platform investments.

Snapshot

Global			Market Size		Growth Forecast			
	IT Services ⁱ		\$1,002.1 billion (2018)		\$1,912.3 billion by 2023			
	Software ⁱⁱ		\$484.2 billion (2018)		\$987.9 billion by 2023			
	IT Hardware ⁱⁱⁱ		\$290.4 billion (2017)		\$317.4 billion by 2022			
	Semiconductors ^{iv}		\$508.1 billion (2018)		\$746.9 billion by 2023			
Ireland		Exports ^{ix}	% of national exports	5-year CAGR of exports	Employment ^x	% of national employment	5 -year CAGR of employment	DEE ^{xi}
	All Agency	€142.1bn	58.3%	13.6%	156,307	6.6%	6.1%	€12.8bn
	Irish	€3.3bn	1.3%	11.5%	39,105	1.7%	5.3%	€2.4bn
	Foreign	€138.9bn	56.9%	13.7%	117,202	4.9%	6.3%	€10.4bn

- i. Global IT Services, Marketline, February 2019
- ii. Global Software, Marketline, February 2019
- iii. Global IT Hardware, Marketline, August 2018
- iv. Global Semiconductors, Marketline, January 2019
- v. IT Services in Europe, Marketline, February 2019
- vi. Software in Europe, Marketline, February 2019
- vii. Mobile Apps in Europe, Marketline, December 2018
- viii. Cloud Computing in Europe, Marketline, July 2018
- ix. ABSEI 2018, DBEI (includes computer, electronic and optical products; electrical equipment; computer programming; computer consultancy activities; computer facilities management activities; other IT and computer service activities, the data includes companies involved in technology platforms) vii) percentage of national exports is derived using total exports from ABSEI 2018.
- x. AES 2019, DBEI (includes computer, electronic and optical products; electrical equipment; computer programming; computer consultancy activities; computer facilities management activities; other IT and computer service activities, the data includes companies involved in technology platforms) National percentages derived using CSO, LFS Q4 2019 figure of 2,361,200
- xi. Direct Economy Expenditure relates to total payroll costs, and materials and services sourced from Irish suppliers

Pre-COVID-19 Position

The Technology Sector globally has been characterised by significant pace of change presenting opportunity, transformation and disruption for the technology sector itself and other sectors of the economy

- Technology is disrupting markets and business models across many sectors. Markets that did not exist ten years ago are now multi-billion-dollar markets.
- The trend towards cloud computing continues, driven by the attractiveness of flexible consumption models, pay-per-use, improved security and resilience.

- Ongoing convergence of 5G, AI, Data Analytics, IoT is poised to create opportunities across many sectors, including connected vehicles, smart cities, smart buildings, connected homes, wearables, including healthcare, etc. The technology services industry is evolving from offering services that improve productivity to providing value-added services such as analytics consulting; this increases rivalry as players seek to capture a share in higher margin sectors.
- Digital Platforms, providing search and social media (e.g. Google, Facebook), marketplaces (e.g. Amazon) and other crowd sourcing platforms (e.g. Airbnb and Uber) are having a disruptive impact on their respective sectors.
- Artificial Intelligence (AI) is pervading all sectors and being built into both consumer and business solutions. Concerns about potential negative impacts of AI have led to much focus on guiding its ethical development by the EU and the OECD.
- Over recent years, there have been shifting perspectives on technology and innovation from unquestioning enthusiasm to scepticism; from technology being a positive impact on social and economic development to it becoming a threat to economic growth, competitiveness and societal progress. The so called 'tech-lash' has meant greater scrutiny is now placed on technology providers and innovators in areas of taxation, competition policy and data privacy. The global oversight of technology firms and sectors has been heightened with the emergence of more tech specific regulators. Focus has turned more to how such technology is being used and whether its use is delivering benefits to consumers. In this context policymakers are increasingly turning their attention to the ethics and principles surrounding AI and its development.
- There is also a growing threat of anti-trust measures against digital platforms. Digital platforms enable the discovery and sharing of information by consumers, and the harvesting and analysis of data on those consumers by the platform. Companies in this space typically have huge scale and market power and are increasingly under heightened scrutiny of their competitive practices. As part of the European Digital Strategy, the European Commission has announced a Digital Services Act package to strengthen the Single Market for digital services and foster innovation and competitiveness of the European online environment.²
- There are high levels of mergers and acquisitions, driven by market leaders who are looking to expand activities and to gain access to strategic geographical markets. Many technology companies, through their venture arms, are investing in start-ups within growth areas, particularly in AI.
- There is intense global competition for technical skills including more traditional STEM skillsets, like critical thinking and problem solving but also emerging skills like data capture and analytics. This is coupled with an increasing demand for STEM professionals to have soft skills, such as teamwork and communication.
- Allocation of the taxation rights on profits generated by the sale of digital products is a topic of intense international debate. Effective engagement with the OECD and EU Commission

² <https://ec.europa.eu/digital-single-market/en/digital-services-act-package>

will be required to ensure an equitable distribution of taxing rights between the location where value is created and the location of the sales transaction, so Ireland remains an attractive location for technology companies.

- Data localization - We are in a new phase of globalisation, driven by new digital technologies and advances in digitalisation. Data has become a key pillar of economic activity, trade and competitiveness. Companies of all sizes and across all sectors now access, utilise and transfer data as part of their value chains. The European data strategy aims to make the EU a leader in a data-driven society. Creating a single market for data will allow it to flow freely within the EU and across sectors for the benefit of businesses, researchers and public administrations.³
- Global investment in Quantum technologies including computing, communications and sensors is accelerating rapidly. Within a small number of years, this will be a strategic and disruptive technology.

Ireland has become a competitive global technology hub, attractive for mobile strategic investment and technology-rich start-ups within all subdivisions of the sector:

- 9 of the top 10 global software companies, 9 of the top 10 technology companies, 3 of the top 4 internet companies have significant operations here (Google, Amazon, Facebook) and 4 of the top 5 IT services companies have a presence in Ireland.
- Companies at the vanguard of the internet and social media revolution, including Dropbox, Equinix, Google, Facebook, LinkedIn, Amazon, PayPal, eBay and Twitter have joined the sector's traditional players with long-established operations – such as Intel, HP, IBM, Microsoft and Apple in establishing a presence in Ireland.
- Ireland has entered a new phase in the evolution of the financial technology sector. Financial institutions have shifted focus and are now seeking to partner with more emerging technology companies to gain access to new markets and products.
- Ireland has a strong entrepreneurial culture and boasts a range of innovative technology-rich high-potential start-ups as well as a number of Irish owned companies focused on niche markets. Software has consistently been the top or second sector for venture capital investment in Ireland over the past 4 years.
- More local and international companies are investing in blockchain-related developments in Ireland.
- Prior to the pandemic, rapidly evolving digital technology and improving infrastructure was having a direct impact on opportunities for remote working resulting in new, flexible and open talent models being adopted by firms across the country.

³ European data strategy, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

- While cybersecurity is a global problem and a threat to development of the online economy, a 2018 PWC report revealed that Ireland had particularly high levels of cybercrime.
- Ireland has been identified as having a two-speed digital economy with a small number of foreign-owned multinationals with high digitalisation levels and indigenous SMEs, which are slower in leveraging digital solutions.⁴ Irish SMEs face financing and knowledge barriers to implementing digital solutions. Improved access to finance, in the start-up environment could assist in addressing the finance gap while an increased awareness of the digital solutions available and their potential benefits can reduce the knowledge gap.

Impact of COVID-19

GLOBAL

- COVID-19 has placed an increased focus on mobile communications, presenting opportunities for the Technology industry, including a growing need for 5G technology.
- In both developed and developing economies, operators suspended data limits and boosted capacity in response to the pandemic at no additional cost, and many governments temporarily issued additional wireless spectrum to operators to further increase network capacity.
- There has been a sharp increase in the number of people using Video Communications, with Zoom seeing a significant spike in users. Zoom reached peak daily meeting participants of 200 million+ and 300 million+ in March and April 2020, respectively. In contrast, there were ~10 million in December 2019⁵. Microsoft Teams has seen a 500% increase in Teams meetings and a 200% increase in mobile app usage⁶.
- Telehealth is one of the developing industries in the crises for which a lot of apps have been built in the past few months to help achieve this.
- Some of the trade implications for the ICT sector may be positive as global usage increases dramatically and inspires sharper recognition of the importance of access to technology and connectivity for all.⁷
- Forecasts for smartphone shipments decreased from a previously expected 1.4 billion to 1.3 billion devices in 2020. In 2020, personal computer (PC) shipments are forecast to reach 248 million units, a decline of 7%; 266.7 million units were sold in 2019. Shipments of personal computing devices (PCDs) are also expected to decline by 9%. In comparison, there was a decline of 6.8% in 2019.⁸

⁴ The Digitalisation of Small and Medium Enterprises in Ireland, DBEI, March 2019

⁵ <https://www.businessofapps.com/data/zoom-statistics/>, 2020

⁶ <https://www.microsoft.com/en-us/microsoft-365/blog/2020/03/05/our-commitment-to-customers-during-covid-19>, 2020

⁷ https://www.wto.org/english/tratop_e/covid19_e/services_report_e.pdf, 2020

⁸ <https://www.statista.com/study/71685/impact-of-the-coronavirus-covid-19-pandemic-on-the-global-tech-industry/#professional>, 2020

NATIONAL

- While the technology sector has been one of the least affected sectors some technology companies have faced challenges to support businesses in other sectors as they struggle to adapt and others supporting food, drink, travel and street retail businesses found their revenue streams drying up overnight.⁹
- Companies with remote-working technologies are seeing increased demand as businesses increase their remote-working capabilities.¹⁰

Issues, Opportunities and Challenges for the Sector

- The dramatic changes forced upon us by COVID-19, have demonstrated clearly that Ireland's technology sector is key to every aspect of economic and social life. The technology sector can help drive Ireland's reboot, through direct economic input and through supporting businesses and organisations.¹¹
- Start-ups will also play a key role in post-COVID recovery. Start-ups are key to economic growth and contribute significantly to job creation¹².

⁹ ECB found that the Information and Communication Technology is one of the least affected sectors with initial economic loss from the lockdown of only 10%.

¹⁰ https://www2.deloitte.com/content/dam/Deloitte/pl/Documents/Reports/pl_COVID_19_Impact_Technology_Sector.pdf, 2020

¹¹ Ibec Reboot & Reimagine, 2020

¹² OECD: Start-ups vs COVID-19