ICT & DATA ANALYTICS

Sector Background

The Information and Communications (ICT) sector is of vital strategic importance to Ireland, both in terms of the numbers of highly skilled professionals employed and its significant contribution to export performance, accounting for €70 billion per annum. ICT is also widely used across other sectors of the economy. Around 60% of ICT professionals are employed in the broad ICT sector, while 40% are employed across other sectors of the economy (ref Higher Education Authority ICT Skills Action Plan 2014-2018).

Globally, the sector is in the midst of a disruptive growth and innovation phase. This includes the development of software and programming capabilities, the adoption of cloud computing, the penetration of mobile devices and technologies and the Internet of Things, the emergence of Big Data analytics, IT security, micro and nano electronics and the adoption of social technologies in both the personal and business environment.

The varied sub-sectors of the ICT Sector include:

Software and Programming

Software and Programming are central to the computer industry. In order to function, a computer needs information about its task and it needs to be programmed to perform tasks. Programmers and Developers are involved in writing the code or instructions that tell the computer what tasks to carry out. Programmers need to learn the computer languages (e.g. C++, Java, COBAL) which are used to develop software, and because of the increasing number and complexity of computing languages, students and workers in this area need to constantly keep up with the latest developments.

Hardware & Manufacturing

Hardware and Manufacturing is a significant sub-sector of the computer industry. Computer hardware includes all the machinery and equipment, the nuts and bolts of a computer and its add-ons such as a printer, scanners and speakers. ICT Hardware includes the manufacturing of semi-conductors, integrated circuits, computer hardware, peripherals and storage devices.

Computer hardware starts in the research and development (R&D) departments of manufacturing companies. Teams of engineers (mechanical, electronic, electric, manufacturing, CAD, software, etc.) work to design, test and produce the latest components. When a product is found to satisfy a market need, manufacturing processes are developed to produce the finished product.

Cloud Computing

Cloud computing is the delivery of computing as a service, using processing power and storage of data on computers and data centres based elsewhere, away from the users own premises. This is made possible because shared resources, software, and information are provided to computers and other devices as a metered service over a network (typically the Internet). Simply put, users can now do more with less equipment, and are getting access to more computing power, whilst reducing the costs of their IT investment. Google, YouTube, Gmail, DropBox and SalesForce are all examples of cloud computing usage.

Internet of Things

The Internet of Things (IoT) refers to a network that connects any object with the Internet via radio frequency identification (RFID), infrared sensors, GPS, laser scanners and other information sensor equipment, for information exchange and communication. It is used for intelligent identification, positioning, tracking, monitoring, and management.

Microblogging and location/mapping will emerge as ways for consumers to manage their relationship with the devices and objects they use on a daily basis. Currently, IoT solutions are mostly deployed to address issues around supply chain and product/asset tracking and location in such industries as utilities, oil and gas, manufacturing, retail, healthcare, and logistics. Going forward, IoT solutions have the potential to create smart environments spanning across different industries (smart cities, smart energy, smart transport, smart buildings, smart health, smart manufacturing, smart retail, etc.).

Data Analytics

Big Data is one of the fastest growing areas of computing and Ireland has become the European data centre location of choice for world leaders including Microsoft, Google, Yahoo, MSN, Adobe and IBM, and is now poised to become a global cloud centre of excellence.

Historically, the type of data generated has been 'structured data' – from financial institutions, bank accounts, and big institutions. Today we have unstructured data – the type of data being generated by social media, mobile phones for example. The management of data is essential to business, and its importance will continue to grow as long as more and more devices, technologies and services harvest more and more information from society.

Data analytics involves the collection, organisation, and interpretation of statistical information to make it useful to a range of businesses and organisations. A Data Analyst is someone who scrutinises information using data analysis tools. The meaningful results they pull from the raw data helps their employers or clients make important decisions by identifying various facts and trends.

The work of Data Analysis involves:

- Use of advanced computerised models to extract the data needed
- Removal of corrupted data
- Performing initial analysis to assess the quality of the data
- Performing further analysis to determine the meaning of the data
- Performing final analysis to provide additional data screening
- Preparing reports based on analysis and present to management

IT Security

Business and organisations are increasingly dependent on ICT for communication *outside* a "protected" internal, organisation-only environment. Trends such as mobile technology, cloud and social networking increase an organisation's interaction with customers, staff, suppliers, partners and other parties. At the same time, this makes them more vulnerable to deliberate or accidental security breaches and cyber-attacks. The demand for security technologies and skills in IT security is evolving into a need for complex, context-aware protection. As a result, IT security technology and skills are in big demand.

There are three main areas of ICT security:

- **Identity and access management** (IAM) - solutions used to identify users in a system and control their access to resources within that system by associating user rights and restrictions with the established identity.
- **Secure content and threat management** (SCTM) - products to defend against viruses, spyware, spam, hackers, intrusions, and the unauthorised use or disclosure of confidential information.
- **Security and vulnerability management** - solutions that focus on allowing business and organisations to determine, interpret, and improve their risk position.

Gaming and Media

Ireland's gaming and media industry is one of the fastest growing sectors in IT. Our worldwide reputation for creativity and communication is fuelling the interest of gaming companies. Big Fish, EA, Havok, DemonWare, PopCap, Zynga, Riot Games and Jolt all have a significant presence in Ireland and are increasingly hiring graduates from an IT background.

Typical Roles

Some roles in this sector include;

• **Programmer/ Software Developer** • **Games Developer** • **Web Developer** • **IT Consultant** • **Database Administrator**	• **Information Security Specialist** • **Network Engineer** • **Data Analyst** • **Data Scientist** • **Statistician**

Entry Routes

ICT

According to the Graduate Recruitment and Employability Survey (2013-14), conducted by AHECS, the ICT sector places a heavier emphasis than many others on the relevance of degree and overall academic results as an important criteria for short-listing candidates. Work placements are also highly valued by employers and extra-curricular involvement is viewed as a key consideration in the shortlisting process. It was also found that in terms of skills, ICT employers are looking for teamwork and communication skills, a positive attitude, business and commercial awareness and self-management skills. A Computer Science graduate typically starts out as a programmer, software developer, systems analyst or web developer and with experience can move into more senior management and consultancy roles.

Undergraduate Study

Potential candidates interested in entering the ICT sector often start with an undergraduate course in Computer Science and then choose work depending on their area of interest. Many new specialised computing courses have been introduced at both undergraduate and graduate level as a result of skills shortages in the ICT Sector and the numerous job opportunities in the current climate.

Undergraduate courses in Ireland can be searched through Qualifax and ChooseIT, in the UK through UCAS, and in Europe through Eunicas.

Graduate Study

Graduates without a Computer Science degree can undertake IT conversion courses on offer at various institutions throughout the Republic of Ireland and Northern Ireland. Postgraduate and Graduate Entry courses can be searched through Qualifax, postgradireland and mastersportal.

Applications for ICT conversion programmes in a variety of areas for unemployed graduates are made through bluebrick.ie.

Data Analytics

The usual entry point to careers in Data Analytics is a degree in statistics, mathematics or a related subject involving maths, such as economics or data science. Other degrees are also acceptable if they include informal training in statistics as part of the course, for instance social science or informatics.

There is strong demand for qualified and experienced data analysts but it can be a competitive field. Potential candidates can gain a competitive edge by obtaining a master's degree in a field like finance or statistics. Career progression prospects are good in larger companies and organisations.

Undergraduate courses in Ireland can be searched through Qualifax and ChooseIT, in the UK through UCAS, and in Europe through Eunicas. Postgraduate and Graduate Entry courses can be searched through Qualifax, postgradireland and mastersportal.

Relevant Bodies & Professional Associations

ICS - The Society for Chartered IT Professionals in Ireland International Game Developers Association (IGDA) ICT Ireland Irish Internet Association Irish Software Association	National Software Directorate Insight Centre for Data Analytics Business Analyst Association of Ireland The Society for Chartered IT Professionals in Ireland Irish Centre for High-End Computing (ICHEC) Irish Computer Society