TOGETHER FOR
DESIGN

DIGITAL, PRODUCT AND
STRATEGIC DESIGN SKILLS
OF THE FUTURE

National Skills Council

Expert Group on
Future Skills Needs

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Finally, the EGFSN Secretariat would like to thank Cruinn Associates, whose work included the literature review, the economic modelling, the delivery of workshops and the undertaking of interviews with key informants, as well as the integration of the various research elements into the final report.

INTRODUCTION TO THE EXPERT GROUP ON FUTURE SKILLS NEEDS

The Expert Group on Future Skills Needs (EGFSN) advises the Irish Government on the current and future skills needs of the economy and on other labour market issues that impact on Ireland's enterprise and employment growth. It has a central role in ensuring that labour market needs for skilled workers are anticipated and met.

Specifically, the EGFSN:

■ Carries out research, analysis and horizon scanning in relation to emerging skills requirements at thematic and sectoral levels. Steering Groups comprising of experts from relevant enterprise sectors and the education and training sector may oversee sectoral research studies to be undertaken or commissioned by the EGFSN. Drawing on statistical input and analysis from the SLMRU and consultation with the enterprise/education experts as part of the study, draft reports setting out the projected needs are prepared by the EGFSN.

■ Engages with the HEA, SOLAS, QQI, the Regional Education Fora, and education and training providers in the course of its research.

■ Engages with DES, HEA, SOLAS and other relevant bodies to produce agreed action plans to address the skills needs identified.

■ Submits the findings of its research and agreed Action Plans to the National Skills Council prior to publication.

■ Disseminates its findings to the Regional Skills Fora and other relevant groups.

The Enterprise Strategy, Competitiveness and Evaluation Division within the Department of Business, Enterprise and Innovation provides the EGFSN with research and analysis support.

FOREWORD

The 2017 predecessor to this report, *Winning by Design*, recognised design as a key component of Ireland's innovation ecosystem. The report looked at the definition of design, the design skills necessary across the economy, and how businesses can use design as a strategic means to encourage innovation.

Together for Design builds on this foundation, looking at the future demand for design skills over the years 2020-2025. As the Fourth Industrial Revolution transforms Ireland's society and economy, design skills are becoming more cross-cutting than ever, with technology blurring lines between disciplines in industry and education.

In order to assume a leadership position in design, Ireland needs to be at the cutting edge of the strategic thinking, technologies and process that can help to transform research and development into commercially viable products and services which meet user needs. Future graduates need the skills to be able to adapt to a changing market and to strategically apply their design skills to innovation, creative thinking and problem solving. In addition, designers need to have leadership skills to both communicate their ideas at boardroom level and manage large teams.

This means working together, both within the design community to build a collective voice, and between education and enterprise to ensure Ireland's graduates are equipped with the skills necessary to thrive in tomorrow's economy. As such, I would urge the National Skills Council to consider the recommendations contained within this report.

On behalf of the EGFSN I would like to thank all of the contributors to this report who so generously gave us their time and expertise. I would also like to express my thanks to the members of the project Steering Group for their insights and support in finalising the report. Finally, I would like to thank the EGFSN Secretariat, within the Department of Business, Enterprise and Innovation for managing and leading the study to a successful conclusion.

Tony Donohoe
Chairman
Expert Group on Future Skills Needs

EXECUTIVE SUMMARY

IN NOVEMBER 2017 THE EGFSN PUBLISHED *WINNING BY DESIGN*. THE AIM OF THE REPORT WAS TO ACT AS AN INTRODUCTORY PAPER TO ESTABLISH WHAT WAS MEANT BY THE TERM DESIGN AND TO UNDERSTAND HOW PERVASIVE IT IS IN OUR SOCIETY AND ECONOMY.

It provided an introduction to the design skills required for firms to be innovative and competitive in global markets. The report outlined the evolution of design and how the use of design adds strategic value, creative thinking and innovation from the earliest stages of development through to the final delivery of products and services. It highlighted the importance of design for commercial success and outlined the multi-disciplinary skills required by designers.

Together for Design builds on the strong foundations put forward by *Winning by Design*. Aligned with the findings of its predecessor, this report recognises that design has become an increasingly influential driver of economic growth, integral to both industry and society. *Together for Design* focusses on the three design disciplines identified as of importance for Ireland, namely digital, product and strategic design. The report finds that these design disciplines are constantly evolving in response to new opportunities across technology and industry and as a result, skills in these areas are high in demand.

Together by Design adopted a design thinking methodology. This methodology used a five-step process that required empathising, defining, ideating, prototyping and testing. The process takes a human-centred approach to capture insights by actively involving users (in this case, enterprises, designers and academics) within the process. The contribution of these users is essential

throughout the process at different stages and in different ways. For the purposes of the report, the three design disciplines were classified as follows:

- Digital Design (including Interactive Media, UI & UX Design, Digital Media, Interaction Design, Multimedia Design, Web Design)

- Product Design (including Product Design Innovation, Process Design, Industrial Design, Manufacturing Design, Engineering)

- Strategic Design (including Service Design, Design Thinking, Co-Design, Design Management, Design Innovation)

Increasingly, enterprises are recognising the value that design adds to their business. In fact, design roles are already outperforming other areas of growth in employment across Ireland. Since 2011, the number of design jobs in the economy has increased from 1.1% to 1.9% (2019), representing a 0.8% increase over 8 years. However, between the years 2016 and 2019 the number of design jobs in Ireland has increased by 0.4% alone. This evidences that the design landscape is growing and gaining in importance.

Three scenarios (low, medium and high) were considered to forecast future design growth. These forecasts suggest that by 2025 occupations in digital, product and strategic design could range from 65,000 to 77,000 occupations. This would mean that by 2025 there would be an additional 21,000 to 33,000 occupations in these disciplines, accounting for 2.8% of all jobs in Ireland.

Focussing solely on the medium growth scenario, it is forecast that there will be over 6,000 new openings annually from 2020 – 2025 in design occupations reflecting both the expansion, growth and replacement demand for these skills. Currently, it is estimated that 1,300 students graduate annually from higher and further education with the relevant design skills required for these roles. This number increases to almost 2,000 students when a further cohort of graduates, who have studied relevant modules or course content within different programmes of study, are included. On the basis of the evidence provided in the Graduate Outcomes Survey, just over 1,000 of these will end up in a job within nine months of graduating.[1] This provides a sense of the potential pool of graduate completers that could take up jobs in these occupations.

The research also highlights that in 2018, Critical Skills Employment Permits were issued to over 2,700 people in the areas of digital, product and strategic design. Whilst the presence of programmers and software development professionals in this number has the potential to skew the relative importance of design skills, this figure still demonstrates that enterprises are struggling to find the right people in both Ireland and Europe who have these skills.

Over the course of the research, workshops, interviews and a survey were carried out with key stakeholders in enterprise, the design community and academia, through which a number of findings emerged. Their views are summarised below.

Enterprise & Design Community

■ Design is widely viewed as a growth area in Ireland and there is a sense that enterprises are increasingly aware of the importance of design. However, it was felt that Ireland still has a way to go to become a design hub on par with other European countries.

■ Across enterprise and the design community there was a strong sense that a stronger voice is needed to champion and advocate for design at Government level. This need was presented in a number of different ways but the consensus for leadership was clear.

■ Design and the traditional craft sectors are often confused with each other. Whilst both have a role to play in the economy, the design and craft sectors have decidedly different end markets. It was felt that design should position itself as separate to craft.

■ It was suggested that Ireland lacks a national sense of design. This was considered to have a direct impact on enterprise and the pipeline of talent. Stakeholders emphasised the importance of critical thinking and creativity at primary and secondary school level.

■ It was felt that there was a lack of design culture in enterprise. Stakeholders stated that SMEs and LEOs need to increase their awareness and understanding of design. This was seen as essential to promoting and developing business strategically so that Ireland can be more competitive.

■ Across enterprise and the design community the recruitment of experienced designers is difficult. Whilst there is demand in this area, there is a relatively small pool of experienced designers in Ireland. Equally, design leaders are in demand but are in short supply.

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[1] Source: HEA (2018). *Graduate Outcomes Survey: Class of 2017.* Available at: https://hea.ie/assets/uploads/2019/02/HEA-Graduate-Outcomes-Survey.pdf

- Smaller enterprises find it more difficult to attract design skills as they are competing against large MNCs for the same talent. It was suggested that this was creating a two-tier system for design in enterprises across Ireland.

- There was a strong desire for increased collaboration between design and business schools, industry and academia.

- It was suggested that more flexible pathways, apprenticeships, short courses and boot camps would incentivise people in work to upskill and utilise education within an applied industry context.

Academia

- It can be challenging for academic institutions to respond to the demands for industry focussed courses/programmes. However, some institutions have found ways to respond to demand.

- There is an increasing focus on the development of soft skills for designers. There is also a reframing of the multi-faceted skills which are required to work in multi-disciplinary and collaborative teams.

- Design policy is viewed as disjointed. Academics believe that a long-term Government policy for design would allow Ireland to evolve and lead in this area.

- There was a consensus that continual lifelong learning of both educators and practitioners of design is needed.

- It was suggested that, in order to promote design courses to parents and designers, course names should be unambiguous. Also, it was proposed that the visibility of the course syllabi needs to more accurately reflect the precise nature of the elements covered by the course.

- Academia felt that to help increase the supply of future design graduates will require promoting design internships, mentorships and placements. Over the medium-term increased support for design in schools was suggested.

The accumulation of evidence suggests an undersupply of people available to meet the growing demand for these design skills going forward. In order to ensure Ireland's economy can meet the demand for design skills in these areas into the future, a series of strategic recommendations have been proposed, including:

i **A collective voice for leadership in design.**
There is a need for design to present a collective voice across enterprise, academia and the design community. The forthcoming National Design Centre should help refine a collective 'voice' so that emerging and urgent issues can be anticipated and met.

ii **Policy interventions to address skills shortages in design.**
The provision of flexible education provision methods, the delivery of Technology 2022 and the promotion of Springboard and Skillnet Ireland are key to addressing design skills shortages.

iii **Collaboration between education and enterprise.**
Collaboration is vital to help deliver the design skills required by enterprise. The design community should engage directly with educational institutions to facilitate developmental processes for educators and to support the emergence of new design disciplines and career options.

iv **Develop career pathways in design.**
Current and any future funding pathways, such as Springboard, Skillnet Ireland, the Human Capital Initiative and apprenticeships should be fully utilised to deliver additional design skills.

v **Design in education.**
The design community should engage with the guidance profession and the Transition Year programme to embed design in secondary school, while engaging with post-secondary educational institutions to promote strategic design in their offerings.

1

INTRODUCTION

In 2019 the Government launched Future Jobs Ireland, a new economic pathway, based on embracing innovation and technological change, improving productivity, increasing labour force participation, and enhancing skills and developing talent. A commitment of *Future Jobs Ireland* is to "ensure our enterprises and workers are resilient and prepared for future challenges and opportunities. This is a whole-of-Government approach, which will form a key part of Ireland's economic agenda over the medium term."

it's clear that by 2025, enterprises and industries will operate in a changed economy. Technology offers new ways of doing business and fosters economic opportunities – certain job roles will disappear or be redefined, and emerging job roles may require new and different skillsets. Ireland's capability in cutting edge technological areas such as Artificial Intelligence (AI), Augmented and Virtual Reality (AR and VR), Data Analytics, Internet of Things (IoT) and Blockchain needs to be embraced and facilitated in order to help companies design, develop and implement solutions across multiple sectors such as MedTech, FinTech, Advanced Manufacturing and AgriFood. As rapid advances in technology continue apace, challenges and opportunities are presented for enterprises and employees to adapt and thrive in a constantly changing economy. Set in this context are a number of key policy initiatives as drivers which will shape Ireland's economic and skills agendas in the future – *Future Jobs Ireland*[2], *Project Ireland 2040*[3], *Global Ireland 2025*[4] and the *National Skills Strategy 2025.*[5] These policies all represent an integrated approach to prepare towards a projected growing but low carbon economy set within the *Climate Action Plan.*[6]

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[2]   Department of Business, Enterprise and Innovation. Future Jobs Ireland 2019. Available at:
        https://dbei.gov.ie/en/Publications/Publication-files/Future-Jobs-Ireland-2019.pdf
[3]   Department of Public Expenditure and Reform (2018) Project Ireland 2040. Available at:
        https://www.gov.ie/en/policy/project-ireland-2040-policy/
[4]   Government of Ireland. (2018) Global Ireland 2025.
        Available at: https://assets.gov.ie/831/160718094402-7490182-global-ireland-master-draft-14-lowres.pdf
[5]   Department of Education and Skills (2016) National Skills Strategy 2025. Available at:
        https://www.education.ie/en/Publications/Policy-Reports/pub_national_skills_strategy_2025.pdf
[6]   Department of Communications, Climate Action and Environment (2019). Climate Action Plan 2019.
        Available at: https://www.dccae.gov.ie/en-ie/climateaction/publications/Documents/16/Climate_Action_Plan_2019.pdf

One of the five pillars of *Future Jobs Ireland* focuses on enhancing skills and developing and attracting talent. It is within this pillar that the requisite design skills of the future need to be built. Key elements must be in place to ensure Ireland is agile, resilient and ready to contend in a competitive global market. The fluidity of the economy and the emerging opportunities that innovation and technological present will affect the design disciplines upon which the research is focused – namely digital, product and strategic design, as highlighted in the 2017 predecessor to this report, *Winning by Design.* However, it is recognised that due to the impact of technology there is a blurring of disciplines, skillsets and teaching of design in Further and Higher Education. As such, this report more than a simple review of supply and demand of these design skills of the future.

A necessary lead-in time in relation to teaching, training, staffing and equipping educational institutions is required to ensure the skills of design educators are responsive and relevant. Ireland's economy and business needs are driven by global markets and vice versa. In order to assume a leadership position in design, Ireland needs to be at the cutting edge of research and development. Future graduates need the skills to be able to adapt to a changing market and to strategically apply their design skills to innovation, creative thinking and problem solving. In addition, designers need to have leadership skills to both communicate their ideas at boardroom level and manage large teams.

Ultimately, Ireland's design skillsets need to be competitive and leading edge if the country is to assume the position of a recognised and leading centre of design excellence in Europe. Otherwise, there is the potential for Ireland to fall behind its international counterparts. The required and anticipated design skillsets must be put in place to ensure that the education, enterprise and design communities together supply the workforce of the future with the requisite design skillsets.

2

TERMS OF REFERENCE

- A review of main trends and drivers of change impacting on the industry's current future skills and competencies requirements building on *Winning by Design.*

- A high level desk-based international policy review to determine best practice in design skills provision in leading countries and how this can inform Ireland's future

- Build on previous work undertaken in determining the current workforce profile of the sector in relation to digital, product and strategic design.

- A modelling exercise to determine the future design skills requirements for enterprise over a five-year period to 2025. This will include a low, high and central demand forecast scenarios.

- A supply profile of the current relevant skills from education and training providers.

- A set of recommended responses based on the results of the quantitative and qualitative research to address any identified gaps in skills provision taking into account the skills needs requirements of the economy.

- Consideration of how any identified gaps in skills provision, including quantity and diversity[7], may be addressed in both design and enterprise sectors.

- Design and distribution of a structured survey of key informants on skills demand needs, including identifying how they might differ inside and outside of Dublin and how best to address this.

- An overview of ideas and recommendations arising from three thematic workshops on national and regional skills needs and supply provision with selected companies, organisations, education and training providers, and State agencies.

- Consideration of the upskilling requirement of current workers and jobseekers to fill potential job openings.

- Application of the process of design thinking within the report.

- An executive summary within the final report.

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[7]   To include, but not limited to, gender and regional diversity.

2.1 Methodological Approach - Design Thinking

The methodology utilised design thinking as the over-arching approach to determine, define, and deliver a meaningful body of research and report. Design thinking can be broken into five key processes (Figure 1). Design thinking is a 'human-centred' approach that helps to identify specific contexts and challenges. It shifts the perspective from overly focusing on a hard and fast end solution towards richer data based on rounded insights, stories and experiences. It actively involves users within the process. Their contribution is essential - at different stages, in different ways.

Figure 1: Research Methodology - Design Thinking

EMPATHISING

Stakeholder Survey
Stakeholder Interviews
(telephone/in-person

PROTYPING

Workshop II:
Upskilling & Reskilling
Design Education Futures

D E I P T

DEFINING

Digital/Strategic/
Product Design
Policy Analysis &
Literature Review

IDEATING

Workshop I:
Supply & Demand
Future Design Skills

TESTING

Workshop III:
Scenarios & Forecasts
Emergent Findings

01 **Design Phase**
Design Thinking Methodology including secondary and desktop research

02 **Delivery Phase**
Primary research of quantitative and Qualitative methods with academic design, Enterprise and state agency stakeholders

03 **Dissemination Phase**
Digital distribution of final report to key stakeholder audiences

2

DEFINING: problem definition and interpreting results
Typically, in a design thinking led process *Empathising* would come first. However, it was consciously decided to put *Defining* as the first step due to the scope of the report and research context. Thus, the defining stage involved both defining the question(s), interpretation of the policy context and analysis of available statistics and datasets relating to digital, product and strategic design – including the following:

- A profile of Further and Higher Education design courses in Ireland

- An immersive review of main trends and drivers of change impacting the industry's current and future skills and competencies requirements.

- A high level desk-based international policy review to determine best practice in design skills provision in leading countries and how this can inform Ireland

- Stakeholder consultations with stratified samples of:
  - Enterprises e.g. MNCs, SMEs, Design Agencies (n=42)
  - HEIs[8] e.g. Universities (n=8), Institutes of Technology (n=11); Colleges (n=5)
  - Government Departments and State Agencies e.g. Enterprise Ireland, IDA Ireland, Department of Education and Skills (DES), Department of Business, Enterprise and Innovation (DBEI) (n=5)
  - Educational Bodies e.g. HEA, SOLAS, Irish Universities Association (IUA) (n=3)
  - Design Associations e.g. Institute of Designers in Ireland (IDI), Design and Crafts Council Ireland (DCCI) (n=2)
  - Industry Bodies e.g. Irish Business and Employers Confederation (IBEC), Industry Research and Development Group (IRDG) (n=2)

- Building on previous work undertaken, a determination of the current workforce profile of the sector in relation to digital design, product design and strategic design

- A modelling exercise to determine the future design skills requirements for enterprise over a five-year period to 2025 – including low, high and central demand forecast scenarios

- profile of current supply of relevant skills from training and education provision

- Quantitative review of HE's ability to provide new design provision

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[8]   Please note: a full list is available at Higher Education Authority website: https://hea.ie/higher-educationinstitutions/?v=l

EMPATHISING: listening, observing and understanding
This stage provided new insights to inform an understanding and help define or redefine the various problems that might be faced in future. A series of consultations were held with key stakeholders to identify wider issues that might limit or affect their ability to respond with agility to innovation and change. Respondents were interviewed using a combination of online survey and structured interviews. These included:

- An online structured survey of skills demands to scope business needs within digital, strategic and product design from multiple sectors and respondents (n=250)

- Structured interviews (in-person/by telephone) with Enterprises selected from across different sectors and regions of the economy with mixed levels of design needs. Interviews were representative of those with experience of design including a mix of regional and international respondents (n=24)

- Structured interviews (in-person/by telephone) with Design Start-ups, SMEs and State Agencies to reflect demand side of design skills (n=18)

IDEATING: exploring divergent views, issues and ideas
Armed with data derived from the first stages, three creative and participatory co-design workshops were held with 50 stakeholders in Dublin and Galway. The workshops explored and expanded on national and regional issues in technology, business and design and the skillsets that are currently required, and will be required, in the next five years. Participants were drawn from selected companies, organisations, education and training providers, and State agencies. Participants included those at senior and decision-making level and those at pivotal points in career and experience. These workshops were strictly non-hierarchical. The emphasis was not on individuals' job titles but on rather their enthusiasm, experience, knowledge and drive. By virtue, these workshops were multi-disciplinary and were delivered by experienced design thinking facilitators with a wide range of stakeholders. The focus of the workshops was human-centred – exploring macro and micro levels considering the current and future skillsets of design graduates and how they will meet the needs of enterprises and design organisations over the next five years.

PROTOTYPING: developing scenarios and modelling skills
Based on evidence, review and insights from the previous stages, three future scenarios were developed cross-referencing supply and demand skillsets. A process of exploration, in-depth consideration and experimentation helped to shape and create preliminary responses using data derived through quantitative modelling and qualitative research. These scenarios were tested in relation to current policy in Ireland. At this stage the aim was to be in a position to develop annual demand scenario forecasts for design skills over the period 2020-2025 so that they could be tested in the next stage of the process.

TESTING: reviewing and thinking towards convergence
Design Thinking enabled the research to maintain an agile approach to this challenge. The aim is to avoid ingrained patterns of thinking and to maintain a fresh and open approach that enabled a review of the impact and implications as responses were rationalised. This stage of Design Thinking focused on testing and consolidating the data, research and insights. In addition, the quantitative outputs (as defined in Stage 1) further examined and tested datasets in order to draw robust conclusions and recommendations. Activities in the workshops stemmed from a range of creative exercises, tools and techniques. The workshops used a series of sketch-noting and sought stakeholders' consent to use their views in the report in line with both General Data Protection Regulations (GDPR) and Data Protection Act (DPA) 2018.

2.2 Design Definitions

Defining Design Skills

In January 2016, DBEI published the *Policy Framework for Design in Enterprise in Ireland*[9]. This framework used a broad definition of design focusing on 6 design groups – Specialised Design, Architecture, Digital, Engineering, Advertising and Craft. In November 2017, the EGFSN published *Winning by Design*[10] which built on this work. It acted as an introductory paper to explore further what was meant by the term 'design' and understand how pervasive it is in Irish society and the economy. The report noted the fact that design had broadened from its traditional definition and reflected upon the effect that this has and will have on design skillsets required by enterprise. It noted that the emerging hybrids of design mean that job roles no longer fall into neat categorisation and that designers are being asked to work in ways that transcend disciplines.

This broad definition took in a number of codes from Standard Occupation Classification (SOC)[11] system and the Nomenclature of Economic Activities (NACE) reflecting enterprises relevant to the wider design definition.

Winning by Design considered the term 'design' at its broadest definition as both a discrete sector and as a cross-cutting skillset – design could encompass visual communications, fashion, textiles, architecture and interiors. However, for the purposes of this report, design refers to the three design disciplines identified by *Winning by Design* as areas of focus for Ireland– namely digital, product and strategic design.

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[9]   Department of Business, Enterprise and Innovation (2016) Policy Framework for Design in Enterprise in Ireland. Available at: https://dbei.gov.ie/en/Publications/Publication-files/Policy-Framework-Design-in-Enterprise-in-Ireland.pd[f]

[10]   The Expert Group on Future Skills Needs (2017). Winning by Design. Available at: http://egfsn.ie/all-publications/2017/winning%20by%20design.pdf

[11]   Department of Business, Enterprise and Innovation. Standard Occupational Classification (SOC). Available at:: https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Classification-of-Employments/

Occupation Definitions

The research initially dealt with defining design based on the data identified for the three design disciplines arising from *Winning by Design*. Subsequently, a second occupational definitions of 'design' was used. The definitions used are as follows:

(i) The SOC codes as set out in the terms of reference which are aligned to official definitions of occupations by CSO *(Table 1)*;
(ii) Aligned job roles in the context of design as defined for the purposes of this research *(Table 2)*

The differences largely reflect the fact that SOC codes are broader (even at 4-digit level) than the job roles that emerged from *Winning by Design*. The SOC codes have been crucial in providing a basis to determine official figures for jobs numbers in these occupations. They are central to the modelling exercise set out in Section 6. For the purposes of data analysis, codes were identified from the report based on the following:

Table 1: SOC Definition of Design

	Description of Design Community	4-Digit SOC
Design - Digital	IT business analysts, architects and systems designers	2135
Design - Digital	Programmers and software development professionals	2136
	Web design and development professionals	2137
Design - Product	Design and development engineers	2126

Source: Winning by Design

The fit within the wider definition of design is highlighted in Table 2. This design domain definition was established to include the occupations set out in Table 2. These have been selected on the basis of their relation to 'job role' definitions.

These roles are more typical of what is currently used by employers, employees and others to describe digital, product, and strategic design roles.

2

A review of the UK's Occupation Coding Toolkit also reflects a degree of 'match' between the two classifications. For example, UI & UX media fall under SOC codes 2136 and 2137. Engineering design falls under SOC code 2126. It is challenging to find direct matches between the two definitions because these job roles tend to evolve quite quickly relative to the now outdated SOC 2010, which is currently under review.

Table 2: Definition of Design Domains

| Product	Digital	Strategic
■ Product Design	■ Digital Design	■ Strategic Design
■ Innovation	■ Interactive MediaUI & UX Design	■ Service Design
■ Process Design	■ Digital Media	■ Design Thinking Co-Design
■ Industrial Design	■ Interaction Design	■ Design Management
■ Design for Manufacturing	■ Multimedia Design	■ Design Innovation
■ Engineering	■ Web Design	

Business Definition

A key part of the research was to understand the demand for these types of design skills from business. These types of skills are likely to be 'bought' in by some sectors of the economy but there are certain sectors which are more likely to directly employ these design skills, particularly those providing services to others. For the purposes of this research those sectors more likely to employ these skills as a core part of their business have been classified using the NACE codes set out in Table 3. It is important to understand the extent to which the two definitions are related, particularly in the context of providing hard quantitative data for the purposes of skills forecasting.

In order to understand the extent to which job roles outlined under the design domains potentially align with SOC codes, a word search of design domain subsectors using the ONS Occupation Coding Tool[12] has been set out in Table 4. Occupations outlined are those which fit within the four SOC codes provided (2126, 2135, 2136, 2137).

Important Note: No SOC codes have been allocated to strategic design as it does not have an explicit link to a specific 4-digit SOC code as is the case with digital and product design. strategic design is a relatively new field that uses a holistic, multi-disciplinary approach to applied design. It therefore has to be placed across different existing SOC codes.

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[12] Available at: https://onsdigital.github.io/dp-classification-tools/standard-occupational-classification/ONS_SOC_occupation_coding_tool.html
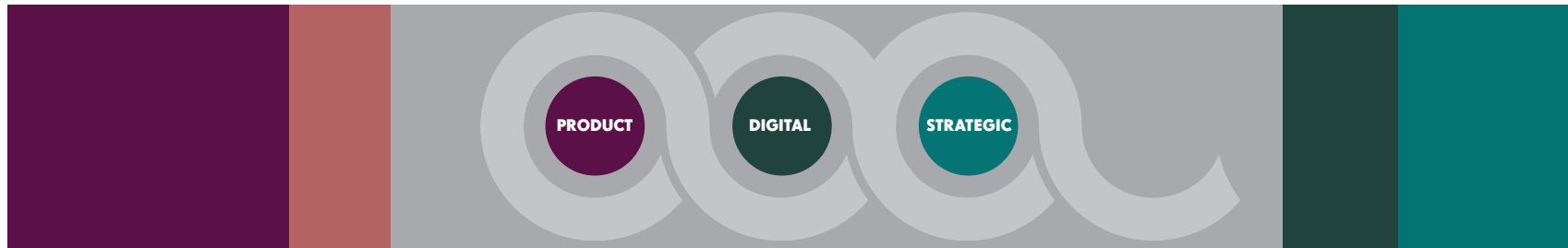
The review of job roles through the ONS Occupation Coding Tool did identify aspects of strategic design which identified with the 4 SOC codes reviewed in this research. For example, 'Strategist, IT' identified under SOC 2135.

Table 3: Businesses focused on Design Skills/Occupations by NACE

Product	Digital	Strategic
■ Design and development engineers – Code 2126	■ IT business analysts, architects and systems designers – Code 2135 ■ Programmers and software development professionals – Code 2136 ■ Web design and development professionals – Code 2137	
- Product Design - Product Design Innovation - Process Design - Industrial Design - Design for Manufacturing - Engineering	- Digital Design - Interactive Media - UI & UX Design - Digital Media - Interaction Design - Multimedia Design - Web Design	- Strategic Design - Service Design - Design Thinking - Co-Design - Design Management - Design Innovation

Source: Central Statistics Office

PRODUCT DESIGN ●● DIGITAL DESIGN ●● STRUCTURES AND PLACES ●● DESIGN AS STRATEGY

Table 4: Key Word Search using ONS Occupation Coding Tool

Design	
Design	2126, "Engineer, design" 2126, "Designer, avionics" 2126, "Designer, electrical"
Product	
Product Design/Product Design Innovation	2126, "Engineer, design" 2135, "Architect, product"
Process Design	2126, "Engineer, professional, design" 2126, "Engineer, design" 2135, "Architect, process"
Industrial Design	2126, "Engineer, design"
Design for Manufacturing	2126, "Engineer, design"
Manufacturing Design	2126, "Engineer, design"
Engineering	1121, "Director, engineering" 1121, "Manager, engineering" 2122, "Consultant, engineering" 2129, "Analyst, engineering"

Digital	
Digital	2135, "Architect, digital" 2137, "Producer, digital"
Interactive	2136, "Designer, interactive"
UI	2136, "Developer, UI" 2137, "Designer, UI"
Interaction	2136, "Designer, interaction" 2135, "Architect, integration"
Design Media	2137, "Designer, media, interactive" 2137, "Designer, media, new" 2126, "Engineer, design"
User Experience	2137, "Researcher, UX"2137, "Architect, experience, user" 2137, "Consultant, experience, user" 2137, "Researcher, experience, user" 2133, "Manager, experience, user, computing" 2137, "Designer, experience, user, computing"
Web	2135, "Architect, web" 2137, "Designer, web" 2137, "Developer, web" 2137, "Editor, web" 2137, "Manager, web" 2137, "Master, web" 2137, "Producer, web" 2137, "Technician, web"

2

Strategic	
Strategic Design	2126, "Engineer, design" 2135, "Architect, strategic" 2135, "Strategist, IT"
Service Design	2126, "Engineer, design"
Design Thinking	2126, "Engineer, design" 2126, "Designer, avionics"
Co-Design	
Design Management	2126, "Engineer, design"
Design Innovation	2136, "Designer, interaction" 2126, "Engineer, design"

SERVICE   DESIGN THINKING   DESIGN INNOVATION   DESIGN MANAGEMENT   CO-DESIGN

3

IRISH DESIGN CONTEXT

3.1 The Design Education Landscape

Traditionally, design education was taught in an art college environment with a strong emphasis on creative art, design thinking, practice and process. However, most art colleges have now largely been subsumed by universities – either fully, or through affiliation. University status has created new opportunities in design – notably in driving research and PhDs, as well as inter-disciplinary learning.

It is argued that more changes are needed to design. In 2010, Norman claimed that design needs "more rigour, more science and more attention to the social and behavioural sciences, to modern technology and to business - a new breed of designers need a wider education, design courses should be located within science and engineering".[13]

With digitalisation transforming society and work, industry will need designers and educators who know how to design with, and for, new technologies. Within this bottleneck, it is recognised that new design specialisms will emerge, paired with technology highlighting the increased need for ethics in designing products, services and experiences.[14]

[13]   Norman, D. (2010). Why Design Education Must Change. Available at: www.idemployee.id.tue.nl/g.w.m.rauterberg/lecturenotes/DG000%20DRP-R/references/norman-2010.pdf

[14]   Justice, L. (2019). *The Future of Design Education,* DMI Journal, Vol.30, Issue 1

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The 2015 study *Beyond Discipline: Design Practice and Design Education in the 21st Century* suggests that design education would benefit from an university system that reflects the ever-changing nature of design- one that is centred on thinking and process, as opposed to discipline-specific practical skills. The study also identifies a need for a clear definition and voice of design to be represented to Government- a need which, as explored later in this report, is reflected in Ireland.[15]

In 2010, the UK Design Council strongly advocated multidisciplinary skills to develop graduates' skillsets for innovation. With business modules, design students could "close skills gaps" to better understand clients' real-life issues and develop their own consultancies or agencies. Business and engineering students would also benefit from seeing how designers think and work.[16]

Discipline boundaries have become increasingly blurred and hybrid jobs with cross-disciplinary skillsets are the "fastest growing and highest-paying - and also the most resistant to automation."[17] Designers consistently need to widen their skillsets and scope of work to anticipate and meet this demand. Those who have hybrid, or combined digital skills, will earn more.[18]

Design courses in HEIs are fully accredited. They are developed under strict guidelines that adhere to a benchmarked quality of level, rigour and skills. From initial idea to implementation the development of a new course varies, but it is sometimes a relatively slow process. Full documentation sets out in detail the course need, scope and teaching and learning approach. Courses are regularly reviewed by internal and external experts to ensure that what is offered, and how it is taught, is still relevant to industry and the educational standard. Non-accredited courses do not go through this rigorous process.

Accreditation gives employers an assessment of competency and skill. It 'proves' the student has a certain level of knowledge, experience and core skillsets. This may also include exchange programmes, placement, live projects with enterprise and competitions managed by experienced and qualified staff.

[15]   Furniss, L. (2015). *Beyond Discipline: Design Practice and Design Education in the 21st Century.*

[16]   Design Council, UK (2010). *Multi-Disciplinary Design Education in the UK.*

[17]   Burning Glass Technologies (2019). *The Hybrid Job Economy: How New Skills Are Rewriting The DNA of the Job Market.* Available at: https://www.burning-glass.com/research-project/hybrid-jobs/

[18]   Burning Glass Technologies & Department for Digital, Media and Sport (2019). *No Longer Optional: Employer Demand for Digital Skills.* Available at:
        https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807830/No_Longer_Optional_Employer_Demand_for_Digital_Skills.pdf

As enterprise and society develops, there is research that suggests that HEIs and university systems will need to continue to adapt and change. EY identified five disruptors driving change and shaping Higher Education: [19]

EY argues the model for the university of the future is most likely to be "commercial" (Figure 3). This is to suggest that in the future more universities could be financially independent private institutions driven by commercial interests and work-integrated learning. Or, alternatively, universities of the future could be "disruptors". This would suggest that they are de-regulated, on demand, competitive, and dominated by continuous learners' demands for short courses and micro-certificates.[20] Continuous lifelong learning for industry-ready skills creates a demand from non-traditional learners for flexible learning, variety in delivery and access to a wider level and type of accreditation.[21][22]
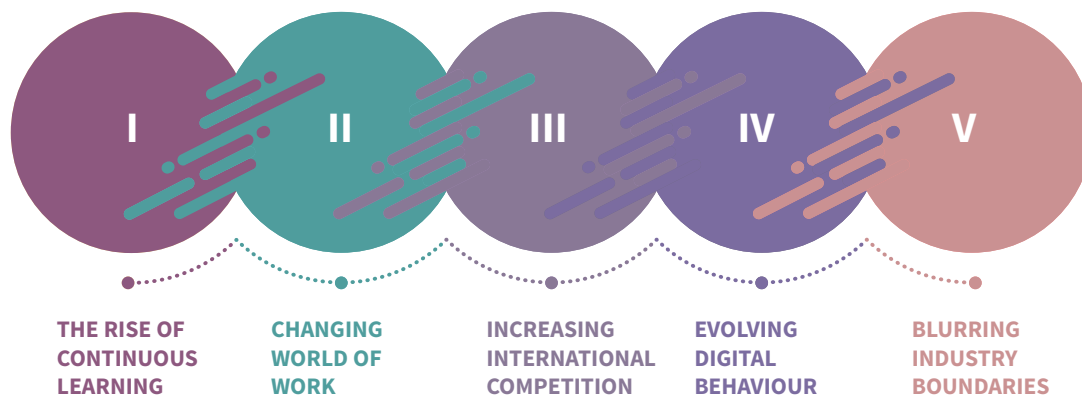
I	II	III	IV	V
THE RISE OF CONTINUOUS LEARNING	CHANGING WORLD OF WORK	INCREASING INTERNATIONAL COMPETITION	EVOLVING DIGITAL BEHAVIOUR	BLURRING INDUSTRY BOUNDARIES

It has been suggested that these changes may include a shift from "faculty-focused, to learner-centric" systems. This may include greater integration with industry to "co-create and collaborate" and inhabit a re-imagined physical campus in the digital world with fewer fixed-term degree programmes.[23]

[19] EY (2018). Can The Universities of Today Lead Learning for Tomorrow? Available at: https://www.ey.com/en_au/government-public-sector/can-the-universities-of-today-lead-learning-for-tomorrow

[20] EY (2018). Can The Universities of Today Lead Learning for Tomorrow?

[21] EY (2018). University of the Future 4.0. Available at: https://www.ey.com/Publication/vwLUAssets/ey-university-of-the-future/$File/ey-university-of-the-future.pdf

[22] EY identify non-traditional students as people who have: delayed post-secondary enrolment, are employed full time, are independent of financial aid, have one or more dependents, do not have a traditional high school diploma.

[23] EY (2018). Can The Universities of Today Lead Learning for Tomorrow?

Figure 3: Can The Universities of Today Lead Learning for Tomorrow?

Potential areas of disruption

How do universities create value?	Who are our customers	Domestic students	International students	Continuous learners	Government	Industry
	What are the jobs to be done for customers?	Acquiring knowledge	Developing hard and soft skills	Accessing employment opportunities	Coming of Age	Learning flexibly	Discovering new ideas	Transferring new knowledge
	What products/ services are we providing?	Undergraduate degrees	Postgraduate degrees	Courses	Other services	Research
	How do customers get our services?	Teaching and learning	Campus and residential facilities	Online	Virtual reality	Artificial intelligence	Publications	Research projects	Partners	Other
How do universities deliver value?	How do we produce it?	Teaching activities	Develop content	Deliver content	Assess learning	Credentials learning
	Research activities	Develop proposal	Fund proposal	Conduct research	Publish research	Commercialise research
	How do we distribute it?	Academic schools and faculties	Physical campus	Digital campus	Printed materials
	How do we support it?	Student administration	Student services	Research administration	Marketing	Back office services	Technology	Other
	Who are our key partners and suppliers?	Government	Other universities	Industry	Outsourcers
How do universities capture value?	What are our major investments?	Campus infrastructure	Digital infrastructure	Back office transformation	Industry engagement	Research	Talent
	What is our revenue model?	Student fees	Government grants	Commercialised research	Philanthropy

Source: EY, 2018

Likewise, in 2019 Rogers and Bremner explored how the future of design education will look and asked whether design schools are shaping a new type of designer, or if tomorrow's designers will emerge from other professions such as business, health care, education and computing, where design thinking is now regularly applied.[24] At a time when governments and markets across the world are reshaping education in a time of rapid and intensive change, the shape of the Design School of the future is informed by international perspectives from within academia, intensive relationships with industry and the increasingly close relationship between the Design School and cultural sectors.

Through social media, analytics and cloud computing, it is expected that university services and administration will "know" their students better, which will improve retention and student experience. Students' preferences, pathways and career choice will be developed through personal adaptive learning to suit their individual needs and interests, and not limited to one university.[25]

In this vision, assessments will be based on competencies for future learning, rather than mastery of taught knowledge. Students will build their knowledge and skills at their own speed, in their own time. Freshwater argued, "in the future, the university campus will become a precinct that interfaces university and society, with start-ups, community organisations and social enterprise intermingling with the students: there will be full integration with society and industry".[26]

Imagining a Design School of the future in Ireland, unfettered by existing systems, calls for creative thinking. In many ways, the 'future' is not something far away and distant. In fact, Irish universities are already embedding initiatives which actively encourage the development of ideas and entrepreneurship, such as Blackstone Launchpad[27] and Tangent.[28] This shows that opportunities can be created. The types of skills predicted to rise or decline clearly show that the ability to think, create, learn and analyse will be of key importance (Figure 4). Softer skills such as critical thinking, problem solving, data analysis, analytical reasoning and communication abilities have become essential and in high demand.[29] Significantly, many of these are 'human' skills which are more difficult to automate.

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[24] Rodger, P.A. and Bremner, C. (2019). *Design School: After Boundaries and Disciplines (Series in Education).* Vernon Press, USA.

[25] EY (2018). *University of the Future 4.0.*

[26] EY (2018). *Can The Universities of Today Lead Learning for Tomorrow?*

[27] *Blackstone Launchpad* https://www.blackstonelaunchpad.org, https://www.tcd.ie/tangent/accelerators/

[28] Tangent Ideas Workspace, Trinity College Dublin https://www.tcd.ie/tangent/

[29] EY (2018). *University of the Future 4.0.*

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Figure 4: The Future of Jobs Report

Today, 2018	Increasing, 2022	Declining, 2022
Analytical thinking and innovation	Analytical thinking and innovation	Manual dexterity endurance and precision
Complex problem solving	Active learning and learning strategies	Memory, verbal, auditory and spatial abilities
Critical thinking and analysis	Creativity, originality and initiative	Management of financial, material resources
Active learning and learning strategies	Technology, design and programming	Technology, installation and maintenance
Creativity originality and initiative	Critical thinking and analysis	Reading, writing, math and active learning
Attention to detail trustworthiness	Complex problem solving	Management of personnel
Emotional intelligence	Leadership and social influence	Quality control and safety awareness
Reasoning, problem solving and ideation	Emotional intelligence	Coordination and time management
Leadership and social influence	Reasoning, problem solving and ideation	Visual, auditory and speech developments
Coordination and time management	Systems analysis and evaluation	Technology use, monitoring and control

Source: WEF, 2018

Employees recognise the value of working for a company that enables them to develop and grow. According to a report by Nesta, even with the best designed skills policy, "workers need to feel motivated to learn new skills."[30] Those who are most vulnerable in the labour market are not always willing to reskill. People in low-paid work may not have the time or money to reskill, and those in employment are not offered training by employers.

Many young people are now looking to combine on the job training with education through degree apprenticeships. The advantage for the student is that they are paid to develop practical skills while at work, combined with exposure to education, as a recognised, accredited qualification. The advantage for the university is that it diversifies their student body, creates stronger links with industry and produces highly employable graduates.

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[30]   Nesta (2019). *Adult Skills and Lifelong Learning Inquiry*. Available at:
        https://media.nesta.org.uk/documents/Adults_Skills_and_Lifelong_Learning_Consultation_Response_Nesta_Submission_1.pdf

The Dyson Institute of Engineering and Technology[31] is an innovative apprenticeship system that links on the job training to a university qualification. Developed by James Dyson to "bridge Britain's chronic skills gap" with the aim to double his engineering workforce to 6,000 by 2020, it is the first privately funded engineering university in the UK. Currently accredited through Warwick University, the Dyson Institute aims to be self-accrediting as an independent work-based institution by 2020.[32]

As new opportunities emerge for people with self-taught skills or employees who have upskilled and reskilled to meet new career opportunities, there are more options than ever for those who wish to participate in Higher and Further Education.

People who are passionate, driven, industry-focused, agile and/or opportunistic, with no background in education, are actively creating new competitive models in education to disrupt the hierarchy of traditional learning. For example, private educational enterprises are responding to learner demand through providing short courses in high-demand technology-focused skills.[33]

These developments are already visible. Most universities currently offer Massive Online Open Courses (MOOCs), distance learning options or blended learning. MOOCs offer institutions global reach and scale the ability to diversify with short/long programmes in a range of subjects. These can stimulate learning at a low-level, which can turn into high-level education impact. The rise of online course providers such as *EdX*, *Khan Academy, Udemy, Futurelearn, Alison, Coursera and Udacity,* have expanded the standard of online education in the private sector so that now all online HE courses have to compete with the global reputations of Institutions such as MIT, Stanford or Harvard.

For Anant Agarwal, CEO of edX[34], education should offer the opportunity to design your own degree from a combination of different online and residential courses. Agarwal suggests that as hybrid skillsets become increasingly prevalent, students will combine different specialisms and subjects to develop niche skillsets from different providers, or institutions globally.

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[31]   Available at: https://www.dysoninstitute.com
[32]   The Guardian (2016). *James Dyson launches new university to bridge engineering skills gap*. Available at: https://www.theguardian.com/technology/2016/nov/04/james-dyson-addresses-engineering-skills-gap-with-university-launch
[33]   The US-based Flatiron School and General Assembly are both commercial education models providing access to 21st Century tech skills. UX Design Institute, Ireland is accredited by Glasgow Caledonian University.
[34]   Agarwal, A. (2018). *Future-Proofing Higher Education Sarts with Reinventing the College Degree*. Available at: https://qz.com/1469291/future-proofing-higher-education-starts-with-reinventing-the-college-degree/

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A degree may be a "stack of certificates and modular credentials" topped-up through upskilling throughout the individual's career. Credit stacking online such as the MIT Micro Master's program could become the new standard approach and is transferable to a campus-based system.[35]

Generation Z students are very comfortable with digital learning.[36] Online courses are not used just for training. Central Saint Martin's (UAL) offers a range of short design course online at introductory level.[37] The University of the Creative Arts also offers fully online art and design degree courses through its Open College of the Arts (OCA) platform.[38]

IDEO is a major influencer in design globally and its online courses through IDEO U certificate are prized.[39] It is an example of the successful diversification of a design consultancy to a commercial educator. Similarly, the Interaction Design Foundation[40] offers free courses for members and industry-recognised certificates.

The organisation is strengthened by its links to high level industry figures as well as major companies and leading universities. It capitalises on its global reputation, rather than relying on formal educational accreditation. In the future this may be what enterprise and students will look for most from a skills provider. This would have implications for HEIs worldwide.

Currently in Ireland, you do not need a degree or qualification to use the title 'Designer'. There is no mandatory professional accreditation linked to

MORE THAN EVER, DESIGNERS NEED TO CONNECT FACE TO FACE, NETWORKING FOR CONTINUOUS LEARNING AND ESSENTIAL SUPPORT.

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[35]   MicroMasters is a joint programme between MIT and edX. It is an online access course which offers the 'same learning and challenge as MIT courses'. Students can use this qualification to apply for an 'accelerated on campus Master's course at MIT – or elsewhere'   Available at: https://micromasters.mit.edu

[36]   *Generation Z* refers to those born between 1995 and 2015.Source: Universities UK (2013). *Massive Open Online Courses: Higher Education's Digital Moment?*

[37]   Available at: https://www.arts.ac.uk/study-at-ual/short-courses

[38]   Available at: https://www.oca.ac.uk/

[39]   Available at: https://www.ideou.com

[40]   Available at: https://www.interaction-design.org

design. Anyone can legitimately set themselves up in business without a formal qualification. However, for an added level of professional validation, some design courses align with certain institutions/bodies, but this is not obligatory.[41] To increase their promotion potential job seekers need to have specific skills and expertise such as CAD, Photoshop, and computer programming (required for 28% of low-skill jobs, 56% of middle-skills jobs and 68% of high-skills jobs). This is in turn is creating a high demand for CPD.[42] CPD short courses enable designers to stay aware of changes in the law, in technology and developments in strategic thinking. They also help people maintain contact with a community of learning to share best practice. More than ever, designers need to connect face to face, networking for continuous learning and essential support.

3.2 Design Policy in Ireland

Winning by Design

In November 2017 the EGFSN published *Winning by Design*, a study on the design skills requirements for firms to be innovative and competitive in global markets. The objective of the study was to establish exactly what was meant by design and the extent to which it is pervasive in our society and economy.

The report identified how design is important across many different sectors of the economy and recognised that it is vital that firms engage with design for their own success. It identified three design disciplines as areas of focus for Ireland which are now the focus of this report – namely digital, product and strategic design.

Winning by Design found that the definition of design has broadened from its traditional understanding (as associated with styling or aesthetics) to becoming a key component of the innovation ecosystem. The report demonstrated that design is now a fundamental part of the R&D process. It highlighted that enterprises must ensure that their products and services incorporate not just technical feasibility and business viability but also user desirability. It identified that design is what brings user desirability to products and services and can greatly aid their successful transformation. *Winning by Design* noted that enterprise investment in design is strongly linked with increased shareholder value and commercial success. As such, design is an economic driver. This aligns with the European Commission's finding that the systematic use of design in R&D improves competitiveness.[43]

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[41]   Related bodies include: Special Interest Group on Computer-Human Interaction (SIGCHI), Institution of Engineering Designers (IED), Chartered Society of Designers (CSD), The Independent Game Developers' Association (TIGA), The Irish Computer Society (ICS), Design History Society (DHS), Design Research Society (DRS), Institute of Industrial Engineers (IIE), Marketing Institute of Ireland (MII), Service Design Network (SDN).

[42]   Burning Glass Technologies and Department for Digital, Media and Sport (2019). *No Longer Optional: Employer Demand for Digital Skills*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807830/No_Longer_Optional_Employer_Demand_for_Digital_Skills.pdf

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It found that as the definition of design has broadened so too have the design skillsets required by industry. The skills required by designers no longer fall into neat categorisation. Designers are now required to operate in ways that transcend disciplines.

The report proposed a series of recommendations to enhance and develop design in Ireland, based upon the following key areas:

DESIGN SKILLS ENTERPRISE DEMAND

DESIGN EDUCATION PROVISION

COMMUNICATION OF DESIGN
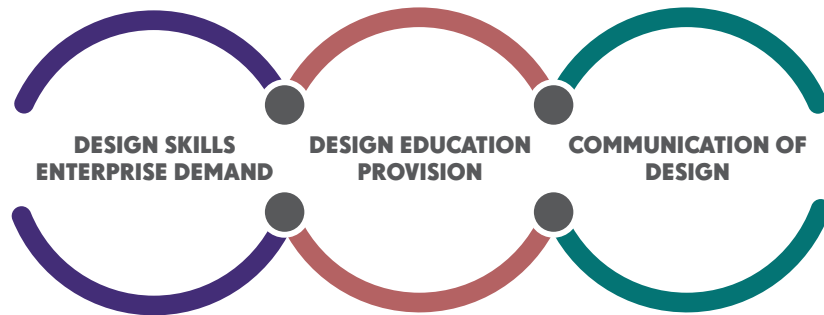
Recommendations based on these areas have been monitored to date by the EGFSN Secretariat and the completion of this report will satisfy the primary outcome arising from *Winning by Design* – to review enterprise demand and design education provision.

Winning by Design provided a synopsis of the key influential policies and studies that have sought to shape design, including the following:

- Irish Design (2015)[44]

- A Study of the Role and Importance of Design in Firms in Ireland in Non-Design-Intensive Sectors (2015)[45]

- The Irish Design Footprint: Economic Value and Characteristics (2016)[46]

43 European Commission (2013). *Action Plan for Design Driven Innovation.* Available at: http://ec.europa.eu/DocsRoom/documents/13203/attachments/1/translations
44 Available at: http://www.irishdesign2015.ie/
45 Department of Business, Enterprise and Innovation (2016). *The Irish Design Footprint: Economic Value and Characteristics.* Available at: https://dbei.gov.ie/en/Publications/Publication-files/Design-in-Non-Intensive-Design-Sectors.pdf
46 Department of Business, Enterprise and Innovation (2016). *The Irish Design Footprint: Economic Value and Characteristics*. Available at: https://dbei.gov.ie/en/Publications/Publication-files/The-Irish-Design-Footprint.pdf

- Policy Framework for Design in Enterprise (2016)[47]

- Ireland – the Design Island: A Consultation Paper Towards A National Design Strategy (2017)[48]

Further reports of note to design in Ireland also include:

- Digital Transformation: Assessing the Impact of Digitalisation on Ireland's Workforce (2018)[49]

- Forecasting the Future Demand for High-Level ICT Skills in Ireland 2017-2022 (2019)[50]

- Technology Skills 2022: Ireland's Third ICT Skills Action Plan[51]

- Project Ireland 2040

IT IS PARTICULARLY IMPORTANT TO NOTE THAT WITHIN *PROJECT IRELAND 2040*, THE GOVERNMENT HAS COMMITTED TO BUILD A NATIONAL DESIGN CENTRE AS PART OF THE GOVERNMENT'S €9.4 BILLION STRATEGIC INVESTMENT SPENDING PRIORITIES TO SUPPORT ENTERPRISE, INNOVATION AND SKILLS 2018-2027.

Together for Design builds on the knowledge base of existing design policy and practice in Ireland from *Winning by Design* to further explore emerging and current issues affecting the supply and demand of design skills in Ireland from 2020-2025.

This includes an economic analysis of design jobs projected growth during this period and how the education sector can potentially meet the demand of enterprise. In addition, a set of scenarios were produced to forecast the key trends and drivers affecting supply and demand in Ireland. The objective of this is to drive change and economic growth through increasing the supply of Design graduates, in particular those with digital, product and strategic design skills.

[47] Department of Business, Enterprise and Innovation (2016). *Policy Framework for Design in Enterprise in Ireland*. Available at: https://dbei.gov.ie/en/Publications/Publication-files/Policy-Framework-Design-in-Enterprise-in-Ireland.pdf

[48] Design and Crafts Council of Ireland (2017). *Ireland - the Design Island*. Available at: http://www.idi-design.ie/content/files/National_Design_Strategy_ISSUU.pdf

[49]   EGFSN (2018). *Digital Transformation: Assessing the Impact of Digitalisation on Ireland's Workforce*. Available at: http://egfsn.ie/all-publications/2018/digital-transformation.pdf

[50] EGFSN (2019). *High-Level ICT Skills Demand Analysis*. Available at: http://egfsn.ie/all-publications/2019/high-level-ict-skills-demand-analysis.pdf

[51] Department of Education and Skills (2019). *Technology Skills 2020*. Available at: https://www.education.ie/en/Publications/Policy-Reports/technology-skills-2022.pdf

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3.3 Design Representative Bodies in Ireland

There are a number of bodies in Ireland which represent the design community in Ireland, including:

The Design and Crafts Council Ireland (DCCI)

DCCI is the national agency for the commercial development of Irish designers and makers, stimulating innovation, championing design thinking and informing Government policy. DCCI offers a range of programmes, supports and services for designers and craftspeople, learners and teachers, retailers and gallerists, shoppers and collectors, media and partner organisations in order to raise the standard and profile of Irish design and craft. Its activities are funded by Enterprise Ireland.

DCCI continues to drive both the design and craft agenda in Ireland. DCCI was mandated by Government to lead the development of *Ireland – The Design Island: A Consultation Paper Towards A National Design Strategy* which was published in 2017 and resulted in the establishment of the National Design Forum.

The Institute of Designers in Ireland (IDI)

IDI is a membership association of Irish design professionals who promote and advocate for Irish design. It aims to promote high standards of Irish design, to foster professionalism and to emphasise designers' responsibility to society, to the client and to each other. Formed in 1972, it is recognised at national and international level as the representative body for the Irish design profession.

IDI's membership represents a broad range of design disciplines, including professionals in consumer and capital projects, interiors and exhibitions, textiles and fashion, visual communication, new media, design management and design education. IDI is administrated by a board and an elected council and delivers initiatives on both a national and local level to promote Irish design.

Interaction Design Association (IxDA)

The Interaction Design Association (IxDA) is a member-supported organization dedicated to the discipline of interaction design. Since its launch in 2003, IxDA has grown into a global network of more than 100,000 individuals and over 200 local groups, focusing on interaction design issues for the practitioner, no matter their level of experience. The Irish group has a growing cohort of members drawn from multinational and indigenous companies.

Service Design Network (SDN)

The Service Design Network (SDN) is the leading non-profit organisation committed to global growth, development and innovation within the practice of service design. Working in partnership with a collective of service design professionals and other engaged shareholders, SDN fosters an open-minded network focused on knowledge-sharing and exchange. The vision for the Ireland chapter of the SDN is threefold: providing a forum

for practitioners to share and develop thinking around service design and to connect with practitioners from other chapters; to work to educate and inspire aspiring service designers; and to work with industry partners to promote the discipline and its value.

Institute of Creative Advertising and Design (ICAD)

ICAD is a non-profit, membership led body consisting of creatives in Ireland. Their primary aim is to support creative excellence in Irish advertising and design and those working within the industry. Their mission statement informs everything they do - to "foster, promote and reward creative excellence in Irish advertising and design". They are best known for their annual awards and also run exhibitions, events, talks, offer learning opportunities and publish an awards book.

Design Educators Ireland (DEI)

DEI is the representative body of third level design education providers in Ireland, with members from the leading 15 HEIs representing their staff and students.[52] DEI seeks to contribute to the development of design education in Ireland, enhancing its standing and stature, as well as supporting its engagement with industry, government and wider society. DEI's objectives are focussed on ambitions in relation to learning and teaching, research and knowledge exchange, and advocacy and promotion.

3.4 Design in Education

Over the last decade many wider educational programs now value and integrate methodologies of design thinking across a variety of curriculums. This has cast a welcome light on creative processes and helps to facilitate more creative and innovative solutions. Faculty and students in the Sciences, Humanities, Business and ICT now have opportunities to explore broader methods, possibilities and solutions to enhance their technological capabilities. design thinking provides a common language. It also shifts entrenched mind-sets so that different disciplines can more easily work together to appreciate alternative ways of seeing and doing. This enhances the possibility for creative insights to emerge, based on a more open and experimental approach.

Engineering-type courses are now adding "with/and design" to their course titles. This is used strategically to 'soften' the course title in order to attract a wider range of students - and address gender imbalance. While this may reflect a change in the course direction the framework for creative problem solving falls short in teaching core design and aesthetic principles. The actual design practice content is limited compared to a design-intensive course.

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[52] DEI Institutional members include: Athlone Institute of Technology, Cork Institute of Technology, Dublin Institute of Design, Galway-Mayo Institute of Technology, Griffith College, Institute of Art, Design and Technology Dun Laoghaire, Institute of Technology Carlow, Institute of Technology Sligo, Letterkenny Institute of Technology, Limerick Institute of Technology, Maynooth University, National College of Art and Design, Technological University Dublin, University of Limerick, Waterford Institute of Technology

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Collaboration with Industry

The challenge for educators now is how to build on shared learning environments between design and external domains. For students to learn design based on real world problems, they need to experience design at different stages of development and production. To make real impact, designers need to be brought in at the early stage of development, rather than at the end. While most courses set 'live' projects in collaboration with industry, these can be difficult to fit exactly within the academic calendar to correspond to student learning/skill levels and are built on personal rather than institutional links. Staff increasingly collaborate with industry through Innovation Vouchers[53] and research, which adds value to the course and currency to staff knowledge.

Design Start-Ups

A new phenomenon, to date poorly researched, both in entrepreneurship and design literature is that of Design-Intensive Start-ups (DIS). These are start-ups that focus on design as primary source for their development. DIS diverged from new-technology start-ups on several dimensions, and represent an alternative entrepreneurial model, which is not supported by existing literature. In the design world, somewhere between casual freelancing and self-employment, a bigger business could emerge –

especially with inter-disciplinary collaboration. Historically there has been a lack of tools specific to designers to support them to become entrepreneurs, or to know how/when to scale up from casual freelancing, to self-employment, to establishing as a business. The design landscape has changed considerably, and certain Irish design institutes now actively encourage students to be more entrepreneurial and strategic in taking their ideas to the open market – rather than being client-led or seeking employment. Design courses work with open, real-world briefs to create student contact with wider stakeholders and agencies, as they would in practice.

For students, bridging the gap between education and employment is always difficult. A survey of 251 graduates in 2015 from undergraduate product design courses aimed to identify professional product design roles in companies employing product designers. [54] The objective was to explore how design practice has evolved and the effect that this has had on product design as a discipline. The research exposed the variety and cross-disciplinary roles that product designers now undertake. It highlighted the fact that product designers in industry need to have the capacity to respond to virtually any design problem. This reflects the difference between design in education, design in industry and design in start-up SMEs.

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[53] Available at: https://www.enterprise-ireland.com/en/research-innovation/companies/collaborate-with-companies-research-institutes/innovation-voucher.shortcut.html

[54] Kiernan L., Ledwith A. (2015). Is Design Education Preparing Product Designers for the Real World? A Study of Product Design Graduates in Ireland. pp. 218-237.

Investing in Design Skills & Research

While not all designers go through tertiary education, for most, this is the normal route to develop high level design skills and knowledge. Using the National Framework of Qualifications (NFQ[55]) as a reference point, the percentages of learners completing their second level education as well as progressing to higher education in Ireland since 2007, show particular progress made in the following:

The number of learners completing senior cycle at second level increased from **81%** to

90.6%

This exceeds the 90% target set for 2020.[56]

93%

of people aged 20-24 achieved an award at Levels 4-5 or more on the National Framework of Qualifications in 2014. This was an increase of 7% on the baseline year of 2005 and just 1% short of the target for 2020.

The progression rate to Higher Education increased by 14 percentage points, from 55% to

69%

while there was an 11 percentage point increase in the number of people in the labour force achieving a qualification at Levels 6-10 on the NFQ.

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55   Available at: www.nfq.ie

56   EGFSN (2007). *Tomorrow's Skills: Towards a National Skills Strategy.* Available at: http://www.egfsn.ie/Publications/2007/Tomorrow-s-Skills-Towards-a-National-Skills-Strategy1.html

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Investment in research and innovation supports Ireland's frontier research to enable it to maintain its position as a competitive smart economy of the future to leverage further EU funding in anticipation of the impact of Brexit. However, PhDs in practice-based design are still low in Ireland compared to other countries. If Ireland is to develop as a design hub, design research will need more PhD level students to add quality and expertise across industry and academia in order to lead design in the coming years. For example, design-led enterprises could be encouraged to release designers via sabbaticals to undertake PhDs or consider collaborating on suitable research with academia. Ultimately, this would require employers to engage in supporting this process. Design-led research works across different disciplines to respond to changing human needs and to work with emerging technology and industries. This needs to be policy-driven and fully supported in its own right and not just to support collaborative-based research.

Department of Education and Skills Policy and Provision
Ireland has taken important steps to respond to many of these challenges in recent years. In 2016, Ireland launched its own *National Skills Strategy 2025* with a focus on active inclusion to support participation in education and training and the labour market. Moreover, Ireland has expanded and reformed its apprenticeship system. It has also created a network of Regional Skills Fora to encourage employers and the education and training system to work together in responding to regional skills needs. The following section outlines the key policy levers addressing Ireland's education and skills agenda relevant to design education.

National Skills Strategy
The National Skills Strategy is a key driver within which investment is seen as critical to developing sustainable economic growth to ensure that Ireland is renowned at home and abroad as a place where talent thrives, and people's lives improve. The strategy encompasses the following key objectives:

Education and training providers will place a stronger focus on providing skills development opportunities that are relevant to the needs of learners, society and the economy.

The quality of teaching and learning at all stages of education will be continually enhanced and evaluated.

Active inclusion to support participation in education, training and labour market.

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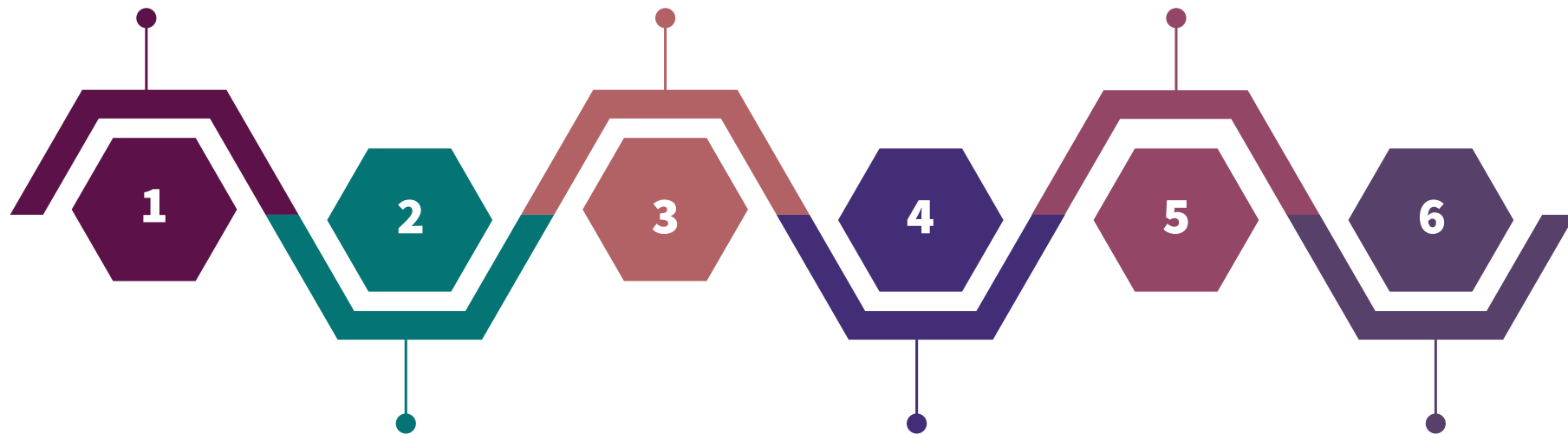
Employers will participate actively in the development of skills and make effective use of skills in their organisations to improve productivity and competitiveness.

People across Ireland will engage more in lifelong learning.

Support an increase in the supply of skills to the labour market.

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Transversal skills are placed at the centre of the National Skills Strategy. Recent key policy initiatives from DES relating to all levels of education are highlighted further below. A number of these skills have been identified within enterprise as desirable competencies including creativity, innovation, entrepreneurship, critical and analytical thinking, team work and communication.[57] All of these skills are intrinsically embedded within design education curriculums reflecting students' design thinking process.

National Skills Council
The National Skills Council was launched in 2017 as a key element of the new skills architecture set out in the National Skills Strategy 2025. The Council is made up of high-level officials and experts from both public and private organisations. The role of the Council is to oversee research, to advise on the prioritisation of identified skills needs and also how to deliver on those needs. It has a key role in promoting and

reporting on the delivery of responses by both education and training providers.

Regional Skills Fora
To facilitate and encourage stronger links between employers and the education and training sector, the DES has established a network of nine Regional Skills Fora and nine Regional Skills Fora Managers. Each forum provides robust labour market information to inform programme development while encouraging greater collaboration between enterprise and education and training providers to identify and respond to existing and future regional skills needs.

Apprenticeships in Ireland
Funded by the National Training Fund (NTF), apprenticeships are a demand-driven educational and training programme that develops the skills of an apprentice in order to meet the needs of enterprise and the labour market. Apprenticeships combine learning in the workplace with learning in a training centre or

educational college. They provide the opportunity for learning acquired off-the-job to be applied and further developed under supervision in the workplace. Apprentices are employed by an approved employer for the duration of the programme. Degree apprenticeships combine higher level education with learning in industry to deliver graduates with enhanced capabilities and work experience. Unlike traditional students, apprentices work and receive a salary. Degree apprenticeships therefore help to widen participation and add greater diversity to the job market.

SOLAS is the lead agency responsible for apprenticeships on behalf of Government, working in close partnership with the HEA, Quality and Qualifications Ireland (QQI), industry and education and training providers across further and higher education. Building on the *Programme for Government*[58], the *Action Plan for Education*[59] contains a commitment to enrol 31,000 people on apprenticeship programmes in

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[57] Department of Education and Skills (2016). *National Skills Strategy 20205*. Available at: https://www.education.ie/en/Publications/Policy-Reports/pub_national_skills_strategy_2025.pdf

[58] Government of Ireland (2016). *Programme for a Partnership Government.* Available at: www.merrionstreet.ie/MerrionStreet/en/ImageLibrary/Programme_for_Partnership_Government.pdf

the period 2016–2020. As of November 2019, there are 54 apprenticeships in operation, ranging from NFQ level 5 – 10. The 2019 NTF allocation for apprenticeship training was €142 million in 2019 and has risen to €169 million in 2020.

STEM Education Policy Statement
The *STEM Education Policy Statement 2017–2026*, published by DES in November 2017, sets out the ambitious goals and actions required to achieve and improve the Science, Technology, Engineering and Maths (STEM) education experience and outcomes for all learners.[60]
The overarching aim of the policy statement is to provide a STEM educational experience for learners that nurtures curiosity, inquiry, problem solving, creativity, ethical behaviour, confidence, and persistence, along with the excitement of collaborative innovation and that these experiences should be built into their primary and post primary school experience. The policy statement was accompanied by an implementation plan for 2017-2019, with a new implementation plan to be published for subsequent years.[61] One of the key actions arising from the policy statement has been the introduction of STEM Clusters. These clusters are provided with funding

and link with external agencies including Google, Combi-lift, University of Limerick, and Institutes of Technology in Sligo and Dundalk. This policy is important as it fosters creative skills at an early age. In doing so, this can spark the curiosity of young minds through making, creating and playing to provide the basics and fundamentals principles in design. Ultimately, this harnesses the requisite skillsets to create the designers of the future and a pipeline towards transitioning more easily into formal training and learning of design in both Further and Higher education.

Solving this pipeline shortage is crucial in continuing the supply of new infrastructure and technology and to guarantee future prosperity, sustainability and wellbeing for Ireland. According to Engineers Ireland, over 94% of engineering employers in Ireland are reporting skills shortages as the main barrier to growth within the sector.[62]

In Ireland, the uptake of STEM subjects increased by 5% to more than 88,000 students undertaking the subjects. Maths, engineering and construction, physics and technology studies are all on the rise, a promising sign given the identified skills shortage outlined in Engineers Ireland's report.

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[59] Department of Education and Skills (2016). *Action Plan for Education 2016-2019.* Available at: https://www.education.ie/en/Publications/Corporate-Reports/Strategy-Statement/Department-of-Education-and-Skills-Strategy-Statement-2016-2019.pdf

[60] Department of Education and Skills (2017). *STEM Education Policy Statement 2017–2026.* Available at: https://www.education.ie/en/The-Education-System/STEM-Education-Policy/stem-education-policy-statement-2017-2026-.pdf.

[61] Department of Education and Skills (2017). *STEM Education Implementation Plan 2017-2019*. Available at: https://www.education.ie/en/The-Education-System/STEM-Education-Policy/stem-education-implementation-plan-2017-2019-.pdf.

[62] Engineers Ireland (2019). Engineering 2019: A barometer of the profession in Ireland. Available at: http://engineersireland.ie/EngineersIreland/media/SiteMedia/communications/publications/Engineering-2019-report.pdf

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Creative Ireland

With a remit to develop and nurture creativity, *Creative Ireland*, is led by the Department of Culture, Heritage and the Gaeltacht (DCHG), DES and Department of Children and Youth Affairs (DCYA).[63] The plan highlights the need for creativity and culture to be placed at the heart of education for children and young people and acknowledges that future generations will need "the skills to be creative and inventive, to solve problems, to work collaboratively and experimentally, and to think conceptually and imaginatively".[64] DES is engaged in *Creative Ireland* notably through Pillar 1 of the programme, *Creative Youth,* published in December 2017.

By placing creativity and culture at the heart of education, *Creative Youth* focuses on "developing creative capacities and skills but also for encouraging social responsibility and personal qualities such as resilience, empathy, and a capacity for friendship." At the Creative Youth plan's core is a belief that creativity and culture should be at the heart of education for all young people – with every child in Ireland having practical access to tuition, experience and participation in music, drama, art and coding by 2022.

Under Pillar 4 of the *Creative Ireland* programme, the Government committed to elevating Ireland's potential in the creative industries by "drawing together on an all-of-government basis, state agencies, industry partners and those engaged in fostering innovation in enterprise".

In 2019, an initiative entitled *Roadmap for the Creative Industries* has been taken forward under the *Future Jobs Ireland* framework, which seeks to develop a roadmap of support and enhancement for the creative industries, as part of the ambition to diversify Ireland's enterprise base. The roadmap is expected to be completed in 2020. However, within the wider creative industries, it recognises that design-based, digital creative and content creation industries are potential growth areas for Ireland. The roadmap looks at a wide range of industry development needs, including skills, and seeks to take on board recommendations of this report, together with its own set of strategic actions.

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[63]   Available at: https://www.creativeireland.gov.ie/en

[64]   Department of Culture, Heritage and the Gaeltacht (2017). Creative Youth. Available at: https://www.creativeireland.gov.ie/sites/default/files/media/file-uploads/2018- 03/CI_ChildrensPlan_Screen_1.pdf.

Primary Education

The Primary Curriculum[65] has been designed to develop the full potential of the child. The curriculum endeavours to equip children with the knowledge and skills that will serve them not only in their lives as children but later as adults; it is concerned with developing their capacity for creative expression and to promote their emotional and physical development.

The ability to think critically, to apply learning and to develop flexibility and creativity are also acknowledged as important factors in the success of the child's life. The curriculum places a particular emphasis on promoting these skills and abilities so that children will be able to cope successfully with change.

Creativity is developed within, and through, a range of subjects in the primary curriculum including: Language; Social, Environmental and Scientific Education; Drama, Music and Visual Arts. This encourages wider thinking, self-expression and the generation of original ideas based on the ability to experiment, test and reflect within a particular context. Creativity enables risk-taking and the capacity to deal with ambiguity. It also adds immense personal and social value which builds to a more creative culture.

Junior Cycle

In post primary school, the *Framework for Junior Cycle*[66] outlines eight key principles which inform the planning, development and implementation of junior cycle programmes in all schools. These principles are: learning to learn, choice and flexibility, quality, creativity and innovation, engagement and participation, continuity and development, inclusive education and wellbeing.

[65]   Department of Education and Skills (1999). Primary School Curriculum. Available at:
        https://www.curriculumonline.ie/getmedia/93de2707-f25e-4bee-9035-92b00613492e/Introduction-to-primary-curriculum.pdf
[66]   Department of Education and Skills (2015). *Framework for Junior Cycle 2015*. Available at: https://www.ncca.ie/media/3249/framework-for-junior-cycle-2015-en.pdf

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The learning at the core of Junior Cycle is described in twenty-four statements of learning, which are underpinned by the eight principles of the Framework. These statements support students so they will be able to:

■ Create, appreciate and critically interpret a wide range of texts

■ Describe, illustrate, interpret, predict and explain patterns and relationships

■ Take initiative, be innovative and develop entrepreneurial skills

■ Bring an idea from conception to realisation

Subjects in which creativity, as well as expression and response are explored and developed include Visual Arts and English. The ability to apply different methods of communication is essential to design. Visual literacy and competencies have a wide application linked to decision-making, empathy and judgement, as much as creative expression.

Senior Cycle
At senior cycle, eight principles are used to inform curriculum planning, development, provision and implementation in schools. These principles are:

QUALITY	**INCLUSIVE EDUCATION**	**CONTINUITY, CHOICE AND FLEXIBILITY**	**PARTICIPATION, RELEVANCE AND ENJOYMENT**
WELLBEING	**CREATIVITY**	**INNOVATION**	**LIFELONG LEARNING**

In addition to these eight principles, there are five key skills in the Senior Cycle:

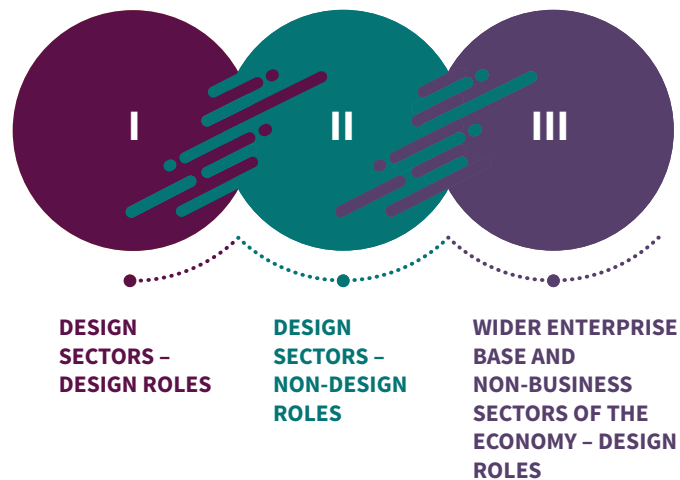| CRITICAL AND CREATIVE THINKING | INFORMATION PROCESSING | COMMUNICATING | PERSONALLY EFFECTIVE | WORKING WITH OTHERS |

The role of both Primary and Secondary school cycles are important in creating a conducive learning environment upon which the fundamentals of design can be learned at the earliest age. The benefits of enabling young people to think critically and creatively at this early stage prepares them for the demands of Further and Higher Education level and to deal with more complex problem solving. It also encourages them to adapt more easily to a potential future of lifelong learning.

However, gaps between the economic and societal needs of the country and the skillsets required will need to be narrowed if Ireland's economy is to continue to innovate and flourish. Ireland is particularly strong in the area of youth skills, levels of tertiary education and skills used in innovation. Compared to other OECD countries Ireland is significantly weaker at foundational skill levels and the use of intensive skills in the workplace and daily life.[67]

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[67]   OECD (2019). *OECD Skills Strategy: Ireland.* Available at: https://www.oecd.org/ireland/Skills-Strategy-Ireland-EN.pdf

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3.5 Design in Enterprise

UK-based studies highlighted three elements to be considered when considering the economic contribution of the Design Economy: [68] [69]

DESIGN SECTORS – DESIGN ROLES

DESIGN SECTORS – NON-DESIGN ROLES

WIDER ENTERPRISE BASE AND NON-BUSINESS SECTORS OF THE ECONOMY – DESIGN ROLES

Together these elements constitute the Design Economy as illustrated in Figure 2.

It is important to understand the variances within which design operates economically and the finer nuances of those working as designers in enterprise, and those in the design community. The interplay between these two facets in the economy can create confusion in official statistics. Nonetheless, the issue is that design and design roles permeate across both the enterprise and design communities within Ireland's economy. These roles are wide-ranging and operate in areas where people might not realise design is integral. It is also important to point out the role design has in acting as a driver in economic growth by adding value to businesses and the wider economy.

68   UK Design Council (2015). *The Design Economy: The Value of design to the UK.* Available at: https://www.designcouncil.org.uk/resources/report/design-economy-2018

69   UK Department for Culture Media & Sport (2016). *Creative Industries Economic Estimates.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/523024/Creative_Industries_Economic_Estimates_January_2016_Updated_201605.pdf

Figure 2. Illustration of the make up the Design Economy: indicating the interplay of occupations and industries contributing to the Design Economy.

Source: UK Design Council.

Design as a Policy Driver

Future Jobs Ireland complements *Project Ireland 2040* and *Global Ireland 2025* and builds on other strategies and plans being implemented by DBEI such as *Innovation 2020*[70], *Enterprise 2025 Renewed*[71] and the *Regional Enterprise Plans.*[72]

These policies will have a key bearing on the future work of IDA Ireland, Enterprise Ireland, Science Foundation Ireland (SFI) and the LEOs to help Irish enterprises to develop a culture of innovation and sustainability across the economy. Areas such as design innovation, sustainable design, and universal design have key roles in driving future economic growth, via the skills of product, digital and strategic designers.

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[70]   Department of Business, Enterprise and Innovation (2015). Innovation 2020. Available at: https://dbei.gov.ie/en/Publications/Publication-files/Innovation-2020.pdf

[71]   Department of Business, Enterprise and Innovation (2018). Enterprise 2025 Renewed. Available at: https://dbei.gov.ie/en/Publications/Publication-files/Enterprise-2025-Renewed.pdf

[72]   Available at: http://www.regionalapj.ie/en/

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Designing Skills of the Future

By 2025, workers and enterprises will be operating in a changed economy. Technology creates new ways of doing business and generates new economic opportunities. This presents challenges but also possibilities - certain job roles will disappear or be redefined, and emerging job roles will require new and different skillsets.

Enhancing skills development and attracting talent is one of the key pillars of *Future Jobs Ireland*. Ireland's greatest competitive advantage is its people and its ready access to talent. For the economy to succeed in a competitive global economy, future employees must have:

- Up-to-date skills and continue to train and develop throughout their careers.

- Accessible upskilling options.

- Education and training providers to offer relevant and up-to-date courses which meet the needs of enterprises.

In a high-demand skills market, Ireland is competing with other countries to develop and attract talent. *Future Jobs Ireland* aims to deliver on a range of ambitions over the coming years including:

- Providing high quality and timely education and training responses to evolving enterprise and skills needs.

- Encouraging lifelong learning and upskilling.

- Fostering participation in apprenticeship and traineeship programmes.

- Competing successfully for international talent.

- Improving career guidance and advice.

In Ireland, these points are all of relevance for design and in particular the issue of developing pathways and careers for those working or seeking to work as designers in the future. Upskilling and reskilling will be as important for the individual as their initial education. Provision for mid-career changes brings a diversity of people and experience into growth areas of design from weaker areas, or for those whose career interests have shifted.

Future Jobs Ireland will target a doubling of participation in lifelong learning by 2025, aiming to reach, and if possible, exceed, the EU average in terms of the percentage of the population with at least basic digital skills and target a substantial increase in investment in training in Irish enterprises.

Design Innovation in SMEs

Innovation is the most challenging discipline to master and implement. Innovation is about identifying deep customer insights rather than relying on marketing reports, running small experiments to verify assumptions and mitigating the risks in bringing disruptive new services and product to market. Designers are trained in these techniques. They are comfortable dealing with ambiguity, identifying which problems are actually worth solving, then generating creative and wide-ranging solutions based on the customer's required and desired outcomes, leveraging digital and technology platforms. This is the key cornerstone of any business, and when done in a structured discipline enables SMEs to significantly scale their businesses.

SMEs and entrepreneurship are central to Ireland's challenge of generating a broad-based growth and prosperity that builds on and extends its successes in attracting high quality foreign direct investment. The new International Organization for Standardisation (ISO) best practice guide on innovation management clearly positions "a customer centric approach" (the core of all design and design thinking techniques) as a key cornerstone to deliver successful innovation.[73] This addresses and strongly supports the implementation of a number of the key OECD recommendations as outlined in the OECD's recent policy review of SME and entrepreneurship policy in Ireland.[74]

[73] ISO (2019). *Innovation Management - Guidance*. Available at: https://www.iso.org/obp/ui/#iso:std:iso:56002:ed-1:v1:en

[74] OECD (2019). *SME and Entrepreneurship Policy in Ireland*. Available at: https://dbei.gov.ie/en/Publications/Publication-files/SME-and-Entrepreneurship-Policy-in-Ireland.pdf

[75] World Economic Forum. Available at: https://www.weforum.org/focus/fourth-industrial-revolution

[76] European Commission (2018). *Digital Economy and Society Index* (DESI) 2018 Country Report Ireland. Available at: https://ec.europa.eu/information_society/newsroom/image/document/2018-20/ie-desi_2018-country-profile_eng_B4406C2F-97C3-AA9A-53C27B701589A4F3_52225.pdf

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Learning in the Fourth Industrial Revolution

According to the World Economic Forum, the "fourth industrial revolution" in robotics, AI and automation is transforming Ireland's future labour market.[75] This means certain job roles will disappear, be re-defined or adapted to new technologies. Brand new job roles will appear that will require new and different design skillsets - many of which are yet to be conceived. It is a new future, of work, of jobs, careers, skills and education. This level of disruption means Ireland must prepare for an impending change. Indicators suggest that the Irish economy is not currently equipped for this level of disruption. For example, according to the Digital Economy and Society Index (DESI) in Ireland, only 48% of the population have at least basic digital skills set against the EU average of 58%.[76]

Compared to the EU average, Ireland reports relatively lower levels of participation in adult learning. Adult learning means the participation of adults aged 25-64 in lifelong learning which encompasses all purposeful learning activity, whether formal, non-formal or informal, undertaken with the aim of improving knowledge, skills and competence in design domains.

The level of adult participation in lifelong learning in Ireland in 2018 (12.5%) was slightly higher than the EU average (11.1%) but significantly lower than the rates of high performing countries, such as Sweden (29.2%) and Finland (28.5%).[77] [78] It is also below the 15% average target set by the strategic framework *Education and Training 2020* amongst its four key objectives includes 'enhanced creativity, innovation and entrepreneurship'.[79]

> ## BRAND NEW JOB ROLES WILL APPEAR THAT WILL REQUIRE NEW AND DIFFERENT DESIGN SKILLSETS - MANY OF WHICH ARE YET TO BE CONCEIVED.

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[75] World Economic Forum. Available at: https://www.weforum.org/focus/fourth-industrial-revolution

[76] European Commission (2018). Digital Economy and Society Index (DESI) 2018 Country Report Ireland. Available at:
https://ec.europa.eu/information_society/newsroom/image/document/2018-20/ie-desi_2018-country-profile_eng_B4406C2F-97C3-AA9A-53C27B701589A4F3_52225.pdf

[77] Please note: the Labour Force Survey (LFS) replaced the Quarterly National Household Survey (QNHS) in Q2 2017. As a result, care should be taken when comparing data from before and after this period.

[78] Eurostat (accessed 13 November 2019); data refers to the share of adults aged 25-64 who participated in formal and/or non-formal learning activities

[79] European Commission (2019). Education and Training 2020. Available at: https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en

The *New Skills Agenda for Europe* states that nearly all jobs will require some level of digital design skills in the future, with provision made for the right training, skills and support in the area of digital skills.[80] The EU Parliament and the Council recommends 8 key competencies:

- Literacy

- Multilingualism

- Numerical, scientific and engineering skills

- Digital and technology-based competences

- Interpersonal skills, and the ability to adopt new competences

- Active citizenship

- Entrepreneurship

- Cultural awareness and expression

For Ireland, it will be important for designers of the future to blend these competencies into their work. Those with digital and product skillsets may have an advantage but still need to acquire or develop wider, softer skills in order to compete in future job markets.

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[80]   European Parliament (2017). *New Skills Agenda for Europe: State of implementation*. Available at:
        http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/607334/IPOL_BRI(2017)607334_EN.pdf

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UX · **UI** · **SERVICE DESIGN**
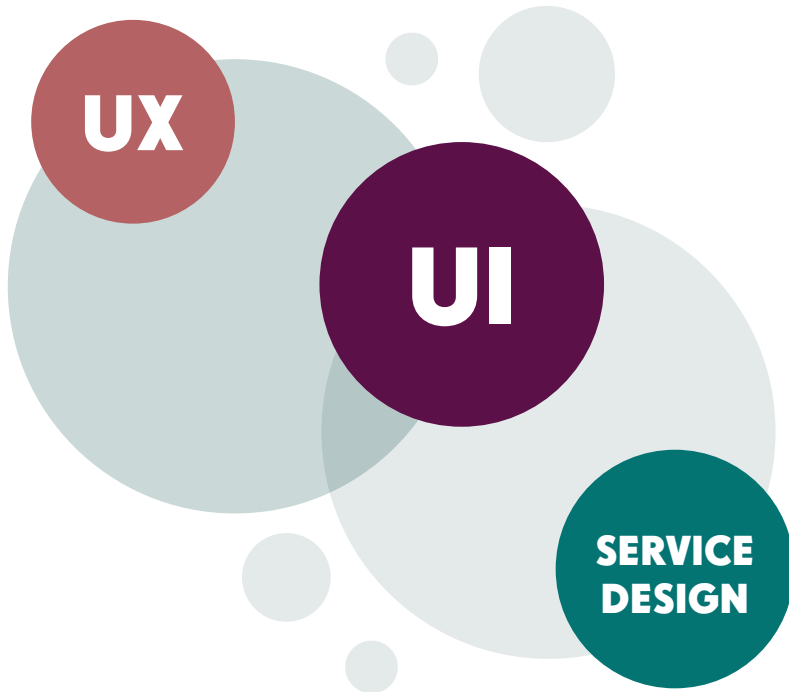
National Digital Strategy
In Ireland, a new *National Digital Strategy* is being devised to position Ireland to maximise the opportunities of digital transformation for the benefit of society and economy.[81] Digital skills will be promoted as part of lifelong learning strategies nationally. Schools lay the foundations for young people, but adults will continually need to update and develop their individual competencies. Future employability demands more than just digital skills. Above all, it needs a creative mind-set to accommodate change and anticipate or generate market demand. However, new technologies are not always the answer to solving problems. The design of technological products and services need to equally determine when, where, how and why they are used by people in any given context. In the digital age human centred design, in different forms (UX/UI/Service Design), has emerged as an essential area of design enabling technology and critical to its success.

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[81] Department of an Taoiseach (2018). National Digital Strategy Consultation. Available at: https://www.gov.ie/en/consultation/1618101010-national-digital-strategy/

3.6 International Policies

To gain an understanding of best practice in design policy, an overview of design policy, design promotion, design professionals and design institutes in Ireland was undertaken alongside socio-economic comparisons for a number of countries (see Appendix B). The key international design skills policies and strategies included in this research have been summarised below.

United Kingdom (UK)

The UK has three of the top ten art and design schools in the world. It also has a longstanding tradition of industrial based manufacturing design and innovation.[82]

Established in 1994, the UK Design Council champions design across industry, education and government agencies.[83] It uses creative solutions to solve real problems and develops design-related research to demonstrate the impact and value of design to the economy and society. It also offers support in design, product development and social innovation.

The Design Economy report found that in 2016 the design economy in UK generated £85.2 billion in Gross Value Added (GVA). Of this, 68% was generated by designers working in non-traditional design areas. One in three roles in design were in digital design, with an 85% growth rate for firms working in this sector between 2009 to 2016.[84]

As the first country to introduce computer programming at primary school level in 2015, coding is viewed to be at the core of design education activity to enable creativity to cross over and ideas to be realised in multiple platforms.

Design culture in the UK is supported by regional Innovation Labs, the Creative Industries Federation, the Design Business Association, the Design Museum, the V&A and the V&A Dundee. This allows for opportunities to engage with the wider public to promote Design disciplines and foster a better understanding of the sector and its constituent elements. The fact that such organisations exist is testament to the influence they can have in shaping the public psyche to appreciate the intrinsic and extrinsic value of design and its impact in society.

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[82]   Available at: https://www.topuniversities.com/university-rankings-articles/university-subject-rankings/top-art-design-schools-2019

[83]   Available at: https://www.designcouncil.org.uk

[84]   The Design Council (2018). *The Design Economy: The State of Design in the UK*. Available at:
https://www.designcouncil.org.uk/sites/default/files/asset/document/Design_Economy_2018.pdf

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Finland

Finland has a long-standing international reputation for high quality craft and design[85] and currently leads European countries in human capital in digital skills.[86] Finland's national design policy, Design Finland Programme,[87] built on the success of Helsinki as World Design Capital 2012 and the 1999 initiative *Design 2005!* and brings together all stakeholders across supply and demand to put design at the heart of Finnish innovation and industry.

From early childhood design literacy is taught within other subjects through phenomenon-based learning, where students "learn by doing".[88] The vision is that all of Finland's citizens, across different professions, will have and use "diverse basic skills".

Design education is multidisciplinary, user-driven and well resourced. Design students take business modules and a broad choice of minor subjects. Non-design students are also offered design as a minor subject to promote innovation and impact through real world problems. Current Business Finland programmes pursue progress through sustainable development "with equal emphasis placed on environment, economy and people".[89][90] Service design is actively promoted and a new digital platform (Kokeilun Paikka) encourages all citizens to contribute ideas towards "innovative solutions and improvements to services".[91]

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[85]   Available at: https://finland.fi/arts-culture/welcome-to-finland-the-design-nation/

[86]   European Commission (2019). *Digital Economy and Society Index (DESI) 2019, Country Report, Finland*.

[87]   *Design Finland: Proposals for Strategy and Action* was developed by a broad-based steering committee to review and develop actions, vision and strategy to promote design in Finland. It was guided by the Ministry of Education and Culture and Ministry of Employment and implemented from 2013 to 2020.

[88]   Available at: https://www.weforum.org/agenda/2017/10/why-finland-is-tearing-down-walls-in-schools/

[89]   Available at: https://www.businessfinland.fi/en/for-finnish-customers/services/programs/#stored

[90]   Ministry of Economic Affairs and Employment in Finland. (2013). *Design Finland: Proposals for Strategy and Action*, *p.36*. Available at: https://tem.fi/documents/1410877/2901871/Design+Finland+Programme/8603cb0b-52ce-4025-b208-0ad65e353b43

[91]   Available at: https://www.kokeilunpaikka.fi/en/

Sweden

Sweden has a strong tradition in design - particularly in furniture and textiles.[92] The Swedish Industrial Design Foundation (SVID) works with business, public services and researchers to highlight design and disseminate knowledge. As part of this, SVID produces the Swedish Design Research Journal.[93]

Swedish Design Moves, a global touring exhibition, showcases the work of contemporary manufacturers and designers to reflect Swedish values and expression. Funded by the Swedish government it promotes international awareness of Swedish design, fashion and architecture.[94]

The Swedish Centre for Architecture and Design (ArkDes) is the main centre of design in Stockholm and holds events, exhibitions, education programmes and debate. The annual Stockholm Furniture and Light Fair is the world's largest meeting place for Scandinavian design.[95]

In 2018 the Swedish Government introduced the Policy for Designed Living Environment[96] integrating sustainability and universal design into design and architecture. Sweden is ranked second in the European countries for Human Capital in digital skills and aims to be the best in the world in developing opportunities in digitalisation.[97] In 2019 it opened the national centre of AI research and innovation, AI Innovation of Sweden, to support Sweden's industry and welfare.[98]

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[92] Available at: https://sweden.se/culture-traditions/swedish-design/
[93] Available at: http://www.svid.se/en/
[94] Available at: https://swedishdesignmoves.com
[95] https://www.stockholmfurniturelightfair.se/about-us/about-us?sc_lang=en
[96] Ministry of Culture, Government Offices of Sweden. (2018). *Policy for Design Living Environment*. Available at: https://www.government.se/48ec28/contentassets/c008469d86b848f3918a1efcd7d7fb2f/webb_policy-for-designed-living-environment.pdf
[97] European Commission. (2019). *Digital Economy and Society Index (DESI) 2019, Country Report, Sweden*.
[98] AI Innovation of Sweden. Available at: https://www.ai.se/en

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New Zealand

The Value of Design to New Zealand report established that the total contribution of design to the New Zealand economy was $10.1 billion (4.2% of GDP) in 2016.[99]

The report identifies where design fits in the broader economy and industry. Product design and interactive design were by far the largest design disciplines, making up 46% of design's contribution to GDP. In the absence of a national design strategy, this project seeks support from government to recognise design as a sector that warrants investment.

The Auckland Co-Design Lab[100], established in 2015, is a collaboration between local and central Government to bring together multidisciplinary teams working with the public sector and communities to develop innovative ideas and solutions. It uses service design tools to focus on the complexities of everyday services to understand issues and address problem areas.

The New Zealand Government actively supports design thinking.[101] In 2016 it developed SmartStart[102], part of New Zealand's digital transformation, focusing on key events in people's lives rather than how government agencies are set up. The service was developed in 6 months.

Auckland University of Technology (AUT) provides flexible pathways for design students to access major/minor subjects, to explore their own personal areas of interest to develop niche expertise. The system also offers design students a double award degree combined with Business.

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99   PWC. (2017) *The Value of Design to New Zealand*. Available at: http://designco.org.nz/about/about-designco/
100 Available at: https://www.aucklandco-lab.nz
101 Available at: https://dpmc.govt.nz/our-programmes/policy-project/policy-methods-toolbox/design-thinking
102 SmartStart was developed between the Department of Internal Affairs, The Ministry of Social Development, Inland Revenue and the Ministry of Health as a one-stop platform for anyone who needed information in relation to having a baby. Available at: https://www.digital.govt.nz/showcase/smartstart-a-new-type-of-service/Collaboration

Australia

According to the Queensland Design Strategy 2020, design is "the key to unlocking innovation and competitiveness in more of our businesses."[103] Developed alongside the Smart State Strategy [104] it led to increased spending on university research and development. By enhancing creativity, to meet the challenges of the future across the environment, community, citizens and cities, the strategy aims to strengthen the economy, foster a design culture, build design knowledge and support public sector innovation. To promote and develop Queensland as a centre of design excellence it established the Queensland Design Council (2010) with people drawn from across the sector.

Victoria's Creative State 2016-20[105] "puts creativity at the heart of Victoria's future" to support and develop the creative industries and includes the Victorian Premier's Design Awards. Creative Victoria supports the wider creative industries including the Melbourne Arts Precinct and support for indigenous cultures.[106]

Since 1958 Good Design Australia has showcased the value of Australian design to business and industry through the Good Design Award and the Good Design 'Tick' trademark, in recognition of quality design, approved by a panel of design experts.[107]

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103   Queensland Government (2008). *Queensland Design Strategy 2020*. Available at: https://www.ico-d.org/database/files/library/designstrat2020.pdf

104   Queensland Government, *Smart State Strategy : Queensland's Smart Future 2008-2012*. Available at: https://www.qctn.com.au/LinkClick.aspx?fileticket=jNQZwuuZnH4=

105   Victorian Government (2016). *Creative State: Victoria's First Creative Industries Strategy 2016–2020*. Available at: https://creative.vic.gov.au/creative-state

106   Victorian Government (2016). *Creative State:*

107   Available at: https://good-design.org

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Singapore

Singapore's vision for *Design 2025* is to have "design talent with interdisciplinary skillsets" and "a workforce with design sensibilities".[108] Design Singapore Council (DSG), based in the National Design Centre, provides support for business, education and design. In 2015 Singapore was designated a UNESCO Creative City of Design.

SkillsFuture Singapore works on industry's future needs to help people upskill and adapt to new ways of working. [109] It is a fully integrated system that connects individuals to competencies, employers, jobs, recruitment and training and assists individuals mid-career change into a growth sector. [110]

The Skills Framework for Design facilitates the individual to plot their own career path, with expert guidance on skills and competencies, training in digital skills and financial support for lifelong learning for all Singaporeans aged 25 or over.[111]

The 2017 Design Education Review Committee was established to enhance current provision of design in HE, and across other disciplines so everyone in Singapore can use design thinking in problem-solving.

Design students experience an extended and holistic curriculum to broaden their learning and life skills. Through non-design subjects and adjacent skillsets they are encouraged to be more self-reliant in their decision-making, aided by studio collaborations with students from different courses. Design educators maintain industry-level skills through secondments and use a skills competency matrix so they can more effectively perform their roles. To plug gaps in service design, the Service Design Lab, Singapore, collaborates with private agencies to re-design systems and human interaction for the public sector.[112]

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[108]   Design Singapore Council (2016). *Design 2025: Singapore by Design*. Available at: https://www.designsingapore.org/what-we-do/resources/design-2025.html
[109]   Available at: https://www.skillsfuture.sg/sfw/design/index.html
[110]   The *SkillsFuture Mid-career Enhanced Subsidy* provides 90% of the costs for any of the SkillsFuture Singapore courses for people over the age of 40 and no less than 90% of costs for full time or part-time Ministry of Education courses. Available at: https://www.skillsfuture.sg/enhancedsubsidy
[111]   Available at: https://www.skillsfuture.sg/skills-framework/design
[112]   Service Design Lab. Available at: https://www.servicedesignlab.net

South Korea

South Korea has led the world in developing its series of five-year national design strategies (starting in 1993) to transform South Korea into an industry hub. The Korea Institute of Design Promotion (KIDP) was established in 1970 to ' revolutionise the export structure of Korea by promoting the field of design'.[113] It supports SMEs to use design strategically, trains designers and conducts design research– as well as protecting design rights (Design Publication Proof System). Korean design is promoted through the 'Good Design' award.

South Korea has built a national design presence through numerous centres including: Korea Design Center, Design Innovation Center (DIC), Design Korea (annual event), Dongdaemun Design Plaza (DDP), Design Council Busan, Daegu Gyeongbuk Design Center (DGDC). The DDP, designed in 2014, is a vast 38,000 square metre cultural complex and design hub for conferences, exhibitions, fashion shows and includes a design museum and design shop.[114] The Seoul Design Foundation (SDF) created the Seoul Upcycling Plaza (SUP) to increase consciousness and citizen engagement with recycling and resources. The Seoul Design Cloud combines the Seoul Design Week, Seoul Fashion Week and Seoul Upcycling Week. [115] The Korea Future Design Research Institute (KFDRI) located in Seoul National University develops research across culture, design trends, behaviours and lifestyle.[116]

[113]   KIDP. Available at: http://first.kidp.or.kr/eng/index.htm
[114]   Dongdaemun Design Plaza. Available at: http://www.ddp.or.kr/eng/main
[114]   Available at: http://www.seouldesign.or.kr/board/1066/post/102957/detail?menuId
[116]   Available at: http://www.euni.de/tools/jobpopup.php?lang=en&option=showJobs&jobid=28940&jobtyp=10&university=Se
        oul+National+University&country=KR&sid=3661

4

SUPPLY SIDE
REVIEW OF DESIGN SKILLS OF THE STUDENT POPULATION IN IRELAND

4

4.1 Introduction

A key consideration of this research is to understand how many students leave the education system annually that have the skills or potential skills to take up job roles in the design occupations defined by this research. In essence this helps to understand if sufficient numbers of graduates are completing courses to meet the demand for jobs in these occupations going forward.

SUPPLY

DEMAND

A key consideration of this research is to understand how many students leave the education system annually that have the skills or potential skills to take up job roles in the design occupations defined by this research. In essence this helps to understand if sufficient numbers of graduates are completing courses to meet the demand for jobs in these occupations going forward. Identifying these courses is challenging in the sense that these skills span a number of course types and, in some instances, form a module within a wider course type. As such, we have approached this part of the research by focusing on a key word search approach working with colleagues in the HEA and SOLAS to identify courses which match as closely as possible with the skillsets as reviewed during the defining stage of the research. Working with DEI provided a layer of detailed knowledge of design courses within the Higher Education sector in Ireland relevant to this research. The focus on supply terms was on:

■ *HEIs.* HEIs are universities receiving direct grant funding, institutions conducted by higher education corporations, and designated institutions. There are 8 universities in Ireland, serving around 107,000 students (2017). There were 76,500 students in the 11 Institutes of Technology (2017). There are also 13 Higher Education Colleges, serving 22,189 students as of 2019.[117]

■ *FEs*. FEs are bodies that primarily provide any study after secondary education that is not part of HE (that is, not taken as part of an undergraduate or graduate degree). As of 2018, there were 24,928 further education and training courses in Ireland, with a total of 175,054 unique learners enrolled in the FE sector.[118]

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[117]   Available at: https://heca.ie/

[118]   SOLAS (2019). *This is FET Facts and Figures 2018*. Available at: http://www.solas.ie/SolasPdfLibrary/This%20is%20FET%20Facts%20and%20Figures%202018.pdf

National Framework of Qualifications (NFQ)

The National Framework of Qualifications (NFQ) is a system of levels used to describe the Irish qualifications system. The NFQ is based on standards of knowledge, skills and competence and incorporates awards made for all kinds of learning, wherever it is gained. Figure 5 identifies the qualifications and details how they support the supply of skills from Levels 1 to 10 through the Further and Higher Education system in Ireland.

Figure 5: National Framework of Qualifications
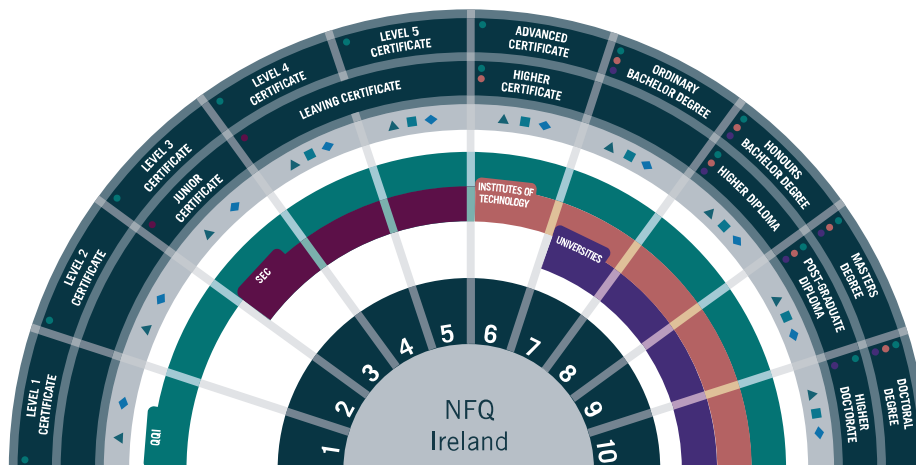
The majority of HE courses supply skills at NFQ Level 7 and above. FE courses are concentrated on NQF Level 1 to 6 courses.

All of the 4 SOC codes that form part of this research are focused on NFQ Level 6 and above.[119] This largely centres on provision by Irish Institutes of Technology and Universities.

Source: www.nfq.ie

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[119]   This is based on UK SOC code links to its NFQ Framework.

4.2 Higher Education Sector

Two approaches have been taken to understand the potential supply of graduates with design skills in Ireland. This includes:

I   KEY WORD SEARCH UNDERTAKEN BY THE HEA

II   REVIEW OF COURSES BY DESIGN EDUCATORS IRELAND
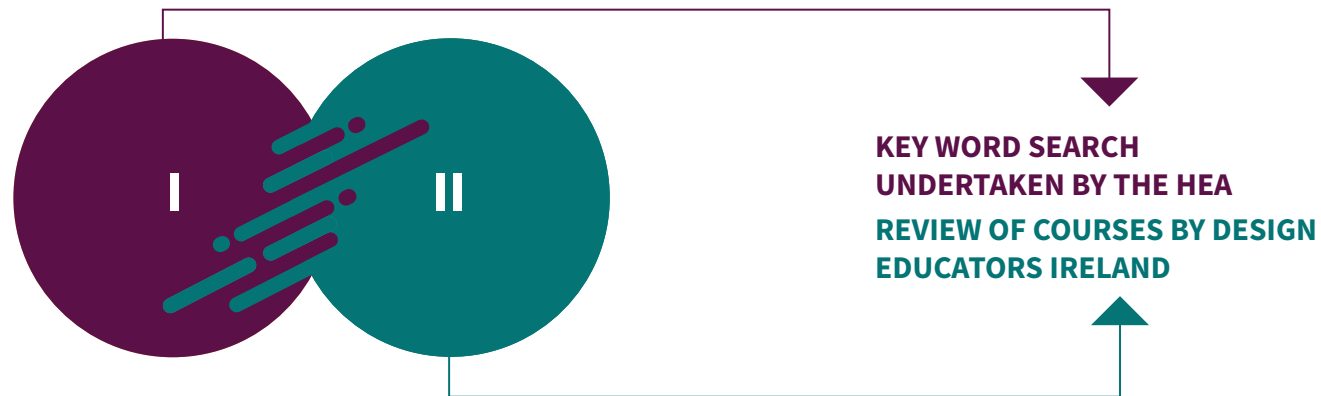
Both have undertaken bespoke pieces of work for the purposes of the research. Preliminary findings were as follows:

HEA Course Search

Combining the key word search by the HEA and the research understanding of relevant job roles and links to courses, the evidence would suggest that an estimated 1,337 students graduated with applicable design skills from the Higher Education sector in 2017. This included 842 students in Non-ICT[120] related courses and 495 in ICT related courses *(Table 6).*

Almost 4 in 5 are undergraduates. The supply of graduates is dominated by Institutes of Technology (81%).

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[120]   Courses include broad disciplines such as Engineering, Manufacturing and Construction, Arts and Humanities and Social Sciences.

4

Table 6: Higher Education Graduates in 'Design' (2017)[121]

	Non ICT	ICT	All 2017 Graduates
Undergraduate	678	382	1,060
Postgraduate	164	113	277
Totals	**842**	**495**	**1,337**

	Non ICT	ICT	All 2017 Graduates
Universities	101	103	204
Colleges	40	14	54
Institute of Technology	701	378	1,079
Totals	**842**	**495**	**1,337**

Source: HEA

The largest number of 2017 graduates came from Dublin Institute of Technology (288), Limerick IT (111), IT Carlow (110), University of Limerick (105), Galway-Mayo IT (102) and Cork IT (95).

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[121] Updated information for 2017 only (2018/19 data pending publication by HEA at the time of report).

DEI

As stated earlier in the report, DEI is the representative body of design education comprising of 15 HEIs in Ireland. DEI has used a different approach to establishing the extent of supply of design skills graduates. This assesses formal course titles but also focuses on curriculum and module content. Its argument is that the formal title of a programme is often not representative of the actual curriculum, volume and depth of expertise in identified skillsets. In its assessment it suggests that "design is regularly bolted onto course titles by non-design departments to aid recruitment".

DEI's analysis has therefore focused on the specialist design courses that have module content in the specific digital, product and strategic skillsets and are taught within a design studio context, enabling them to be design practitioners rather than merely design aware. For example, they highlight that graphic design is now almost entirely focused on digital design. They also highlight that the proportion of product design within Mechanical Engineering programmes is limited and often cursory, and as such would be wary of including Engineering courses within the product design section.

In terms of strategic design, this is the area with the fewest specialist dedicated programmes (for the most part represented at Level 9 or 10), but many programmes have considerable design management components. DEI recommend adopting a three tier rating system in order to provide greater granularity. This focuses on:

- *Tier 1:* Courses which specialise entirely in digital, product or strategic design (50% design and above for example).

- *Tier 2:* Design Programmes that offer modules in product or strategic design (in their view this is the key dataset as it 'truly' reflects the skillsets being embedded into the curriculum in a tangible and explicit manner).

- *Tier 3:* Non-Design Programmes that offer modules in product or strategic design (this is the least robust dataset, but this could draw upon the HEA data to help generate the required information).

Focusing on Tier 1 only (Table 7), the DEI approach suggests that the supply of design graduates in 2019 is estimated at 924 students. These are largely undergradurate students (85%) and more focused on digital design skills (65%). This approach suggests that there were just 78 graduates in strategic design in 2019.

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Table 7: Estimated Higher Education Design Skills Graduates – Tier 1

2019 Graduates	Digital	Product	Strategic	All
Undergraduate	531	229	26	786
Postgraduate	71	15	52	138
Total	602	244	78	924

Source: DEI, 2019

The largest number of students graduated from IT Carlow with a Higher Diploma in Arts in Digital Media Design (50 graduates) and IADT with an MSc in User Experience Design (47 graduates). Strategic Design courses are focused at post graduate level and include a PG Cert in design thinking from IADT (26 graduates) and an MSc in Design Innovation from Maynooth (17 graduates).

Tier 2 graduate numbers have been assessed by DEI on the basis of those degree courses that have modules/course content that could be considered directly related to the specialist design skills which form part of this research. This would suggest that in 2018/19 there were an estimated 816 design graduates who have studied modules/course content within their programmes of study. This includes courses focused on architecture, graphic, fashion, interior design and digital media who have a foundation in design skills that can be built upon to help meet some of the supply shortfall.

4.3 Further Education (FE) Sector

The FE sector provides education and training up to and including Level 6 on the NFQ. As with the Higher Education sector, SOLAS undertook bespoke analysis for the purposes of this research to assess the extent of provision in the FE sector that was in some way related to the skills set defined. As with HE, this involved a key word search made up of key words from both the SOC occupations and job roles.

The key word search identified 82 FE courses supplied in colleges located throughout Ireland spanning digital, engineering, media and web design. Together they accounted for 1,490 completers in 2018 of whom 860 were certified. The majority of those certified (62% or 536) achieved a Level 5 certificate (Figure 6).

Figure 6: 'Design' Completers from FE Sector 2018

2018 FE Completors in Design Related Courses
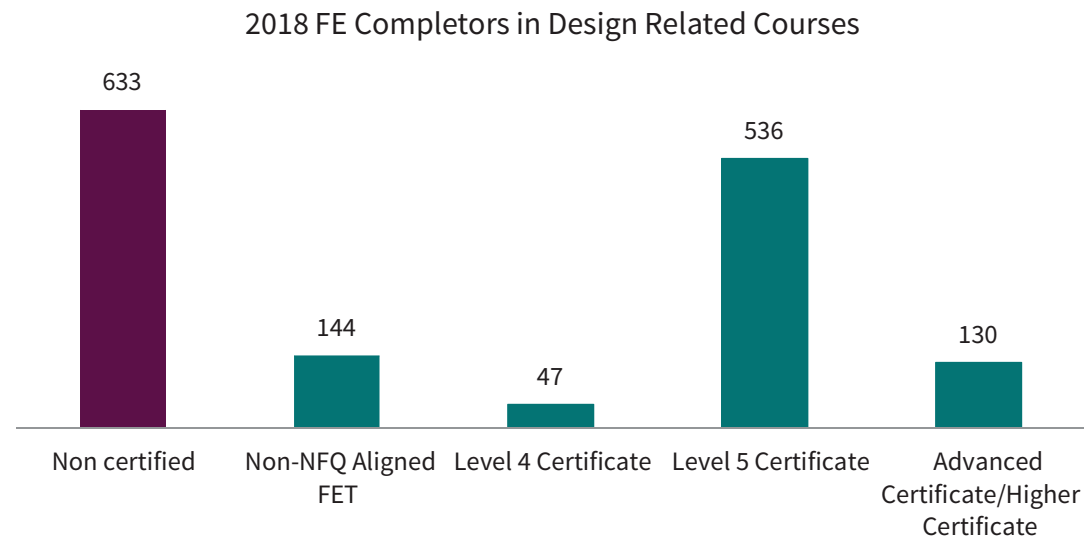
Source: SOLAS

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The largest number of completers focused on Engineering Technology courses with one course alone having 110 completers in 2018. The highest level of completers at Advanced Certificate/Diploma studied a Higher National Diploma in Creative Media Production (52 completers). In total, there were 130 completers with an Advanced Certificate/Higher Certificate, the equivalent of NFQ 6. The largest number of completers at this level were studied a Higher National Diploma in Creative Media Production (33).

All ETBs offer some courses related to design skills in the definition's broader sense. Galway & Roscommon ETB and Limerick Clare ETB offer courses at all levels (Table 8).

Table 8: Courses by Education and Training Board (ETB)

ETB/Award Level	Non-NFQ Aligned FET	Level 4 Certificate	Level 5 Certificate	Advanced Certificate/Higher Certificate
Cavan & Monaghan			X	X
City of Dublin	X		X	X
Cork	X	X	X	X
Donegal	X			
Dublin & Dun Laoghaire	X		X	X
Galway & Roscommon	X	X	X	X
Kerry	X	X	X	
Kildare & Wicklow			X	
Kilkenny & Carlow			X	
Laois & Offaly			X	
Limerick & Clare	X	X	X	X
Longford & Westmeath		X	X	
Louth & Meath			X	
Mayo, Sligo & Leitrim	X	X	X	
Tipperary			X	
VSCSS[122]			X	
Waterford & Wexford	X		X	

Source: SOLAS

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[122] Voluntary Secondary and Community and Comprehensive Schools

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4.4 Summary

This preliminary assessment of the supply of design skills in Ireland would suggest that the numbers of graduates from the Higher Education sector in 'dedicated' courses ranges from 924[123] to 1,337.[124] There is also the potential to include a further 130 completers from the Advanced Certificate/Higher Certificate with the FE sector giving a range of 1,054 to 1,467.

These numbers do reflect different approaches and time periods but provide some basis for estimating that around 1,300 students graduate with relevant skills annually from the HE and FE sectors.

There are more layers to the supply side at both the HE and FE level. For example, at HE level there are graduates who have studied modules/course content which is relevant to these design skills (approximately 650 graduates in 2018/19). At FE level there were 563 completers in courses at Level 4 and 5 which have relevance to the design skills sets reviewed in this research.

There are also further considerations to be taken into account including the extent to which these graduates/completers take up jobs following completion of their courses. For example, the latest Graduate Outcomes Survey[125] suggests that around 78% of graduates from Irish HEIs are working or due to start work 9 months after leaving college. There will also be a degree of overlap between FE students who then go on to Higher Education While this information has not been available to date, from 2018/19 HEIs will return information on the entry basis of new entrants including those entering on the basis of an FET award. These issues will be given further consideration following discussion on preliminary findings from this review.

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[123]   DEI assessment based on 2019 data.
[124]   HEA key word search using 2017 data.
[125]   HEA (2019). *Graduate Outcomes Survey 2017*. Available at: https://hea.ie/assets/uploads/2019/02/HEA-Graduate-Outcomes-Survey.pdf

5

DEMAND SIDE
DRIVERS IMPACTING ON CURRENT AND FUTURE DESIGN SKILLS

5

5.1 Introduction

Design skills are increasingly infiltrating every aspect of the economy. From 2020 to 2025, the importance of these skills is critical, particularly as the fourth industrial revolution takes hold. There are design intensive sectors which focus for the most part on providing services to the wider economy. It is also the case that these skills are increasingly being recognised as integral to the everyday operation of business.

This section sets out what this research has established about those enterprises that provide specialised services in the types of design skills which are the focus of this project. It also examines the extent to which other sectors of the economy integrate those design skills as dedicated jobs/roles in their business.

As previously outlined, strategic design does not have an explicit link to a specific 4-digit SOC code as is the case with digital and product design. Thus, it is difficult to assess demand aspects of strategic design which were identified with the 4 SOC codes reviewed in this research. strategic design is a relatively new and emerging field that uses a holistic, multi-disciplinary approach to applied design. It therefore has to be placed across different existing SOC codes.

5.2 Sectors focused on providing design skills services

This research is focussed on four particular sectors of the economy, referencing their 4-digit NACE code. NACE codes represent the industry standard classification for sectors of the economy (Table 9). The *Irish Design Footprint* research identified these four sectors because of their focus on Engineering design and digital design including computer programming, software and games.[126] These sectors are therefore considered most likely to employ the design skills considered in this research.

Table 9: Businesses focused on Design Skills/Occupations

	Description of Design Community	NACE 2
Design - Engineering	Engineering Activities and Related Technical Consultancy	71.12
Design - Digital	Computer Programming Activities	62.01
	Other Software Publishing	58.29
	Publishing of Computer Games	58.21

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[126]   Department of Business, Enterprise and Innovation (2015). *The Irish Design Footprint: Economic Value and Characteristics*. Available at: https://dbei.gov.ie/en/Publications/Publication-files/The-Irish-Design-Footprint.pdf

CSO data has been accessed to provide an understanding of these sectors in terms of jobs. The data highlights that there were just under 10,000 enterprises employing people in engineering and digital design services in 2017. The largest sector was Engineering Activities and Related Technical Consultancy (5,964) followed by Computer Programming Activities (3,085). Just 26 companies are listed in the Publishing of Computer Games sector (Figure 7). While not all jobs in these sectors will be focused on digital, product and strategic design skills, these findings do indicate that sectors more likely to employ these skills are growing at a faster rate than the average for Irish industry.

Figure 7: Number of Engineering and Digital Design Services Businesses (2017)

Enterprises - 9,952 (2017)

Engineering Activities and Related Technical Consultancy
60%

Other Software Publishing
9%

Computer Programming Activities
31%

Publishing of Computer Games
0%
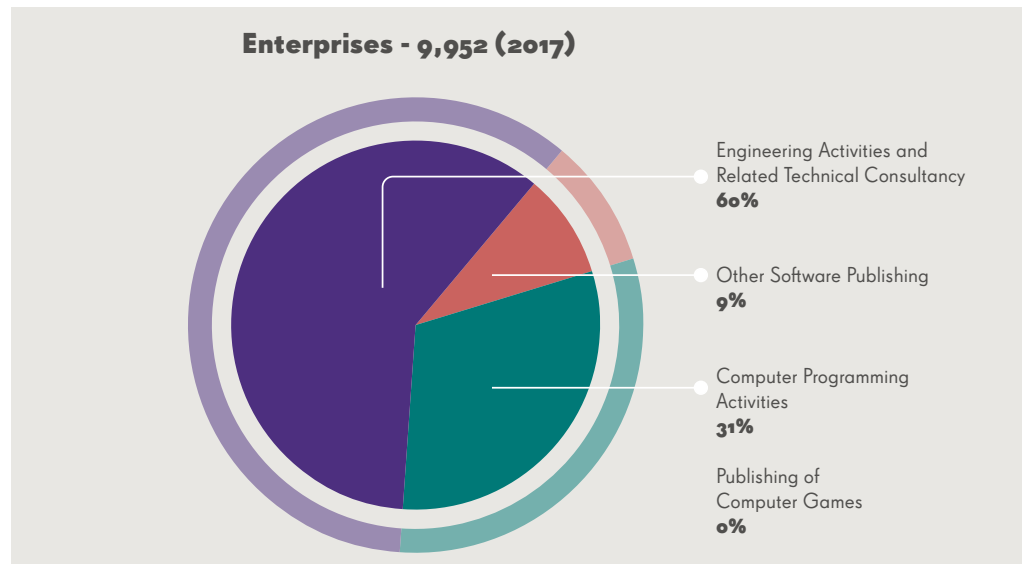
Source: CSO

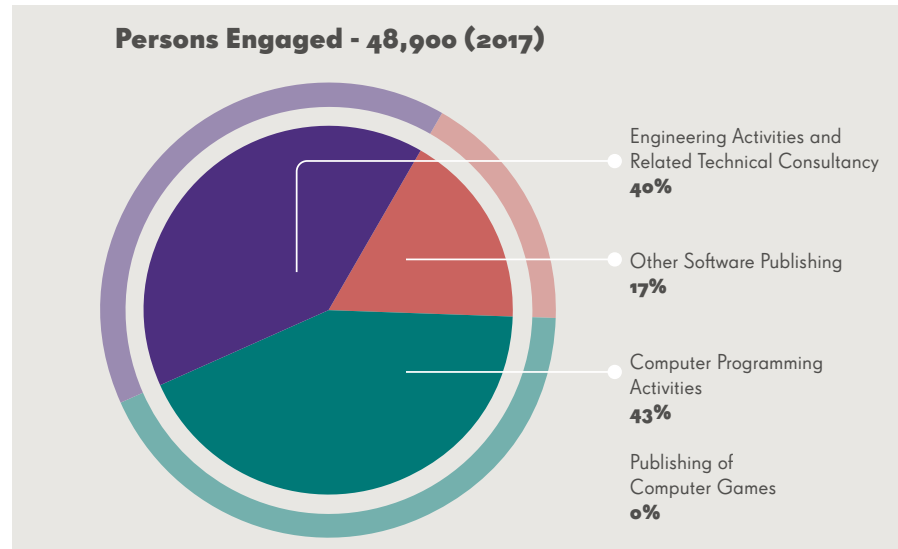These businesses have around 48,900 people working in them (employees and owners), an average of 5 people per company. This represents around 3.1% of persons engaged in active enterprises in Ireland. While Engineering Consultancy is largest in terms of the number of businesses, Computer Programming is largest in terms of the number it employs. Almost 21,000 people are employed in this sector.

Figure 8: Persons Engaged

Persons Engaged - 48,900 (2017)

Engineering Activities and Related Technical Consultancy
40%

Other Software Publishing
17%

Computer Programming Activities
43%

Publishing of Computer Games
0%

Source: CSO

In total these businesses make up 3.7% of active enterprises in Ireland. By way of comparison, these sectors make up a similar share of active enterprises in the UK (3.8%) which suggests that the sectoral focus on this type of design in Ireland is on a par with the UK, Ireland's nearest neighbour (Table 10). Ireland does have a greater share focused on Other Software Publishing, at 8.8%, compared to 1.8% for the UK with fewer focused on Engineering Activities (Ireland 59.9% vs. UK 68.1%) although this remains the largest sub sector.

Table 10: Enterprises – Ireland (2017) and UK (2018)

| Sector (NACE)	Ireland No.	UK No.	Ireland share (%)	UK share (%)
Engineering Activities and Related Technical Consultancy	5,964	78,550	59.9%	68.1%
Computer Programming Activities	3,085	32,525	31.0%	28.2%
Other Software Publishing	877	2,100	8.8%	1.8%
Publishing of Computer Games	26	235	0.3%	0.2%
	9,952	115,426	100%	100%
Share of Country Total			**3.7%**	**3.8%**

Source: CSO, ONS

These sectors have exhibited stronger growth than the Irish average in recent years. Average annual growth over the two years to 2017 was 5.6% for enterprises and 7.7% for jobs, vastly outstripping the economy-wide average annual employment growth rate of approximately 3.5%. There was particularly strong growth in jobs in both Engineering Services and Computer Programming both average annual growth rates of 8% and 10.8% respectively. There was also strong growth in the Publishing of Computer Games, albeit from a very small base.

Table 11: Change in Design Focused Enterprises & Persons Engaged: 2015 - 2017

Sector (NACE)	2015	2016	2017	Average Annual Change2015-17
Active Enterprises				
Engineering Activities and Related Technical Consultancy	5,125	5,224	5,964	+5.0%
Computer Programming Activities	2,678	2,784	3,085	+8.1%
Other Software Publishing	844	848	877	+1.2%
Publishing of Computer Games	15	21	26	+37.9%
TOTAL	**8,900**	**9,140**	**9,952**	**+5.6%**
Persons Engaged				
Engineering Activities and Related Technical Consultancy	16,908	18,282	19,703	+8.0%
Computer Programming Activities	17,282	18,881	20,956	+10.8%
Other Software Publishing	7,508	7,520	8,098	+0.5%
Publishing of Computer Games	90	126	143	+21.1%
TOTAL	**41,788**	**44,809**	**48,900**	**+7.7%**

Source: CSO

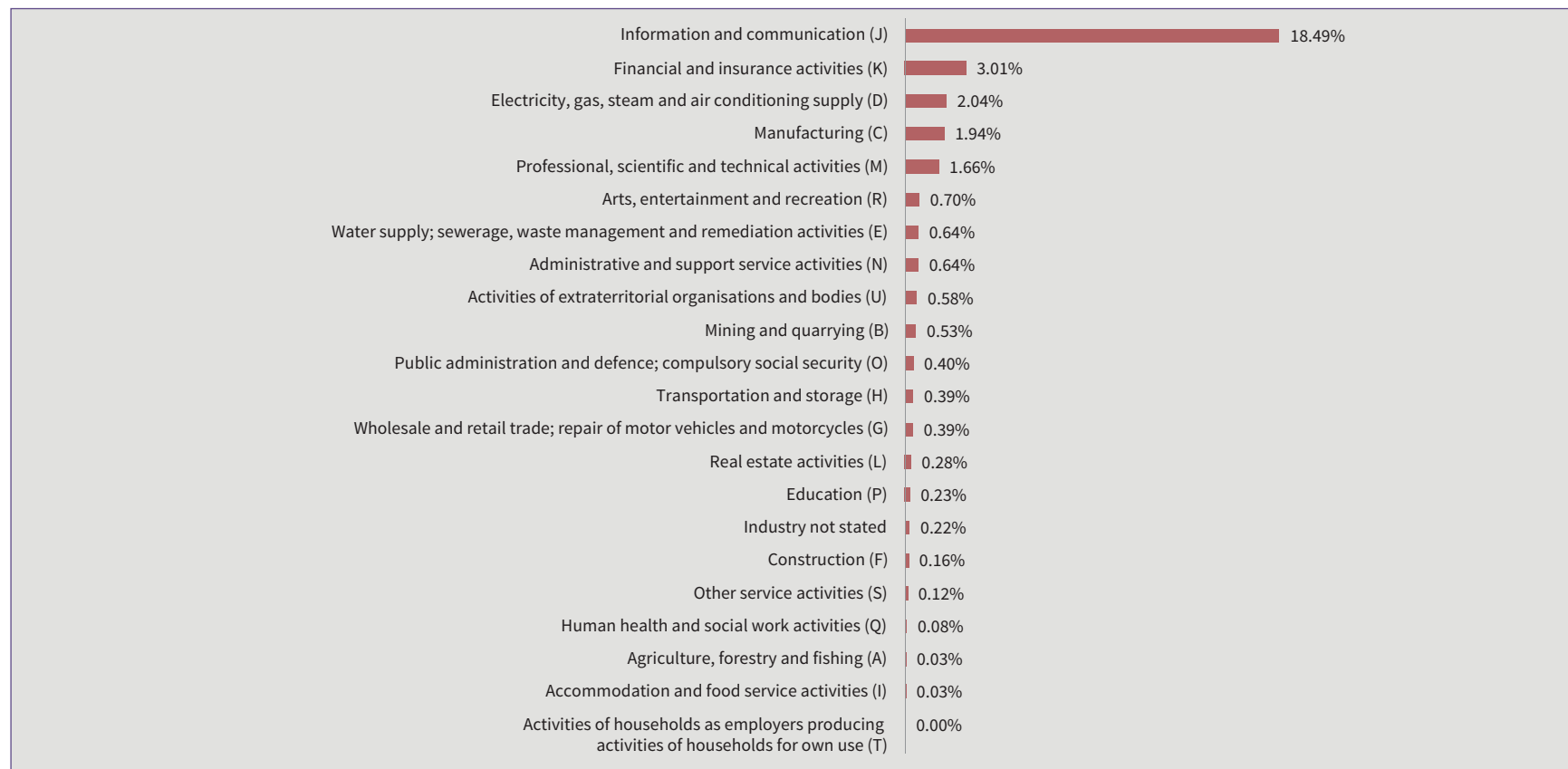**5.3 Sectors Skills - Engineering & Design**
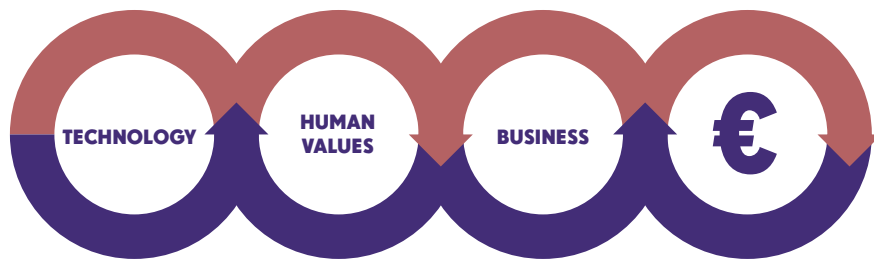
AN IMPORTANT PART OF THE PICTURE IS TO UNDERSTAND HOW DESIGN SKILLS ARE USED IN OTHER PARTS OF THE ECONOMY.

While it is not possible to get this level of detail from up to date data sources such as the Labour Force Survey (LFS), it is possible to get some indication from the Census of Population, undertaken every five years in Ireland. The latest Census information available was for 2016.

The 2016 Census indicates that there were 29,231 people working in design-related occupations (SOCs 2126, 2135, 2136, 2137) in that year, 69% of which were programmers and software development professionals. Although it is unclear exactly how many of this cohort were working in design. Figure 9 highlights the concentration of those skills employed in jobs across sectors.

The largest sector by a considerable margin employing these skills is Information and Communication, accounting for almost 17,000 jobs or 18.5% of all jobs in that sector that year. There is a considerable gap after that with these skills accounting for around 3% of jobs in Financial & Insurance Activities and between 2% and 3% in sectors including Manufacturing and Professional and Technical Services. All remaining sectors employ less than 1% of people with these specific skills and the shares are particularly low in sectors including Accommodation and Food Services, Agriculture and Health.

Figure 9: Design Occupation % Share of Sector Jobs 2016

Sector	%
Information and communication (J)	18.49%
Financial and insurance activities (K)	3.01%
Electricity, gas, steam and air conditioning supply (D)	2.04%
Manufacturing (C)	1.94%
Professional, scientific and technical activities (M)	1.66%
Arts, entertainment and recreation (R)	0.70%
Water supply; sewerage, waste management and remediation activities (E)	0.64%
Administrative and support service activities (N)	0.64%
Activities of extraterritorial organisations and bodies (U)	0.58%
Mining and quarrying (B)	0.53%
Public administration and defence; compulsory social security (O)	0.40%
Transportation and storage (H)	0.39%
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.39%
Real estate activities (L)	0.28%
Education (P)	0.23%
Industry not stated	0.22%
Construction (F)	0.16%
Other service activities (S)	0.12%
Human health and social work activities (Q)	0.08%
Agriculture, forestry and fishing (A)	0.03%
Accommodation and food service activities (I)	0.03%
Activities of households as employers producing activities of households for own use (T)	0.00%

Source: CSO

5

Similar data from the Census (2011) highlights that the share of jobs taken up by these skills is growing.

> BETWEEN 2011 AND 2016, OVERALL DESIGN JOBS GREW BY 43% AGAINST A TOTAL JOBS GROWTH OF 11%, ALMOST FOUR TIMES FASTER. THIS REPRESENTED NET ADDITIONAL JOBS OF 8,777 JOBS.

Of the 22 sectors, design jobs as a share of total jobs in the sector increased in 16 sectors.   In terms of the biggest employers of these skills, each showed some increase in the share of jobs taken up by these roles (Table 12). In the Information and Communication sector, design skill roles as a share of total jobs increased from 15% of the total to 18.5% of the total over the 5-year period to 2016, an increase of 6,598 jobs. Other sectors where the number of jobs increased notably were Professional and Technical (688) and Manufacturing (566). Changes in employment of design skills in other sectors were marginal over this time.

Table 12: Change in Design Skills Share of Sectoral Jobs

	Design share of sector jobs 2016	Design share of sector jobs 2011	% Point difference
Information and communication (J)	18.49%	14.68%	3.82%
Financial and insurance activities (K)	3.01%	2.76%	0.24%
Electricity, gas, steam and air conditioning supply (D)	2.04%	1.84%	0.19%
Manufacturing (C)	1.94%	1.82%	0.12%
Professional, scientific and technical activities (M)	1.66%	1.28%	0.37%

Source: CSO

5.4 Design Skills – A Supply Shortage

It is possible to get a sense to which Design skills are in short supply from both the DBEI Critical Skills Occupations List and the SOLAS Difficult to Fill Vacancy statistics. The DBEI Critical Skills Occupations List focuses on jobs where there is a shortage in respect of qualifications, experience or skills which are required for the proper functioning of the economy. The list is organised using the SOC 2010 system. Specific capabilities or skills that are eligible within a broader occupation category are listed under *Employments with Specific Skills* – applicants with these skills may apply for Critical Skills Employment Permits.

This is designed to attract highly skilled people into the labour market with the aim of encouraging them to take up permanent residence in the State. All of the four 4-digit SOC codes identified in this research are listed on the Critical Skills Occupations List. Information provided by the DBEI for this research highlights that in 2018 there were 2,615 permits issued to people coming to work in Ireland with Digital Skills (SOCs 2135, 2136, 2137) with a further 2,480 permits issued in 9 months up to September 2019. A further 117 people with Design and development engineer skills were issued with a permit in that year. Therefore, in total, 2,732 permits were issued in 2018 to allow people with these skills to come and work in Ireland (Table 13). This would represent 7% of all Design skills jobs in Ireland in 2018. It should be noted, however, that it is not possible to determine exactly how many people working in this area are focused largely on design. The presence of programmers and software development professionals, as a high-growth occupation, have the potential to skew the relative importance of design skills.

Table 13: Number of Design Skills Permits Issued in 2018

SOC	Description	No. Permits
2126	Design and development engineers	117
2135	IT business analysts, architects, and systems designers	901
2136	Programmers and software development professionals	1,643
2137	Web design and development professionals	71
Total Permits 2018		**2,732**

Source: DBEI

5

Figure 10: Critical Skills Permits Issued for SOCs 2126, 2135, 2136, 2137

Design Skills - Critical Skills Permits Issued

2015	2016	2017	2018	To Sept 2019
1622	2187	2241	2732	2603
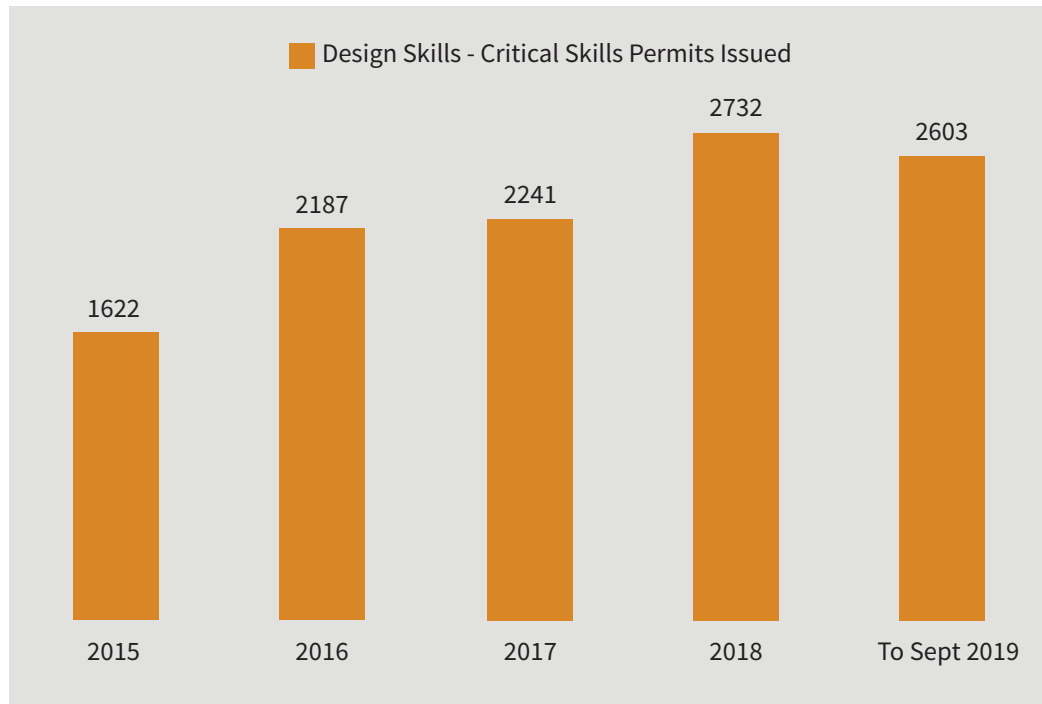
Source: DBEI

The number of permits has been steadily growing. In 2015 there were 1,622 permits were issued. In 2018 this had grown to 2,732. This represents an increase of 68% and on the basis of permits issued to date in 2019 it is likely that twice as many permits will be issued in 2019 as were issued in 2015, just four years ago (Figure 10).

The SOLAS Difficult to Fill Vacancies Survey[127] obtains the views of selected Irish recruitment agencies in respect of occupations that require skills which are in short supply and in their view, are proving difficult to fill.

According to this paper, over half of respondents reported difficulty recruiting in IT (software developers, analysts, designers, engineers, architects, support and technicians) and Engineering (production and process, design and development, automation, validation, environmental health and safety, quality control, quality and regulatory engineers, production, quality and engineering technicians). The skills set reviewed in this research fall into both of these broad occupations.

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[127] SOLAS (2019). *Difficult to Fill Vacancies Survey.* Available at: http://www.solas.ie/SolasPdfLibrary/15008_SOLAS_Vacancies_Infographic_WEB.pdf

The SOLAS Vacancy Overview 2018 focuses on broad sectors including Information and Communication which has a strong focus for the occupational skills reviewed in this research. It highlights that "many of the indicators examined here point to a sector with skills that are in high demand and are proving difficult to fill". It goes on to highlight that both vacancy and recent job hire data clearly indicate that job openings are for high skilled full-time roles requiring primarily third level qualifications. It also notes the relatively high turnover of staff in this sector and the fact that the number of new employment permits issued for this sector in 2018 was higher than employment growth over the same time period. To give one example, the Information & Communications sector accounted for 13% of all notified vacancies through IrishJobs.ie in 2018. Of those vacancies which stated a level of education, 70% required at least a third level degree. More than half of vacancies were for professionals including Software developers/engineers.

5.5 Summary

The research would suggest that the Engineering and Digital Design services sectors are important growth sectors in terms of both the number of businesses but particularly in terms of jobs. In the two years to 2017, the number of businesses in the sector grew by an average annual rate of 5.6% compared to an average for Ireland as a whole of 4.5%. The number of persons engaged grew by 7.7% per annum compared to an average of 3.5% for Ireland.[128] These skills are dominated by Computer Programming activities employing 21,000 and Engineering Consultancy employing just under 20,000. Taken together, the four SOC codes identified make up 3.7% of Irish enterprises and 3.1% of persons engaged. While not all jobs in these sectors will be focused on product, digital and strategic design skills, these findings do indicate that sectors more likely to employ these skills are growing at a faster rate than the average for Irish industry.

Design skills are employed across all sectors of the economy although are particularly focused on the Information and Communication sector reflecting the specific services nature of the jobs. Their uptake in most other parts of the economy is small but for the most part growing. Most of the jobs growth in these skills between the two Census periods (2011 and 2016) was in Information and Communication but there were also notable increases in Professional Services and Manufacturing.

These skills are in growing demand if the DBEI Critical Skills Occupations List is considered. Although the presence of programmers and software development professionals have the potential to skew the relative importance of design, it is still likely that there is a significant amount of demand for design skills under these permits. The number of permits issued under these 4 SOC codes has been steadily growing with permits up from 1,622 in 2015 to 2,732 in 2018. These skill sets also form part of a broader occupational grouping under the current SOLAS Difficult to Fill Vacancies list.

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[128] Central Statistics Office (2019). *Structural Business Statistics 2017*. Available at: https://www.cso.ie/en/releasesandpublications/er/sbs/structuralbusinessstatistics2017/

6

DESIGNING SCENARIOS OF THE FUTURE:
DESIGN JOBS GROWTH IN IRELAND
WHAT NEW SKILLS ARE NEEDED?

6.1 Introduction

This section estimates the additional Design jobs anticipated in Ireland by 2025. It is based on four 4-digit SOC codes (SOCs 2126, 2135, 2136, 2137) which are assessed as the best 'fit' for the digital, product and strategic design domains. The focus on these four SOC codes provides access to CSO official statistics on the number of people in Ireland with these specific occupational skills sets. It is important to note that limitations to data collection have percolated through the research. In particular, this has been an issue with respect to the emerging field of strategic design in providing accurate demand side forecasts based on available published datasets owing in part to their non-inclusion in SOC.

A number of sources have been used to provide three scenarios for the potential number of design jobs in Ireland by 2025. These focus on low, medium and high growth scenarios. The data sources largely centre on the CSO's LFS and Census of Population along with other data sources (EY Irish Jobs Forecasts).

The current number of jobs in Design skills, using the four SOC codes identified for the purposes of this research, is established using LFS data to present a baseline. How Irish jobs have grown since 2013 (post recovery) is reviewed and used to forecast the number of Irish jobs in 2025 under the three scenarios.

The approach then focuses on understanding how design jobs are distributed across sectors in Ireland (SOC by NACE). This uses information available from the 2011 and 2016 Censuses of Population. It reviews how the share of those jobs has changed between 2011 and 2016 and what that means in terms of Design jobs share of total Irish jobs by 2025. This evidence is then applied to the 3 scenario forecasts of total Irish jobs for 2025 to provide an estimate of the number of Design jobs by 2025. The extent to which jobs will be created due to 'expansion' demand (growth in those occupations) and 'replacement' demand (openings created through people leaving the labour market) are also considered.

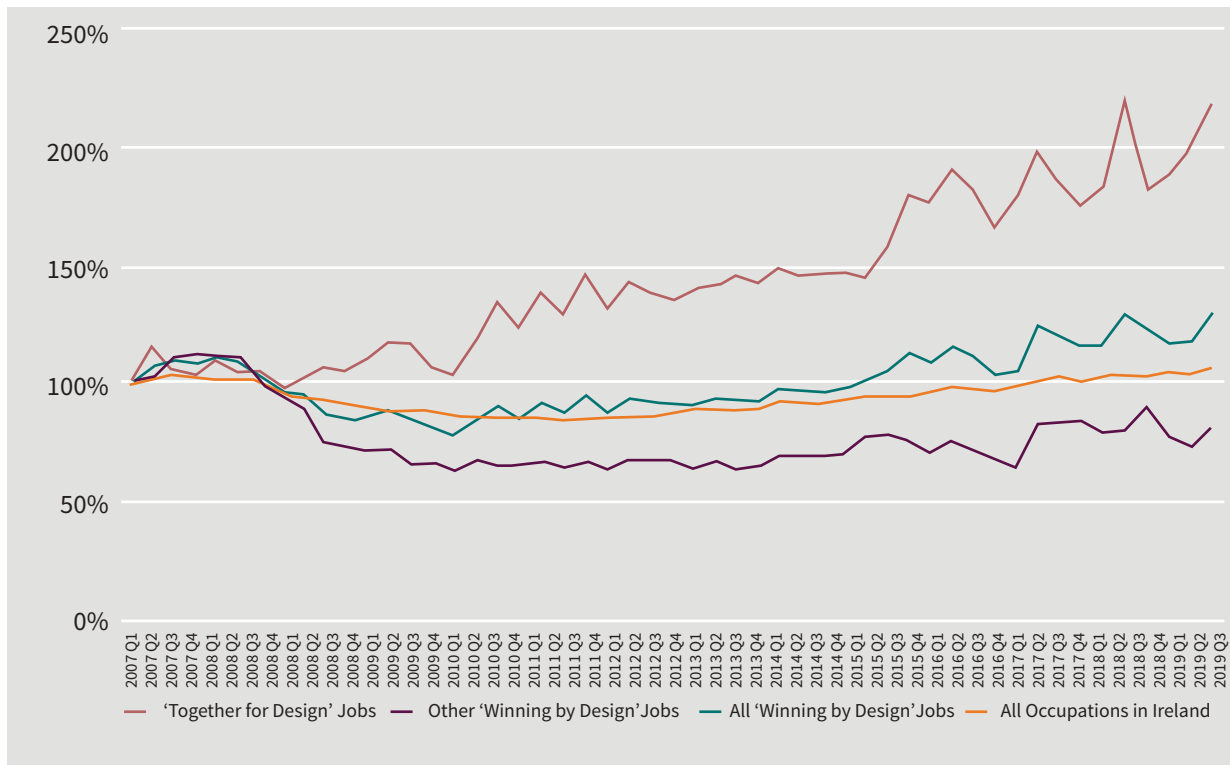## 6.2 Assessment of Current Jobs in Design Occupations in Ireland

CSO has provided information following a bespoke data request as part of this research to outline the number of jobs in the 4 SOC codes that form the core of this research. Disclosure issues meant that this had to be provided at an aggregate level reflecting the fact that the LFS is a sample survey and granular analysis can be challenging.

The data provided by the CSO suggested that there were 44,000 Design jobs under those 4 SOC codes in Q3 2019 (latest available at time of research). Males make up 80% (around 4 in 5) of those jobs compared to 54% of overall jobs in Ireland.[129]

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[129] CSO has noted that due to sampling considerations, the gender dimension of Design Skills jobs should be treated with some degree of caution.

Figure 11: Design Occupation Jobs Growth Rate

| | ‘Together for Design’ Jobs | Other ‘Winning by Design’ Jobs | All ‘Winning by Design’ Jobs | All Occupations in Ireland |

Source: CSO; Base Q1 2007=100

A time series of information was provided which highlighted that design skills had grown at a faster rate that overall Irish jobs and indeed spearheaded growth among wider *Winning by Design* occupations (Figure 11).

In fact, the number of jobs with digital, product and strategic skills has more than doubled (+120%) since 2007 while in the other design occupations identified in the report, employment numbers have actually contracted (-20%). Although, as previously outlined in Section 7, the presence of programmers and software development professionals, as a high growth occupation within the digital design designation, is partly responsible for this.

Total Irish jobs in Q3 2019 in Ireland amounted to 2.323 million jobs, meaning that design jobs accounted for an estimated 1.9% of total Irish jobs in that quarter.

6.3 Growth Forecasts

The past performance of jobs growth in both design and wider Irish jobs provides an important basis on which to assess future growth forecasts. We have based our analysis on past performance over the period of 2013 to 2019 on the basis that the economy was coming out of recovery into a sound growth trajectory over that period.

This would suggest that average annual growth in jobs in design occupations amounted to 8.2% per annum compared to 2.5% per annum for total Irish jobs over the same time frame, a difference of 5.8% in annual growth (Table 14).

Table 14: Average Annual Growth (2013 – 2019)

	Design Occupations	Total Irish Jobs	% Difference in Growth
Average Annual Growth (%)	+8.2%	+2.5%	+5.8%

In simple terms, this means that design occupations grew at a faster rate than the overall jobs population in Ireland over the most recent post recovery period. However, it is important to note that the data for the 4 SOC codes show a degree of variation quarter on quarter (for example, in Q1 2019 average annual growth in Design Occupations was 4.4% compared to an overall growth employment growth of 2.7% - a difference of 1.7%) so the 'scale' of the difference should be treated with some degree of caution.

It is important to provide a sense of how overall jobs in Ireland could grow up to 2025 as context to any scenarios specifically focused on design occupations. This has involved a review of a number of available forecast sources as provided in Table 15.

At present, Ernst & Young (EY) are the only source of jobs growth figures up to 2025. It suggests that average annual jobs growth in Ireland is set to slow with average annual growth forecast at 1.5% up to 2025.

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Table 15: Sources of Irish Jobs Growth Estimates (Annual Growth Rates %)

%	2017	2018	2019	2020	2021	2022	2023	2024	2025	Source
Jobs Growth	2.9	3	2.2	1.5	1.6	1.7				Budget 2019
Total Employment Growth	2.9	3.1	2.4	1.7						Central Bank
Labour Force Growth	1.1	1.9	1.5	1.4						Central Bank
Jobs Growth	2.9	2.9	2.2	1.8	1.6	1.5	1.4	1.3	1.2	Ernst & Young

6.4 Design Occupations within the Business Sector in Ireland

It is important to understand how jobs in the 4 design occupations used in this research are distributed across business sectors in Ireland. This requires analysis of SOC codes by NACE codes. This detail is only available through the Census of Population that was last conducted in 2016. This analysis would suggest that these design skills are widely distributed across sectors in Ireland but typically make up a very small share of jobs across each (Table 16).

Table 16: Design Jobs Across Sectors in Ireland, 2016

	2016 Jobs	Share of Design Jobs (%)	Share of Irish Jobs (%)
All Irish Jobs	2,000,0000		100%
Design Jobs	29,231	100%	1.46%
Agriculture, forestry and fishing (A)	28	0.10%	0.001%
Mining and quarrying (B)	27	0.09%	0.001%
Manufacturing (C)	3,896	13.33%	0.194%
Electricity, gas, steam & air conditioning supply(D)	263	0.90%	0.013%
Water supply; sewerage, waste management and remediation activities (E)	66	0.23%	0.003%
Construction (F)	163	0.56%	0.008%
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	1,044	3.57%	0.052%
Transportation and storage (H)	320	1.09%	0.016%
Accommodation and food service activities (I)	34	0.12%	0.002%
Information and communication (J)	16,656	56.98%	0.830%
Financial and insurance activities (K)	2,733	9.35%	0.136%
Real estate activities (L)	25	0.09%	0.001%
Professional, scientific and technical activities (M)	1,879	6.43%	0.094%
Administrative and support service activities (N)	457	1.56%	0.023%
Public administration and defence; compulsory social security (O)	423	1.45%	0.021%
Education (P)	404	1.38%	0.020%
Human health and social work activities (Q)	170	0.58%	0.008%
Arts, entertainment and recreation (R)	239	0.82%	0.012%
Other service activities (S)	49	0.17%	0.002%
Activities of households as employers producing activities of households for own use (T)	-	0.00%	0.000%
Activities of extraterritorial organisations and bodies (U)	5	0.02%	0.000%
Industry not stated	350	1.20%	0.017%

Source: CSO

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The largest sector employing these skills is the Information and Communication sector. This analysis suggests that in 2016, 57% of Design jobs were in the Information and Communication sector.

However design jobs in the Information and Communication sector accounted for less than 1% (0.8%) of jobs across Ireland. Manufacturing was the second largest sector employing these skills (13% of Design jobs and 0.2% of Irish Jobs).

This information is also available for 2011 and has provided an understanding of how the number and share of design jobs across sectors has changed in the 2011 to 2016 period. In 2011, design jobs made up 1.1% of total Irish jobs. By 2016 this had increased to 1.5%. Changes across sectors have also been reviewed. For example, between 2011 and 2016 the share of design jobs in the Information and Communication sector as a proportion of total Design jobs increased from 49% to 57%. The share of Information and Communication Design jobs as a proportion of total Irish jobs increased from 0.56% to 0.83% over the same period.

6.5 Designing Scenarios

The three scenarios proposed in Table 17 provide a low, medium and high estimate of the number of jobs in design by 2025 based on the evidence built to date. It relies on estimates of overall jobs growth in Ireland by 2025 based on three average annual growth rates as below.

Table 17: Irish Jobs Estimates 2025

	Low	Medium	High
Irish Jobs Growth Rates (Average Annual %)	0.0%	1.5%(EY estimate)	2.9%(Based on 2013-2019 performance)
Irish Jobs Estimates by 2025 (m)	2,327	2,539	2,760

The scenarios have been estimated using the evidence presented through the 2016 analysis of Design jobs by sector across the economy (focused on CSO Census data) and the most recent Q3 data from the LFS. This provides estimates of the average annual change in the share of design jobs by sector as a percentage of all Irish jobs over that 3-year period. This average annual growth rate is then applied over the 6-year period to 2025 to estimate what the share of design jobs across sectors could look like by 2025 (Table 18).

Table 18: Design Jobs Forecast Estimates by 2025

000s	Low	Medium	High	Design Jobs Share of Total Irish Jobs (%)
Irish Jobs 2025 (Forecast)	2,327	2,539	2,760	
Agriculture, forestry and fishing (A)	0.06	0.07	0.07	0.00%
Mining and quarrying (B)	0.06	0.07	0.07	0.00%
Manufacturing (C)	8.64	9.43	10.25	0.37%
Electricity, gas, steam and air conditioning supply (D)	0.58	0.64	0.69	0.03%
Water supply; sewerage, waste management and remediation activities (E)	0.15	0.16	0.17	0.01%
Construction (F)	0.36	0.39	0.43	0.02%
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	2.32	2.53	2.75	0.10%
Transportation and storage (H)	0.71	0.77	0.84	0.03%
Accommodation and food service activities (I)	0.08	0.08	0.09	0.00%
Information and communication (J)	36.95	40.32	43.83	1.59%
Financial and insurance activities (K)	6.06	6.62	7.19	0.26%
Real estate activities (L)	0.06	0.06	0.07	0.00%
Professional, scientific and technical activities (M)	4.17	4.55	4.94	0.18%
Administrative and support service activities (N)	1.01	1.11	1.20	0.04%
Public administration and defence; compulsory social security (O)	0.94	1.02	1.11	0.04%
Education (P)	0.90	0.98	1.06	0.04%
Human health and social work activities (Q)	0.38	0.41	0.45	0.02%
Arts, entertainment and recreation (R)	0.53	0.58	0.63	0.02%
Other service activities (S)	0.11	0.12	0.13	0.00%
Activities of households as employers producing activities of households for own use (T)	0.00	0.00	0.00	0.00%
Activities of extraterritorial organisations/bodies (U)	0.01	0.01	0.01	0.00%
Industry not stated	0.78	0.85	0.92	0.03%
Design Jobs by 2025	65	71	77	
Design Skills as a share of Irish jobs	2.8%	2.8%	2.8%	2.8%
Additional Jobs by 2025	21	27	33	

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Taking this approach, it would suggest that by 2025 the number of design jobs in Ireland could range from 65,000 to 77,000 (Table 19).

Table 19: Estimates of Additional Jobs in Design Skills in Ireland by 2025

	Base (Q3 19)	2025		
		Low	Medium	High
Jobs ('000s)	44	65	71	77
Additional jobs by 2025 ('000s)		21	27	33

This approach suggests that by 2025 design skills will represent around 2.8% of Irish jobs. This compares to 1.2% in 2011, 1.5% in 2016 (Census) and 1.9% in Q3 2019 (LFS). This means an increase of 0.9 percentage points over the 6-year period to 2025 (from 1.9% to 2.8%) which appears achievable in the context of the past growth performance of the sector.

Every year there will be potential new job openings across these occupations which will be made up of both:

(i) Expansion demand driven by new demand for these skills through growth; and

(ii) Replacement demand reflecting the fact that people will leave these occupations for a variety of reasons which are both permanent (retirement) and temporary (illness) in nature.

Expansion demand is calculated as the difference in the demand for those skills year on year, for example how many more people with those skills will be needed in 2020 compared to 2019. Replacement demand for the purposes of this research has been estimated at 4%.[130]   This means that each year an estimated 4% of the existing jobs will exit the labour market and need to be replaced. Table 20 provides an indication of the extent of expansion and replacement demand on an annual basis estimated under each scenario.

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[130]   As per EGFSN's 2019 report 'Forecasting the Future Demand for ICT' report. Estimate taken for Level 6/7.
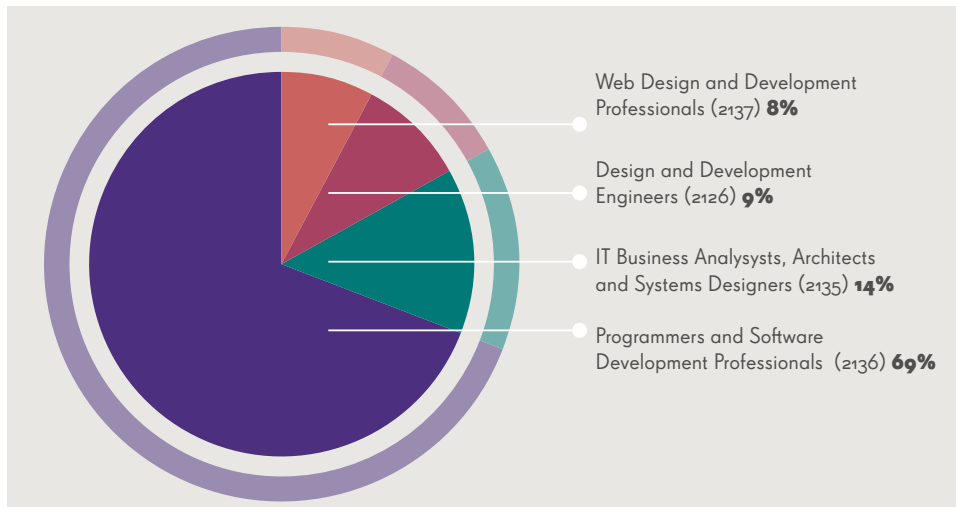
Table 20: Annual New Openings 2020 to 2025 ('000s)

Estimated New Openings By 2025						
Low ('000s)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Expansion Demand	3.4	3.4	3.4	3.4	3.4	3.4
Replacement Demand	1.9	2.0	2.2	2.3	2.5	2.6
TOTAL	**5.3**	**5.5**	**5.6**	**5.8**	**5.9**	**6.0**
Medium ('000s)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Expansion Demand	4.1	4.2	4.4	4.5	4.6	4.7
Replacement Demand	1.9	2.1	2.3	2.5	2.6	2.8
TOTAL	**6.1**	**6.4**	**6.6**	**6.9**	**7.2**	**7.6**
High ('000s)	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Expansion Demand	4.8	5.1	5.3	5.6	5.8	6.1
Replacement Demand	2.0	2.2	2.4	2.6	2.8	3.1
TOTAL	**6.8**	**7.2**	**7.7**	**8.2**	**8.7**	**9.2**

6

The analysis would suggest that in 2020 for example there could be an estimated 5,300 to 6,800 new openings across these 4 occupational skills sets. Focusing on the medium scenario, this could be made up of 4,100 additional/new jobs created through growing demand for these skills and 1,900 created because of the need to replace people who are exiting from these occupations at that time. The 2016 Census provides further detail around the share of digital jobs distributed across the 4 SOC codes used.[131] This is set out in Figure 12.

Figure 12: Design Jobs by 4 SOC Codes, 2016

Web Design and Development Professionals (2137) **8%**

Design and Development Engineers (2126) **9%**

IT Business Analysysts, Architects and Systems Designers (2135) **14%**

Programmers and Software Development Professionals (2136) **69%**

It highlights that in 2016 almost 7 in 10 jobs in design skills were classified under SOC 2136 which includes programmers and software development professionals.

On the basis of the 2016 distribution it is possible to estimate how many people will be employed by 2025 across the 4 SOC codes (Table 21). For example, under the high growth scenario an estimated 52,900 professionals with Programme and Software Development skills will be employed in labour force by 2025.

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[131] This data is not available through the Labour Force Survey because of sample size and disclosure issues.

Table 21: Distribution of 2025 Forecast Design Jobs for 4 SOC categories

'000s			
	Low	**Medium**	**High**
Design Jobs 2025 by SOC	**64.8**	**70.8**	**76.9**
Design and development engineers (2126)	5.9	6.5	7.0
IT business analysts, architects and systems designers (2135)	9.3	10.1	11.0
Programmers and software development professionals (2136)	45	48.7	52.9
Web design and development professionals (2137)	5.0	5.5	5.9

This provides the opportunity to make a broad estimate of the number of additional jobs that will be working within those skills/occupations by 2025. For example, by 2025 an additional 22,600 people with Programmer/Software Development Professional skills will be working in the sector under the high growth scenario (Table 22).

*Table 22: Change in Job Numbers between Q3 2019 and 2025*

'000s			
	Low	**Medium**	**High**
Design and development engineers (2126)	1.9	2.4	3.0
IT business analysts, architects and systems designers (2135)	3.0	3.8	4.7
Programmers and software development professionals (2136)	14.3	18.4	22.6
Web design and development professionals (2137)	1.6	2.1	2.5
Overall Change 2019 to 2025	**20.8**	**26.8**	**32.9**

6

6.6 Summary

This section provides estimates of the number of design jobs by 2025 under the 4 SOC codes identified to define design skills for the purposes of this research. It suggests that by 2025 the number of people with design skills jobs in these occupations could range from 65,000 to 77,000, an increase from 44,000 in 2019. This will mean that by 2025 there will be an additional 21,000 to 33,000 people working in those occupational groups. Programmers and software professionals are anticipated to account for the majority of additional jobs.

The analysis also suggests that under the medium growth scenario for the Irish economy (with jobs growth averaging 1.5% per annum), there will be around 6,100 new openings annually in these design occupations. This reflects both expansion and growth in the demand for these skills (65%) and the fact that a proportion of these skills will need replaced (35%) annually for a variety of reasons, such as migration and retirement.

The preliminary assessment of the supply of these design skills in Ireland suggests that around 1,300 students graduate annually with relevant skills from Higher and Further Education sectors in Ireland. On the basis of evidence from the Graduate Outcomes Survey, just over 1,000 of these will end up in a job 9 months after graduating.[132] There is a further cohort of graduates who will have studied modules/course content within their programme of study that would have relevance or transferability to these design skills (circa 650). This gives a sense of the potential 'pool' of graduate completers that could take up jobs in these occupations. The research has also highlighted that critical skills employment permits were issued to 2,732 people with these skills in 2018, indicating a significant demand from businesses to bring in these skills from outside the EU. According to SOLAS, the evidence also suggests that businesses are still finding it hard to find the right people with these skills. The accumulation of this initial evidence assessment suggests a potentially significant undersupply of people with these skills to meet the growing demand going forward.

THE FUTURE?
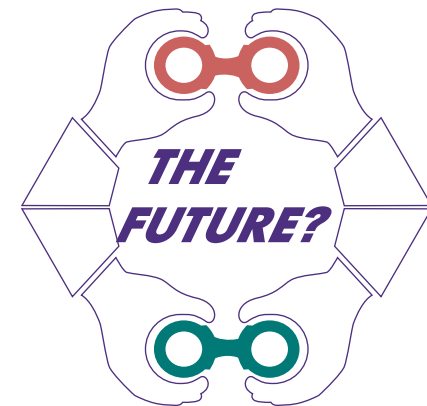
WHAT NEW SKILLS ARE NEEDED?

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132   Source: HEA (2018). *Graduate Outcomes Survey: Class of 2017*. Available at: https://hea.ie/assets/uploads/2019/02/HEA-Graduate-Outcomes-Survey.pdf

7

INSIGHTS ON DESIGN SKILLS:

ENTERPRISE, DESIGN AND ACADEMIA

7

7.1 Enterprise & Design

Interviews were conducted with 42 representatives from 38 organisations across the design and enterprise sectors in Ireland representing demand in design skills. Firms self-identified if they operated in the design community as a design or non-design firm. Interviewees included representatives from start-ups, SMEs, design agencies, MNCs, Government Agencies, industry and professional bodies.

To achieve a balance of views, respondents ranged in age, discipline and gender. Roles interviewed included: Principal Product Designer, Freelancer, Design Thinking Consultant; Product Manager; Head of Design; Chief Innovation Officer; CEO; Head of Technology; VP Customer Experience; Product Development Manager; Head of Product Design; Head of UX Design.

Respondents worked across a range of different areas related to product, digital and strategic design such as Engineering, Medical Device Design and Manufacturing, Product Design, UX Design, UX Research, Software Design, Experience Design, Strategic Design, Product Development, Innovation, Digital Design, Brand Development, Web and Service Design.

Questions focused on design skills in the context of the economy, growth and future needs. The following summary highlights 'demand side' based on analysis from structured interviews.

Thematic Analysis

A demand side analysis of interviews from enterprise (n=24) and design (n=18) communities across digital, product and strategic design.

DESIGN	Design Skills Landscape	Design Skills Pool (Experience/Quantity/ Quality/Adaptability)	Design Fit (Roles)	Design Fit-for-Purpose	Design Retention/ Recruitment	Design Demand	Design Supply	Design Trends	Design Evolution
	Demand for design has created greater diversity across design in Ireland through foreign & EU staff. Ireland is not a design leader - current culture restricts change and development in design. There is an over-emphasis on "Dublin Design". It is difficult to get people to move out of Dublin.	Difficult to find enough experienced people in UX/UI. Low quantity/small pool. Design needs leaders to communicate future needs and development. Not every designer wants to take on a leading role. There are not enough graduates. SMEs can't compete with MNCs in-house design team salaries. Younger people coming through are more digitally focused and adaptable. Online platforms widely used by SMEs and sole traders to sub-contract work to a worldwide pool.	Communications with clients.Current role fits include Specialists; Generalists; Prototypers &Strategists. Role fits include; Industrial Design; Data Science; Business Design; and Ethnography. Interaction Design (UX/UI) – broad spectrumBranding/ Infographics.	Pace of technology means current skillsets become obsolete more quickly. Scale of consultancies makes it difficult to hire. Design/business SMEs difficult to fund upskilling courses for staff. Design is undervalued - clients want it cheaper. Gaps in design education and research across discovery and business models.	Building a team with the right level skills takes a long time. Finding people with technology is easy but leadership more difficult. Difficult to retain junior staff in a high demand workforce. SMEs need to offer loyalty incentives & flexible working to retain key staff.	Demand for digital (UI/UX/VR) and design experiences. Design will integrate the physical and virtual worlds. Design needs to distance itself from the craft sector in order to promote contemporary design needs/ sector. Upskilling and training courses are vital for sole traders.	Design education should collaborate more with business schools. Industry needs more flexible learning pathways for people in employment. Students need more industry experience: apprenticeships bootcamps and short courses. Design Leaders aged 30- 40 years are in high demand.	Designers need to be in the 'C-suite' to lead and strategise. Design solutions can impact on society, environment and economics. Designers need to work with strategy and the language of business in design.	Design needs a champion at governmentlevel with a clear voice. Dublin has the potential to be a 'new' London or Stockholm. Critical thinking skills. Designers need to be able develop multi- disciplinary ideas/skillsets.

7

ENTERPRISE

Design Skills Landscape	Design Skills Pool (Experience/Quantity / Quality/ Adaptability)	Design Fit (Roles)	Design Fit-for-Purpose	Design Retention/ Recruitment	Design Demand	Design Supply	Design Trends	Design Evolution
Growth and demand in digital/product service design, medical device, UX/UI/CX design-based research and design thinking. Traditional design-specific consultancies are obsolete. Design agencies offer wider multi-disciplinary inputs. Business needs to understand the added value of design. Difficult to recruit UX/Mechanical and Industrial designers.Ireland not perceived in EU/US as a "Design Hub". MNCs absorb or acquire the best design graduates.	Short supply of designers with solid experience in strategic design - a relatively new field in Ireland and not well understood as a career path. The existing talent base is augmented by Irish designers returning with experience in London/ Berlin/Paris/Amsterdam/etc. The pool of digital designers has increased more than product design. Younger people are adaptable and have well developed digital skills. Design thinking helps businesses to better understand customer's needs.	Developer led roles Process and Product Innovation. Current role fits: Content Strategists; Researchers; Generalists; HybridDesigners; Senior Managers & Director role in VP Design; VP Customer Experience; CX Head of Design New role fits Design Engineers; Design Thinkers; Facilitators; Visual Designer; UI UX designers (front end).	Design is more integral to industry across disciplines, and works vertically, instead of horizontally. Creativity, critical thinking and design need to be further incorporated at school level. Designers must learn how to collaborate and work in teams. Ireland needs to create design hubs regionally. Designers need to develop inter-personal skills.	Difficult to find and recruit Industrial/ Mechanical/UX/UI Designers. Demand from MNCs and headhunting creates a high turnover of staff. Mentoring is very important, but it is difficult to get senior people. Design needs better representation at government level. SMEs identify tax relief implications for innovation vouchers and procurement.	Design is a two-tier system: corporate design world /gig economy. The cost of living in Dublin makes it difficult to relocate talent from abroad. Ireland's reputation for technology and software needs to be applied to design. Recruitment is expensive and time consuming.	Design education needs to overlap with other disciplines. Normalise design by foster entrepreneurial mind-sets. Ireland needs to develop a world class reputation for design. If designers do not lead, design will be led by non-designers. Weak design skills could kill Ireland's reputation as a leading Design country in EU.	Education cannot compete with salaries paid to top design industry staff. Needs to be greater interaction between industry and education. Problem-solving should be learned in primary school. Ireland has to invest in world class talent & research to be competitive in design globally.	The speed of output and access to skills in China is phenomenal – harder to compete. Need for guidance and support in ethical design. Maintaining the tax rate is essential for growth. Design will be less affected by AI because creativity cannot be automated. Design industry must define design better.

Design is widely viewed as a growth area in Ireland predominantly across medical devices, digital services, UX/UI and service design. There is also a sense that business is slowly becoming more aware of the importance of design, particularly in relation to design thinking and service design. Whilst Ireland has created wider opportunities in design and attracted greater diversity of talent through an international workforce, it is not yet a design hub on a par with other Europe countries. In this respect, stakeholders felt that Ireland is still "immature" in design terms but has the potential for steady growth.

There was a very strong feeling arising from the design and enterprise interviews that the design and craft sectors are often confused with each other. Both have a role to play in Irish society but with decidedly different end markets. Traditional craft workers are more focussed on the delivery of individual hand-made items while designers typically design for mass production and mass consumption. While the craft of 'making' is important, design in Ireland needs to be much more dynamic, forward-looking and essential to a vibrant economy. In that respect, design needs to be an integrated function in enterprise beyond "making" to producing and scaling products or services on a global scale.

The craft sector has nearly 50 years of representation by the Crafts Council of Ireland. In 2014, the Council amended its trading name to 'Design and Crafts Council of Ireland' to more accurately reflect its remit. There were concerns amongst interviewees that the inclusion of design in what was previously a craft remit does not reflect the current landscape and impact of design. It was suggested that Design works alongside technology and should be treated similarly as it is vital to project the right image to build Ireland's reputation overseas.

Respondents felt that Ireland lacks a national sense of design - in business and in society people in Ireland still don't quite know what design really means. It was suggested that, if pushed, people may equate design to styling, but they would have little knowledge of the wider reach and impact that design has across industry. As design is not in their sphere, people do not know what it does, how or what they could learn from it. This was considered to directly impact on the pipeline of talent. Respondents strongly believed that critical thinking and creativity in design should be an imperative at primary and secondary school level. This would allow cross-fertilisation of ideas, collaboration and multidisciplinary thinking and nurture a more creative national psyche.

Within the ecosystem, respondents suggested that SMEs and LEOs need a better understanding of design. This was viewed as essential to promoting and developing business strategically so that Ireland is more competitive and in position to lead. But creativity requires investment and incentives. It was suggested that Ireland's standing as a design hub would be significantly strengthened if more high-level design teams were encouraged to relocate here,

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instead of being based overseas. This was considered a way to fully connect design through the system. Respondents believed that without this design becomes self-limiting and the best designers may be attracted overseas to work on these more prestigious jobs.

Across enterprise and design the recruitment of experienced designers is difficult – but especially across UX/UI. There appears to be strong demand for these skills but there is only a relatively small pool of experienced designers available in Ireland. The lack of people to lead and mentor in this area impacts negatively on training, development and future growth. There is a risk that if industry cannot source enough people locally to fill these roles that jobs would shift elsewhere.

DESIGN LEADERS ARE A DRIVING FORCE – BUT ARE IN SHORT SUPPLY.

Design respondents observed that despite encouragement not every designer wants to assume a leading role, preferring to work in the creative, rather than business, end. Unless this changes, it means that design could be led by non-designers – or younger designers coming through with a more commercial and business savvy mind-set.

The Design Enterprise Skillnet is working to tackle this. In 2019, they launched a Diploma in Design Leadership[133] targeting the professional designers who want to step up in their career. Twelve people are expected to graduate from this course each year. In addition, this year, they have delivered 3,226 training days, with 679 participants, from 277 companies which evidences demand and commitment from the sector to develop their skills.

Younger designers appear to have a strong 'can do' attitude, are generally adaptable and by adding to their skillsets can shift easily into new disciplines and jobs. The younger respondents interviewed worked independently developing and driving their own businesses. Through Blackstone Launchpad they have acquired an entrepreneurial mind and were confident in their abilities to deliver quality design. They viewed learning as a self-motivated continuous process. Working with other start-ups enables them to exchange ideas, knowledge and skillsets. They are their own boss and (because they are young) they see opportunities that older people might not. The freelancing and start-up world is very different from corporate culture. It, perhaps, attracts more free-spirited people who might not 'fit' in large organisations and yet it is a thriving and dynamic indigenous sector, reflecting a strong culture of work and opportunity.

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[133]   Available at: https://www.designenterprise.ie/event/design-management-professional-diploma/

Design respondents were of the view that because larger firms in-house design offer higher salaries and packages, they are effectively stripping out the best talent and graduates. It was suggested that this has effectively created a two-tier system for design across Ireland. Smaller consultancies cannot compete in terms of salary, although they do offer the benefit of working in a small cohesive team with creative responsibility and scope.

Traditional discipline-specific design agencies are in decline. They have reinvented themselves and re-branded as creative agencies offering wider services across disciplines. They now work more closely with the client to develop the 'brief'. In this respect, design has adopted a more strategic position to lead, rather than serve, client-needs. Using design strategically can help clients relate better to customers' needs to move forward in a digital age.

Based on the interviews completed, designers in practice tend to work in dedicated roles as part of a multidisciplinary team. In SMEs, these roles extend well beyond the traditional subject discipline and include engineering through to product development, creative research and visualisation as well as data analytics, business strategy/development, digital marketing, web, film and animation. Sole traders outsource work to freelancers and/or collaborate with other sole traders on jobs where they need specific support/skillsets. Teams of independents come together for individual jobs. Where gaps exist online platforms such as, Fiverr.com, Freelancer.com, and Upwork are used widely to connect with a worldwide talent pool of designers and domain expertise.

Interviewees stated that MNCs, as large organisations, have the advantage of in-house specialist roles linked globally. This includes design thinkers, design engineers, process engineers, end to end designers, co-creators, product/UX-UI researchers/Content strategists/Design directors/Design producers/Mechanical designers. It was believed that they can easily create multi-skilled teams, bringing together a range of levels and talents to work at different stages on a specific job. With global capacity it was perceived that the turnaround for outputs can be done quickly, they can offer a wide scope of work and have the expertise in-house for to provide the full package.

Although design skills in Ireland were generally considered fit for purpose by respondents, they noted gaps and had genuine concerns that current skills supply will not meet future needs. In five years, it was agreed that technology will be in a very different place and that industry needs to keep pace through continuous training and learning. With the rapid pace of change in the sector, courses from the Design Enterprise Skillnet, IDA Ireland and IRDG, alongside events, conferences and meet-ups have become an essential lifeline for SMEs to support and sustain their industry skills and insights. SME owners have to be self-motivated to know what they need to know. Online courses (with optional accreditation) are used widely for general upskilling especially by freelancers.

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Regionally, access to training and short courses is problematic as 'live' courses tend to be based in Dublin and Cork. With Dublin tending to be the focus for most design events.

Some respondents from MNCs stated that they found it difficult to get enough good people and jobs are unfilled longer than they would like. To build capacity, MNCs put a lot of energy into recruitment. It was suggested that there needs to be more investment in world class talent and research to create a flexible and skilled workforce to meet future demand.

It was voiced that returning diaspora have high level international experience but the cost of living in Dublin is a critical factor. Relocation costs are also significantly higher than other locations which inhibits attracting talent. With high demand, there is a significant turnover of staff across the industry – especially at junior level. To retain key staff, SMEs offer loyalty incentives through flexible working, share options and job motivation. MNCs equally find recruitment challenging. For them, it is easier to attract junior staff but more difficult to find senior staff. The use of external recruitment companies was also deemed problematic largely due to an inherent lack of understanding of design and how new design roles fit with the needs of business.

It is believed that the demand for design skills in Ireland is largely driven by digital technology, automation and MNCs. It was felt that whilst the industry seems to have a grasp of innovation it struggles to understand design – or to know quite where it fits. Clients of interviewees still do not fully appreciate the time and cost it takes to develop high quality work.

Respondents agreed that design is under-valued. It was suggested that design needs to promote and explain itself better so that the enterprise sector is more aware of how design can solve problems in business, in the same way as Engineering or Accountancy can. However, there are healthy signs that design is part of the corporate executives ('C-suite') with an advantage in strategic thinking, innovation and the business of design.

Ireland has an opportunity to deliver 'high value-added' design globally but remains expensive in comparison to countries with lower cost economies such as India and China. although the sector as a whole is moving very fast, design and design education in Ireland, is perceived by interviewees to be lagging behind.

As design has developed, it has diversified into new and emerging roles requiring wider skillsets (discipline plus specialism). With VR/AI/AR/UX/UI/CX, branding systems, animation, and integration of marketing the design industry needs the design basics to be strong so that designers can handle change. It also requires a wide range of soft and hard skills such as, data skills, empathy skills, ethnographic research, cross-disciplinary interaction, creativity and critical thinking skills amongst others.

Advances in technology and the physical and virtual worlds between human and machine, will become more blurred. With the next wave of technology designers will need to be able to think without constraints and work with new challenges. This demand for new skillsets and new emerging and hybrid roles creates an urgency which has to managed and planned.

There is a perception that universities are slow to change. Just as the business of design has transformed, it was suggested that there needs to be stronger collaboration between design and business schools, industry and academia.

Across both design and enterprise respondents were keen to see students collaborate and learn alongside other disciplines within industry-type environments, design hubs and accelerators both within and outside of Dublin. It was suggested that awareness of the business design would make students more entrepreneurial, be able to speak the language of business and be in a stronger position to generate ideas (commercial and creative) as thinkers and doers.

Similarly, it was suggested business students would benefit from design electives to develop their creativity and risk-taking. Some respondents felt that the structure of HEIs inhibit flexible interaction and multidisciplinary teaching/learning and can restrict staff and students from connecting with the 'real' world. It was suggested that staff interaction across subject disciplines would allow for cross-fertilisation and be more reflective of industry practice. Equally, it was believed that staff would benefit from greater industry contact/experience and their expertise in pedagogy could cross over into industry training. For interviewees, the need for strong links between industry and academia could not be understated. In addition, it was felt that business schools in Ireland should further encourage graduates in marketing and related business disciplines to undertake electives in design to develop skills in managing and motivating designers to deliver world class solutions. Design thinking, design management, strategic design and innovation design were mentioned in this context.

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It was suggested that more flexible pathways, apprenticeships, short courses and boot camps would incentivise people in work to upskill and utilise education within an applied industry context. Respondents recognised that it is difficult for students to bridge the gap between education and industry. In enterprises, graduates demand a lot of time and energy (from senior staff) to develop and train. It was felt that placement and apprenticeships to learn on the job would ensure the student is more industry aware and improve their skillsets and job prospects. It was believed that the relationship between HEIs and enterprise could be more conjoined.

Across both enterprise and design there was strong sense that what Ireland needs most is an advocate to champion and lobby for design at government level. Respondents believed that design should have a clear voice to promote and develop industry, academia and research and to encourage design thinking across a wide range of human and environmental needs including health, sustainability, food production and the ageing population. This need was presented in a number of different ways by interviewees but the consensus for leadership was clear.

7.2 Academia

A series of qualitative interviews were conducted with representatives from across Ireland's academic sector. In total 22 interviews were facilitated with a range of Lecturers, Course Coordinators and Heads of Schools and Departments to include a composition of product, digital and strategic design disciplines.

The structured interviews explored 'supply side' questions relating to provision of academic courses and programmes at both undergraduate and post-graduate level relating to digital, product and strategic design skills. Supplementary questions focused on design skills in the context of the economy, growth and future needs. The summary overleaf supplies an overarching thematic summary of interviewees.

Respondents viewed the design skills landscape in Ireland to be growing in the areas of UX; UI; Design Innovation; Digital Design; VR; AR; Product Design; Service Design; Game Design; 3D Printing and AI– with the latter topic currently under public consultation to develop a strategy for AI in Ireland.[134] Also growing are the fields of design thinking and human-centred design. These fields have permeated into both academia and industry alike as MNCs adopt design-led approaches in industry sectors of technology, software, engineering, science, healthcare and MedTech. In addition, larger enterprises are subsuming design in-house and consultancy practices are acquiring design agencies into their businesses.

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[134]   Department of Business, Enterprise and Innovation (2019). *Public Consultation on the Development of a National Strategy on Artificial Intelligence*. Available at: https://dbei.gov.ie/en/Consultations/Public-Consultation-Development-of-a-National-Strategy-on-Artificial-Intelligence.html

Thematic Analysis
A supply side analysis of interviews from representatives of FE/HE institutions across digital, product and strategic design disciplines (n=22).

	Design Skills Growth	Design Skills Needs	Design Demand	Design Skills Future-Proofing	Design Skills Policy	Design CPD	Design Supply	Design Evolution
ACADEMIA	UX; UI; Interaction Design; Design Innovation; Digital Design; VR/AR; Product Design; AI; Service Design; Game Design; 3D Printing. Increasing use of design thinking by consultancies and large corporations. Ireland slow to see design as a strategy – lags behind many EU countries *(Danish Design Ladder)*. Human-centre design approach in software, engineering, science, healthcare, MedTech. Policymakers & public agencies need to value the contribution design makes to both industry and society.	Design skills not fulfilled in Technology sector in Ireland. Cross-Collaboration formal or informal with industry/ academia partners – time and fluidity factors at play. UI/UX misrepresented as single design disciplines. Smaller class sizes, more focused skillsets, contact time and improved student experiences. Increase empathy, critical thinking, problem solving, creativity, imagination, communication, curiosity, collaboration 'softer skills' that are transferable as design boundaries blur. Need for design skills to be reframed as multi-faceted. Design skills can create resilience in contribution to Civil Society/Economy.	Validation to develop a U/G or P/G Design course can take up to 4-5 years. Re-shaping of design by MNC cultures or influences in Ireland. Make Design Thinking universal in academic disciplines. Need for investment upskilling/ reskilling of designers. Need to sell/ label design courses to attract both students and parents.	Cross-Collaboration e.g. live industry projects/problems. Need for a Digital & Skills-based portfolio. Need for Hybrid Courses e.g. Design and Entrepreneurship. Design artificially measured in academic norms. Academia's role is to future-proof long-term graduate employability. Design skills curricula is constantly evolving. More funder support for design vis-a-vis scientific research e.g. SFI, DBEI, DES.	Enterprise Ireland recognises design thinking adds value to business. Need for higher visibility of Design in Government e.g. Minster level. No Design Centre in Ireland - National Design Forum in DBEI has been largely inactive. Irish Governmental policy needs to develop and support Design to the same level as it did to Technology sector.	Sabbaticals or job swap with EU/US design institutions. Multi-discipline design training e.g. Mi-Lab, MUIDI courses are Dublin-centric which limits regional access. 'Creative Leadership' programmes for academics. Recognition or accreditation of Design roles or professionals as other disciplines i.e. Accountancy. Pressure on staff to achieve PhDs rather than upskill in design.	Academia must adapt to need and demands of industry more quickly. Potential for 'Discovery' - Innovation Vouchers' for design with SMEs. Increase the awareness of SMEs/MNCs – to use design strategically. Design courses restricted by set outdated requirements QQI/HEA/SOLAS Distrust in fads/ oversimplifying Design Thinking.	Generation Z poses new challenges. Design silos in Art Schools need to be mainstream – Design Schools in traditional university models perceived to be lagging behind. Design 'ownership' in academia i.e. Social Sciences; Business; Humanities; or multi-disciplinary schools. Design gravitating towards design of services versus products. Think medium to long term on design policy: 5-10 year plan with investment.

ACADEMIA	Design Skills Growth	Design Skills Needs	Design Demand	Design Skills Future-Proofing	Design Skills Policy	Design CPD	Design Supply	Design Evolution
	Global trend in design being taken 'in-house' by large corporations or subsumed into consultancies. Language of design is changing but needs to be clearly defined to a common language used by both academia and industry. MNCs/IDI/EI etc value design whilst majority of SMEs still don't yet 'get it' in Ireland. No one-size fits all approach to design in HE/FE – 'design' in course title doesn't make it design! Companies tempt placement students to stay on rather than return to finish course due to skills shortage.	Design-led research differs from standard methods – need for a human-centric, iterative process transcending and/or solving complex problems. Academia working to old model from 20-30 years ago - some level of duplication – need new delivery modes and diversity of disciplines.	Need for a campaign to create more awareness of design as public views limited to TV programmes or influence of Apple. Modular design of courses and programmes with internal or external collaborative partnerships e.g. *UL Design Factors Group*. Current gap in provision of Service Design in Ireland. Meeting demand locally would reduce need to recruit internationally.	Increase exposure, & awareness of design across primary, secondary & Leaving Certificate and develop different pathways to academia/industry. Need to articulate design as an iterative process to solve problems - not just a finished or stylised end product/service. Need for smaller, but more intensive class sizes for design education. Scandinavian model would allow for modular approach to design cross-disciplinary electives.	Design's role in Ireland nationally not represented - compared to other EU countries. Design needs a leader, voice or champion to raise its profile. Demystify design to make it a more competitive USP for Ireland Inc.IRDG is seen as very good for innovation and design thinking support for industry. Designers of future will need to work multi-disciplinary teams locally and globally.	Staff turnover in academia low – stagnates design teaching. Online Learning both threat and an opportunity. No formal CPD pathway exists for educators/ designers. Erasmus Plus works well for EU exchange and study visits Students query staff links with industry – look for engaged and connected staff. Academics need to constantly learn, reskill or upskill in the design world.	Many academic design courses at full capacity/ over-subscribed e.g. NCAD, TU, Monaghan Inst. Digital, product and strategic element in design needs to be more visible. Ireland needs a Centre of Design Excellence. Online courses difficult to compete with. Academia need support/time to build course etc. UX/UI blurring into industrial design means programmes need to be creatively developed by academia.	Cost of living is an issue for students in Dublin – need for a regional reach/hub to develop Ireland's future workforce. Adopt principles of universal and sustainable design - embed in practice or circular economy. Bite-sized education chunks -more preferable to students than four- year courses. State R&D and Tax Relief Schemes are open to misuse by FDI/MNCs as design teams are often located abroad. Increase funding/ investment in education & design.

Respondents believe that academia needs increased agility to adapt to the increasing demand for design skills from industry in Ireland. Current capacity levels of student numbers are at their maximum and design courses are oversubscribed in a number of institutions. NCAD, TU Dublin and Monaghan Institute report that their intake quotas mean many students do not get a place on their preferred undergraduate design course. The supply of design courses in Ireland is outweighed by other disciplines. For example, Maynooth University annually produces 1,000 graduates in business but only 40 graduates in design.

Responding to the demands of enterprise for courses and programmes that are industry focused and aligned to business needs is challenging for all academic institutions. It can take up to 4-5 years to develop and design a new undergraduate/postgraduate degree through to academic validation – which is an impediment to meeting such demands.

However, some institutions have been more responsive and agile in meeting the demand. IT Sligo commenced a new Bachelor of Arts honours degree in App Design and User Experience in September 2018.[135] This innovative four-year honours degree programme prepares graduates to design engaging interfaces for apps, websites, wearable and 'yet to be imagined' future digital products. According to the Institute of Designers in Ireland, UX design is the fastest growing design community nationally and so graduates are in high demand both in Ireland and abroad.

Furthermore, NCAD was the first HEI to launch undergraduate and postgraduate Interaction Design programmes and has launched the first degree in Service Design in Ireland in 2019. It has also introduced a new real-world learning year across all its design programmes called Studio+ which seeks to prepare graduates for employment and enterprise through focusing on strategic and digital design skills. NCAD is also developing new global programmes with leading international institutions in China.

Similarly, IT Carlow launched a new Bachelor of Science in Interactive Digital Art and Design in September 2019.[136] The course equips graduates to work in one of the most creative careers within the technology industry and the skills required to become a professional digital artist and application developer. User-focused design is critical in industry for areas such as, gaming, application development, entertainment media, virtual reality, animation and film production.

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135   Available at: https://www.itsligo.ie/2018/06/05/new-app-design-and-user-experience-ux-degree-at-it-sligo/
136   Available at: https://www.itcarlow.ie/courses/type/undergraduate-cao-courses/computing-networking-courses/computing-in-interactive-digital-art-cw237.htm

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Therefore, the issue is not that the emerging demand of enterprise cannot be matched – it is the speed of change within which academia has the ability and agility to meet the future design skills needs in particular in growth sectors and domains within digital, product and strategic design disciplines. Some of these factors include the constraints of academic structures and decision-making processes for validation of courses through to rigid timetabling, semester and modules of delivering and teaching design issues.

Academia highlight the decreased level of funding HEIs receive since post-austerity measures. It was suggested that this has been a hindrance for HEIs to invest in new design programmes and forms of delivery. Furthermore, academics expressed that there was a low level of design research funding available at a national level. Whilst the EU's Horizon 2020 and international schemes such as those in the UK.[137] explicitly fund design research, this is not the case for the Irish Research Council (IRC) or SFI.

The increasing need for design skills is recognised by all academic institutions and are important, not just to the design community, but to wider industry and society at large in Ireland and globally.

There is an increasing focus on the development of soft skills for designers including empathy, critical thinking, problem solving, creativity, imagination, communication, curiosity and collaboration. These skills become transferable as design boundaries blur across industries and sectors.

Academia argues its role is not just about meeting and responding to industry demands, but also about future-proofing graduate employability. Whilst that may be the case, there is increasing recognition that the norms, structures and policies within which Higher Education operates can be prohibitive in terms of academics being agile to adapt to these constant changes.

Whilst its agreed that the current design skills in the technology sector are not being met as quickly as enterprises need, there is equally a reframing of the multi-faceted skills which will be required to work in multi-disciplinary and collaborative teams in the future as enterprises demand design be more customer-centric. Other gaps exist in areas of strategic and service design which need to be filled by academia in order to meet the growing demand for using design to navigate complex systems and problems facing both industry and society, such as sustainability, climate change and accessibility.

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[137]   The Arts and Humanities Research Council (AHRC) and the Engineering and Physical Sciences Research Council (ESPRC) were mentioned in this regard.

In the norms of academia, design is perceived as being artificially measured versus other disciplines, such as Social Sciences, Business, and Engineering. Likewise, the proportion of research for funding in design-related disciplines is perceived as significantly lower than in other areas of education. In response, future-proofing design with hybrid courses, such as Design & Entrepreneurship or Design & Software Development, is viewed as a means to protect and profile the role design can play cross-discipline and cross-sector. It is agreed by academics interviewed that the increasing need for cross-collaboration (for example, live industry projects, building digital skills, skills-based portfolio) for graduates is key to developing design skills (both hard and soft) for their future usage given the significant pace of change.

In terms of design policy, following the publication of the *Policy Framework for Design*[138] academia feel there has been minimal implementation or action since its publication. For example, the National Design Forum under the remit of DBEI has been largely inactive over the course of 2019. Design policy is seen as disjointed between the design community and the HEA. It is believed that design would benefit from a Government policy as the Technology sector in Ireland has previously.

The continual lifelong learning of both educators and practitioners in design is still needed. Academics are often encouraged to pursue a PhD whereas practitioners will often tend to upskill or reskill in any given design areas in order to improve their knowledge.

Whilst no formal pathways exist for designers there are a number of organisations and initiatives which do support both academics and practitioners to learn including Erasmus Plus, Institute of Designers in Ireland, the Design Enterprise Skillnet alongside online learning, study visits and internal staff training and development, such as creative leadership programmes.

Academia argue that design courses are often being restricted by requirements set out by authorities. It was also suggested that, the naming of course titles to be unambiguous is important in order to promote courses to both students and parents. In addition, the visibility of course syllabi need to more accurately reflect the precise nature of whether a course has a digital, product or strategic design emphasis as this can often be lost in translation. This means that official graduate statistics can be problematic to decipher based on 'pure' design courses and those with design modules: built-in or bolted-on. Academia argue that all formally recognised design courses and those containing design modules should be included – as both contribute towards developing students' design skills and thus help meet demand.

138   Department of Business, Enterprise and Innovation (2016). *Policy Framework for Design in Enterprise in Ireland*. Available at:
       https://dbei.gov.ie/en/Publications/Publication-files/Policy-Framework-Design-in-Enterprise-in-Ireland.pdf

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There is a distrust of fads and trends in academia – specifically the oversimplification of design thinking – which applies equally to the enterprise and design community in so far as the concept has been somewhat "hijacked" and over-used.

For example, whilst academia acknowledges the importance of raising awareness about design thinking, attending a two-day workshop on Design Thinking cannot make a person a designer. Academia also recognise the importance of increasing the awareness of the value and benefits of design for Enterprises and SMEs – to utilise design for products, digitally or strategically, and equally to promote design within corporate 'C–Suite' executive leadership team agendas for MNCs operating in Ireland.

Interviewees from academia felt that to help increase the supply of future design graduates will mean in the short-term to promote design internships, mentorships and placements with both enterprises to collaborate and gain real-world application and experience. In tandem, over the medium to long-term, increased support for design in schools was suggested as a requirement to create a pipeline of future talent to meet the growing needs of industry. The future evolution of design in Ireland will see the adoption of the principles of universal and sustainable design embedded in practice - in the circular economy; in enterprise; and in academia.

The ways in which designers operate in industry and society may shift in future years as will the ways in which people interact with each other in increasingly virtual and augmented worlds. Thus, designers of future will need to be prepared and skilled to work in multi-disciplinary teams locally and globally. Design is becoming an integrated function to develop products and services alongside software, engineering, manufacturing and marketing teams.

Looking ahead for design to evolve in the future it needs to begin to take more of a leadership position – both in academia and industry. Interestingly, the number-one attribute CEOs look for in their workforce is not intelligence or emotional intelligence – it's creativity.[139]

However, academia in Ireland believe investment is needed to build upon the current design foundations for Ireland to assume a leadership role in the future. This would allow institutions to not just respond and collaborate with industry, but also to lead from the front with creativity, authority and thought leadership. Academics believe that Ireland needs a long-term 10 year plan to help create an enabling environment for a bold and ambitions vision for design. Such a plan would enable Ireland to catch-up with its European counterparts, such as Sweden and Finland, and other international leaders, such as Singapore and South Korea. At present, Ireland only has two institutions in the top 200 global design institutions, namely NCAD and TU Dublin – Ireland's ambition should stretch to going up the rankings and if feasible adding to the rank.

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[139] Seppälä, E. (2016). *How Senior Executives Find Time to Be Creative*. Available at: https://hbr.org/2016/09/how-senior-executives-find-time-to-be-creative

7.3 Workshops Themes

#1

Co-Design Workshop #1: DEFINING & EMPATHISING
Dublin City University, Dublin (2nd July 2019)

This early stage of the research was not about finding all the answers. It was about understanding the wider issues to develop insights from which to move forward. The first co-design workshop set a very open agenda to explore the bigger picture, without judgement or assumptions. Everyone's experience of design is different so there are no right or wrong answers. The aim of this workshop was to get an overview, rather than a consensus.

Activities enabled attendees from different sectors of design to interact and to understand each other's role in Ireland's design ecosystem. Attendees were drawn from across design, enterprise and academia. Those attending were at the frontline of the supply and demand pipeline with design skills central to their core business. They are the experts; the people who know. This co-design workshop was designed to give them a voice.

Following an introduction of the project remit the attendees, working in mixed teams, were set activities to explore the following three over-arching questions:

(i) *Where are we now and where do we need to be by 2025?*

(ii) *What new design competencies and skills will be needed in the future?*

(iii) *How might we create a bridge (supply/demand) to connect design skills across Academia/Enterprise/Design?*

In the room, the passion for design was clear, but so too were the frustrations. Participants felt that, while there is evidence that design is making a positive impact at boardroom level, there is still a long way to go. It was suggested that change is thwarted by silos in systems and thinking. The point was also made that all designers, across every discipline, use strategic and digital design.

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Participants identified that the educational pipeline was at the heart of the issue. Participants felt strongly that design needed a strategy for lifelong learning and should be taught more widely in schools to make everyone 'design-aware'. Design doers (practitioners) are relatively low paid compared to engineering designers and with multi-disciplinary collaboration now more common, it was felt that design needs to be seen to on be on par with other professions.

The biggest problem identified was the dearth of design managers with 15 years or more experience. The impact of this suggests that Ireland is 'missing' the people needed to lead it forward.

Technology is expected to bring new opportunities for design. Designers will move into new roles and their skillsets/competencies will need to expand. They will need to be flexible learners, critical thinkers and highly resilient. They will need an understanding of strategy, business and selling, so they can communicate and collaborate well with other fields. Advanced meta-cognitive skills, empathy and deep listening will also be important and the ability to visualise and prototype. In an ideal 'Design Ireland' participants outlined what they believed Ireland needs most:

- A Minister of Design

- A National Centre for Design/Forum

- Engaging with real-world problems such as climate change and sustainability.

- Head of Citizen Engagement (as in Scotland's framework to support systemic change in Government to improve the way people are able to participate in open policy making and service delivery)[140]

- Multi-disciplinary Education

- STEAMD = STEM + Art and Design

- An MBA for Designers

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[140] Scottish Government (2019). *Scotland's Open Government Action Plan (2018-2020)*. Available at: https://www.gov.scot/publications/scotlands-open-government-action-plan-2018-20-detailed-commitments/pages/3/

Co-Design Workshop #2: Ideating & Prototyping
Maldron Hotel, Galway (5th September 2019)

The second workshop combined the 'Ideation' and 'Prototyping' stages, focused on gathering insights and ideas to test the parameters of the research scope from a future perspective. Ideation is more than just idea generation and brainstorming. It encourages free thinking and random ideas to come together. But most of all, it uses discussion, debate and emotion to fire ideas, opinion and observations.

Without a crystal ball, it is impossible to know for sure what design will look like in the future. But, the pace of technology is moving so fast Ireland has to be one step ahead. And so, this workshop was designed to be playful and imaginative, to explore what the future *might* bring. This is largely based on what is known now, projected from an awareness and expectation for change.

The beauty of co-design workshops is that it brings very different perspectives together. The dynamic comes from the diversity of people engaging with each other to find common ground – or not – their individual experience and imagination is what makes it work better.
People were invited from across the academia, design and enterprise sectors to explore the following questions:

(i) *How might the upskilling/reskilling of designers be delivered in the future?*

(ii) *What would a design school of the future look like? (prototyping activity)*

(iii) *What will future demand for design in Ireland look like?*

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The academics were conscious that students learn in different ways such as, in the field, online, and through social media and peer groups. It was also noted that students learn through industry placements, observation, and trial and error. Students need a safe environment to have the freedom to experiment and learn. Learning on the job (apprenticeships) is a relatively new model in Ireland but is gaining traction. Similarly, opening up design courses to non-designers from wider industry (for example, Masters in UX Design and Innovation at LYIT) enables high-end people at management level to explore creative ways of working in a collaborative learning environment.

The view from enterprise was that while designers control people's reaction and usability, engineers control technology, however they are stronger when they work together. In the future, multi-disciplinary teams, working in unknown areas and using strategic design will be how enterprises work. Currently, it was suggested that designers like to challenge norms but align with art and design rather than as 'developers'. It was thought that design maturity comes from speaking the language of business whilst prioritising design's role.
Working in teams to envision a *'Design School of the Future'* elicited these creative ideas:
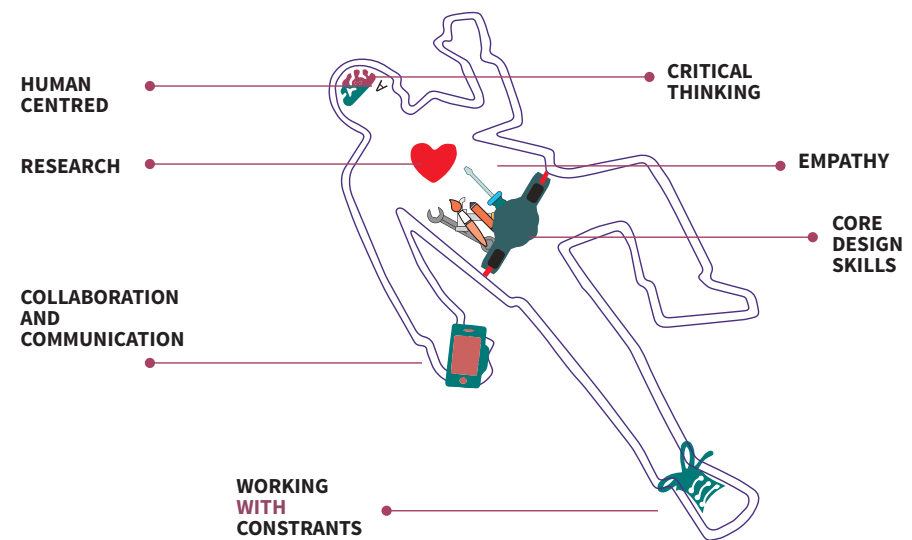
- A place that stimulates the five senses. Think of the 'Eden Project', in Cornwall – a learning space away from big cities in Ireland.

- An Innovation Centre embedded into a campus. Hub and nodes, with satellite design space pods grow on campus. Experienced practitioners (across under-graduate and post-graduate) work with an outer face to industry in School of Excellence - a place people learn and work with empathy in multi-disciplinary teams.

- A cloud-based learning environment where silos no longer apply, whether they be virtual, inter-disciplinary or collaborative.

Looking to future demand, the term 'Designer' is expected to change. Participants envisaged a world where design will have a chartered Institute, regulated skills and titles with weight. In this vision, design will be integral to business with cross-pollination of skillsets and there will be a stringent system for freelancers to survive. Across Ireland people will become more entrepreneurial and students will work with live briefs driven by issues related to ageing, sustainability, social welfare and health. In this future, universal design will grow and be more embedded by accessible design.

CO-DESIGN WORKSHOP

WHAT NEW DESIGN SKILLS AND COMPETENCIES WILL BE NEEDED IN THE FUTURE?

MULTIDISCIPLINARY EDUCATION

SELLING VISUALISATION LANGUAGE

VISION

FILTERING DATA

SPEED

AGILITY

STRATEGY

LISTENING

EMPATHY

EXPERIENCE

CONNECTED

NETWORK

KNOWLEDGE OF OTHER FIELDS

HUMAN CENTRED

RESEARCH

COLLABORATION AND COMMUNICATION

CRITICAL THINKING

EMPATHY

CORE DESIGN SKILLS

WORKING WITH CONSTRANTS

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Co-Design Workshop #3: Testing & Validating
National Gallery of Ireland, Dublin (9th October 2019)

Moving into the last stage of the research presented an opportunity to get feedback at the last workshop on the data collected: the economic forecasts; emergent survey themes; and qualitative interviews.

The sampling of data, whilst still at this testing and validation stage, provided a general idea of where design skills fit economically and the findings from stakeholder engagement provided perceptions from enterprise and individual perspectives. These views highlighted where things are now and where respondents expect they might be going over the next five years.

The co-design element of this workshop was an opportunity for the project team to engage with people from across academia, enterprise and design to debate specific issues arising from the emergent findings and to identify any areas which may have been missed. At this formative stage of the research it was crucial to have and reflect on different viewpoints to guide and support the research. If design in Ireland is to develop, it needs 360° thinking to ensure that people in design are enabled to fully achieve their potential and success.

Design Personas
A series of personas were created as part of the workshop to explore how designers of the future might look like and what skillsets might they require from 2020-2025 (Figure 13).

Figure 13: Designer Personas of the Future
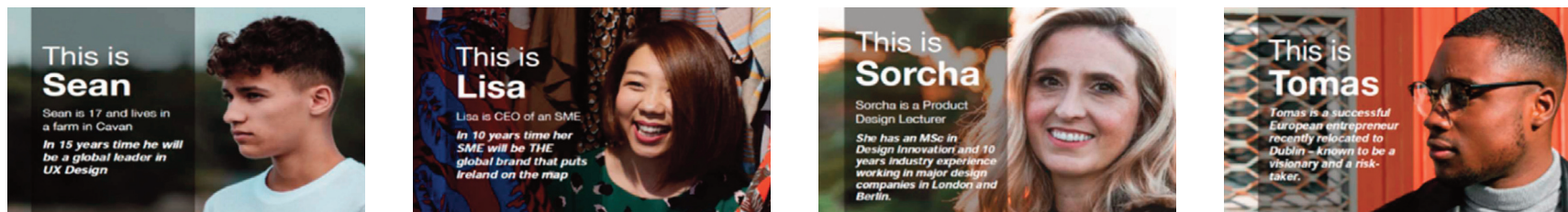
Participants gave their views on a series of questions posed by the research team. These views are outlined below.

What are the future pathways designers need to take alongside/beyond traditional routes?

- Design education needs to be lifelong and continuous. Government/academia/ enterprise should work together to develop a coherent strategy for Design.

- Apprenticeships at FE provide an alternative learning experience to a traditional HE degree.

- Professional accreditation, ethics and CPD should be required in design. CPD needs to be connected. There is a need for more focused courses and post-experience accreditation – which brings a degree of kudos.

- The protection of 'design' as a profession is too exclusionary.

- Competencies in skills are more valued by industry. It can take up to 10-15 years to build/show experience in the job.

- Online courses offer lower cost learning and flexible commitment but participants questioned the levels of quality control and hands-on experience that they offer. It was felt online courses should link more with practice such as internships, mentoring and apprenticeships.

- HEI design courses teach differently but this is not always apparent to prospective students/employers/skillsets.

- In the future, course titles, as they currently exist, will be obsolete as often, they do not reflect what people do or course content.

- Executive education in design is needed.

- Paid internships and mentoring of design students/makers will also be required to develop skillsets.

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Forecasting the Future

Looking forward, to predict scenarios (low, medium and high) the key influencing factors affecting supply and demand as identified by participants included:

- Sustainable Development Goals (SDGs) and the ability to do more with less resources in light of climate change and low carbon initiatives.

- Business models and capitalism

- National Government Design Strategy. Participants used the example of national transport systems to demonstrate the gains that could be made by adopting a cross-departmental design policy within Government.

- A downturn in enterprise design will cut out extraneous elements.

- Design needs to have a Government Department with responsibility for developing design and industry.

- Design in Ireland needs the same push that Science got 15 years ago (from primary to tertiary) with similar long-term goals and strategies. Within Science/Innovation, design is the missing link.

- Ireland has a Chief Scientist – it should have a Chief Designer.

- Ireland needs a 'Young Designer of the Year' and the continuation of IDI's 'Graduate Design Awards'.

7.4 Survey Findings

A stakeholder survey was developed and disseminated to organisations across academia, enterprise and design communities across Ireland to gather their feedback in relation to a number of areas for consideration. The survey remained open for 8 weeks in total from 29th July – 30th September 2019, generating 250 responses across sectors and industries.

Key Findings

- Respondents were split across academia (22%): enterprise (33%); the design community (52%); and state agencies and other sectors (16%)

- There was a balance of respondents across each design domains from digital (48%), product (45%) and strategic design (56%). Roles of respondents ranged from owner to CEO to intern and all those in between.

- 63% of organisations invest in design skills through training programmes or courses for upskilling whilst 30% are not investing at all.

- 65% of organisations highly value design skills.

- 80% of organisations believe design skills will contribute toward driving economic growth over the next 5 years in Ireland.

- The largest sectoral need for digital design was Information and Communication (57%), for product design was Manufacturing (63%); and for strategic design was Education (67%).

- Recruitment of design skills was viewed as being 'moderate' across digital design (31%) and product design (36%). Whereas recruiting those with strategic design (25%) skills was deemed 'difficult'.

- Retaining those with design skills was perceived as 'Fine' in both digital design (31%) and product design (26%). However, it was deemed more 'Difficult' to retain those with strategic design (30%) skills.

- The average number of years respondents had spent working in design in Ireland was 15 years.

The majority of respondents were SMEs with an average of 1-4 employees within the design domains of digital (54%), product (44%), and strategic (62%) design skills. This illustrates capacity internally and ability to service clients with a range of design disciplines (Figure 14). A small sample of respondents were from MNCs. MNCs possess a number of in-house teams with the requisite skillsets for digital, product or strategic design. This is achieved either via recruiting the best of available talent or via the trend of design agency acquisitions. The latter builds a talent pool by subsuming designers into operations.

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For example, these include engineers, developers and analysts within technology, financial or professional services, as evidenced in interviews with these type of firms.

Figure 14: Number of Employees Organisations Employ in Product/Digital/Strategic Design Roles
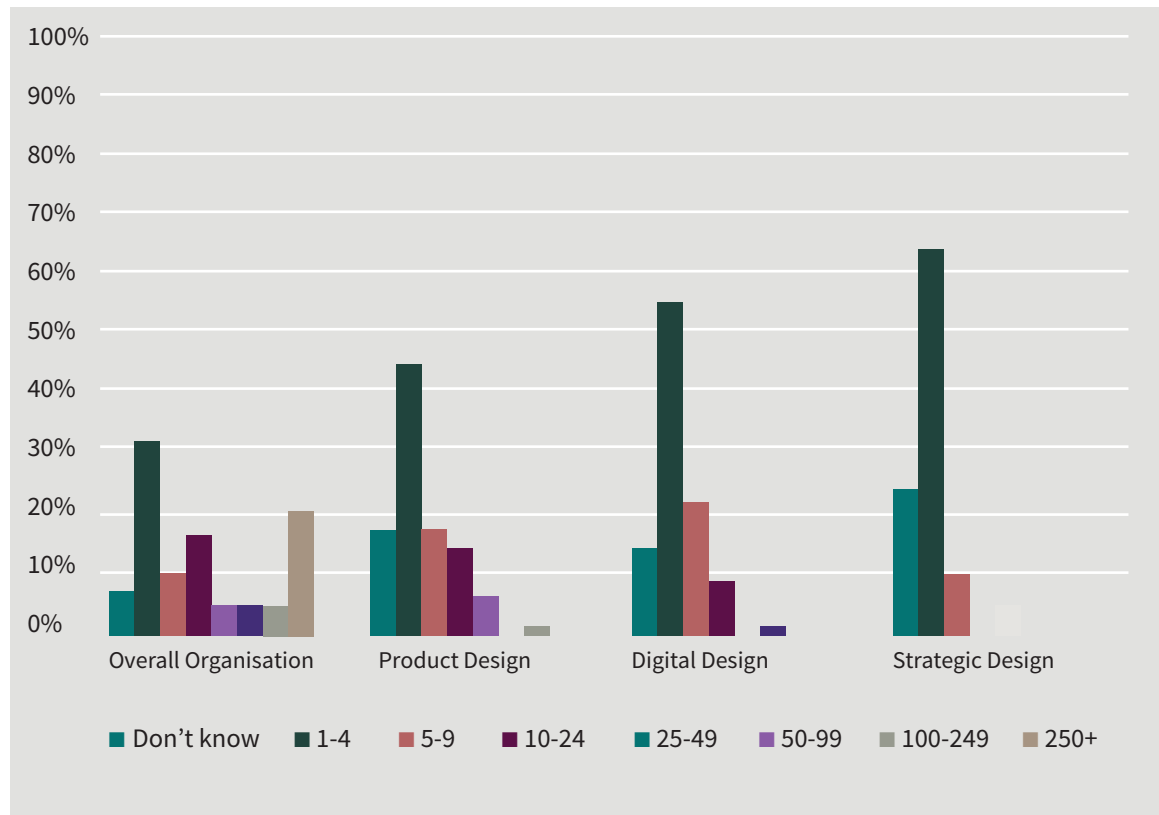
SMEs also utilised a pool of sub-contractors or freelancers across one or more design domains – but more so with digital (59%) and product (43%) design skills than with strategic design (24%). This perhaps indicates the dearth of skills in the latter design domain (Figure 15). It should be noted that for respondents who answered 'don't know' in relation to the breakdown of employees or sub-contractors could be for a number of reasons including: not knowing at the time of completing the survey; not having access to that information internally or generally not knowing the composition of design jobs based on digital, product, or strategic skills as defined in survey.

Figure 15: Number of Sub-Contractors Organisations Employ in Product/Digital/Strategic Design Roles
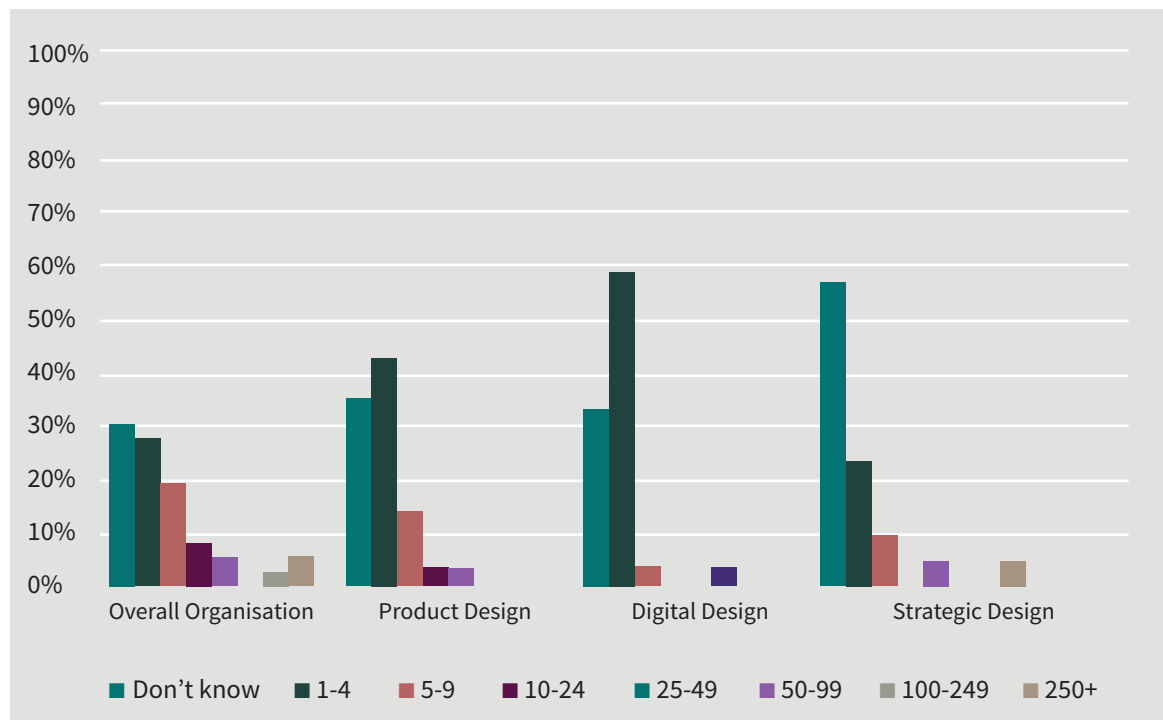
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Organisations were asked to identify their primary source of upskilling or reskilling of designers in the workplace (Table 25). Interestingly, online learning (54%) was the majority source given the flexibility and time saving nature it offers learners. This was followed by routes via traditional undergraduate or postgraduate design or short courses within academia (45%). Other available sources included skilling through professional bodies (30%) (for example IDI, DCCI, IRDG) and state agencies (29%) (such as Enterprise Ireland, LEOs and the Design Enterprise Skillnet). Private or specialist training sources accounted for 26% of respondents.

Table 25: Primary Sources of Learning for Upskilling/Reskilling Designers in Ireland

Online Learning	56.86%
Academia e.g. Further/Higher Education Institution, Education Training Board	45.10%
Professional/Representative Bodies	37.25%
State Agency e.g. Design Enterprise Skillnet/Enterprise Ireland/IDA/LEOs	27.45%
Enterprise e.g. Training Companies/Specialist Trainers	25.49%

Respondents perceived the level of quality of design skills to be "good" within digital design (53%) and product design (53%), but only "fair" for strategic design (30%), whilst 29% reported skills strategic design skills to be "poor". Overall, 33% perceived skills to be only "fair" (33%) to "good" (32%) across the wider design skills sectors in general within Ireland (Figure 16). This indicates that there is much room for improvement in terms of the future of design skills on offer.

Figure 16: Rating of Quality of Product/Digital/Strategic Design Skills in Ireland
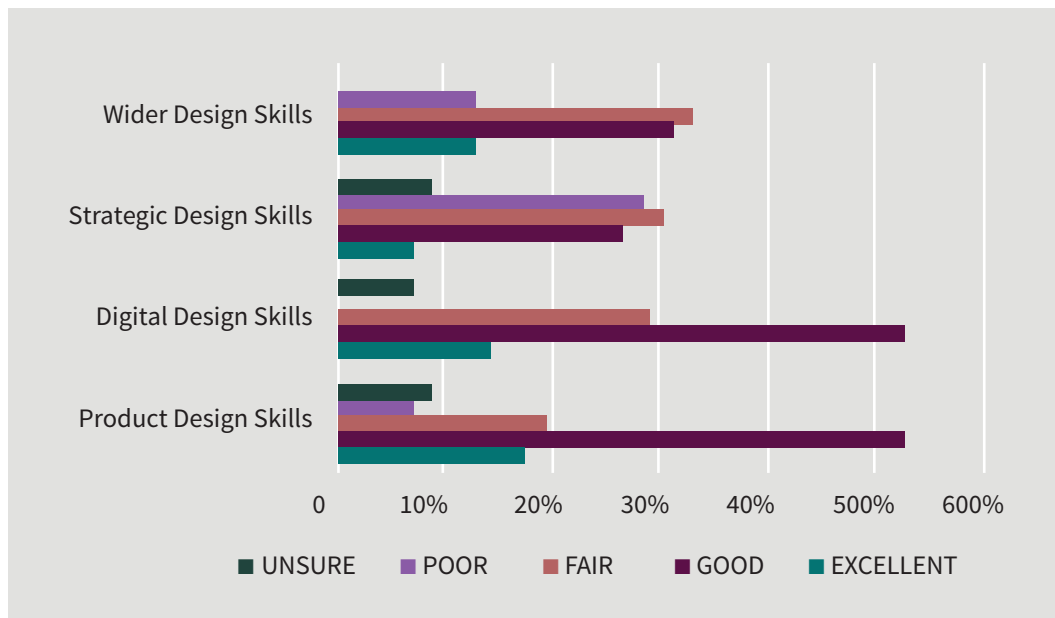
Respondents were asked to rate the level of importance of design skills of the future in Ireland from "less important" and "important" to "critically important" between 2020-2025. As set out in Table 27, the top five design skills deemed as **"critically important"** in the future included Service Design (74%); Design Thinking (72%); Design Innovation (71%); Strategic Design (70%); and User Experience (67%). What is interesting is that these skills fall under the strategic design domain which is perhaps in the shortest supply at present in Ireland. Other skills deemed as important included, Web Design (56%); Multimedia Design (54%); Industrial Design (53%); Engineering (53%) and Interaction Design (53%). Interestingly, respondents viewed Multimedia Design (18%); Interactive Media (18%); Web Design (16%); Manufacturing Design (16%) and Industrial Design (15%) as less important in the future.

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Table 27: Importance of Design Skills of the Future in Ireland 2020-2025

	CRITICALLY IMPORTANT	IMPORTANT	LESS IMPORTANT
Product Design	37.50%	51.79%	12.50%
Product Design Innovation	66.67%%	28.57%	3.57%
Process Design	53.70%	44.44%	3.70%
Industrial Design	37.50%	**53.70%**	**10.43%**
Manufacturing Design	16.67%	51.85%	**14.04%**
Engineering	38.89%	**53.70%**	9.26%
Digital Design	50.98%	47.06%	1.96%
Interactive Media	32.00%	52.00%	**18.00%**
UI/UX Design	58.00%	36.00%	6.00%
Digital Media	40.00%	46.00%	14.00%
Interaction Design	40.82%	**53.06%**	6.12%
Multimedia Design	27.08%	**54.17%**	**18.75%**
Web Design	27.08%	**56.25%**	**16.67%**
Service Design	**73.47%**	22.45%	6.12%
Design Thinking	**72.73%**	25.45%	3.64%
Design Innovation	**71.43%**	25.00%	3.57%
Strategic Design	**70.37%**	31.48%	0.00%
User Experience	**67.31%**	25.00%	7.69%
Co-Design	58.00%	38.00%	6.00%
Design Management	59.26%	31.48%	9.26%

Respondents felt that other emerging sectors requiring design skills in the future included:

- AI

- VR/AR

- Autonomous Vehicles

- Machine Learning

- Robotics

- Sustainable Design

Respondents were asked to rate which growth sectors would require more of Digital, Product, and Strategic design skills in the future in Ireland between 2020-2025. Table 28 shows the top three sectors by NACE code for each domain, as follows:

- **Product Design:** Manufacturing (65.4%); Engineering (48.1%); Professional, Scientific & Technical (30.2%).

- **Digital Design:** Information & Communication (58%); Arts, Entertainment & Recreation (52%); and Real Estate (48.9%).

- **Strategic Design:** Education (76.5%); Public Administration (66.7%); and Health & Social Work (55.8%).

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Table 28: Sectors Requiring Design Skills of the Future in Ireland 2020-2025 (by NACE Codes)

Sector (NACE)	PRODUCT DESIGN	DIGITAL DESIGN	STRATEGIC DESIGN
Construction	37.50%	20.83%	41.67%
Real Estate	6.38%	**48.94%**	44.68%
Financial & Insurance Services	11.76%	45.10%	43.14%
Health Care & Social Work	19.23%	25.00%	**55.77%**
Professional, Scientific & Technical	**30.19%**	30.19%	39.62%
Manufacturing	**65.38%**	7.69%	26.92%
Engineering	**48.08%**	15.38%	36.54%
Information & Communication	2.00%	**58.00%**	40.00%
Accommodation & Food Service	4.17%	43.75%	52.08%
Administration & Support Services	4.26%	42.55%	53.19%
Wholesale & Retail	12.00%	48.00%	40.00%
Public Administration	1.96%	31.37%	**66.67%**
Education	1.96%	21.57%	**76.47%**
Arts, Entertainment & Recreation	6.00%	**52.00%**	42.00%

The identified sectors for digital and product design are understandable and logical in terms of the expected growth and requirement for design skills in the coming years. However, the anomaly appears to be with strategic design and the emphasis on Public Services delivered by the State in terms of education, administration, health and social care. This can be interpreted that the current systems for delivery of services could be improved by re-designing them using strategic design skillsets. Alternatively, it may also indicate that State Agencies need to adopt more strategic design principles and practices as part of its whole of government approach to deliver better outcomes for citizens by utilising co-design or co-production processes to ensure design of better, higher quality public services should be seen as a recommended action in the future.

8

CONCLUSIONS

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The following points form the basis for interpretation of all available quantitative and qualitative datasets during the research study period. They have been drawn against each sector and core area of research activities.

The research used a combined mixed-methods approach. This included a quantitative (online survey) of skills demands and qualitative (interviews and workshops) with an array of start-ups, SMEs, MNCs and Design Agencies from across different sectors, industries and regions across Ireland. This generated original, focused data reflecting the current situation of design in Ireland today with candid and balanced perspectives from enterprise, academia and design organisations.

Technology has created an unprecedented demand for design skills and is likely to continue to influence the future of work and jobs. If education and training is not available to provide the right skills, at the right time, the demands from industry will not be met. If there is a skills mismatch, of shortfall, this would have significant implications for the labour force and industry and indigenous talent.

Historically, Ireland has had a strong reputation for creativity in the arts, with a global recognition for literature and music. More recently Ireland has significantly developed in the areas of animation and film. Ireland can build on these areas of commercial creative excellence through the Design community to become an international leader.

This research provides clear evidence that digital, product and strategic skills are growth areas. However, if Ireland is to be shaped into a leading nation in design it is now a matter of urgency that the recommendations arising are set in place – or this window of opportunity may be lost.

For design to thrive, so that it can drive and benefit Ireland's economic potential it needs to:

- Develop a stronger and richer design culture – for all citizens.
- Make better use of design in Government and State Agencies to deliver public services more creatively and effectively – both online and offline.

- Enable the capacity to produce world class talent as a basis to export products or services globally and attract inward investment.

- Have more effective promotion of Design to industry, Government and society by evidencing the return on investment towards changing mind-sets.

- Assume a leadership position to ensure that design has a strong and collective voice – to lead by design.

- Foster a future workforce that is equipped to deal with new technologies.

- Regularly consult with the supply side (design educators) and demand side (buyers of design services) to address potential problems/issues within the pipeline of talent.

- Create flexible models, curriculum, pathways and courses in Design to make design as a career more widely available to all.

THIS PROCESS HAS BEEN ABOUT ASKING AND LISTENING. NOW IT NEEDS TO BE ABOUT DRIVING CHANGE BY TAKING ACTION.

RECOMMENDATIONS

THE FOLLOWING SERIES OF RECOMMENDATIONS HAVE BEEN DEVISED AS A RESULT OF THE RESEARCH. IF IRELAND IS TO DRIVE THE CHANGE REQUIRED TO REALISE ITS POTENTIAL AND BECOME A LEADING NATION IN DESIGN, THE RECOMMENDATIONS WILL NEED TO BE ADDRESSED WITHIN THE NEXT FIVE YEARS.

9.1 A Collective Voice for Leadership in Design

A major issue permeating throughout the research is the need to put mechanisms in place for design in Ireland to have a collective 'voice' across academia, design and enterprise, so that emerging and urgent issues can be anticipated and met. A lack of senior design staff, design leaders and design champions create blockages in the pipeline for developing design talent, leadership and mentoring development within all sectors. A collective voice would help develop the pipeline of design talent and recognises the need for creativity and critical thinking. The forthcoming National Design Centre is a promising development which could assist with achieving this.

Key Actions:

Utilise the forthcoming National Design Centre to drive forward the design agenda. The National Design Centre should consider the following as part of its work:

(i)	Alongside the existing skills architecture, acting as an ongoing conduit between industry and the education and training system to ensure relevance of course content to industry skills needs and encouraging the uptake of lifelong learning.	**National Design Centre**
(ii)	Developing a coherent approach to promote design with other disciplines as creative problem-solving, such as engineering, computing and business strategists.	**National Design Centre**
(iii)	Assisting entities in the public and private sectors to adopt design thinking and to develop design-driven innovation.	**National Design Centre**
(iv)	Driving the awareness and appreciation of design to students, parents and enterprise by celebrating the contribution that design makes to economic, societal and cultural development.	**National Design Centre**
(v)	Promoting a Government-led procurement culture that champions design quality.	**National Design Centre**
(vi)	Working in conjunction with DPER to promote the use of design in Public Services using strategic design tools to tackle economic and social issues. For example, piloting Design Thinking training for management and staff in Government Departments and State Agencies to drive reform.	**National Design Centre**

9.2 Policy Interventions to Address Skills Shortages in Design

If design is to flourish it needs more support to promote wider and deeper infiltration across society and enterprise. If the supply of design graduates continues at current levels, there will be a challenge to meet the increasing demands of industry and enterprises, from SMEs to MNCs. Work is underway from HEIs to meet these challenges. For example, GMIT, IT Sligo and IT Carlow are responding to industry demand for design skills with Innovation Design, Digital Media and UI undergraduate and postgraduate degrees.   This work can be built upon in a number of ways, as detailed below.

Key Actions:

(i)	Ensure that future Springboard+ calls are reflective of the skills needs identified in the design study.	**Department of Education and Skills**
(ii)	Continue to raise awareness with employers of the subsidised upskilling and reskilling opportunities available through Springboard+ and Skillnet Ireland.	**Department of Education and Skills**
(iii)	Support the implementation of *Technology Skills 2022* targets to increase digital design skills provision.	**Department of Education and Skills**
(iv)	Educational institutions should continue to be encouraged to ensure that flexible provision methods, such as online courses, are available for academic educators and design practitioners to upskill or reskill in design discipline and design practitioners to upskill or reskill in design discipline and students have opportunities for placements, mentoring, exchange visits, etc.	**Department of Education and Skills**

9.3 Collaboration between Education & Enterprise

The need for collaboration between education and enterprise is well documented though a number of DES policies, including the *National Strategy for Higher Education 2030*[141], the *National Skills Strategy*[142], and the HEA's *Systems Performance Framework*.[143] This collaboration has also been fostered in recent years through the development of the National Skills Council and the Regional Skills Fora.

Collaboration of this nature is vital to helping deliver skills required by enterprise. Outward-facing HEIs working with industry level problems help students gain experience of the working world during their education. It also keeps staff more actively connected to industry values and needs. Staff development should not focus solely on academic outputs and should support a balance of industry experience and entrepreneurial collaboration. It also needs to be customised to enable the individual to develop their own particular strengths and add value to their teaching. The aim should be to facilitate a greater range of staff experiences and knowledge to add currency to the curriculum.

Key Actions:

(i)	The design community should engage directly with HEIs and ETBs, via industry liaison officers, to strengthen collaboration between academia and industry to uptake development processes. This could include sabbaticals, fellowships, industry-led projects, short course teaching, teaching exchanges, practice-based PhDs and short bursts of industry-led inputs, organised at an institutional level.	**Design community**
(i)	As design evolves there is a clear need for multidisciplinary and cross-disciplinary teaching to support the emergence of new design disciplines and burgeoning career options. As such, the design community should define the disciplines necessary for such an approach via the National Design Centre and engage directly with education and training providers to support the emergence of this.	**Design community/ National Design Centre**

141 Department of Education and Skills (2019). *National Strategy for Higher Education 2030*. Available at: https://hea.ie/assets/uploads/2017/06/National-Strategy-for-Higher-Education-2030.pdf

142 Department of Education and Skills (2016). *National Skills Strategy 2025*. Available at: https://www.education.ie/en/Publications/Policy-Reports/pub_national_skills_strategy_2025.pdf

143 HEA (2018). *Systems Performance Framework*. Available at: https://hea.ie/assets/uploads/2018/01/higher-education-system-performance-framework-2018-2020.pdf

9

9.4 Develop Career Pathways in Design

Design needs to sell itself. It needs to highlight the work that it does, and value it adds within enterprise. Design needs to be shaped into Ireland's culture and mindsets. As such, the design community needs to exploit existing frameworks and funding within the education system to improve career pathways.

Key Actions:

(i)	The design community, working in partnership with educational institutions, should exploit the various funding options such as Springboard+, Skillnet Ireland and the Human Capital Initiative to enable enterprises and individuals to upskill, reskill and engage in lifelong learning.	**Design community**
(ii)	The design community should explore the potential for Design Apprenticeships under the Generation Apprenticeship Scheme to encourage a wider potential pipeline of students towards a career in design.	**Design community**

9.5 Design in Education

For the potential of design to be realised, it should be promoted by the design community in education across levels. As such, the design community should engage with the guidance profession and the Transition Year programme to further embed design in secondary school, while communicating with post-secondary educational institutions to promote strategic design in their offerings.

Key Actions:

(i)	The design community should engage with the Institute of Guidance Counsellors to ensure that the career opportunities arising from design are well communicated to students.	**Design community**
(ii)	The design community should explore the development of a Transition Year Design Programme to promote the uptake of design as a career.	**Design community/ Department of Education and Skills**
(iii)	The design community should engage directly with HEIs and ETBs to explain the importance and relevance of strategic design so that it is included as a module in non-design courses·	**Design community**

APPENDICES

Appendix A: EGFSN Design Skills in Ireland

Key Word Search

- Design

Product Design

- Product Design
- Product Design Innovation
- Process Design
- Industrial Design
- Design for Manufacturing
- Manufacturing Design
- Engineering
- Design engineering
- Design and development

Digital Design

- Digital design
- IT business analytics/analysts
- Architects
- Systems design

- Programme development
- Software development
- Interactive media
- UI
- UX
- Interactive media
- Design Media
- Digital Media
- Web design
- Web development
- Multimedia design

Strategic Design

- Strategic Design
- Service Design
- Design Thinking
- Co-Design
- Design Management
- Design Innovation

Key Sources:

<u>SOC Codes</u>

- Design (digital) – IT business analysts, architects and systems designers – Code 2135
- Design (digital) – Programmers and software development professionals – Code 2136
- Design (digital) – Web design and development professionals – Code 2137
- Design (product) – Design and development engineers – Code 2126

Appendix B: Comparisons of Leading Design Countries versus Ireland

	Ireland	UK	Finland	Sweden	New Zealand	Australia	Singapore	South Korea
Population (2019)[144]	4,853, 506	66,488,991	5,518,050	10,183,175	4,885,500	24,992,369	5,638,676	51,635,256
Employment rate[145]	2,298,600	32,724,500	2,561,700	5,145,300	2,641,000	12,921,600	2,292,700***	27,134,900
Working age population (15-64) [146]	3,141,57	42,503,79	3,428,59	6,346,43	3,160,83	16,283,25	4,299,96	37,491,39
Designers/Design roles	48,000[147]	1.690.000[148 149]	54,985[150]	97,024[151]	94,200[152]	218,983[153]	44,400[154]	274,464[155]
GDP[156]	$83, 081.1	$45,504.8	$48,433.2	$53, 249.2	$40,713.1	$54, 144.2	$87,108	$40,096.4
National Design Policy/Strategy	No	No	Yes	No	No	State only	Yes	Yes
Public Spendingper student tertiary % GDP[157]	15.4%	38.0%	33.9%	43.2%	25.2%	17.9%	24.2%	15.0%
Young Population (15 and under) [158]	22.0%	17.8%	16.4%	16.5%	20.5%	18.8%	12.3*	14.3%

[144]   The World Bank https://data.worldbank.org (Accessed 5th November 2019)

[145]   OECD (2019), Employment rate (indicator) doi: 10.1787/1de68a9b-en (Accessed 8th November 2019)

[146]   The World Bank https://data.worldbank.org/indicator/SP.POP.1564.TO; 2018 data

[147]   Department of Jobs, Enterprise and Innovation, *Policy Framework for Design Enterprise in Ireland* (2016)

[148]   Design Council (2018). *The Design Economy 2018.* Available at: https://www.designcouncil.org.uk/resources/report/design-economy-2018

[149]   Note: this includes a wide range of design related occupations/roles from civil engineers to glass and ceramic makers.

[150]   Nordic Innovation (2018). *Nordic Design Resource*: *Country Profile Finland*. Available at: http://nordicdesignresource.com/wp-content/uploads/2018/10/Country-profile-Finland.pdf

[151]   Nordic Innovation, Nordic Design (2018)

[152]   PWC (2017). *The Value of Design to New Zealand.* Available at: http://designco.org.nz/about/about-designco/_

[153]   My Skills Australia. Available at: https://www.myskills.gov.au/industries/design

[154]   Skills Future (2019) *Skills Framework for Design: A Guide to Occupations and Skills*. Available at: https://www.skillsfuture.sg/skills-framework/design

[155]   Korea Institute of Design Promotion (2010). Available at: http://first.kidp.or.kr/eng/index.htm

[156]   OECD (2019) Gross domestic product (GDP) (indicator). doi: 10.1787/dc2f7aec-en (Accessed on 01 November 2019)

[157]   Worldbank https://data.worldbank.org/indicator/SE.XPD.TERT.PC.ZS (data for 2016 / Singapore 2017)

[158]   OECD (2019). Young population (indicator). doi: 10.1787/3d774f19-en (data for 2014) (Accessed 1st November 2019)

	Ireland	UK	Finland	Sweden	New Zealand	Australia	Singapore	South Korea
Design Promotion	Design and Craft Council of Ireland Institute of Designers in Ireland (IDI) Kilkenny Design Centre Skillnet Industry Research & Development Group (IRDG)	The Design Council Design Business Association Design Museum 100% Design New Designers	Design Forum Finland Helsinki Design Week Finnish Design Museum Ornamo National Council for Architecture and Design	Swedish Society of Industrial Art and Design (SVID) Design Sweden Design Moves ArkDes	The Designers Institute of New ZealandDesign Association of New ZealandSemi-Permanent	Design Institute of Australia Good Design Australia Sydney Design Festival	DesignSingapore Council National Design Centre Skills Framework for Design Singapore Design Week	Korean Institute of Design Promotion (KIDP) Korea Design Center Design Korea Dongdaemun Design Plaza Design Innovation Center (DIC)
Design Institutes	National College of Art and Design (NCAD) Technological University Dublin Institute of Art, Design and Technology, (IADT)	Royal College of Art (RCA) University of the Arts, London (UAL) Glasgow School of Art (GSA)	Aalto University University of Lapland	Umeå University Konstfack University University of Gothenburg	Auckland University of Technology (AUT) Massey University Auckland University	RMIT University of Technology Sydney (UTS) University of Melbourne	National University of Singapore (NUS) Nanyang University La Salle College of the Arts	Seoul National University Sungkyunkwan University Hanyang University
Global Competitiveness Index ranking (2018)[159]	23rd	8th	11th	9th	18th	14th	2nd	15th

*(2020: 0-14 year olds) Source: https://www.worldometers.info/world-population/singapore-population/#broad-age
** (2012) Singapore Statistics https://www.singstat.gov.sg/-/media/files/publications/population/ssnmar13-pg1-7.pdf

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[159]   World Economic Forum (2018). *The Global Competitiveness Report 2018*. Available at: https://www.weforum.org/reports/the-global-competitveness-report-2018

Appendix C: Stakeholder Survey Questions

1. Which of the following sectors do you work within?
   - Academia
   - Enterprise
   - Design
   - Other (please specify)

2. Which design domain(s) do you work within?
   - Product
   - Digital
   - Strategic
   - Other (please specify)

3. How many years have you worked within your primary design domain(s) in Ireland?

4. Do you/your organisation invest in Design Skills?
   - Yes
   - No
   - Unsure

5. To what extent do you/your organisation value Design Skills
   - Highly valued
   - Fairly valued
   - Somewhat valued
   - Not valued
   - Other (please specify)

6. How would you rate the level of design skills in your primary design domain; and wider design skills landscape in Ireland?

7. How easy/difficult is it to recruit Design Skills in Ireland?

8. How easy/difficult is it to retain Design Skills in Ireland?

9. How many paid staff and/or sub-contractors does your organisation currently employ or contract within the following design domains?

10. What is the current workforce diversity of those working in Product, Digital and/or Strategic design domains with you/within your organisation?

11. How do you/your organisation see the demand for Design Skills in Ireland changing within the next 5 years – Do you believe they will?

12. In what sectors do you see future demand for Design Skills in Ireland?

13. Do you feel there is a need for Apprenticeships for Design Skills in Ireland?
   - Yes
   - No
   - Unsure

14. Do you feel there is a need for Continuous Professional Development (CPD) for Design Skills in Ireland?
   - Yes
   - No
   - Unsure

15. Are there other sectors which you believe will be important drivers of demand for design skills in Ireland over the next 5 years?

16. What are the other emerging design skills that will be important drivers of change over the next 5 years?

17. Any other comments, observations or feedback?

Appendix D: Steering Group Members

Name	Organisation
Andrew Bradley (Chairperson)	Bradley Brand and Design
Tommy Murray	Indigenous Enterprise Development Division, Department of Business, Enterprise and Innovation
Stephen Hughes	Enterprise Ireland
Catherine Slowey	IDA Ireland
Karen Hennessy	Design and Crafts Council of Ireland
Kirk McCormack	Institute of Designers in Ireland
Denis Hayes	IRDG
Alex Milton	Design Educators Ireland
Joanne Tobin	Department of Education and Skills
Claire McGee	Ibec
Seán Mc Nulty	Dolmen
Lorna Ross	VHI
Bill Kearney	IBM
Brian Stephens	Design Partners
Ruth Morrissy (Project Manager)	Department of Business, Enterprise and Innovation
Katherine Griffin	Department of Business, Enterprise and Innovation

Appendix E: Members of the EGFSN

Name	Organisation
Tony Donohoe (Chairperson)	Ibec
Kevin Daly	Head of Secretariat and Principal Officer, Labour Market and Skills Unit, Department of Business, Enterprise and Innovation
David Hegarty	Assistant Secretary, Department of Business, Enterprise and Innovation
William Beausang	Assistant Secretary, Department of Education and Skills
Kathleen Gavin	Principal Officer, Department of Education and Skills
Keelin Fagan	Enterprise Ireland
Dr Vivienne Patterson	Higher Education Authority
Dr Laura Bambrick	Irish Congress of Trade Unions
Ray Bowe	IDA Ireland
Shauna Dunlop	SOLAS
Selen Guerin	Skills and Labour Market Research Unit, SOLAS

Appendix F: Glossary of Terms

AI	Artificial Intelligence
AR	Augmented Reality
CX	Customer Experience
DBEI	Department of Business, Enterprise and Innovation
DCCI	Design and Crafts Council Ireland
DCHG	Department of Culture, Heritage and the Gaeltacht
DCYA	Department of Children and Youth Affairs
DCU	Dublin City University
DEI	Design Educators Ireland
DES	Department of Education and Skills
DBEI	Department of Business, Enterprise and Innovation
DPER	Department of Public Expenditure Reform
EGFSN	Expert Group on Future Skills Needs
EI	Enterprise Ireland
EY	Ernst & Young
FE	Further Education
FEC	Further Education College
HE	Higher Education

HEA	Higher Education Authority
HEI	Higher Education Institution
IDA	IDA Ireland
IDI	Institute of Designers in Ireland
IUA	Irish Universities Association
LEO	Local Enterprise Office
NACE	Nomenclature of Economic Activities
NCAD	National College of Art and Design
NFQ	National Framework of Qualifications
QQI	Quality and Qualifications Ireland
SOLAS	An tSeirbhís Oideachais Leanúnaigh agus Scileanna/Further Education Skills Service
SOC	Standard Occupation Classification
STEM	Science, Technology, Engineering and Maths
TUD	Technology University Dublin
UX	User Experience
VR	Virtual Reality
WEF	World Economic Forum