Design Council

The Design Economy 2018

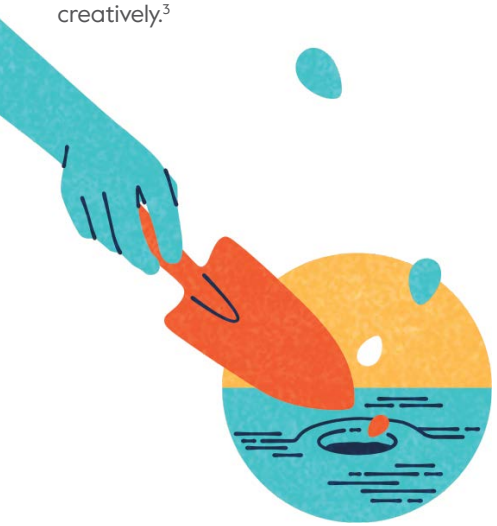
The state of design in the UK

Foreword

Churchill's war government established the Council for Industrial Design in 1944 to support the economic renewal of the nation. The country turned to design to rebuild, innovate and instigate growth. Our role now as Design Council is to make life better by design. So as the country faces seismic economic challenges and change, it is time to once again turn to design.

The UK is responding to the fourth industrial revolution, whilst tackling stagnant productivity, unequal growth across its regions and automation's increased impact on living conditions and job security. It must also establish a new vision for its place in the world – negotiating an exit from the European Union and developing new trading partnerships.

Yet with these challenges come opportunities. Innovation and technological change – from 3D printing to artificial intelligence – offer hope for a brighter future. They bring the prospect of business growth and higher value jobs that can transform the economy across the UK. As advanced economies such as the UK adjust to technological and economic developments, commentators from Nesta[1] to the World Economic Forum[2] predict that demand will grow for skills which are difficult to automate. Our 2017 research found that designers have these attributes, typified by their emphasis on interpersonal skills such as operations analysis and social perceptiveness, and cognitive abilities such as visualisation and thinking creatively.[3]



[1] Nesta (2017) *The Future of Skills: Employment in 2030* [online]
[2] World Economic Forum (2016) The 10 Skills You Need to Thrive in the Fourth Industrial Revolution [online]
[3] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]

"Design and design skills are at the heart of the fourth industrial revolution. They give us the tools to respond to these unprecedented challenges, and instigate the growth, innovation and jobs that will drive the UK's global future."

Design and design skills are at the heart of the fourth industrial revolution. They give us the tools to respond to these unprecedented challenges, and instigate the growth, innovation and jobs that will drive the UK's global future.

Good design puts people first. It uses creativity to solve problems, challenge thinking and make lives better. Designers operate across the whole economy. They shape the built environment, the digital world and the products and services we use, creating better places, better products, better processes and better performance.

We define this activity as 'the design economy' – the value created by those who use design in a wide variety of industries. This includes designers in design industries (eg, digital design or animation), other roles in design industries (such as administration, finance and distribution on the basis they are supporting the main design function), as well as designers in other sectors of the economy, such as in banks, consultancies, automotive or aerospace companies.

The Design Economy 2018 builds on our 2015 research, a world first state-of-design report. It demonstrated how design drives growth and innovation to create significant value for the UK economy. Design economy studies have since been replicated by others for the City of Atlanta and New Zealand, with more in the pipeline. Our 2018 report explores wider questions arising from our original research and connects to the emerging economic challenges facing the UK. It examines in greater depth the economic impact of design on regional and local economies, and provides a deeper analysis of the types of businesses and people who are using, working with and benefiting from design.

Our 2018 report shows that design is growing – both in value and demand. However, there is still room for improvement, with many businesses, areas of the country and people continuing to miss out on the benefits.
Our report draws on in-depth analysis of data from the Office for National Statistics (including the Annual Business Survey and Annual Population Survey) undertaken on behalf of Design Council by the Enterprise Research Centre. A unique survey of over 1,000 UK businesses about their use of design, delivered by BMG Research, complements this. Additionally, BOP Consulting compiled in-depth case studies of seven firms who either operate in design-intensive industries or are exemplars of how non-design firms can use design to achieve better outcomes.

We hope you enjoy reading this research and will work with us to deliver on the recommendations and help the UK economy turn to design once more.

Sarah Weir OBE
CEO, Design Council

Key findings

The Design Economy 2018 provides a comprehensive overview of the state of design in the UK and is packed full of data and new evidence on design's value and impact.

The value of design to the UK

The UK has transitioned from an economy powered by might and machine to one increasingly powered by services and technology. Design has played a key role in these developments, evolving with economic shifts, boosting productivity and instigating innovation[4] – from the industrial designers that pioneered post-war aviation to those designing robots and artificial intelligence today. This 2018 report focuses on the value created for the UK economy by designers operating either in design industries or outside in wider business sectors.[5] It demonstrates the continuing importance of design to UK growth and future economic sectors:

1. Design is high value and growing:
The design economy generated £85.2bn in gross value added (GVA) to the UK in 2016. This is equivalent to 7% of UK GVA and equivalent to the size of the distribution, transport, accommodation and food sectors[6]. This value has grown 10% since our last report, outstripping the UK growth rate during the same period (7% between 2014 and 2016). Over the longer term, between 2009 and 2016 the design economy grew by 52%, spreading far beyond the creative industries and across the UK economy. Designers operating in non-design industries such as aerospace, automotive and banking created the majority of this value (68%).

2. The scale of the design economy is growing:
In 2016, there were 1.69 million people employed in design roles. This represents growth of 6% since our last report, equivalent to 99,604 new jobs (compared to a UK average of 4% since 2014). If the design economy were one sector, this would make it the ninth largest employment sector in the UK.

This size renders it comparable to the hospitality sector (1.6 million employees) and the logistics sector (1.5 million).

We also found there are 78,030 design-intensive firms operating in the UK (2017). This represents a 63% increase in design-intensive firms since 2010 (compared to a 3.7% increase for businesses across the UK as a whole).

3. The design economy has a 'long tail':
A 'long tail' characterises design-intensive sectors, with many small firms compared to a few larger firms. The growth in firm numbers is being driven by a large number of start-ups, the majority of which (60%) survive for more than three years, which is higher than the average for small and medium enterprises (SMEs) across the country (44%).[7]

4. Designers are highly productive:
We found designers were 29% more productive than the average UK worker, each delivering £50,328 in output (GVA per worker, 2016), compared to £39,111 across the rest of the economy. This figure is higher than those working in 'professional, scientific and technical activities' (£50,064) which incorporates accounting and auditing activities, and research and experimental development in the natural sciences, among others.[8]

5. Design is increasingly digital:
Digital design now accounts for just over one in three design roles (2016) and is the fastest growing part of the design economy. Firms in this sector experienced an 85% growth in turnover between 2009 and 2016, reflecting the growing importance of digital design to the UK. This demand also extends abroad: the digital design subsector is the UK's most valuable design exporter, delivering £27.9bn in design-influenced exports in 2015, which is equivalent to 58% of the value of all design exports.

[4] Design Council (2018) *Understanding Design-Intensive Innovation: A literature review* [online]
[5] In *The Design Economy 2018* we have focused our analysis on those 23 Standard Occupational Classification (SOC) codes that were previously identified as being design occupations. This means figures for GVA and employment are naturally lower than those reported in our 2017 *Designing a Future Economy* report, which identified 40 SOC codes that use design skills, including many non-design occupations.
[6] ONS (2017) Regional gross value added [online]
[7] ONS (2017) Business demography, UK: 2016 [online]
[8] ONS (2018) Labour productivity: region by industry [online]

The scale and scope of the UK design economy

It is within the context of the fourth industrial revolution and the predicted growth in demand for design skills that we sought to better understand the qualifications, pay and working patterns of those operating within the design economy and where in the country design is having an impact.

Our analysis shows that designers have higher levels of formal qualifications than the average UK worker and are, in many cases, also more highly paid. This signifies the demand for design skills, knowledge and services. Building on this demand presents a unique opportunity for the design economy.

However, our analysis also highlights key challenges. The south-east of England continues to benefit disproportionately from high value design occupations and innovation. With 1.69 million people currently employed in the design economy, there is room for growth. Design largely operates in higher value sectors, impacting some local economies more than others and has a less diverse workforce.

As such, much of the design economy's potential to contribute to future UK growth remains untapped, and there is an emerging risk of growing inequality between firms accessing design and those that do not, as well as between people who have such skills and those who don't.

6. Designers are highly qualified:
Across the design workforce 57.1% of workers held a degree as their highest level of qualification (in 2016), compared with a UK average of 34%. This indicates that not only are designers staying in formal education longer, but also that there is a growing expectation amongst employers for designers to be educated to this level.

7. Designers are well paid:
Our research shows that in 2016, the average weekly salary for workers in the design economy was £548, only slightly higher than the UK average weekly wage of £539 that year. However, this figure is depressed by the wages of support roles in design industries, and rises to £609 per week for designers in design industries. Digital designers earn the most with an average weekly wage of £757. Coupled with the higher levels of formal qualifications in these sectors, this suggests these skills have a high perceived value to these firms.

8. Design has a diversity challenge:
- Ethnicity: The design economy employs a slightly higher proportion of people from Black, Asian and Minority Ethnic (BAME) groups than are employed in the wider UK economy (13% compared with 11%), and this figure has improved since our previous analysis (11.4%). However, BAME designers are least likely to be in senior roles, accounting for only 12% of all design managers.
- Gender: 78% of the UK's design workforce is male. This is higher than the percentage of men in the wider UK workforce (53%). This is also despite women making up 63% of all students studying creative arts and design courses at university. The overall ratio is skewed by the male dominated subsectors of product and industrial design (95%), digital design (85%), and architecture and built environment (80%). Even when employed in design, women earn less. For example in the multidisciplinary design subsector, women working as product, clothing and related designers earn 18.3% less than men in that subsector despite making up nearly two-thirds of that design subsector (64%). Women are also less likely than men to be in senior roles, with only 17% of design managers being female.

9. Design can generate significant value for local and regional economies:
London remains the powerhouse of UK design, with almost one in three design firms now based in the capital, as well as one in five design workers. This has become more concentrated since our last study. Yet this study also shows that over the past few years most UK regions have also experienced growth in the GVA generated by designers in their area. This growth appears to be driven by a combination of two things. The first driver is localised design specialties such as craft design in the West Midlands (eg, the potteries in Stoke-on-Trent). Outside London and the south-east, the West Midlands, along with the north-west, has experienced the most significant growth in design GVA since 2010 (83% and 28.5% respectively).

The second key driver is a growth in clusters of multidisciplinary design firms – covering firms undertaking specialised design activities ranging from sustainable design and industrial design to interior design, among others. These are strongest in London and the south-east, with the multifaceted nature of the design economies in these regions a strength not always replicated elsewhere.

The design economy in a global UK

Design specialism sets the UK apart from global competition. But whilst the demand for UK design is growing, international competitors are also growing their design exports rapidly. Capitalising on design's potential to increase UK goods and services exports is more important than ever as the UK exits the European Union.

10. UK designed products and services are in demand and recognised across the world:
We found that in 2015, the total value of exports where design had made a key contribution was £48.4bn, representing 7% of total UK exports that year. In keeping with the wider economy, this value is slowing down with only a 1.6% improvement since 2009 (compared to -3.1% for the UK economy as a whole during the same period).

11. A global UK needs to maintain its position as the destination of choice for design:
Despite impressive exports, the total value of UK design goods exports ranks sixth in the world behind France, Switzerland, USA, Hong Kong and Germany. This trend is in keeping with our 2015 analysis. The value of these exports also appears to be growing fastest amongst those countries which strategically invest in design, including Saudi Arabia, China, the UAE and South Korea.

12. Protecting UK design:
Designers need an intellectual property system that is flexible, reliable and easy to use. This is challenging in the rapidly changing global context, but it is vital given the international nature of the UK design industry. Domestically, there was a 46% rise in design registrations by UK businesses with the Intellectual Property Office between 2015 and 2016. However, internationally the number of design registrations made by UK businesses with the World Intellectual Property Office is continuing to decrease, and has dropped 58% since the year 2000. Only Italy has experienced a greater decrease out of G20 nations. This may be for a variety of reasons: fewer design-influenced goods and services being exported outside the European Union and/or declining awareness of the World Intellectual Property Office system, among others. As the UK exits the European Union, this trend must be further investigated to ensure it does not hold back international trade.

How design is used by UK businesses

Design operates across the UK economy and is no longer confined to the creative industries. Other types of firms are investing in designers and design skills. We wanted to explore how the rest of the UK business population interacts with designers – how they're investing in design, the impact it has on their organisation and what the demand for design is.

13. Investment in design is growing:
In 2015, UK firms invested £14.7bn in design. Our analysis shows that when firms invest in design, they are more likely to invest in other intangible assets such as R&D and get them working in synergy to generate new innovations and create additional value.

14. Design-led firms lead the way:
More than two-fifths of our survey respondents agreed that the use of design within their organisation has contributed to an increase in sales turnover, business competitiveness, and awareness and recognition of the brand and/or raised brand loyalty.

Design drives innovation

Design can be both a resource for, and a form of, innovation. It adapts to meet demand and user needs, but also generates and delivers ideas which push boundaries. Forward-thinking businesses will combine user insight and data to generate innovations that are novel or radical and that change perceptions and behaviours rather than accommodating them.

To better understand how UK businesses use design, we asked them to rate themselves on the Design Ladder. This rates design use on four steps – from design playing only a small part in a business's operations through to design being central to strategy.[9]

15. Design is a resource for innovation:
Our survey found that firms with any R&D or design functions or facilities in-house are significantly more likely than average to have developed completely new and original products, services or processes. They are also more likely to consider design activity as being 'very important' or 'critical' to the development of these completely new products, services or processes.

16. Design is a form of innovation:
Sixty per cent of firms use design in some way (as defined using the Design Ladder). This ranged from using design to bring a final finish to a product through to design being fundamental to their organisation's strategy. The ranking that firms give themselves on the Design Ladder is often an accurate reflection of their tendency to innovate. Multivariate analysis finds design is ranked third as a driver of innovation, close behind having an R&D budget and R&D staff.

[9] The Design Ladder is a tool for rating a company's use of design. The Design Ladder was developed in 2001 by the Danish Design Centre, and enabled us to obtain a succinct but broad understanding of the role of design within UK firms.

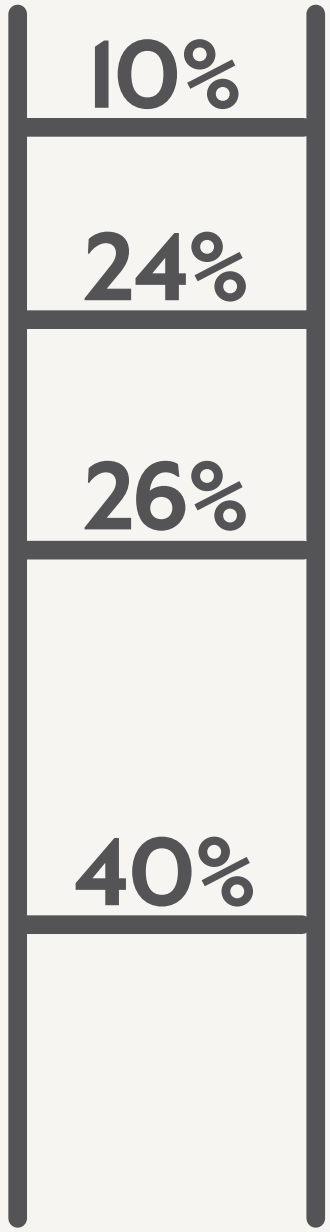
Figure 1: Design use by UK firms, as positioned on the Design Ladder (n=1,006)

Step 4
Design as strategy:
Design is a central and determining element in the business – it is an essential factor in the overall business strategy.

Step 3
Design as process:
Design is an important factor in the business and is integrated into many aspects of operations and delivery.

Step 2
Design as form-giving:
Design is not a fundamental contributor to what the business supplies or produces but it is used at the interface with customers, eg, in marketing or packaging or to bring a final finish to a product or service.

Step 1
Non-design:
Design plays only a small or very peripheral part in the operations of the business.



% of UK firms who responded to our survey

Figure 2: From design investment to innovation to productivity

+ and (+) represent statistically significant relationships, + the more significant of the two, - represents no statistically significant relationship, t = time

17. Design boosts long-term productivity:
Analysis of the UK Innovation Survey shows engagement with design increases the probability that firms will undertake both product/service and process innovation. This effect is largest among manufacturing firms and where firms are also undertaking in-house R&D. As process innovation is positively related to productivity, the effect of using design to shape processes also leads to productivity increases. To a lesser extent we also found that design is linked to organisational innovation[10] and subsequent productivity gains. However, our analysis also shows that while design contributes to product/service innovation, this has a disruptive effect on productivity in the short term as new innovative products are first introduced. The potential for such short-term disruptive effects has been noted in other analyses of both product and organisational change.[11]

18. There is room for improvement in the use of design by UK firms:
A sizeable proportion (40%) of UK firms perceive themselves to be on the bottom step of the Design Ladder where design only plays a small or very peripheral part in the operations of the business. This 40% tended to be smaller sized firms. Additionally, despite the positive evidence of the impact of design functions or facilities in-house on innovation, only a quarter of all firms employ staff whose role it is to undertake design functions. There is, therefore, room for improvement in the use of design by UK firms, which connects directly to wider findings on regional and sector use of design.

[10] Organisational innovation is broadly defined and covers changes to firms' strategy, work organisation and marketing activities.
[11] Bourke J and Roper S (2017) 'Innovation, quality management and learning: short-term and longer-term effects' *Research Policy* 46(8) pp.1505-1518

How the use of design by UK firms is expected to change

Our analysis shows that when non-design firms use design in their work, it can generate new innovations and create growth. We found that UK firms acknowledge that design will become a greater requirement in order to stay competitive in the changing economy. Yet, there is significant ground to cover to get the majority of UK firms to use design to prepare for this future. Without the right support, failure to achieve this could prove costly as the UK enters a period of change and responds to the fourth industrial revolution.

19. Demand for design skills is expected to grow: More than half of respondents (53%) expect the demand for design-related skills to increase in their sector or industry in the next three years. Such skills include originality and creative skills (the ability to generate new ideas for products, services and business processes) and digital skills (those required to produce visual digital products such as animations, software and database management systems).

20. Design has the potential to play an even greater role in economic growth in future: Three-fifths of respondents (59%) believe that design will contribute substantially to any of a range of business improvement activities in the next three years. This includes efforts to increase sales in the UK, the development of new products or services, and marketing campaigns. Yet design offers much more than this, and despite awareness of its potential benefits a sizeable proportion of businesses still do not use design as effectively as they could. When asked why, most respondents (88%) stated they would like support to use design more, with the most popular request being for financial support for investment in design.

"There is significant ground to cover to get the majority of UK firms to use design to prepare for this future. Without the right support, failure to achieve this could prove costly as the UK enters a period of change and responds to the fourth industrial revolution."

Conclusion

Design is a UK success story. The value of design continues to grow at a pace, as do the number of people employed in design and the number of firms in the design economy. The use of design helps firms to innovate, improves their productivity and increases turnover. Design will therefore be vital at a time of social and economic change.

The design economy is also changing. The growth of digital design over the past decade has created a range of new opportunities. With artificial intelligence and automation, it is likely that digital design will continue to grow in the future. Over the coming years it is essential that the digital design sector acknowledges the important role it plays in delivering digital products that may have uses we have yet to fully understand.

If design is to continue to be a UK success story, it is vital that we face up to the challenges facing design today. Design must be better distributed across the country. Our findings show that there is a clear difference between the regions, firms and people that use design and those that do not. Design is also too homogenous. A more diverse industry will not only help to reinforce the talent pipeline but also bring in a wealth of new ideas and originality of thought, supporting greater innovation in the future.

The opportunity for design to drive growth in the fourth industrial revolution is clear. We now need to build on the success of a world-leading sector to make sure that design is at the heart of the new economy.

Recommendations

1. A Research, Design and Development tax credit
A Research, Design and Development tax credit will help improve the confidence of UK firms to invest in design. Incentives should be targeted at the sectors with the lowest levels of productivity and the highest chances of automation. These would benefit most from an uplift in productivity while creating more meaningful, creative and higher value jobs in the process.

2. A UK Design Action Plan
The UK needs a consolidated, national action plan for design. Design Council, along with our partners including Manchester Metropolitan, Cardiff Metropolitan and Lancaster Universities, has begun work on developing this plan. We will work with central government, regions and businesses to further develop and deliver the plan, and ensure tangible opportunities to grow the use of design across the UK.

3. Improving access to design
Most of the UK workforce does not currently have exposure to the advanced skills and knowledge required in a future economy. Design spans sectors and occupations and will be in high demand in the future. Building on our pool of design skills is one way in which to create a future ready workforce and this can be achieved by focusing on the following four areas:

- To ensure that the number of designers doesn't stagnate and that people from all backgrounds have the opportunity to become designers, Design and Technology must become a core part of the EBacc.

- Along with art, the UK should incorporate design methods, tools and approaches into STEM subjects. This will teach future generations the skills required for a changing economy.

- Higher education institutions need to do more to break down the boundaries between subject areas to ensure they are preparing young designers for the future.

– Urgent action is required to improve diversity. Design industries must lead on introducing measures that improve access to design occupations. This also includes exploring how women, ethnic minorities and those from less privileged backgrounds enter leadership positions. For some sectors this may require introducing diversity targets, although lessons should also be learnt from what other sectors such as engineering are doing to widen recruitment and design training amongst women and those from different social backgrounds.

4. Putting in place the right intellectual property framework for design
As part of any future trade agreements, the government should ensure it is creating a supportive framework under which UK firms can export, confident in the knowledge that the quality and integrity of their products and services will be protected.

Further detail on our recommendations can be found at the end of the report.

Contents

Design Economy 2018

Introduction

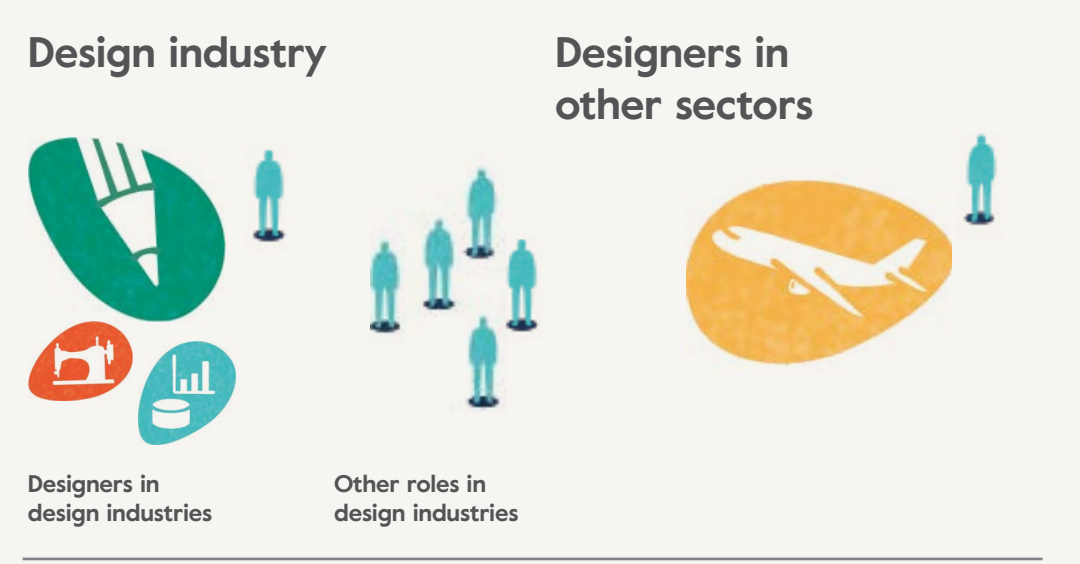
Not since the creation of Design Council in 1944 has there been a more critical time to understand the value and importance of design. The UK is entering a long period of uncertainty, with stagnant productivity and growing automation putting pressure on living standards and job security, at the same time as negotiating an exit from the European Union.

Yet with these challenges come opportunities. The wave of innovation and technological change taking place as part of the fourth industrial revolution – from 3D printing to artificial intelligence to the internet of things – offers hope for a brighter future.

Design is central to overcoming these challenges and making a success of the opportunities. It must be at the centre of everything we do.

Designers operate across the whole economy, shaping the products we buy, the services we use, the built environment around us and the digital world. We refer to this activity as 'the design economy' – the value created by those who do design in a wide variety of industries. This includes designers in design industries (eg, digital design, architecture and the built environment), other roles in design industries (such as administration, finance and distribution on the basis they are supporting the main design function) as well as designers in other sectors of the economy, such as aerospace, finance and retail. Our previous analysis in 2015 showed how design is vital to the UK economy, driving growth and innovation.

Figure 3: The design economy



Since 2015 we have further explored what makes design such a valuable part of the economy. This has included working with leading experts around the world to understand how we can better evidence the role of design in innovation, as well as exploring the skills used by designers which enable them to be so productive at a time when the rest of the UK is working hard just to stand still. The evidence base for greater use of design in the UK is compelling. Everything we have learnt over the past three years has fed into this 2018 edition of *The Design Economy* – which includes a set of recommendations to grow the impact of design across the UK economy.

What is design?
Design solves problems. So it is first and foremost about meeting the needs of people. It acts as a problem-solver by bringing critical thinking to reach the core of an issue by gathering together different perspectives and experiences and drawing insight from these to inform the development of new ideas and the delivery of new and innovative solutions.

Design is an integral part of innovation, and design capability is a fundamental requirement for organisations and businesses, regardless of size and sector, tackling complex economic and societal challenges and using it to drive change and secure growth.[12]

It is widely acknowledged that design should no longer be regarded solely as a way of shaping and styling products;[13] over the last decade its role in transforming the way organisations are structured and how they operate, think and work has become more prevalent.[14] Design skills and capabilities are rapidly becoming a requirement for business and innovation leaders[15] and a growing number of forward-thinking organisations are beginning to use design strategically to stimulate growth by bringing together their commercial, technological and market needs.[16]

How we defined design in this study
Defining design for research purposes is complex. A 2017 study led by Lancaster University found that "most companies perceive design as multifaceted; it is not one thing, easily defined" and the study observed 15 different statements as to 'what design is' in its survey research methodology.[17]

There are two main definitions of design used in this report. The first, which was used in the economic analysis the Enterprise Research Centre undertook for this study, echoes the definition of design set out in our 2015 edition of *The Design Economy*:

"Design is the creation of a proposition in a medium, using tools as part of a process. While all design is innately creative, the nature of each element has the potential to differ between different types of designers:

- Proposition may be objects that are visible (a building, a dress, a kettle) or invisible (software code, policy, process).
- Medium may take various forms. For example: physical (pencil sketch, 3D model, painting); spatial (a building, a street grid); digital (computer game, app, sound); or temporal (a process or sequence).
- Tools may vary (whether a pencil, a knife, a keyboard) in creative and reflective/analytic modes.
- Process may include one or more means of design inspiration and design review, working alone or in collaboration with others."

However, for the survey of UK firms delivered by BMG Research, we needed a second, simpler definition that could easily be understood by those less familiar with design. We therefore adapted the definition developed by the Danish Design Centre for a UK audience. Respondents were given the following definition of design at the beginning of the survey, defined as "one or a combination of three things":

- Design of physical products – such as a car, a building, an item of furniture, a silicon chip or a component – in order that the product is efficient, can be produced cost-effectively, and/or is aesthetically attractive to customers.
- Visual design – using traditional or digital media, in order to market the company and its products or services and to develop brand identity, or to help create a visual experience as, say, in a video game or in film or on a stage set.
- Systems or process design – by which services to customers or production processes are organised for maximum efficiency. This might include, for example, the design of a website to maximise user experience and interaction, the design of external supply logistics or of internal workflow, or design to ensure that the internal units or functions within a complex business are fully co-ordinated within an overall business strategy.

Respondents were asked to think about the role of design in their organisation, however minor or great that role is, and whether or not any design work for their business is undertaken in-house or is outsourced to design specialists.

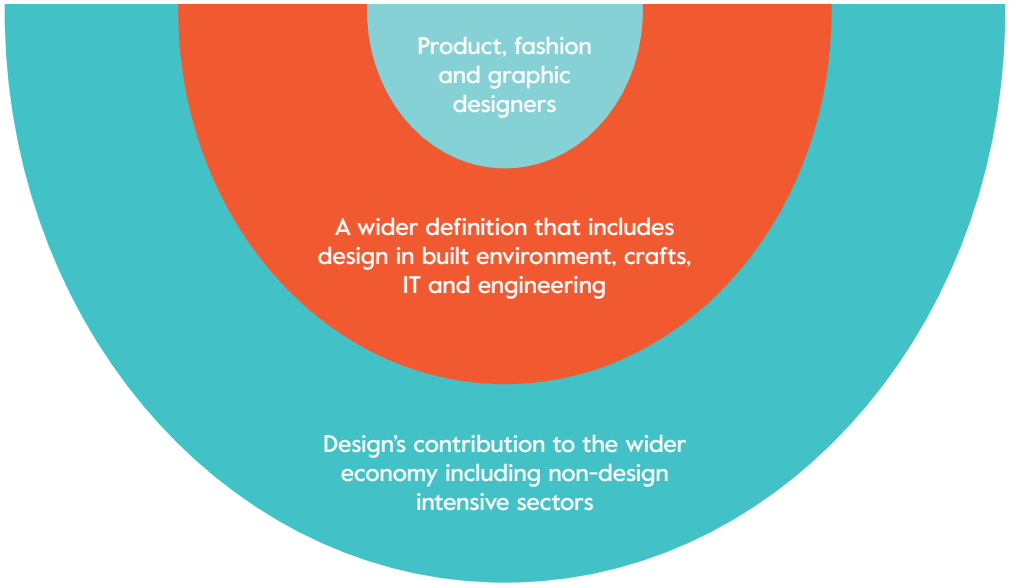
[12] Design Council (2017) *Understanding Design-Intensive Innovation: A literature review* [online]
[13] Buchanan R (1992) 'Wicked problems in design thinking' *Design Issues* 8 (2) pp.5-21
[14] Harvard Business Review (2015) *Design Thinking Comes of Age* [online]
[15] Nesta (2017) The Future of Skills: Employment in 2030 [online]
[16] Design Management Institute (2015) 'Design value index 2015' [online]
[17] Cooper R, Hernandez RJ, Murphy E and Tether B (2017) *Design Value: The role of design in innovation* [online]

Method
Given the varied and expansive nature of modern design, it is challenging to define its parameters. However, in order to deliver an authoritative account of its economic value, we have adopted a similar approach to our 2015 study, using official data sources to explore the value of design. This builds on the approach first developed by Nesta[18] and used by the then Department for Culture, Media and Sport (DCMS) in their Sector Economic Estimates.[19] However, The Design Economy 2018 adopts a broader definition of design than these studies, which limit their analysis of design to one sector (SIC 74.10 Specialised design activities) which includes product, fashion and graphic designers. The definition used in this report expands beyond this, as illustrated in Figure 4.

The process by which we reached our definition of design involved two key steps:

1. Identifying designers
To identify the occupations of those working in design, we reviewed a range of existing literature and consulted with key stakeholders across the world of design. Using these outcomes we worked through a process of review and selection of best fit Standard Occupational Classification (SOC) codes to identify designers within Office for National Statistics (ONS) data, who are counted in the analysis regardless of the industrial sector they work in.

Figure 4: Broader definition of design



[18] Nesta (2012) *A Dynamic Mapping of the UK's Creative Industries* [online]
[19] Department for Culture, Media and Sport (2016) *DCMS Sectors Economic Estimates 2015* [online]

Table 1: Design occupations

SOC	SOC description	Example designer
2121	Civil engineers	Building engineer, structural engineer
2431	Architects	Architect, architectural consultant, landscape architect
2432	Town planning officers	Planning officer, town planner
2435	Chartered architectural technologists	Architectural technologist
3121	Architectural and town planning technicians	Architectural assistant, construction planner
3122	Draughtspersons	CAD operator, cartographer
5113	Gardeners and landscape gardeners*	Garden designer, gardener, landscape gardener
3422	Product, clothing and related designers	Fashion designer, product designer, interaction designer
2473	Advertising accounts managers and creative directors	Advertising manager, campaign manager, brand identity
5211	Smiths and forge workers	Blacksmith, farrier
5411	Weavers and knitters	Carpet weaver, knitwear manufacturer
5441	Glass and ceramics makers, decorators and finishers	Glass blower, potter
5442	Furniture makers and other craft woodworkers	Antiques restorer, cabinet maker
5449	Other skilled trades not elsewhere classified	Engraver, goldsmith
2135	IT business analysts, architects and systems designers	Business analyst, systems analyst, technical architect
2136	Programmers and software development professionals	Database developer, games programmer, software engineer
2137	Web design and development professionals	Internet developer, web designer, user interface designer
5414	Tailors and dressmakers	Fabric cutter, tailor
3411	Artists*	Illustrator, portrait painter, sculptor
3421	Graphic designers	Graphic artist, graphic designer
2122	Mechanical engineers	Aerospace engineer, automotive engineer
2126	Design and development engineers	Design engineer, research and development engineer
2129	Engineering professionals not elsewhere classified*	Metallurgist, project engineer

* Subject to some exclusions: see Appendix 1

2. Identifying design-intensive industries
We then used the design occupations identified in step 1 above to calculate the intensity of design employment in industries as set out in individual Standard Industrial Classification (SIC) codes. The intensity is the proportion of people employed within an industry that are working within one of the design occupations. As per the DCMS/Nesta method, any industry with a design intensity of 30% or above is considered to be a design industry. All employment within a design industry is included in the analysis on the basis that those employed in non-design roles will be supporting the core design function.

This approach allows us to identify designers who are working in design-intensive sectors, but also the large number of designers working in other sectors across the UK economy. Throughout the report, the findings of the research are represented by the following three categories and broken down by design subsector.

1. Designers in design industries (eg, digital design, architecture and built environment)
2. Other roles in design industries (eg, support functions such as administration, finance, distribution)
3. Designers in other sectors across the economy (eg, aerospace, finance, retail etc).

Table 2: Design-intensive industries

Design subsector	SIC	SIC description	Example design business
Architecture and built environment	71.11	Architectural activities	Building design and drafting, eco design
Design (craft)	23.41	Manufacture of ceramic household and ornamental articles	Ceramic tableware
	32.12	Manufacture of jewellery and related articles	Jewellery or watches, production of precious stones
Design (clothing)	14.19	Manufacture of other wearing apparel and accessories	Accessories
Design (digital)	58.21	Publishing of computer games	Computer game design and publishing
	58.29	Other software publishing	Software publishing
	62.01	Computer programming activities	Designing structure and content of software, user interface design
Design (multidisciplinary)	74.10	Specialised design activities	Fashion design, sustainable design, industrial design
Design (product/industrial)	16.29	Manufacture of other products of wood etc.	Furniture design
	26.40	Manufacture of consumer electronics	Electronic home entertainment equipment

To deliver steps 1 and 2 (namely, the identification of designers and design-intensive industries), Design Council commissioned the Enterprise Research Centre to undertake a detailed analysis of economic data related to design in the UK, including the Annual Business Survey, Annual Population Survey and UK Innovation Survey, among others.[20] A detailed methodology is included in the appendices.

Our research has assessed the contribution of design to the UK economy using a set of key measures, including gross value added (GVA), productivity, turnover, employment and exports of goods and services. It includes a summary of how design contributes to the financial performance of businesses, how it affects places in terms of its contribution to local economies, as well as insight into the people who make up the design economy, focusing on who they are and how they work. We have also explored relationships between demographics and a range of outcomes such as gender and pay, ethnicity and seniority, as well as deploying cluster analysis (to visualise where design firms congregate across the country) and causal analysis of the relationships between design, innovation and productivity. All analysis is based on the most recent data available.

The Design Economy 2018 seeks to better understand both the supply and the demand for design in the UK. So in addition to exploring the health of design firms and designers, we sought to better understand how they interact with the rest of the UK business population by means of an online survey using BMG Research's large online panel network. Respondents were invited to participate in the study via targeting of qualifying members of online panels.

We used a stratified sampling strategy[22] targeting panel members by industry sector, business size, region and other key information. In total, 1,006 panel members responded to the invitation and completed the survey. As the survey was self-completion and questions were non-mandatory,[23] not all respondents answered all questions that were asked of them. The lowest base recorded for a question asked of all respondents was 997.

This wealth of data is complemented by seven in-depth case studies[24] of firms who either operate in design-intensive industries or are exemplars of how non-design firms can use design to achieve better outcomes. The case studies provide insights from a range of firms in different parts of the UK that apply design in different contexts. We have purposefully focused on firms leading or changing their sector in some way. The purpose of these case studies is not to be representative of the sector but to provide an insight into the way leading firms are using design, what design capabilities are important and what the impact of their design is.

A more detailed methodology can be found in the appendices.

[20] Design Council and the Enterprise Research Centre are grateful to the Office for National Statistics and to the UK Data Service for making these datasets available. Neither the Office for National Statistics nor the UK Data Service bear any responsibility for the analysis or interpretation of the data. This report contains data licensed under the Open Government Licence v.2.0, http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2/. This report also contains National Statistics data © Crown copyright and database right 2018.
[21] Analysis is designed to show recent trends over a five-year period (except where data covering this period is not available). The latest available data for some indicators (firm counts and employment) relate to 2014, while the latest for other indicators (GVA, turnover and exports) relate to 2013. Time-series analysis is therefore not consistent for these indicators, covering the periods 2010-2014 and 2009-2013 respectively. Percentage change over these periods is shown for the purposes of comparison.
[22] A stratified sample is made up of different 'layers' of the population, for example, selecting samples from different business sectors or regions of the country with the aim of producing results representative of the wider population.
[23] Rather than insist on a response, if respondents were not willing or able to provide a response they were allowed to continue to the next question.
[24] Drawn from interviews conducted by BOP Consulting – full versions forthcoming [online]

Limitations and considerations

As with any statistical analysis, it is important to note that this is a model of reality, not reality itself. So while we have endeavoured to provide the most comprehensive account of the state of UK design ever, there are several limitations to what we are able to say.

Firstly, our economic analysis is tied to the coding of occupations and industries developed by the ONS. It has been well documented that these codes have not kept pace with developments in the real economy[25] despite some improvements since 2016.

An unfortunate feature of the UK SIC and SOC systems is the presence of two codes that capture a range of design activity. The formal description of each code is provided below:

- SIC 74.10 Specialised design activities: "This includes: fashion design related to textiles, wearing apparel, shoes, jewellery, furniture and other interior decoration and other fashion, goods as well as other personal or household goods, industrial design, ie, creating and developing designs and specifications that optimise the use, value and appearance of products, including the determination of the materials, mechanism, shape, colour and surface finishes of the product, taking into consideration human characteristics and needs, safety, market appeal in distribution, use and maintenance, activities of graphic designers and activities of interior decorators."

- SOC 3422 Product, clothing and related designers: "Product, clothing and related designers plan, direct and undertake the creation of designs for new industrial and commercial products, clothing and related fashion accessories, costumes and wigs, and for building interiors and stage sets."

This categorisation means that design occupations such as interior designers, interaction designers and theatre set designers are currently bundled into the same sector and we are not able to differentiate between them. This has necessitated the inclusion of the multidisciplinary design subsector in our definition of design. It is important to note here that it is not necessarily the designer or the business itself that is multidisciplinary, but the subsector as a whole.

ONS' classification system also contributes to a second limitation. Despite developments such as the recruitment of the government's first ever deputy director for service and product design in 2018, the discipline and practice of service design has had to be omitted from this study as it is not a profession currently captured through ONS data. Design Council continues to consult with ONS about changes to Standard Occupational Classification Codes. However, this also highlights how the value of design can be underestimated.

A third limitation is that it has not always been possible in this study to report data for every design subsector due to data suppression. The data in The Design Economy 2018 has been rounded and suppressed in line with the ONS' Disclosure Control Policy for Tables Produced from Surveys. These standards set out the requirements for disclosure control methods which ensure the confidentiality of respondents to government surveys such as the Annual Population Survey. However, while it is designed to protect survey respondents' confidentiality, a consequence of suppression is that the least reliable estimates (those based on the smallest sample and therefore most likely to be subject to sampling variability) are those that are suppressed. All values based on an unweighted count between 0 and 9 (ie, where one or two survey respondents have given a particular answer or combination of answers) are automatically suppressed.

The fourth and main limitation of our study is that we focus on occupations not design practices which can sometimes be multidisciplinary. For example we have not been able to entirely account for the recent and developing practice of 'conversational design' where designers are developing services for home assistant systems such as Amazon Alexa or Google Home, which respond to voice commands rather than physical interactions. Our model will pick up the value generated by the software designers for instance, but may not capture all of the value generated through such activities.

A fifth limitation is that the economic value of design is not the only value that it creates. Designers generate significant social value, such as those digital and service designers working in central and local government who have simplified and improved public services.[28] Designers also add cultural value, for example, the design strategy for the London 2012 Olympics which, five years on, is having a significant impact on cultural life in East London and beyond.[29]

Finally, while not a limitation, for The Design Economy 2018 we have used a different data source to calculate key economic figures (such as GVA) from our previous 2015 study. For figures from 2014 onwards, we have used the Annual Survey of Hours and Earnings which is the preferred approach used by the ONS.[30] We have also included analysis for 2009-2013 using the Annual Business Survey and Annual Population Survey, which provides an illustration of long-term trends in the design economy, but is caveated with the aforementioned methodological change, which affects changes between 2013 and 2014.

Despite these limitations, The Design Economy 2018 provides the most comprehensive insight into the economic value of design in the UK ever undertaken, and to our knowledge is the most authoritative model interrogating the state of design and its impact on national economic growth in the world.

[25] Bean C (2016) *Independent Review of UK Economic Statistics: Final report* [online]
[26] Office for National Statistics (2009) *UK Standard Industrial Classification of Economic Activities 2007: Structure and explanatory notes* [online]
[27] Office for National Statistics (2010) *Standard Occupational Classification 2010 Volume I: Structure and descriptions of unit groups* [online]
[28] Design Council (2018) *Design in the Public Sector: Lessons from applying design approaches in the public sector* [online]
[29] Design Council (2017) *Olympic Design Five Years on: The role design played in creating a legacy for people and place* [online]
[30] Design Council intends to use the Annual Survey of Hours and Earnings as its preferred methodology for future studies.

Alignment with other research

Since the previous version of *The Design Economy* in 2015, we have sought to answer a range of questions raised by that study. For example, what is it that enables designers to be more productive? What is the impact of gender and regional imbalances within the design economy?

To answer these questions we have undertaken a range of complementary research studies in the years between the two editions of *The Design Economy*. In 2017 we published *Designing a Future Economy*[31] which adopts the same methodological approach as *The Design Economy* series to explore how design skills contribute to innovation and productivity. We also undertook a systematic review of evidence and theories describing design's role in innovation: *Understanding Design-Intensive Innovation*.[32]

Learning from this activity informed the methodology for *The Design Economy 2018*. Whilst we have continued with the same methodological approach as the 2015 study, providing consistency over time, this time we have also expanded the analysis to explore geographic clusters and causal relationships between issues such as gender and pay as well as undertaking primary research.

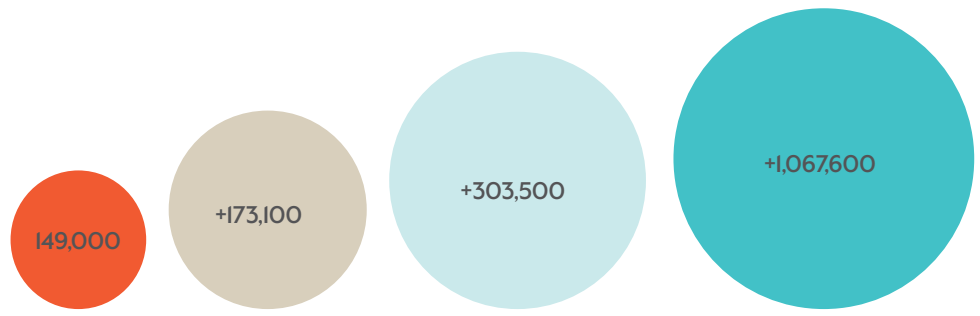
While retaining some methodological similarities with recent research from DCMS and Nesta, this study employs a broader definition of who designers are and where they operate (incorporating analysis of 10 SIC codes, rather than just one). Figure 5 below highlights how our research overlaps, showing that *The Design Economy 2018* includes an additional 1,544,200 people in its analysis on top of those included in DCMS' Creative Industries Economic Estimates.

This report therefore contains higher estimates than Nesta and DCMS studies, and moves design on from being one facet of the creative industries to being a creative practice that cuts across the UK economy.

[31] In *The Design Economy 2018* we have focused our analysis on those 23 Standard Occupational Classification (SOC) codes that were previously identified in 2015 as being design occupations. This means figures such as GVA and employment are naturally lower than those reported in our 2017 *Designing a Future Economy* report, which identified 40 SOC codes that use design skills, including many non-design occupations [online]

[32] Design Council (2017) *Understanding Design-Intensive Innovation: A literature review* [online]

Figure 5: Design employment comparison (between *The Design Economy 2018* and DCMS Creative Industries Economic Estimates)



- Employment in SIC 74.10 Specialised design activities, as per DCMS model
- Additional designers in design industries, as per *The Design Economy 2018*
- Employment in other roles in design industries, as per *The Design Economy 2018*
- Designers in other sectors, as per *The Design Economy 2018*

The value of design to the UK

The UK has transitioned from an economy powered by might and machine to one increasingly powered by services and technology. Design has played a key role in these developments, evolving with economic shifts, boosting productivity and instigating innovation[33] – from the industrial designers that pioneered post-war aviation to those designing robots and artificial intelligence today.

This chapter focuses on the value created for the UK economy by designers operating either in design industries or outside in wider business sectors. It demonstrates the continuing importance of design to UK growth and future economic sectors.

[33] Design Council (2018) *Understanding Design-Intensive Innovation: A literature review* [online]

Gross Value Added
The design economy creates significant economic value for the UK. In 2016, designers generated £85.2bn GVA. This is equivalent to 7% of the UK's total GVA and to the size of the distribution, transport, accommodation and food sectors.[34]

Design spreads far beyond the creative industries and cuts across the wider UK economy, with £58.2bn (68%) of its value now created by designers operating in non-design industries such as aerospace, automotive and banking. The firms showcased in this report are applying design and design thinking in new environments. The Guardian newspaper, for example, is now using design thinking frameworks such as the Design Council Double Diamond[35] visualisation of the design process to align multidisciplinary teams around core business challenges.

In addition Fjord, the design and innovation studio acquired by the international consultancy Accenture, is now being tasked by some of the biggest companies in the world with redesigning their entire internal systems and processes.

These are just two of many examples of how designers operating in non-design sectors are able to generate such significant value.

Our analysis also shows that £27bn in GVA is generated by design industries, and that this figure is relatively evenly split between that generated by designers and those working in other roles supporting the design function. However, while generating less in GVA, the value of designers in design industries has grown at a much faster rate than that of designers in other industries (see Table 3).

Design's contribution to the economy has grown at a faster rate than the UK average GVA. Our analysis, which focused on changes since the last edition of The Design Economy, found that during the period 2014-2016, design economy GVA increased by 10% compared to 7% growth across the UK as a whole. This means the design economy created an additional £7.8bn in output in 2016 compared to just two years earlier. These findings are in keeping with trends observed in the previous edition of this research, and over the total period covered by both studies (2009-2016) the design economy GVA grew by 52% (see Table 4).

Table 3: Design economy GVA by worker type, 2009-2016 (£m)

Worker type	2009	2010	2011	2012	2013	2014	2015	2016	% change 2014-2016	% change 2009-2016
Designers in design industries	£7,054	£6,777	£8,275	£8,731	£9,288	£9,119	£10,098	£11,380	25%	61.30%
Other roles in design industries	£7,978	£7,688	£9,048	£8,956	£9,853	£12,980	£14,283	£15,651	21%	96.20%
Designers in other sectors	£41,007	£41,938	£45,440	£47,053	£52,559	£55,260	£55,065	£58,184	5%	41.90%

Source: Office for National Statistics (2018) Annual Business Survey (2008-2016), Annual Population Survey (2004-2017), Annual Survey of Hours and Earnings (2013-2016)

[34] Office for National Statistics (2017) *Regional Gross Value Added* [online]
[35] The Design Council developed the 'Double Diamond' visual framework to describe the design process [online]

Digital design continues to enjoy the greatest growth rate and now constitutes the majority of the design economy GVA for the first time, delivering £44.3bn (52% of design GVA). The architecture and built environment and product and industrial design sectors also continue to be key contributors, accounting for a combined £28.8bn in design GVA. These three sectors delivered 86% of total design economy GVA in 2016.

Clothing and craft design continue to experience declines in the GVA they generate. Our analysis shows that the clothing design subsector – which includes the design and manufacture of sporting goods (such as tracksuits and swimwear) headwear (such as hats and caps) and other clothing accessories (such as gloves, belts, ties etc) – has experienced the greatest decrease in value, with a 37% reduction in GVA between 2014 and 2016. This is reflective of trends in the broader textiles sector which has undergone significant change in recent years, particularly due to high levels of off-shoring but also due to changing fashions.

Table 4: Design economy GVA, 2009-2016 (£m)

Design subsector	2009	2010	2011	2012	2013	2014	2015	2016	% change 2014-2016	% change 2009-2016
Architecture and built environment	£13,913	£12,487	£14,503	£14,899	£17,360	£12,635	£13,117	£13,543	7%	-2.7%
Design (multidisciplinary)	£3,228	£3,205	£3,934	£3,621	£4,263	£4,737	£5,176	£5,659	19%	75.3%
Design (advertising)	£1,299	£1,693	£1,024	£993	£1,544	£1,726	£1,658	£1,717	-1%	32.2%
Design (craft)	£2,895	£2,943	£3,444	£3,183	£3,046	£2,465	£2,344	£2,185	-11%	-24.5%
Design (digital)	£21,571	£22,671	£26,533	£27,796	£30,041	£38,735	£40,473	£44,316	14%	105.4%
Design (clothing)	£313	£609	£452	£430	£292	£346	£308	£218	-37%	-30.3%
Design (graphic)	£2,377	£2,254	£2,344	£2,898	£2,929	£2,076	£2,104	£2,298	11%	-3.3%
Design (product and industrial)	£10,443	£10,542	£10,529	£10,921	£12,225	£14,639	£14,264	£15,278	4%	46.3%
Design economy	£56,039	£56,403	£62,763	£64,740	£71,700	£77,359	£79,445	£85,216	10%	52.1%
Creative industries[36]	£94,179	£98,073	£106,686	£112,699	£123,387	£133,280	-	-		-
UK economy	£847,761	£880,920	£915,655	£937,039	£1,001,124	1,638,722	1,684,937	1,749,826	7%	106.4%

Note: – indicates that a value is not available.
Source: Office for National Statistics (2018) Annual Business Survey (2008-2016), Annual Population Survey (2004-2017), Annual Survey of Hours and Earnings (2013-2016)

[36] We used the Department for Culture, Media and Sport's definition of creative industries as a comparator throughout this report. This includes the following sectors: advertising and marketing, architecture, crafts, product design, graphic design and fashion design, film, TV, video, radio and photography, IT, software, video games and computer services, publishing and translation, museums, galleries and libraries, and music, performing arts, visual arts and cultural education.

Turnover
Design firms generated £44.8bn in turnover in 2016, which is roughly equivalent in scale to the services to buildings and landscape activities sector (£41bn) and the non-public education sector (£48.3bn).[37] Between 2014 and 2016, design industry turnover increased by 15.4% (compared to 1.1% for UK businesses over the same period) generating an additional £5.9bn.

This trend is supported by longer-term analysis, which shows that the turnover of design firms grew at almost three times the rate of UK businesses between 2009 and 2016 (61% compared to 21%).

Table 5: Turnover generated by design industry firms 2009-2016 (£m)

Design subsector	2009	2010	2011	2012	2013	2014	2015	2016	% change 2014-2016	% change 2009-2016
Architecture and built environment	£4,830	£4,320	£4,997	£5,410	£5,767	£6,766	£7,203	£6,738	-0.4%	39.5%
Design (multi -disciplinary)	£3,724	£3,938	£4,784	£5,134	£4,899	£5,719	£6,558	£6,414	12.2%	72.2%
Design (advertising)	-	-	-	-	-	-	-	-	-	-
Design (craft)	£976	£1,085	£1,242	£1,114	£971	£1,175	£1,239	£1,390	18.3%	42.4%
Design (digital)	£15,367	£15,655	£18,116	£18,370	£20,220	£23,411	£25,604	£28,496	21.7%	85.4%
Design (clothing)	£592	£573	£517	£417	£461	£533	£607	£574	7.7%	-3.0%
Design (graphic)	-	-	-	-	-	-	-	-	-	-
Design (product and industrial)	£2,416	£1,502	£1,421	£1,127	£1,084	£1,299	£1,125	£1,280	-1.5%	-47.0%
Design industries	£27,905	£27,073	£31,077	£31,572	£33,402	£38,903	£42,336	£44,892	15.4%	60.9%
Creative industries	£124,463	£127,724	£136,060	£140,963	£150,233	£161,553	£178,072	£190,117	17.7%	52.7%
UK industries	£2,869,816	£3,025,220	£3,249,106	£3,331,193	£3,538,442	£3,447,055	£3,406,299	£3,483,825	1.1%	21.4%

Note: – indicates that a value is not available.
Source: Office for National Statistics (2018) Annual Business Survey (2008-2016)

[37] Office for National Statistics (2017) 'UK business – activity, size and location' [online]

As with GVA, this growth was driven by strong turnover among firms in several design subsectors. The fastest growing subsector is digital design, with firms in this sector experiencing an 85% growth in turnover between 2009 and 2016, reflecting the growing importance of digital design to the UK. Craft and the multidisciplinary design subsectors have also experienced growth in turnover in both the long and short term, and design firms such as Map (see case study below) demonstrate how these sectors are responding to changing consumer demands and combining traditional craft skills with modern technologies.

The clothing and product and industrial design sectors are the only design subsectors which have experienced long-term declines in turnover, with product and industrial design also experiencing a decline in the short term too, despite growing GVA.

Case study: Map – A growing design firm working with growing businesses in a growing market

Map Project Office is an industrial design firm based in London. It is passionate about making products, particularly blending physical products and digital experiences. It works with major brands (including Google, IBM, Virgin Atlantic) as well as consumer technology start-ups (like coding kit maker Kano and smart doorbell Ding).

Map was originally formed as a laboratory within furniture design firm Barber & Osgerby and interior design firm Universal Design Studio to accommodate its growing portfolio of design work for major technology brands including Sony, Panasonic and Blackberry. Map was spun off into its own business in 2012, led by Barber & Osgerby Director Jon Marshall (who moved to take up a new role as Partner at Pentagram in April 2018) and supported by Will Howe, then Senior Designer.

It is a firm which is familiar with growth. The company originally started with four people and has since grown to a team of 12 designers. Its largely senior-level design team gives the company a more horizontal organisational structure. As it grows, it is increasingly recognising the need to bring in designers with specialisms, although it enjoys the flexibility and project satisfaction of being generalists.

"We all do everything. We all make models, we all do renderings, we all do high-level 3D CAD, we all do research."

Will Howe, Director

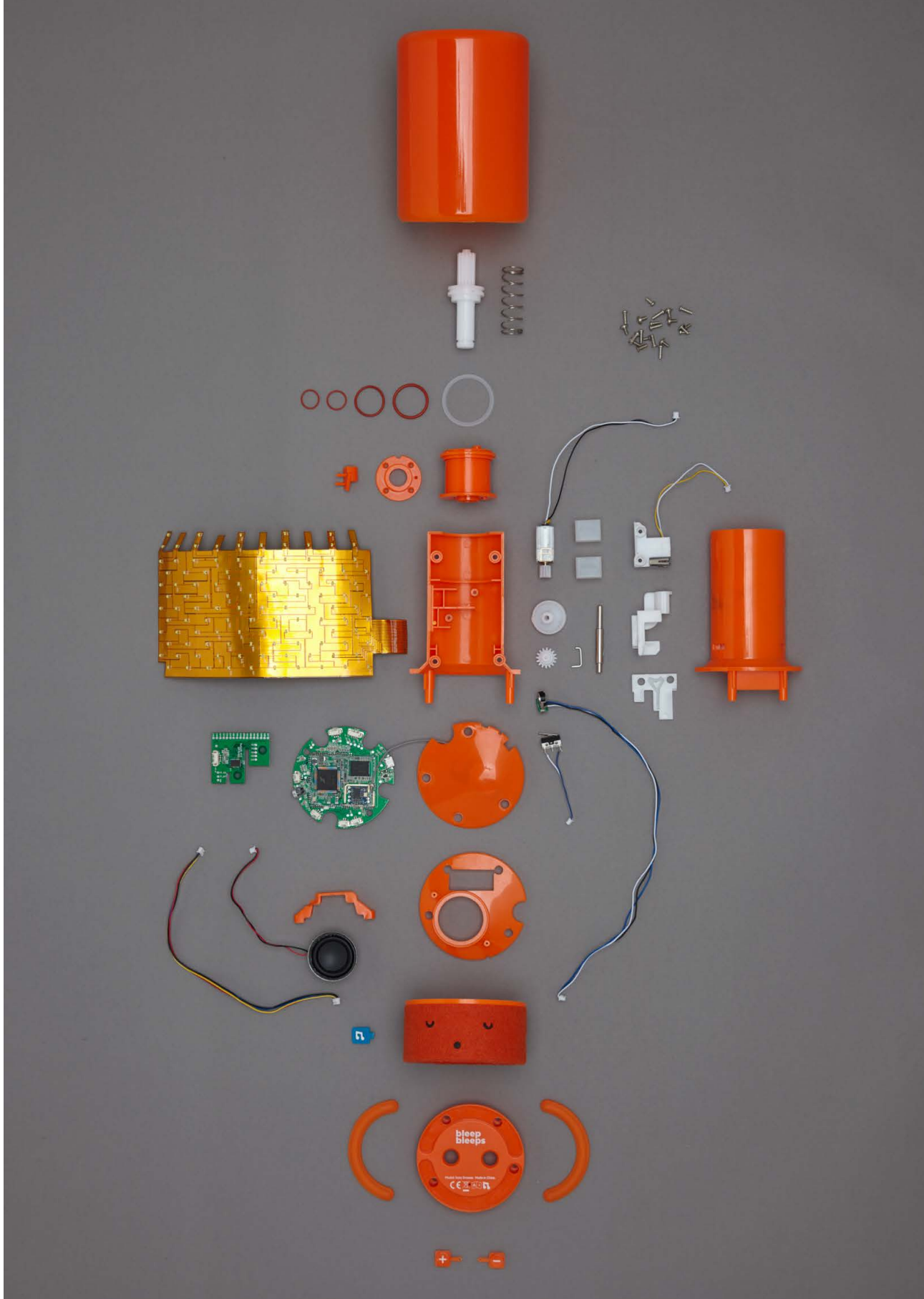
Map often supports clients who are themselves rapidly growing. It works with start-up clients in an end-to-end design process – from strategy, design and fundraising to production, sourcing and manufacturing. This approach to working with founders, alongside flexible payment options or taking equity in start-ups, has created longer term relationships with their clients. In some cases, after the initial design work is finished, Map still has a stake in the company and stays on as an adviser and external advocate. Map believes it is one of the first design firms in the UK to pilot this approach.

Map is also working in a rapidly growing area of connected products and new technologies (like augmented reality and autonomous vehicles). Its design concept team works for some of the largest technology brands in the world, helping to humanise complex and abstract technologies and giving them a physical presence that makes them more accessible to the average consumer.

"I think that's what industrial designers do very well: thinking about just how people use products. And that ability to observe and understand how people interact and behave around new tech drives our work."

Fiona O'Leary, Designer

Photo: Map/Clare Lewington; Copyright Clare Lewington 2018



Firm numbers
Design's significant economic contribution is driven by 78,030 design-intensive firms operating across the UK (2017). This number is greater than the number of firms in the finance and insurance (56,000) and motor trade (75,000) sectors.[38] Since 2014, the number of design-intensive firms has increased by 7.9% (compared to a -1.3% decrease in the number of firms across the UK as a whole). This is equivalent to the addition of 5,690 firms to the industry footprint. Over the longer term, there has been a 63% increase in the number of design-intensive firms since 2010 (compared to a 3.7% increase for businesses across the UK as a whole).

Growth has been notably strong in digital design, which has expanded by 121.7% to create 19,115 new firms since 2010. In combination with this, strong short-term growth in architecture and built environment and multidisciplinary design means that despite contractions in some sectors (craft and product and industrial design), the number of businesses in the sector as a whole has grown.

Table 6: Design industry firms, 2010-2017

Design subsector	2010	2011	2012	2013	2014	2015	2016	2017	% change 2014-2017	% change 2010-2017
Architecture and built environment	11,475	11,620	12,730	13,580	14,440	14,700	15,540	16,325	13.1%	42.30%
Design (multi disciplinary)	15,985	16,620	18,295	19,255	20,740	21,445	22,130	22,795	9.9%	42.60%
Design (craft)	1,545	1,515	1,510	1,480	1,525	1,480	1,515	1,485	-2.6%	-3.90%
Design (digital)	15,745	20,830	27,755	31,215	33,020	32,850	34,165	34,900	5.7%	121.70%
Design (clothing)	1,175	1,075	1,035	960	995	1,050	1,040	1,035	4.0%	-11.90%
Design (product and industrial)	1,995	1,870	1,820	1,680	1,620	1,535	1,515	1,490	-8.0%	-25.30%
Design industries	47,920	53,530	63,145	68,170	72,340	73,060	75,905	78,030	7.9%	62.80%
Creative industries	202,765	208,315	223,530	233,480	251,135	258,135	275,590	287,585	14.5%	41.80%
UK industries	2,574,185	2,547,850	2,610,505	2,625,390	2,721,245	2,449,425	2,554,505	2,668,805	-1.9%	3.70%

Notes: (1) Data not available for 2009. (2) Firm data not available for advertising and graphic design subsectors. However, relevant firms are likely to be captured in the multidisciplinary design subsector.
Source: Office for National Statistics (2018) 'UK business counts 2010-2017'

[38] Office for National Statistics (2017) 'UK business; activity, size and location: 2017' [online]

Design firms: births and survival
The growth in design firm numbers is being driven by a large number of start-ups. Experimental analysis using the Business Structure Database developed by the Enterprise Research Centre suggests there were 10,327 design firms born in 2014. Of these, the majority (59.7%) have survived for more than three years, higher than the average for small and medium enterprises (SMEs) across the country (44%).[39] The majority of these start-ups remain small, although our analysis suggests one in five grew to have an annual turnover of more than £1m within three years.

Table 7 shows that a higher percentage of firms in the digital design subsector experienced growth when compared to other design subsectors, particularly for those firms who had a turnover of £1-2m in 2014.

Table 7: Percentage of established survivors (firms born before 2014 and surviving in 2017) achieving growth in turnover proportional to turnover in 2014

Design subsector	Established survivors (turnover £0.25m-0.5m in 2014 scaling to £1m+ by 2017)	Established survivors (turnover £0.5-1m in 2014 scaling to £2m+ by 2017)	Established survivors (turnover £1m-2m in 2014 scaling to £3m+ by 2017)
Architecture and built environment	5.38%	5.35%	11.0%
Design (multidisciplinary)	5.59%	5.43%	7.5%
Design (craft)	*	*	*
Design (digital)	11.62%	9.89%	15.5%
Design (clothing)	*	*	*
Design (product and industrial)	*	*	*
Total	6.79%	6.16%	9.8%

Note: * indicates that a value is suppressed.
Source: Enterprise Research Centre (2018) Business Structure Database

[39] Office for National Statistics (2017) 'Business demography, UK: 2016' [online]

Design firm size
The majority of firms in the design economy (99%) employ fewer than 50 people. In fact, the majority employ nine or fewer people, meaning the design economy is skewed towards microbusinesses.

A 'long tail' therefore characterises design-intensive sectors, with many small firms compared to a few larger firms. This is consistent across all design sectors. The product and industrial design and clothing design subsectors have the most significant proportion of SMEs, although product and industrial design also has the joint highest proportion of large firms which employ 250 people or more.

There was a notable increase in medium to large design-intensive firms between 2014 and 2017, suggesting a small selection of design firms are recruiting more as they grow. In some sectors this was particularly pronounced, such as in architecture and built environment and digital design where there was a considerable growth in the number of firms employing more than 50 people.

In sectors such as product and industrial design, there has also been a decrease in both micro firms (-7%) and small firms (-22%) as well as an increase in medium-sized firms (20%). Alongside a decrease in the total number of firms in this sector (-8.0%, see Table 6), this suggests that product and industrial designers are increasingly less likely to go it alone and are instead opting to work for larger firms.

Employment
Demand for design and design skills continues to be high and is growing. In 2016, there were 1.69 million people employed in design roles, a figure which has grown 6% since our last report – equivalent to 99,604 new jobs (compared to 4% UK average since 2014). If the design economy were one sector, this would make it the ninth largest employment sector in the UK. As such it is comparative to the hospitality sector (1.6 million employees) and the logistics sector (1.5 million).[40]

In 2016 just over 625,000 people were directly employed in the UK's design industries with a further 1 million designers working in other sectors, which is indicative of how embedded design is across the economy.

Table 8: Design firms by size in 2017 as a proportion of each design industry

Design subsector	Firm counts – sizeband				
	Micro (0 to 9)	Small (10 to 49)	Medium (50 to 249)	Large (250+)	All firms
Architecture and built environment	91.9%	7.0%	1.0%	0.1%	16,325
Design (multidisciplinary)	95.5%	4.2%	0.2%	0.0%	22,800
Design (craft)	91.9%	6.4%	1.4%	0.3%	1,480
Design (digital)	92.9%	5.8%	1.1%	0.2%	34,900
Design (clothing)	85.0%	13.6%	1.5%	0.0%	1,030
Design (product and industrial)	87.9%	9.8%	2.0%	0.3%	1,485
Design industries	72,750	4,510	675	85	78,020
Creative industries	273,015	12,090	2,080	415	287,600
UK industries	2,386,735	231,715	40,530	9,825	2,668,805

Notes: Firm data are not available for the advertising and graphic design subsectors. However, relevant firms are likely to be captured in the multidisciplinary design subsector.
Source: Office for National Statistics (2018) 'UK business counts 2010-2017'

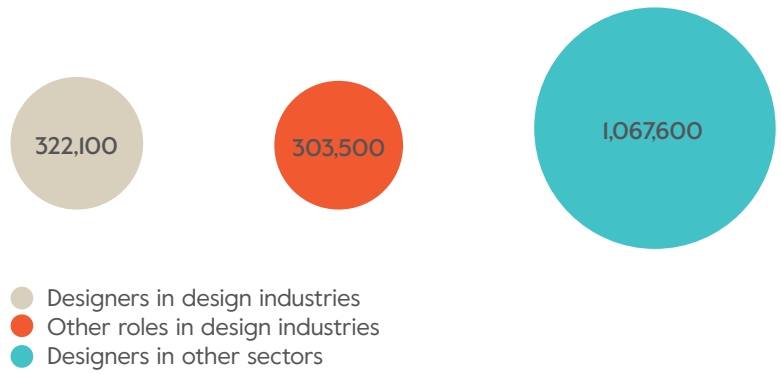
Table 9: Design firms by size, percentage change between 2014 and 2017

Design subsector	Micro (0 to 9)	Small (10 to 49)	Medium (50 to 249)	Large (250+)
Architecture and built environment	14%	-5%	31%	200%
Design (multidisciplinary)	9%	25%	22%	-
Design (craft)	-2%	-17%	0%	0%
Design (digital)	5%	20%	5%	9%
Design (clothing)	6%	-13%	50%	-
Design (product and industrial)	-7%	-22%	20%	-
Design industries	8%	9%	13%	31%

Notes: (1) – indicates that a value is not available. (2) Data not available for 2009. (3) Firm data not available for advertising and graphic design subsectors. However, relevant firms are likely to be captured in the multidisciplinary design subsector.
Source: Office for National Statistics (2018) 'UK business counts 2010-2017'

Reflecting the changing nature of the economy and the increased importance of digital, the digital design subsector is the largest employer of designers, employing 661,915 designers and accounting for just over one in three design roles in 2016. Architecture and the built environment also remains a significant employer with a design workforce of 379,300 – a third more than the next largest employment sector: product and industrial design.

Chart 1: Employment across the design economy



Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

[40] Office for National Statistics (2018) 'Employment by industry' Labour Force Survey [online]

Table 10: Design economy employment 2010-2016

	2010	2011	2012	2013	2014	2015	2016	% change 2014-2016	% change 2010-2016
Architecture and built environment	318,000	325,500	331,700	362,200	372,400	352,800	379,300	1.9%	19.3%
Design (multi disciplinary)	102,500	98,200	101,700	114,700	136,700	135,100	149,100	9.1%	45.5%
Design (advertising)	28,900	22,400	22,600	29,300	30,000	33,500	36,500	21.7%	26.3%
Design (craft)	108,500	114,700	113,600	108,700	108,600	110,100	113,900	4.9%	5.0%
Design (digital)	437,900	492,700	550,500	563,700	608,400	641,100	661,900	8.8%	51.2%
Design (clothing)	21,600	22,000	18,800	20,100	16,700	21,400	23,700	41.9%	9.7%
Design (graphic)	105,800	103,300	118,700	114,700	124,000	116,700	123,300	-0.6%	16.5%
Design (product and industrial)	186,600	190,200	193,700	199,400	196,700	204,700	205,500	4.5%	10.1%
Design economy	1,309,900	1,369,200	1,451,300	1,512,600	1,593,600	1,615,300	1,693,200	6.3%	29.3%
Creative industries	2,278,500	2,422,000	2,558,000	2,622,000	2,754,000	2,899,100	3,018,400		32.5%
UK economy	28,836,600	28,954,200	29,294,700	29,736,500	30,453,900	31,191,000	31,757,000		10.1%

Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

Productivity

At a time when policymakers, business leaders and economists are grappling with how to address the UK's 'productivity puzzle', our analysis sought to better understand the productivity of designers in addition to potential drivers of their productivity (the latter of which is detailed in our 'Design and productivity in UK firms' section).

In terms of the productivity of those working in the design economy, we found that in 2016 designers were 29% more productive than the average UK worker, each delivering £50,328 in output (GVA per worker) compared to £39,111 across the rest of the economy.

This figure is higher than those working in 'professional, scientific and technical activities' (£50,064), which incorporates accounting and auditing activities, and research and experimental development in the natural sciences, among others.[41] Emphasising the growing importance of design across industries, designers working outside the traditional design sector are the most productive, generating £54,502 in GVA per annum. This contrasts with an average output of £35,327 for designers in design industries and £51,568 for other roles in design industries. It is likely that the difference in productivity between designers and other roles in design industries is driven by the higher value added activity in roles such as management and professional occupations outside design.

[41] Office for National Statistics (2018) 'Labour productivity: region by industry' [online]

Table 11: Design economy productivity 2009-2016 (average output per worker – £)

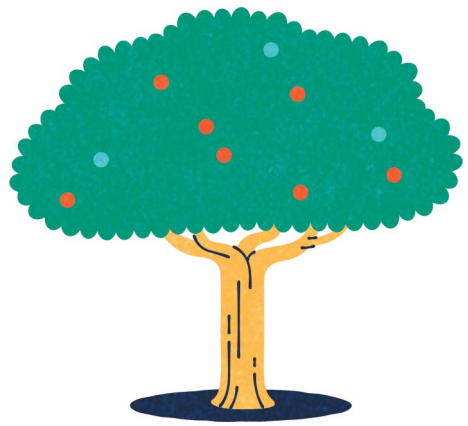
	2009	2010	2011	2012	2013	2014	2015	2016	% change 2014-2016	% change 2009-2016
Designers in design industries	£31,647	£28,937	£34,097	£32,650	£33,948	£30,439	£34,369	£35,327	16.1%	11.6%
Other roles in design industries	£39,514	£38,268	£40,645	£37,133	£38,293	£46,408	£49,093	£51,568	11.1%	30.5%
Designers in other sectors	£47,177	£47,941	£50,276	£49,913	£53,538	£54,481	£53,430	£54,502	0.0%	15.5%
Design economy	£43,306	£43,059	£45,839	£44,608	£47,402	£48,544	£49,182	£50,328	3.7%	16.2%
Design industries only	£35,386	£33,245	£37,230	£34,776	£36,054	£38,149	£41,695	£43,206	13.3%	22.1%
UK economy	£29,557	£30,549	£31,624	£31,987	£33,667	£38,139	£38,329	£39,111	2.5%	32.3%

Source: Office for National Statistics (2018) Annual Business Survey (2008-2016), Annual Population Survey (2004-2017), Annual Survey of Hours and Earnings (2013-2016)

Reflecting the embedded nature of many product and industrial designers' roles, this is the most productive sector, with each worker delivering an annual output of £74,335. Digital and advertising designers are the next most productive, each outputting approximately £66,952 GVA per head.

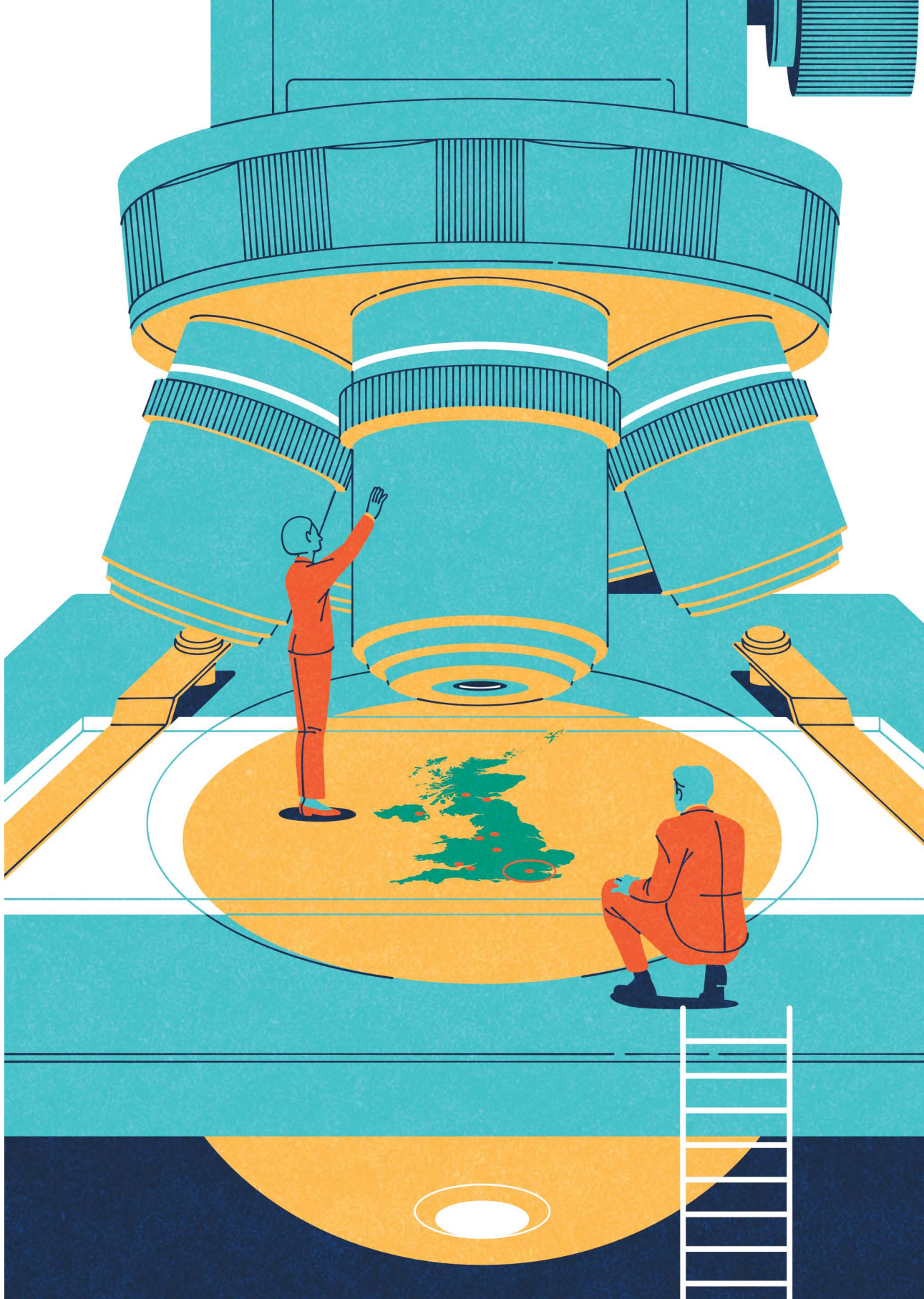
Between 2014 and 2016, the productivity of the design economy grew by 3.7%. This varies across the design economy, and for those designers in design industries it rose 16.1% compared to 2.5% growth for the UK more widely. However, for designers in other industries there has been very little change in recent years.

Over the longer term, design productivity as a whole has not increased to the same extent as the wider economy (16.2% compared to 32.3%). This is because productivity is not evenly distributed across the design economy, with sectors such as architecture and built environment both highly productive and experiencing substantial growth, while others have experienced challenges with productivity.



The scale and scope of the UK design economy

As advanced economies such as the UK adjust to technological and economic developments, commentators such as the World Economic Forum[42] suggest that demand for skills such as operations analysis,[43] visualisation and thinking creatively is likely to grow in the near future. Such skills are seen as difficult to automate, and thus workers with these qualities are expected to experience increased demand for their services. Designers have these skills, and 2017 analysis by Design Council found that they are typified by their emphasis on interpersonal skills, such as operations analysis, social perceptiveness and coordination, and cognitive abilities such as visualisation and thinking creatively.[44] Research by Nesta also supports the notion that demand for these skills will grow, predicting that creative, digital, design and engineering occupations will all experience greater demand for their services by 2030.[45]



[42] World Economic Forum (2016) *The 10 Skills You Need to Thrive in the Fourth Industrial Revolution* [online]
[43] Defined in the O*NET database as "analysing needs and product requirements to create a design".
[44] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]
[45] Nesta (2017) The Future of Skills: Employment in 2030 [online]

It is within this context that we sought to better understand the qualifications, pay and working patterns of those operating within the design economy in order to gain a clearer picture of the demand for design skills, knowledge and services.

Qualifications
Previous Design Council analysis found that designers are more likely to require a first degree or postgraduate qualification (or a vocational qualification at an equivalent level) to enter their jobs than the average UK worker.[46] Analysis for this 2018 study supports this, finding that across the design workforce 57.1% of workers held a degree as their highest level of qualification (in 2016), compared with a UK average of 34%.

Qualification levels differ according to which subsector designers operate in. In advertising, for instance, 78.6% of designers hold a degree or equivalent (2016). This proportion has rapidly grown since the last edition of *The Design Economy*, which found that in 2014 63.8% of designers in advertising required a degree or equivalent. Designers in the digital design subsector are also highly qualified (70%), as well as in the multidisciplinary (60.1%) and graphic design (60%) subsectors. The subsectors with the lowest proportions with a degree continue to be craft (18.4%) and clothing (20.3%), although both have seen growth in the proportion of designers with degrees since the last edition of this study.

This analysis suggests that those sectors trading in intangible assets[47] such as branding and software are driving greater demand for designers formally qualified to a higher level. Across the design economy, this also means the percentage of the design workforce holding a degree has risen 65% since 2010. This indicates that not only are designers staying in formal education longer, but also that there is a growing expectation amongst employers for designers to be educated to this level.
This is supported by our previous analysis, which showed those working in design skills-intensive industries are less likely than average to be able to enter their jobs with qualifications below university level.[48] This potentially limits opportunities for those seeking entry into design roles via vocational education and apprenticeship pathways.

Wages
Understanding pay provides an additional indicator of demand for design skills and their perceived value. Wages are also indicative of higher skills. Our research shows that, in 2016, the mean average weekly salary for workers in the design economy was £548 per week, only slightly higher than the UK average weekly wage of £539 that year. However, this figure is depressed by the wages of support roles in design industries, and rises to £609 per week for designers in design industries. Digital designers earn the most with an average weekly wage of £757. Coupled with the higher levels of formal qualifications in these sectors, this suggests these skills have a high perceived value to these firms.

[46] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]
[47] Intangible assets, sometimes also referred to as knowledge assets or intellectual capital, include software, reputation and branding, research and development, financial product innovation, training and of course design, among others.
[48] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]

Table 12: Mean gross weekly salary in design, 2016

Design subsector	Designers in design industries	Other roles in design industries	Designers in other design sectors	Design subsector average	% change 2014-2016
Architecture and built environment	£661.84	£680.02	£672.07	£671.31	-0.1%
Design (multidisciplinary)	£530.37	£590.24	£560.08	£560.23	7.0%
Design (advertising)	-	-	£692.07	£692.07	-7.2%
Design (craft)	£486.85	£405.42	£446.10	£446.12	23.5%
Design (digital)	£757.12	£818.83	£793.78	£789.91	4.7%
Design (clothing)	*	£320.49	*	£320.49	-9.2%
Design (graphic)	-	-	£483.05	£483.05	-1.4%
Design (product and industrial)	*	£420.68	*	£420.68	10.6%
Design economy average	£609.05	£539.28	£607.86	£547.98	2.7%

Notes: (1) * indicates that a value is suppressed. (2) – indicates that a value is not available.
Source: Office for National Statistics (2018) Annual Survey of Hours and Earnings (2013-2016

The median average salary for designers has risen by 2.7% since 2014, although this is slower than the overall average UK salary which has risen by 5% during the same period. Among design subsectors, the largest salary increase was in craft, where average salaries for designers rose by 23.5% between 2014 and 2016 from £361 to £446 per week. In contrast, the average salary for clothing designers has declined by 9.2% over the same period, from £341 in 2014 to £309 in 2016.

Working patterns
In addition to pay, we also sought to better understand the working patterns of those in the design economy. Our research shows:

- Designers are most likely to be classified as employees (71.4% of the design economy) and most work full-time (85.7%).
- 28.2% of designers are self-employed compared with 15.1% of the workforce as a whole.[49]
- The design subsectors with the highest levels of self-employment are clothing (58%) and multidisciplinary (50.3%). Subsectors with the lowest levels of self-employment are digital (14.4%) and product and industrial (13.3%) design.
- The majority of designers have been with their current employer for two years or more (72%). In addition, one in three designers has been with their current employer for 10 years or more (32%).
- Out of 960,494 designers employed in design and non-design industries, 222,968 (or 23.2%) are managers, while 110,942 (or 11.5%) are foremen or supervisors. The rest are neither managers nor supervisors.
- Approximately four-fifths (79%) of design managers are in the digital design, architecture and built environment, and design product and industrial design sectors.

[49] Office for National Statistics (2018) 'Trends in self-employment in the UK' [online]

Case study: Page\Park – The Scottish architecture practice breaking down hierarchies.

Page\Park Architects is a Glasgow-based architecture and master planning practice applying a 'handcrafted' philosophy towards design for the built environment. It has designed some of Scotland's most beloved buildings including The Lighthouse, the Centre for Contemporary Art, the National Museum of Rural Life, and the Scottish National Portrait Gallery.

The firm was established by David Page and Brian Park in the 1980s with the intention to provide a Scottish base for creative architectural talent at a time when most notable architects and firms were concentrated in London. After the architectural optimism and public sector support of the 1980s and 1990s, Page\Park – along with many UK practices – was profoundly affected by the 2008 global financial crisis. As a result they restructured the business, formalising their business practice areas, and became an employee-owned business with a progressive open-book salary model.

Employee ownership has resulted in very different ways of working compared to most traditionally hierarchical architecture firms. This includes 'all-hands' meetings every Monday and internal design reviews where the project team present to a panel of peers for feedback. Staff are also organised into 'centres of gravity', semi-autonomous groupings by methodological expertise (eg, conservation) or types of building (eg, creative workspace or arts and culture). Each designer is also responsible for a functional support role within the company, for example finance or IT.

"Everyone is aware of what we have to do to keep this machine going."

Karen Pickering, Chair of the Board

Photo: Page\Park; Copyright Page\Park 2018

The rapid adoption of Building Information Modelling (BIM) in the sector is also breaking down hierarchical structures based on seniority, requiring senior and junior staff to work more closely together. In addition, community engagement in design has always been an important part of Page\Park's process. This involves designing with and in response to the community, attending public meetings and talking directly to the people they're ultimately designing for. This handcrafted and customised design process results in a distinct look and personality for each building that is tailored to the needs of the building's users and inhabitants.

"I like to think that what we've built still, after 30 years, has value. People are affectionate about them. People feel something in it that says, 'This particular place that I'm in is kind of special'. We conserve buildings that are 100 years old, so essentially we don't want to have our buildings thrown away after 20 or 30, that's not the point."

David Page, Director and Head of Architecture

The diversity of the design economy

For the design economy and the UK more widely to prosper during uncertain times, it is essential that we bring a greater range of people into design careers across more parts of the country. This is to ensure that more people and businesses have access to high value design occupations and that there is a diverse range of voices in the room, increasing the pool of talent and flow of ideas.

Yet in keeping with results from our 2015 edition, we have found that the design economy continues to be characterised by a relatively young, male-dominated workforce and its economic impact benefits London and the south-east more than any other local economy in the UK. We have proposed policy and business solutions to widen the reach and impact of design in our recommendations.

Gender

The UK's design workforce is mostly male (78%), which is a higher figure than for the wider UK workforce which is 53% male, and one which has not improved since the last edition of The Design Economy in 2015 (which also reported 78%). Overall, women form the minority in six of the eight design subsectors included in this study, with product and industrial design being the most male dominated (95%) followed by digital design (85%) and architecture and built environment (80%). This is despite women making up 63% of all students studying creative arts and design courses at university, and 38% of students studying architecture, building and planning.[50] Yet as Table 13 below highlights, women comprise only 20% of designers in the architecture and built environment subsector.

Table 13: Design occupations by gender, 2016 (totals and as a proportion of subsector)

Design subsector	Male (total)	Male (percentage)	Female (total)	Female (percentage)	Total
Architecture and built environment	273,300	80.0%	68,200	20.0%	341,500
Design (multidisciplinary)	31,700	36.3%	55,600	63.7%	87,300
Design (advertising)	22,900	62.7%	13,600	37.3%	36,500
Design (craft)	82,000	77.4%	23,900	22.6%	105,900
Design (digital)	411,900	85.1%	72,400	14.9%	484,300
Design (clothing)	3,800	27.5%	10,000	72.5%	13,800
Design (graphic)	78,100	64.4%	43,200	35.6%	121,300
Design (product and industrial)	148,900	94.7%	8,300	5.3%	157,200
Design economy	1,052,400	78.1%	295,200	21.9%	1,347,700
Creative industries	1,134,900	63.3%	657,500	36.7%	1,792,400
UK economy	16,223,400	53.3%	14,230,500	46.7%	30,453,900

Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

Even when employed in design, women typically earn less. Table 14 overleaf shows the gender pay gap in different design occupations, calculated as the difference between average hourly earnings (excluding overtime) of men and women as a proportion of average hourly earnings (excluding overtime) of men.
For example, a 4% gender pay gap denotes that women earn 4% less on average than men. Conversely, a -4% gender pay gap denotes that women earn 4% more on average than men.

Our analysis shows that in 19 out of 20 eligible design occupations, women earn less than men. For example, in the multidisciplinary design subsector[51] women working as product, clothing and related designers earn 18.3% less than men in that sector, despite making up nearly two-thirds of that design subsector (64%).

There are also significant gender pay gaps in more male-dominated sectors, with female town planning officers earning 28.6% less, while IT business analysts, architects and systems designers earn 19.8% less. Both these sectors have a predominantly male design workforce – architecture and built environment (80% male) and digital design (85.1% male). These findings are in keeping with those of other studies elsewhere, such as the Women in Architecture survey conducted by The Architects' Journal[52] and The Architectural Review which found consistent pay discrepancy between female employees and their male counterparts, and widespread discrimination in the workplace and on site. There is only one occupation, civil engineers, where women earn more than men (0.4%).

[50] Higher Education Statistics Authority (2018) 'HE student enrolments (including on AP designated courses) by subject area and sex 2016/17' [online]
[51] The multidisciplinary subsector includes "product, clothing and related designers [who] plan, direct and undertake the creation of designs for new industrial and commercial products, clothing and related fashion accessories, costumes and wigs, and for building interiors and stage sets". This differs from the product/industrial design subsector, which concerns furniture design and the manufacture of consumer electronics.
[52] The Architects Journal (2017) Women in Architecture Survey 2017 [online]

Table 14: Gender pay gap (%) for design occupations, 2017[53]

Design subsector	Description	SOC code	Gender pay gap (median average)[54]
Advertising design	Advertising accounts managers and creative directors	2473	13.4
Architecture and built environment	Civil engineers	2121	-0.4
Architecture and built environment	Architects	2431	4.4
Architecture and built environment	Town planning officers	2432	28.6
Architecture and built environment	Chartered architectural technologists	2435	-
Architecture and built environment	Architectural and town planning technicians	3121	13.2
Architecture and built environment	Draughtspersons	3122	11.3
Architecture and built environment	Gardeners and landscape gardeners	5113	2
Clothing design	Tailors and dressmakers	5414	7.8
Craft design	Smiths and forge workers	5211	-
Craft design	Weavers and knitters	5411	-
Craft design	Glass and ceramics makers, decorators and finishers	5441	12.2
Craft design	Furniture makers and other craft woodworkers	5442	7
Craft design	Other skilled trades not elsewhere classified	5449	14.8
Digital design	IT business analysts, architects and systems designers	2135	19.8
Digital design	Programmers and software development professionals	2136	6.8
Digital design	Web design and development professionals	2137	2.1
Graphic design	Artists	3411	6.9
Graphic design	Graphic designers	3421	5.6
Multidisciplinary design	Product, clothing and related designers	3422	18.3
Product and industrial design	Mechanical engineers	2122	-6.1
Product and industrial design	Design and development engineers	2126	8.5
Product and industrial design	Engineering professionals not elsewhere classified	2129	7.9

Note: – indicates that a value is not available.
Source: Office for National Statistics (2018) Annual Survey of Hours and Earnings (2013-2016)

[53] Data in the table is colour coded according to the quality of each estimate and is based upon the coefficient of variation (CV) values for the corresponding male and female earnings estimates. The CV is the ratio of the standard error of an estimate to the estimate itself and is expressed as a percentage. The smaller the CV, the greater the accuracy of the estimate. Cells in white are of good quality, those in light blue are considered of reasonable quality and those in beige are of lower quality. Estimates in orange are considered unreliable for practical purposes or are unavailable.

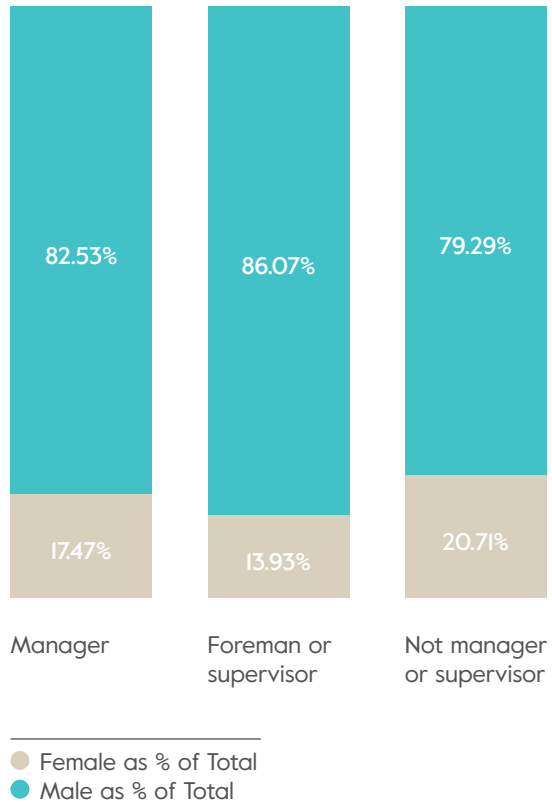
[54] The median average is the value below which 50% of jobs fall. It is ONS' preferred measure of average earnings as it is less affected by a relatively small number of very high earners and the skewed distribution of earnings. It therefore gives a better indication of typical pay than the mean.

Our analysis also finds that women are less likely than men to be in senior roles. Only 17% of design managers and 14% of designers at foreman or supervisor level are female.

Yet there are some signs of change, with more women entering the design economy at a faster rate than men. Since 2010 the percentage of women working in the design economy has grown 42%, compared to 17% growth amongst men.

Furthermore, in response to these challenges, groups such as Kerning the Gap[55] have emerged to promote greater female leadership in design, while design firms such as Studio Moross are consciously making an effort to improve the diversity of their workforce. Yet at a time when demand for design skills is at its greatest, the UK has an untapped well of expertise at its disposal which it has yet to capitalise on. Design Council has gathered extensive data on this issue, and is committed to working with design firms as well as design schools to identify trends, challenges and potential solutions.

Chart 2: Seniority of designers by gender, 2016 (n=960,494)



Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

[55] For more information see: http://www.kerningthegap.com/

Case study: Studio Moross – Tackling a lack of diversity in design

Studio Moross was started by Kate Moross in 2012. Since then, the studio has evolved into a team of 11 in London with an expanding presence in North America, growing its capabilities from branding, graphic design, illustration and packaging to moving image design, animation and broadcast design. The studio has a large client base across the entertainment sector and a strong foothold in the music industry, working with labels, leading artists, and music festivals and venues. It has undertaken design and branding work for One Direction, Sam Smith, Disclosure, Parklife festival in Manchester and the revitalised Dreamland Margate.

Studio Moross approaches its design process and team structure in a flexible, non-hierarchical way and makes a point of engaging and elevating emerging talent. There is no distinction between design and project management roles within the company. All designers handle some degree of project management, lead client relationships and the allocation of work is typically based on expertise rather than seniority.

"Everybody involved has the opportunity to leave their mark on a project – they have personal relationships with clients, they attend meetings and shoots, pitch ideas – they're not just one cog in a big machine."

Oliver Chapman, Senior Project Manager

Photo: Studio Moross; Copyright Studio Moross 2018

Studio Moross has also developed a concerted diversity policy to encourage those from a variety of backgrounds to work at the studio. According to the Creative Industries Federation's 2015 *Creative Diversity* report, 11% of jobs in the creative economy are filled by people from Black and Minority Ethnic (BAME) backgrounds. When weighted according to where jobs are based, this means BAME workers are underrepresented in the creative economy.[56]

Studio Moross uses the recruitment agency Creative Access to identify interns from BAME communities. It uses Instagram and other platforms to proactively identify and attract talented people from diverse backgrounds whose work it likes, but who might not put themselves forward. Kate Moross has also taken on more speaking and writing in the past few years, wanting to elevate LGBTQ+ and non-binary voices in the industry.

"I previously came from a traditional point of view that the best person for the job is the best person for the job. But then I was opened to wider systemic issues. I kept on getting the same type of person applying for our jobs and wondering why we weren't drawing in a more diverse pool. So we've made moves to readdress how we appeal to people."

Kate Moross, Founder and Director

[56] Creative Industries Federation (2015) *Creative Diversity* [online]

"Everybody involved has the opportunity to leave their mark on a project – they have personal relationships with clients, they attend meetings and shoots, pitch ideas – they're not just one cog in a big machine."

Oliver Chapman, Senior Project Manager

Table 15: Design occupations by age, 2016

	16-24 years old	25-34 years old	35-44 years old	45-54 years old	55-64 years old	65 years and over	Total
Architecture and built environment	8.2%	24.6%	22.0%	24.2%	14.7%	6.3%	341,500
Design (multidisciplinary)	13.9%	27.7%	21.2%	21.8%	13.6%	1.9%	87,300
Design (advertising)	*	30.7%	32.6%	26.3%	*	*	36,500
Design (craft)	7.8%	23.1%	19.4%	25.8%	17.9%	5.9%	105,900
Design (digital)	8.4%	33.8%	31.0%	19.3%	6.6%	0.9%	484,300
Design (clothing)	*	20.3%	29.7%	19.6%	*	*	13,800
Design (graphic)	11.1%	31.7%	31.0%	14.2%	7.8%	4.2%	121,300
Design (product and industrial)	8.5%	27.9%	20.6%	22.5%	15.8%	4.6%	157,200
Design economy (%)	8.8%	29.1%	26.0%	21.3%	11.3%	3.5%	
Design economy (n)	118,700	392,500	350,000	287,500	152,000	47,100	1,347,700
Creative industries	144,000	490,500	481,600	392,700	209,200	74,500	1,792,400
UK economy	3,695,000	6,945,800	6,834,900	7,460,100	4,416,400	1,101,800	30,453,900

Note: * indicates suppressed values.
Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

Age
Our analysis shows that overall the design workforce is younger than average – 64% of designers are aged under 45 compared with 57% of the UK workforce as a whole. Graphic design is the youngest subsector, with 73.8% of the workforce under 44 years of age. Craft is the oldest, with 49.6% of the workforce over 45 years old.

Our previous research found a 60% decline in the numbers studying design at GCSE level (between 2000 and 2017). This presents an interesting challenge for sectors with older workforces as their ageing workforce retires and is not replaced.

Table 16: Design occupations by ethnicity, 2016 as a proportion of the sector

	White	Asian background	Black/African/ Caribbean/ Black British	Other ethnic group	Unknown
Architecture and built environment	93.7%	3.7%	*	1.9%	*
Design (multidisciplinary)	89.6%	*	*	*	*
Design (advertising)	93.4%	*	*	*	*
Design (craft)	97.5%	*	*	*	*
Design (digital)	80.0%	13.6%	*	4.3%	*
Design (clothing)	63.8%	*	*	*	*
Design (graphic)	90.8%	5.4%	*	2.9%	*
Design (product and industrial)	88.7%	8.0%	*	1.9%	*
Design economy	87.7%	7.3%	1.4%	3.0%	0.1%

Note: * indicates suppressed values.
Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

Ethnicity
The design economy employs a slightly higher proportion of people from BAME backgrounds than are employed in the wider UK economy (13% compared with 11%). This figure has improved since our previous analysis (11.4%).

A low incidence of BAME designers in different design subsectors means analysis at subsector level is characterised by substantial amounts of data suppression. However, we are able to infer the proportion of BAME designers in each subsector by reporting on the proportion classified as White.

Additional analysis shows that BAME designers are least likely to be in senior roles, accounting for only 12% of all design managers. Our analysis shows that 88% of design managers are White, 7% come from an Asian background, 2% are Black/African/Caribbean/Black British, and 3% come from other ethnic groups.

Social class
The majority of designers are in the higher socio-economic classes. Two-thirds (67%) of designers are in higher managerial, administrative and professional occupations and nearly a quarter of designers (24%) are in intermediate occupations. Only a small fraction (fewer than 7%) are in routine and manual occupations.[57]

The vast majority (over 97%) of designers in advertising, digital, and product and industrial occupations are in the higher managerial, administrative and professional occupations category. Craft has the highest proportion of routine and manual occupations (48%).

The socio-economic status of designers in different design subsectors reflects the design subsectors in which designers are most highly qualified. The subsectors with the highest proportion of designers in higher socio-economic classes (eg product and industrial, advertising and digital) are also those with the highest proportion of designers who hold a degree or equivalent, for example, 97.4% of designers who work in advertising are in the higher socio-economic classes and 78.6% of them hold a degree or equivalent.

By focusing on a measure of socio-economic class that is based on current occupation, we cannot fully understand the socio-economic background of designers, such as the socio-economic class of people in the household they grew up in. This is something Design Council wishes to explore further in the future. However, if the majority of designers are in the higher socio-economic classes, then the design economy risks being seen as elitist. This could present a challenge for the talent pipeline in the future by alienating potential designers who don't feel like design education or design jobs are for people like them. A homogeneity in socio-economic status of the design workforce could also affect design's ability to fully understand and meet user need for the whole of society.

[57] The socio-economic class of designers was obtained from the Annual Population Survey and is based on the three-class version of the ONS' NS-SEC (National Statistics Socio-Economic Classification) variable. It is a derived variable, which is mainly occupation based and uses data on employment status, employment relations and labour contracts to classify the adult population into socio-economic groups.

Table 17: Design occupations by socio-economic class, 2016

Design occupations	Higher managerial, administrative and professional occupations	Intermediate occupations	Routine and manual occupations	Never worked/long term unemployed
Architecture and built environment	56.8%	33.2%	8.1%	2.0%
Design (multidisciplinary)	17.3%	79.4%	*	*
Design (advertising)	97.4%	*	*	*
Design (craft)	*	47.2%	48.4%	*
Design (digital)	97.5%	*	*	2.2%
Design (clothing)	*	54.2%	41.8%	*
Design (graphic)	28.2%	66.1%	2.6%	3.0%
Design (product and industrial)	98.1%	–	*	*
Design economy	67.1%	23.8%	6.5%	1.6%

Note: * indicates suppressed values and – means data not available.
Source: Office for National Statistics (2018) Annual Population Survey (2004-2017)

Design hotspots across the UK

As the economy adapts to the fourth industrial revolution, cities are most likely to reap the benefits. Many are already home to the knowledge-intensive institutions (such as universities) and firms (such as those that use design) that will be at the forefront of this change. Cities provide a greater pool of highly skilled workers. Additionally there is an increased demand for the sophisticated goods and services they produce, not to mention better opportunities for face-to-face contact and potential knowledge and technology spillovers. Yet there is a risk that as these changes take hold, other areas of the country get left behind, with implications for growth, innovation and productivity.

Our analysis explored the geographical distribution of designers and design firms to better understand which areas are benefiting most from design, and which areas require additional support.

Table 18: Design firms by region, 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017	% change 2014-2017	% change 2010-2017
North-east	1,020	1,105	1,270	1,330	1,435	1,450	1,450	1,445	0.7%	41.7%
North-west	3,755	4,105	4,695	5,000	5,435	5,350	5,450	5,600	3.0%	49.1%
Yorkshire and The Humber	2,680	2,905	3,365	3,660	3,855	3,940	3,985	4,115	6.7%	53.5%
East Midlands	2,780	2,945	3,335	3,675	3,905	3,825	3,890	4,010	2.7%	44.2%
West Midlands	3,475	3,690	4,200	4,445	4,640	4,555	4,660	4,785	3.1%	37.7%
East	4,730	5,250	6,125	6,525	6,930	7,020	7,190	7,320	5.6%	54.8%
London	11,825	13,935	17,335	19,015	20,420	21,250	22,635	23,595	15.5%	99.5%
South-east	8,570	9,680	11,585	12,700	13,205	13,305	13,855	14,050	6.4%	63.9%
South-west	3,815	4,240	4,865	5,220	5,710	5,695	5,990	6,195	8.5%	62.4%
Wales	1,220	1,290	1,465	1,505	1,620	1,665	1,680	1,705	5.2%	39.8%
Scotland	2,845	3,155	3,665	3,885	3,995	3,865	3,970	4,035	1.0%	41.8%
Northern Ireland	1,200	1,210	1,195	1,195	1,180	1,140	1,150	1,175	-0.4%	-2.1%
UK design industries	47,920	53,530	63,145	68,170	72,340	73,060	75,905	78,030		62.8%

Source: Office for National Statistics (2018) 'UK business counts 2010-2017'

Regional distribution
Our analysis shows that design is becoming more concentrated in London and the south-east, not less. London remains the powerhouse of UK design, with almost one in three design firms now based in the capital, as well as one in five design workers. London also generates 28% of the design economy's GVA, equivalent to £1 in every £4 generated by UK design.

London has the highest number of design-intensive firms in the UK, with design-intensive firms also accounting for a considerable share of the capital's total business population (4.7%). London, which contains 19% of all UK firms, accounts for 30% of the UK's design-intensive firms – up from 28.2% in 2014. The south-east region, which contains 15% of all UK firms, has 18% of the UK's design-intensive firms.

London has a higher number of firms in all design industries than other UK regions, except in product and industrial design where numbers are higher in the south-east, east and south-west. We also found that 4.7% of firms in London and 3.5% of firms in the south-east are design-intensive firms, compared with an average 2.7% of all UK design-intensive firms.

Despite this, every other UK region (bar Northern Ireland) has experienced growth in the number of design firms since 2010. The south-west has grown 62.4% since 2010, and over the same time period the number of design firms has grown by 54.8% in the east and by 53.5% in Yorkshire & The Humber, while London has experienced the greatest increase with 99.5% growth. While the number of design firms in Northern Ireland has shrunk by -2.1% since 2010, employment has grown 11.1% over the same period, suggesting fewer but larger firms operating in the country.

Table 19: Composition and value of the design economy by region

Region	Firms – 2017	Employment – 2016	GVA – 2016	Productivity – 2016	Exports – 2015
North-east	1,445	47,600	£170	£36,660	£1,065
North-west	5,600	138,600	£606	£51,367	£4,332
Yorkshire and The Humber	4,115	110,000	£593	£45,989	£2,624
East Midlands	4,010	113,100	£448	£37,404	£3,040
West Midlands	4,785	139,300	£507	£43,730	£4,260
East	7,320	143,000	£770	£44,288	£4,255
London	23,595	341,600	£3,873	£70,243	£10,630
South-east	14,050	276,100	£3,125	£67,410	£9,284
South-west	6,195	152,800	£726	£36,728	£4,327
Wales	1,705	50,100	£181	£37,966	£1,234
Scotland	4,035	137,800	£381	£32,772	£3,350
Northern Ireland	1,175	31,900	-	-	-
UK design industries	78,030	1,693,200	£11,380	£50,328	£48,405mn

Note: – indicates that a value is not available.
Source: Office for National Statistics (2018) Annual Business Survey (2008-2016), Annual Population Survey (2004-2017), Annual Survey of Hours and Earnings (2013-2016), 'UK business counts (2010-2017)'

Design therefore plays a key role in several regional economies. Southern English regions enjoy the most significant economic value in terms of GVA, productivity and exports. However, the former industrial heartlands of the north-west of England and the West Midlands also experience high levels of value from their regional design economies.

Table 20: Design productivity compared to regional productivity, 2016

Region	Design productivity – 2016	Regional productivity – 2016[58]	Difference – design compared to regional productivity (%)
North-east	£36,660	£19,542	188%
North-west	£51,367	£22,899	224%
Yorkshire and The Humber	£45,989	£21,285	216%
East Midlands	£37,404	£21,502	174%
West Midlands	£43,730	£22,144	197%
East	£44,288	£24,488	181%
London	£70,243	£45,046	156%
South-east	£67,410	£28,506	236%
South-west	£36,728	£23,548	156%
Wales	£37,966	£19,200	198%
Scotland	£32,772	£24,876	132%
UK	£50,328	£39,111	129%

Source: Office for National Statistics (2018) Annual Business Survey (2008-2016), Annual Population Survey (2004-2017), Annual Survey of Hours and Earnings (2013-2016)

Our analysis shows that every UK region enjoys higher levels of productivity generated by their local design communities than the value generated by the wider workforce in their areas. For example, outside London and the south-east, designers in the north-west are the next most productive in the design economy, generating £51,367 in output per annum. This is substantially higher than the UK average (£39,111 per annum) and higher than productivity levels for the regional workforce more widely (£22,899). In fact, designers are more productive than the average worker in every region of Great Britain.[59]

[58] Office for National Statistics (2017) *Regional Gross Value Added* [online]
[59] Analysis on design productivity in Northern Ireland is not possible due to data suppression.

Most regions have also experienced growth in the GVA generated by designers in their area, and the north-west and West Midlands have experienced significant growth in GVA, productivity and exports since 2010. This growth appears to be partly attributable to demand for localised design specialties, such as craft design and automotive in the West Midlands, eg, the potteries in Stoke-on-Trent and Jaguar Land Rover for example. This is also illustrated in Figure 6, which shows the West Midlands is characterised by a concentration of craft design expertise. Outside London and the south-east, the West Midlands, along with the north-west, has experienced the most significant growth in design GVA (83% and 28.5% respectively) since 2010.

Design clusters

For this 2018 edition we expanded our geographic analysis to identify groups of businesses across the UK which could be considered design clusters. Our analysis replicates that undertaken by the Department for Business, Energy & Industrial Strategy but for different sectors of interest.[60] Clusters are geographic concentrations of firms within the same industry. Research shows that businesses within clusters benefit from agglomeration effects such as facilitated knowledge exchange, increased access to relevant skills and reduced supply chain costs.[61] The identification of design industry clusters helps to increase the evidence base surrounding the strength of the design economy across the UK.

Our analysis provides information on three key aspects:

- Design industry clusters within the UK;
- Employment hotspots within the identified clusters, and;
- Employment growth within the aforementioned clusters.

This information is illustrated pictorially in a series of maps (see Figures 6 and 7 overleaf). We have used a multi-layered approach to identify these design industry clusters. To conduct this analysis we used 'density-based spatial clustering of applications with noise' (DBSCAN).[62] This bottom-up approach uses the location of individual businesses to form clusters. As such, results are not restricted to existing administrative boundaries and the clusters fall within and across administrative boundaries. A DBSCAN map was produced for most design subsectors.[63]

We then built upon the DBSCAN maps by overlaying the results of the Kernel Density Estimation (KDE). The KDE technique was used to create a heat map which is used to identify employment hotspots. This allows users to better understand the distribution of employment within and outside the clusters. The red hotspots are generally contained within a DBSCAN identified cluster. However, where this is not the case, it is because the KDE is picking out areas with high employment, but not sufficient individual businesses to be a cluster. The KDE analysis forms the first map for each subsector (Figure 6). A second map was then produced for each design subsector to illustrate employment growth within the cluster between 2010 and 2015 (Figure 7).

This analysis supports the findings of our 2015 study, and highlights that different regions have different design expertise. The architecture and built environment subsector, for instance, is heavily concentrated in London and the south-east (Figure 6), and employment in this subsector appears to be growing more concentrated in these regions (Figure 7). Conversely, the design economy in the West Midlands is characterised by craft and product and industrial design, building on the region's craft and industrial heritage, as well as its continued association with manufacturing and engineering (ranging from automotive production to pottery).

While still concentrated in London and the south-east, employment in digital design and multidisciplinary design is more dispersed across the country than other sectors. There also appears to have been substantial growth in employment in these sectors outside southern England between 2010 and 2015. This is partly explained by the multifaceted nature of the multidisciplinary design subsector, which covers firms undertaking specialised design activities ranging from sustainable design and industrial design to interior design, among others. However, along with growth in digital design, it suggests that demand for a more diverse range of design skills is slowly changing outside the capital. Nonetheless, despite some growth in other areas of the country, design remains widely underused in areas where it could have the greatest impact. London and the south-east appear to be benefiting more from greater access to, and use of, design across their economies. This is possibly correlated with the concentration of other key sectors in these regions, such as architecture and banking, which are high value users and providers of design.

[60] Department for Business, Energy and Industrial Strategy (2017) *Density-Based Spatial Clustering: Identifying industrial clusters in the UK – methodology report* [online]
[61] Design Council (2018) *Understanding Design-Intensive Innovation: A literature review* [online]
[62] Ester M, Kriegel HP, Sander J and Xiaowei X (1996) 'A density-based algorithm for discovering clusters in large spatial databases with noise' *KDD'96 Proceedings of the Second International Conference on Knowledge Discovery and Data Mining* pp.226-231.
[63] Excluding advertising and graphic design where data were insufficient.

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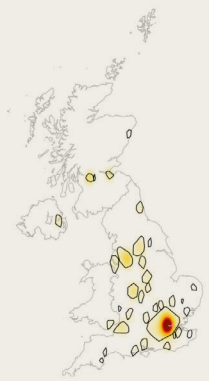
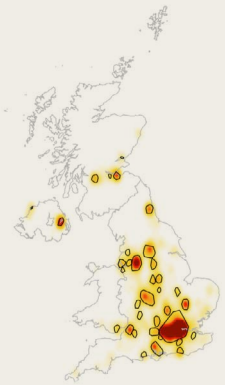
Figure 6: Design clusters, 2015

KDE and cluster formations for Architecture and Built Environment



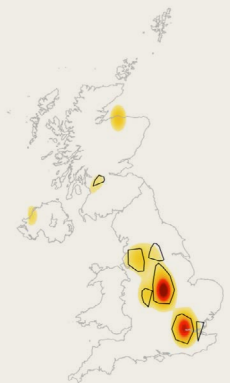
Parameters for Architecture and Built Environment in 2015 are:
radius=0.1 and minimum points=213
The percentage of noise is 32%

KDE and cluster formations for Design (digital)



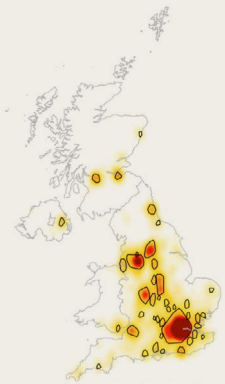
Parameters for Design (digital) in 2015 are:
radius=0.08 and minimum points=519
The percentage of noise is 30%

KDE and cluster formations for Design (clothing)



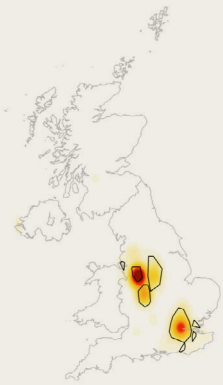
Parameters for Design (clothing) in 2015 are:
radius=0.23 and minimum points=136
The percentage of noise is 28%

KDE and cluster formations for Design (multidisciplinary)



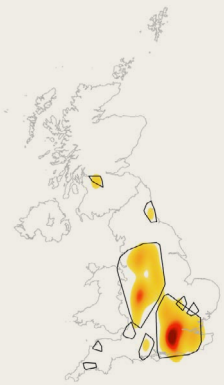
Parameters for Design (multidisciplinary) in 2015 are:
radius=0.08 and minimum points=148
The percentage of noise is 28%

KDE and cluster formations for Design (craft)



Parameters for Design (craft) in 2015 are:
radius=0.19 and minimum points=97
The percentage of noise is 39%

KDE and cluster formations for Design (product and industrial)



Parameters for Design (product and industrial) in 2015 are:
radius=0.2 and minimum points=93
The percentage of noise is 28%

N.B. Do not compare KDE maps between sectors

Source: Enterprise Research Centre extracts from Office for National Statistics (2018) Inter-Departmental Business Register, 2010 and 2015

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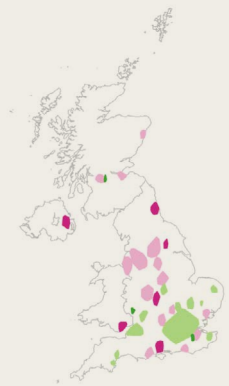
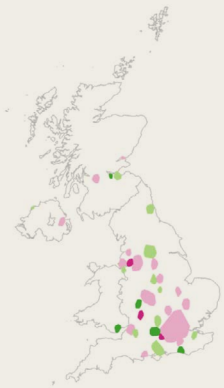
Figure 7: Employment growth within design clusters, 2010-2015

Employment growth within clusters for Architecture and Built Environment between 2010 and 2015



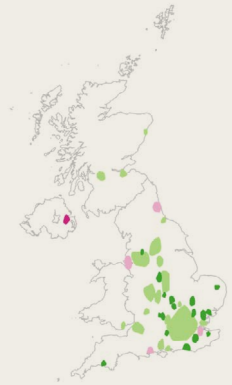
Parameters for Architecture and Built Environment in 2015 are:
radius=0.1 and minimum points=213
The percentage of noise is 32%
Total sector growth: -12%
Growth Outside Clusters: -18%

Employment growth within clusters for Design (digital) between 2010 and 2015



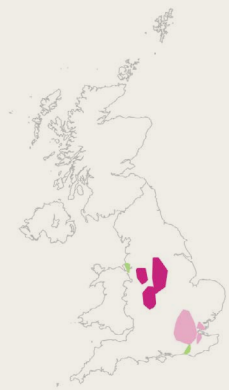
Parameters for Design (digital) in 2015 are:
radius=0.08 and minimum points=519
The percentage of noise is 30%
Total sector growth: -8%
Growth Outside Clusters: -14%

Employment growth within clusters for Design (multidisciplinary) between 2010 and 2015



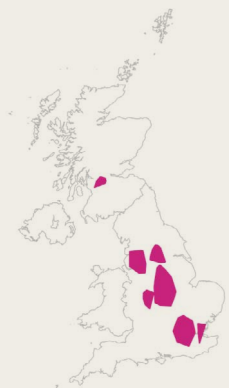
Parameters for Design (multidisciplinary) in 2015 are:
radius=0.06 and minimum points=148
The percentage of noise is 28%
Total sector growth: 11%
Growth Outside Clusters: -1%

Employment growth within clusters for Design (craft) between 2010 and 2015



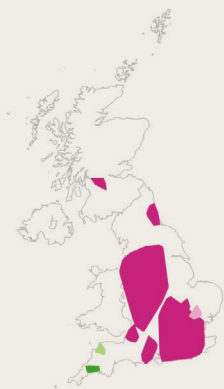
Parameters for Design (craft) in 2015 are:
radius=0.19 and minimum points=97
The percentage of noise is 39%
Total sector growth: -49%
Growth Outside Clusters: -49%

Employment growth within clusters for Design (clothing) between 2010 and 2015)



Parameters for Design (clothing) in 2015 are:
radius=0.23 and minimum points=136
The percentage of noise is 28%
Total sector growth: -67%
Growth Outside Clusters: -60%

Employment growth within clusters for Design (product and industrial) between 2010 and 2015



Parameters for Design (product and industrial) in 2015 are:
radius=0.2 and minimum points=93
The percentage of noise is 28%
Total sector growth: -59%
Growth Outside Clusters: -76%

- Increase Greater Than 30%
- Increase Less than 30%
- Decrease Less Than 30%
- Decrease Greater Than 30%
- No Information

Source: Enterprise Research Centre extracts from Office for National Statistics (2018) Inter-Departmental Business Register, 2010 and 2015

Design firms by city
Our analysis suggests that the areas with the lowest concentrations of design firms are those which have been most adversely affected by the decline of heavy industry, and these tend to be concentrated in northern England.

Table 21 across shows the top 14 and bottom 20 areas for number of design firms, using location quotient (LQ), which is a way of showing how concentrated a particular industry or occupation is within a geographic area compared to the rest of the country. Our research used this approach to understand how an area's economy would look if it were the same size as the UK, revealing areas with more or fewer firms within the design economy than would be expected.

The Centre for Cities estimates that by 2030 the fourth industrial revolution will contribute to considerable job losses across the country, with one in five jobs in an occupation that is 'very likely' to shrink. This is equivalent to 20.2% of the current workforce in cities.[64]

Places such as Mansfield and Sunderland are likely to be worst affected, where they estimate almost 30% of the current workforce is in an occupation 'very likely' to shrink. The majority of jobs at risk can be found in just five types of occupations, also characterised by low value and/or routinised activity:

- Sales assistants and retail cashiers
- Other administrative occupations
- Customer service occupations
- Administrative occupations: finance
- Elementary storage occupations

Conversely, those occupations requiring interpersonal and cognitive skills are anticipated to grow in demand.[65] Previous Design Council analysis highlighted how design occupations use these skills,[66] and thus there is a compelling case to be made for greater use of design to offset job shrinkage and contribute to economic regeneration in areas where there is a below average presence of design firms and design skills. This notion is supported by a comparison of Design Economy data with that from the Centre for Cities. It suggests a growing divide between those local economies (such as Cambridge, Reading and London) where valuable intangible assets such as design appear to have a considerable presence in the form of design firms, and local economies (such as Doncaster and Blackburn) which have a below average presence of design firms.

[64] Centre for Cities (2018) *Cities Outlook 2018* [online]
[65] Nesta (2017) The Future of Skills: Employment in 2030 [online]
[66] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]
[67] An LQ of 1.0 indicates that the concentration of firms within an area matches the national average. An LQ of 1.5 means that there is 50% more of a particular activity in the area than one might expect to find based on the national average. Conversely, an LQ of 0.5 means that there is 50% less of an activity in the area than one might expect. We have presented the 14 locations with an LQ of above 1.0, and the bottom 20 with an LQ below.

Table 21: Location quotients of design firms[67] compared with share of jobs in occupations likely to shrink, by city

City	Firm LQs by city, 2017 (all those above UK average)	Percentage of jobs likely to shrink (%)
Cambridge	2.09	12.9
Reading	1.63	15.4
London	1.60	16.1
Milton Keynes	1.48	21.5
Oxford	1.41	12.8
Bristol	1.28	19.1
York	1.20	18.7
Worthing	1.19	16.0
Bournemouth	1.12	21.9
Hastings	1.11	-
Cardiff	1.09	20.4
Sheffield	1.06	23.5
Leeds	1.06	21.3
Swindon	1.01	23.9

City	Firm LQs by city, 2017 (bottom 20 below UK average)	Percentage of jobs likely to shrink (%)
Doncaster	0.45	26.5
Blackburn	0.47	26.3
Blackpool	0.48	18.6
Luton	0.48	20.1
Grimsby	0.51	-
Bradford	0.57	24.2
Sunderland	0.58	29.2
Wigan	0.59	24.7
Rochdale	0.60	-
Bolton	0.62	-
Middlesbrough	0.65	22.4
Mansfield	0.68	29.4
Newport	0.68	23.4
Burnley	0.68	23.8
Preston	0.69	21.4
Huddersfield	0.69	25.3
Crawley	0.70	20.6
Swansea	0.70	23.2
Birkenhead	0.72	21.8
Peterborough	0.72	24.6

Note: – indicates that a value is not available.
Source: Office for National Statistics (2018) 'UK business counts 2010-2017'; Centre for Cities (2018) *Cities Outlook 2018*

Future economic development not only needs to concentrate on creating more jobs, but also on creating the sort of jobs that will be most in demand in the future. Given the growing demand for design skills and the higher wages, business growth and productivity that result from it, regional and local investment in design offers an opportunity to help turn around the fortunes of towns and cities most vulnerable to the structural changes currently taking place across the economy, as it has done at times of industrial change in the past.

The design economy in a global UK

Design specialism sets the UK apart from global competition. But whilst the demand for UK design is growing, international competitors are also growing their design exports rapidly. Capitalising on design's potential to increase UK goods and services exports is more important than ever as the UK exits the European Union.

This chapter looks at the total value of exports influenced by the design economy, namely, where design has made a contribution to the export of goods and services.[68] It starts with an overview of key data for the UK before progressing to a more in-depth analysis of how the UK compares to its international competitors in terms of exports of design goods and design registrations.

[68] Export estimates are taken from the ONS International Trade in Services (ITIS) data and the UN Commodity Trade Statistics database (Comtrade).

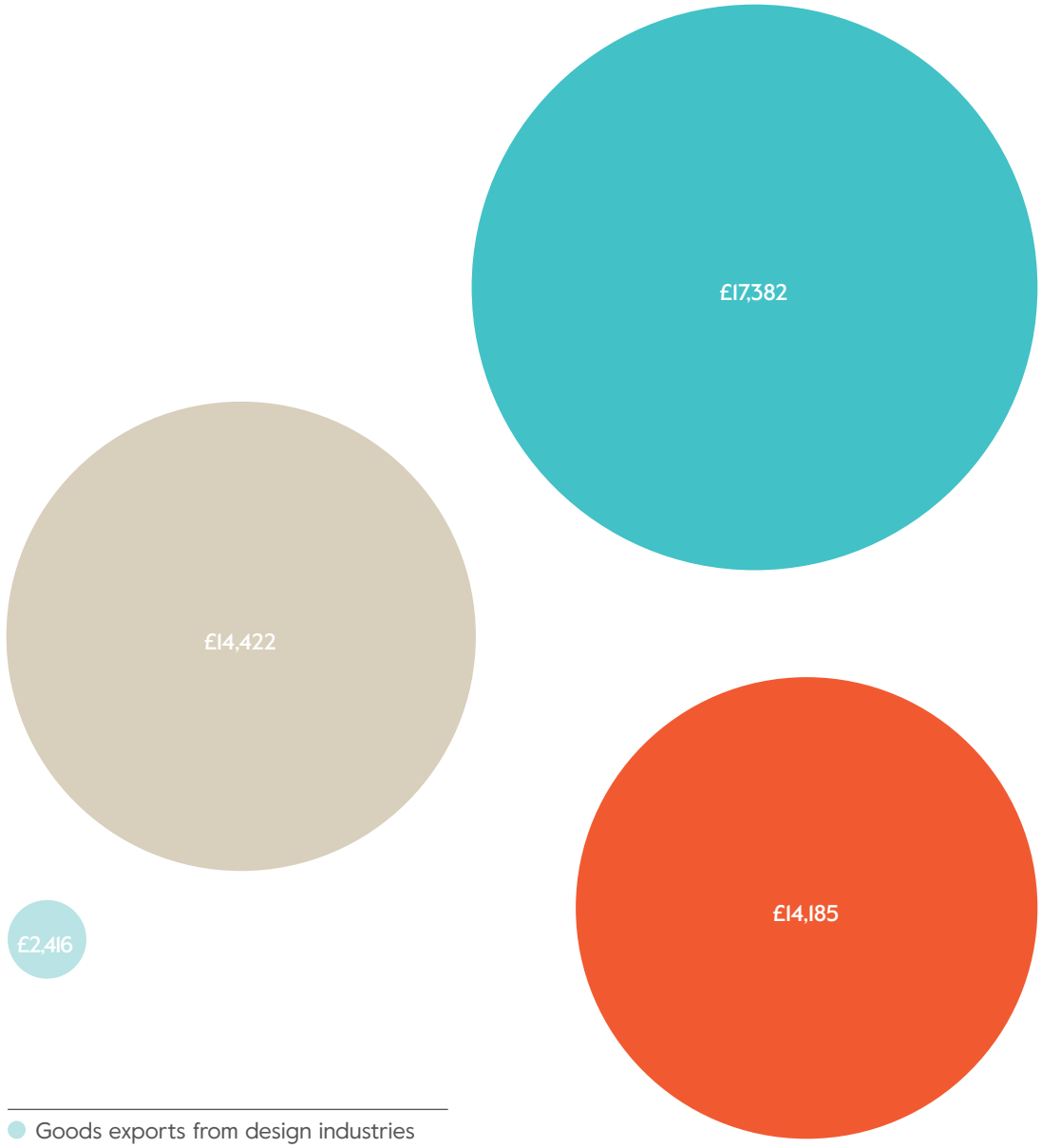
Exports
Evidence suggests that, among other factors, larger firm size[69] and higher productivity[70] all positively improve both the chances of firms exporting and the amount they export. As a sector characterised by SMEs but with high growth potential and high levels of productivity, there is a strong case to be made for further support for UK designed products and services.

We found that in 2015, the total value of exports where design had made a key contribution was £48.4bn (7% of total UK exports that year). This means the value of design exports is greater than that from either the UK's digital sector (£43bn)[71] or from the creative industries (£35bn).[72]

The value of design exports has grown at a faster rate than the UK average. Between 2013 and 2015, value of design exports grew 1.6%, whilst the value of UK exports decreased (-3%), suggesting design exports are higher value and still enjoy high demand. However, in keeping with the wider economy, this value is slowing down. Over the longer term there has been only a 1.6% improvement since 2009 (compared to -3.1% for the UK economy as a whole during the same period).

[69] Serti F and Tomasi C (2014) 'Export and import market-specific characteristics' *Empirical Economics* 47: 4 pp.1467-1496
[70] Gourlay A, Seaton J and Suppakitjarak J (2005) The Determinants of Export Behaviour in UK service firms *The Services Industries Journal* 25: 7 pp.879-889
[71] Department for Digital, Culture, Media and Sport (2018) *DCMS Sectors Economic Estimates 2017: Employment and trade* [online]
[72] Department for Digital, Culture, Media and Sport (2018) *DCMS Sectors Economic Estimates 2017: Employment and trade* [online]

Chart 3: Value of exports from the design economy, 2015



- Goods exports from design industries
- Goods exports from other sectors
- Service exports from design industries
- Service exports from other sectors

Source: United Nations (2018) UN Commodity Trade Statistics database 2009-2016; Office for National Statistics (2017) International Trade in Service 1996-2015

Case study: City ID – Creating a market for UK design in the built environment

City ID is a city information, urban and wayfinding design company based in Bristol and working internationally. It was founded by Mike Rawlinson and Sara Crossley in the late 1990s. Through his experience in town planning and urban design at Bristol City Council, Rawlinson identified an opportunity to provide high quality place-based city information and wayfinding services. Since then, City ID has designed wayfinding projects for airports, integrated transport systems, bike share systems and large parks and carried out work for Bristol City Council, the Queen Elizabeth Olympic Park and New York City's Department of Transportation.

Over the last 10 years there has been increasing attention on placemaking in cities. Over half of the world's population now live in cities, but developing healthy, productive, connected cities is an ongoing challenge requiring connection between different local agendas around development and public space. City authorities are increasingly looking for creative solutions to city problems such as how to encourage more walking.

City ID's first project was for Bristol City Council and introduced the idea of 'Legible Cities' – to make city information more accessible, improve wayfinding and make navigating around cities easier through consistent visual identity, pedestrian signage and maps.

"We operate from the idea that you can weave together different disciplines around one vision – one that promotes improved experience, greater levels of accessibility, greater levels of play in the environment and interest in the environment."

Mike Rawlinson, Founder and Design Director

Photo: City ID; Copyright City ID 2018

Having been one of the first firms to use graphic and information design in an urban environment, City ID has seen a rapid expansion of work in the North American market which now makes up around 70-80% of their annual turnover. They have pioneered a new market for design at scale in the built environment in the UK and internationally.

City ID has developed long-term relationships with many of their clients – they are still working with Bristol City Council almost 20 years on. Their work in New York started with WalkNYC, a commission for pedestrian and bicycle wayfinding. From an early stage, they were conscious of how this system could integrate with other modes of transport, enabling the project to expand to include subways and subsequently lead to other opportunities in the city.

"We designed it in such a way that the information was within an information brand that could work across different modes of transit. At the time, the client thought, 'well yeah OK, but don't get ahead of yourselves' and they didn't see the value in this. But as the years went on they really understood."

David Gillam, Principal Designer

Table 22: Value of design-influenced exports by subsector, 2009-2015

	2013[73]	2014	2015	% change 2013-2015
Architecture and built environment	£6,019	£6,298	£6,322	5.0%
Design (multidisciplinary)	£1,544	£1,557	£1,878	21.6%
Design (advertising)	£993	£1,033	£958	-3.6%
Design (craft/clothing)	£1,444	£1,506	£1,409	-2.4%
Design (digital)	£26,954	£28,555	£27,977	3.8%
Design (graphic)	£1,273	£1,243	£1,215	-4.5%
Design (product and industrial)	£9,417	£9,355	£8,647	-8.2%
Design economy	47,643	49,546	48,405	1.6%
Creative industries total	£17,856	£19,809	-	-
UK economy	£715,414	£698,494	£693,031	-3.1%

Notes: (1) – indicates that a value is not available. (2) Small sample sizes mean that it was necessary to combine the export values of the craft and clothing subsectors in order to be able to extract data on exports for these sectors.
Estimates for this year have been revised since The Design Economy 2015.

Whilst each design subsector has contributed to the growth in exporting, our research shows that some sectors made a more substantial contribution than others to total exports in 2015. As Table 22 shows, digital design delivers £27.9bn (58%) of design-influenced exports, whilst architecture and built environment and product and industrial design are also major contributors, accounting for another £14.9bn in exports combined.

This suggests a growing demand for higher value, UK designed goods at a time when the value of wider UK exports is declining. As the next section of this chapter illustrates, this is part of a wider global shift towards higher value sectors, particularly amongst advanced economies.

[73] Estimates for this year have been revised since *The Design Economy 2015*.

International comparison of design exports
For The Design Economy 2018 we explored how the value of UK design goods exports compares to that of other countries.[74] Conducting an international comparison of the design sector is, however, challenging. This is because countries often have different definitions of design.
It is also not always possible to get hold of national figures regarding design, or where data points are available they simply may not be comparable. These limitations have been noted elsewhere.[75] Nonetheless, using data from the United Nations Conference on Trade and Development Statistics agency (UNCTADSTAT) we can provide an illustration of the performance of the UK design economy internationally.

The definition of design goods used by UNCTADSTAT includes architecture, fashion, glassware, interior, jewellery and toys.

It is therefore a different definition from that used elsewhere in this report (as it excludes services and other intangible assets such as branding and digital design). Thus the value of UK exports reported differs from that in the rest of this chapter, which is more comprehensive. However, the value of UK exports provides the only consistent measurement of design between multiple countries, and therefore offers a useful indication of the state of UK design relative to other countries.

Our analysis suggests there are only 21 countries in the world that generate more than $1bn per year from the export of design goods. There are some notable exceptions outside this list, with India for example generating £529m from design goods exports in 2015. There is also no representation from Russia in the list nor from any Central or South American country.

[74] This is a different approach from the 2015 report, which used the UN Commodity Trade Statistics database and compared export value for 'advertising, market research and public opinion polling', 'architectural, engineering and other technical services' and 'design'. This contributed to higher export values than reported in the 2018 edition, but provided less coverage in terms of the total number of countries that could be compared.
[75] Moultrie J and Livesey F (2009) *International Design Scoreboard: Initial indicators of international design capabilities* [online]

As Table 23 indicates, the value of UK design goods exports ranks sixth in the world behind France, Switzerland, USA, Hong Kong and Germany. This trend is in keeping with our 2015 analysis, which showed these countries to be major exporters of design, with the UK previously ranked fifth (albeit using a different methodology).

In addition to measuring total value of design goods exports, we have also measured their growth in value. The UK is ranked 14th compared to the other countries featured in terms of the long-term growth in value of design goods exports. While several of the countries above the UK in Table 24 across are starting from a lower base in terms of the total value of their design goods exports, France, Switzerland and Germany are pulling away. Similarly, the value of Italian design goods is growing at a faster rate than the UK, and as such could overtake the UK in the near future.

Table 23: Design goods exports (2015)

Country	Design goods exports (US$ million per year, 2015)	Rank – value
France	$12,657.73	1
Switzerland	$12,234.02	2
USA	$10,804.00	3
Hong Kong	$9,753.25	4
Germany	$9,576.72	5
UK	$9,020.00	6
Italy	$5,129.50	7
Canada	$4,079.47	8
UAE	$4,072.00	9
Japan	$3,364.93	10
Spain	$3,188.90	11
Netherlands	$3,021.98	12
China	$2,652.19	13
Austria	$2,624.36	14
Belgium	$2,614.07	15
Singapore	$1,896.83	16
Qatar	$1,531.98	17
Australia	$1,491.81	18
South Korea	$1,488.43	19
Czech Republic	$1,382.19	20
Saudi Arabia	$1,001.80	21

Source: UNCTADSTAT (2018) 'Values and shares of creative goods exports (annual) 2002-2015'

There are numerous factors which explain these figures. The differing trading relationships of the countries in Table 24 is one factor, and this requires further investigation. Since our last report, several countries have also expressed an intention to more heavily invest in higher value sectors such as technology and design as they prepare for the fourth industrial revolution. This notably includes the Chinese government, which has published an industrial strategy that seeks to move from 'Made in China' to 'Created in China'.[76]

The majority of the five countries whose design export value is growing fastest are those where significant government support and investments have been made to support innovation, including Saudi Arabia, China and the UAE. South Korea spends 4% of its GDP on R&D, which is significantly above the OECD average.[77] This may therefore be one explanation for why the value of these countries' exports is growing faster than the UK's. This growing value may also be driven by increasing demand for particular design goods, as in the case of the Czech Republic.

Table 24: Growth in the value of design goods exports (2002-2015)

Country	Growth: 2002-2015	Rank – growth
Saudi Arabia	3457%	1
China	793%	2
South Korea	658%	3
Czech Republic	404%	4
UAE	326%	5
France	280%	6
Switzerland	274%	7
Australia	228%	8
Netherlands	209%	9
Italy	194%	10
Germany	158%	11
Canada	144%	12
Singapore	128%	13
UK	127%	14
Spain	94%	15
Hong Kong	90%	16
Austria	88%	17
Belgium	72%	18
Japan	54%	19
Qatar	42%	20
USA	8%	21

Source: UNCTADSTAT (2018) 'Values and shares of creative goods exports (annual) 2002-2015'

[76] Center for Strategic and International Studies (2015) *Made in China 2025* [online]
[77] Organisation for Economic Cooperation and Development (2016) *Gross Domestic Spending on R&D* [online]

International comparison of design registrations

For designers to be able to generate value from and trade their work, they need an intellectual property system that is flexible, reliable and easy to use. According to data from the Intellectual Property Office, there was a 46% growth in design registrations by UK businesses between 2015 and 2016.[78] This is a substantial improvement and may reflect the impact of recent improvements to the design registration process.

Developing service contracts, licensing designs and protecting design goods is a complex task for any business, and it is even harder to do in international markets. Our analysis looked at the absolute number of design registrations made by countries with the World Intellectual Property Office (WIPO), as well as apportioning these by per million population.

As in our 2015 report, South Korea once again tops the rankings in relative terms, with 1,283 design registrations per million population. China, however, made the highest absolute number of design registrations, with 10 times as many as South Korea in second place. The number of Chinese design registrations is also growing at a substantially faster rate than any other G20 country.

The number of design registrations made by UK businesses with WIPO is continuing to decrease, and has dropped 58% since the year 2000. Only Italy has experienced a greater decrease out of G20 nations. This may be for a variety of reasons – fewer design-influenced goods and services being exported outside the European Union and/or declining awareness of the WIPO system, among others. As the UK exits the European Union, this trend must be further investigated to ensure it does not hold back international trade.

[78] Intellectual Property Office (2018) *Registered Design Statistics* [online]

Table 25: WIPO design registrations made by G20 countries[79] (2016)

Country	Total number of WIPO design registrations (2016)	Rank (absolute)	% change (2000-2016)	Population (2018)	Design registrations (per million population)	Rank (relative)
South Korea	65,635	2	94%	51,164,435	1,283	1
China	650,344	1	1198%	1,415,045,928	460	2
Australia	7,278	8	71%	24,772,247	294	3
Japan	29,865	4	-22%	127,185,332	235	4
Canada	6,170	9	81%	36,953,765	167	5
USA	42,762	3	134%	326,766,748	131	6
Turkey	10,170	6	314%	81,916,871	124	7
Germany	7,384	7	-50%	82,293,457	90	8
France	5,389	12	-49%	65,233,271	83	9
United Kingdom	3,978	14	-58%	66,573,504	60	10
South Africa	2,194	16	79%	57,398,421	38	11
Russia	5,464	11	139%	143,964,709	38	12
Argentina	1,653	17	32%	44,688,864	37	13
Mexico	4,296	13	123%	130,759,074	33	14
Brazil	6,027	10	67%	210,867,954	29	15
Saudi Arabia	937	19	-	33,554,343	28	16
Italy	1,336	18	-78%	59,290,969	23	17
Indonesia	3,893	15	-	266,794,980	15	18
India	10,673	5	233%	1,354,051,854	8	19

Source: WIPO IP Statistics Data Center (2018) 'Total design applications (direct and via the Hague system): total count by filing office 2016

[79] Excluding the European Union.

How design is used by UK businesses

In addition to exploring the supply of design firms and designers, we wanted to better understand how the rest of the UK business population interacts with them, and what the demand for design is.

We surveyed over 1,000 UK firms across a range of sectors to better understand how they use design and the impact it has on their performance. As this chapter illustrates, this has enabled us to provide a more comprehensive picture of the state of design in the UK but also to uncover evidence that despite its impact, design is still undervalued by UK firms.

Investing in design as a driver for innovation
As advanced economies across the world transition from being capital-intensive to knowledge-intensive, the importance of intangible assets such as design is growing.[80] Intangible assets such as software, R&D and design do not have a physical or financial embodiment but evidence suggests that greater use of intangible assets can positively impact upon economic growth through stimulating the introduction of new products/services, processes, organisational forms and practices, and enabling firms to make them more usable and appealing to consumers.[81]

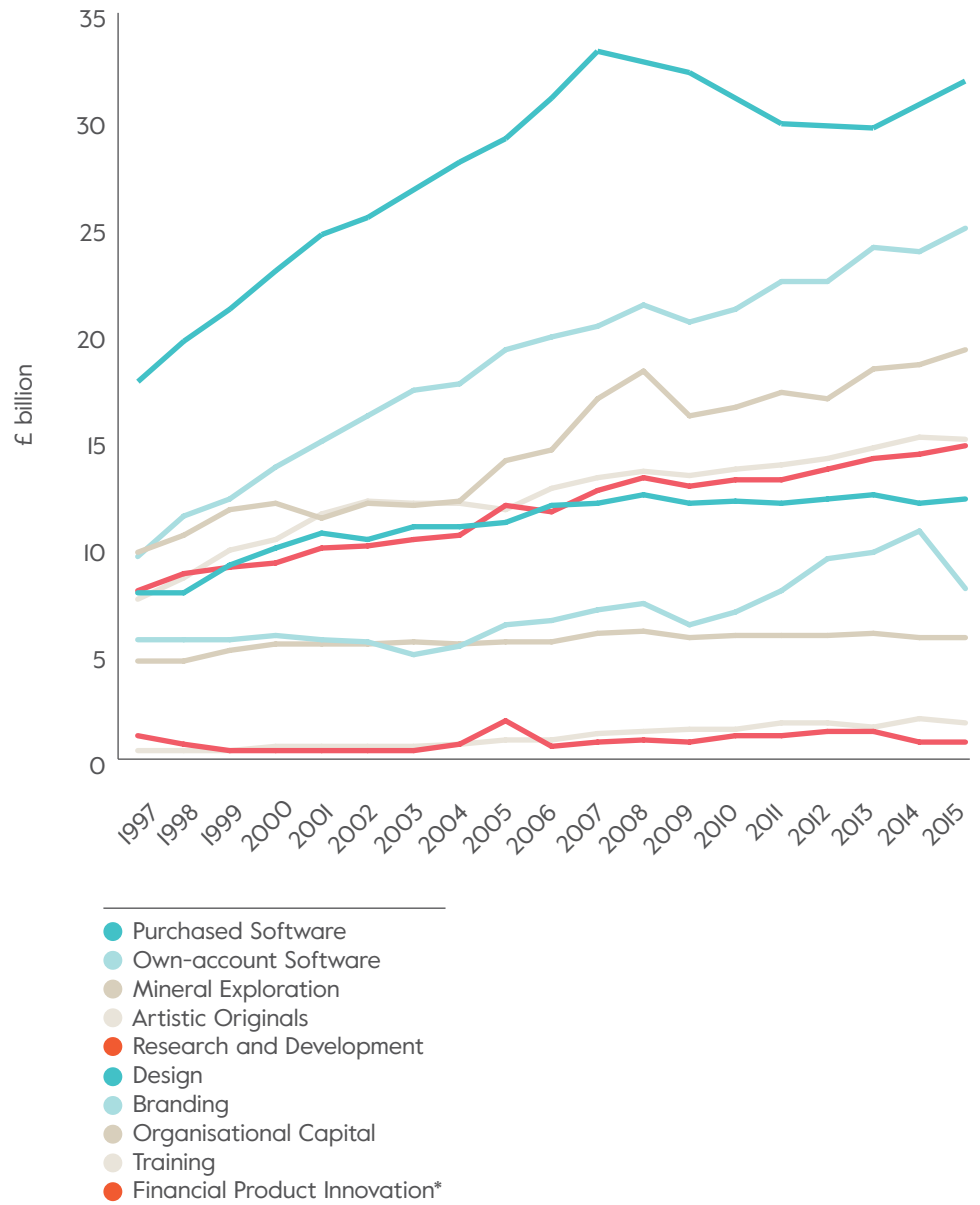
A recent study by the ONS on investment in intangible assets by UK firms therefore provides important context to our survey findings.[82] ONS figures show that in 2015, UK firms invested £134bn in intangible assets (of all types). A closer look at these figures shows that £14.7bn of this total was invested in design (defined as 'the design of products or services to improve their look or performance, web design, etc'). Of this, £10.3bn was purchased services from third parties, and £4.5bn was for in-house design services. The figures also show that investment in design – whether internally or externally – has grown 86% in total over an 18-year period, and now accounts for 11% of all intangible investment. Evidence shows that when firms invest in design, they are more likely to invest in other intangible assets such as R&D and marketing. This combination of activities drives innovation, and therefore investing in design improves the chances of innovation amongst firms rather than investing in other intangible assets alone.[83]

Employment of design staff by UK firms
Within this changing context, we sought to better understand how UK firms are using their investments in design and the impact it is having on their work. Evidence suggests the existence of a design department within a business facilitates and improves the effectiveness of a range of innovation strategies as designers integrate internal and external knowledge, such as technologies not owned by their own organisation.[84]

Of the 1,006 firms responding to our survey, we found that only one in four respondents (25%) report that their organisation employs staff specifically to undertake design functions. This proportion increases with organisation size, and is also significantly higher than average within manufacturing (49%), other services (42%) and arts/entertainment organisations (40%).

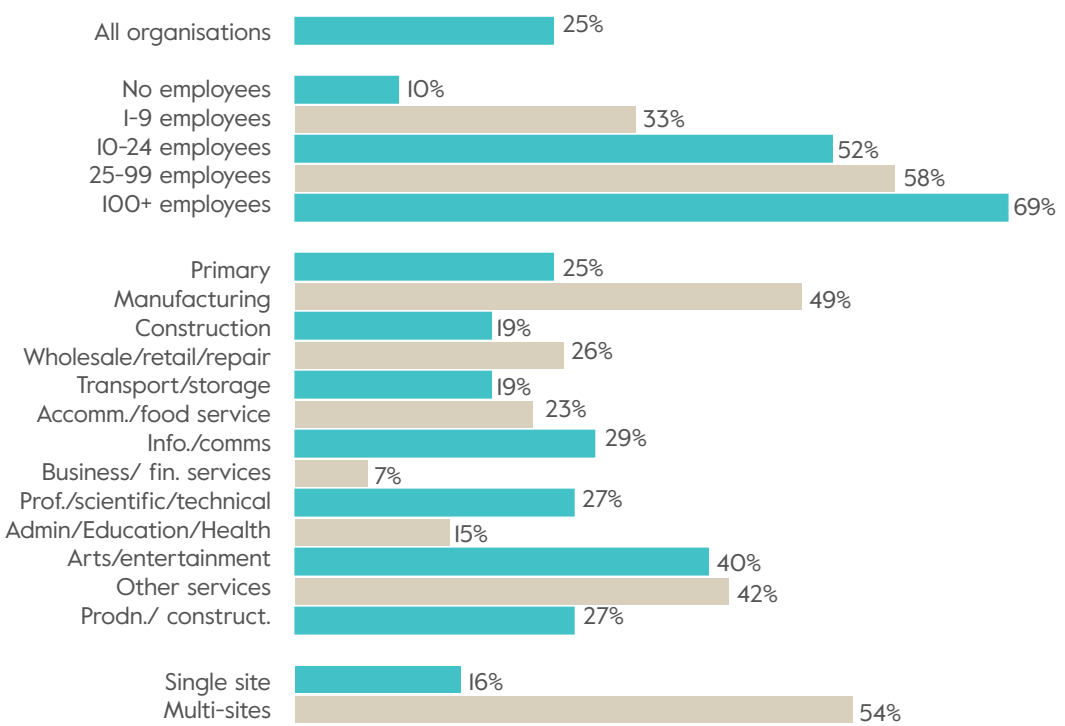
[80] Organisation for Economic Co-operation and Development (2013) *New Sources of Growth: Knowledge-based capital* [online]
[81] Montresor S and Vezzani A (2016) 'Intangible investments and innovation propensity: Evidence from the Innobarometer 2013' *Industry and Innovation* 23:4 pp.331-352
[82] Office for National Statistics (2017) *Experimental Estimates of Investment in Intangible Assets in the UK: 2015* [online]
[83] Department for Business, Innovation and Skills (2010) *The Economic Rationale for a National Design Policy* [online]
[84] Design Council (2018) *Understanding Design-Intensive Innovation: A literature review* [online]

Chart 4: Investment by intangible asset, current prices (1997-2015)



* Key refers to categories in chart, reading from top to bottom

Chart 5: Employment of staff specifically to undertake design functions, by organisation size, sector and number of sites (all respondents)



Source: *Design Economy* survey of UK firms 2018

Among organisations that employ staff in design roles (based on where respondents were able to provide a response), three-quarters (75%) employ between one and four design staff. The number of staff employed in design roles increases with organisation size as one might expect, although one in three organisations with 100 or more employees (34%) still employ fewer than 10 design staff.

We found that organisations are more likely to have individual staff employed or trained in design functions than to have a specific design department or unit as such. Furthermore, they may not have a department or unit but still have a budget specifically for design and R&D. While the lack of a specific department or unit suggests a less formal approach to addressing design functions within an organisation, having a budget in place is indicative of a formally recognised and defined activity.

Table 26: R&D and design facilities within the organisation, by organisation size (all respondents)

	All organisations	No employees	1-9 employees	10-24 employees	25-99 employees	100+ employees
Individual staff who are employed specifically to undertake design function	25%	10%	33%	52%	57%	68%
Individual staff who have been trained specifically in design	23%	13%	28%	49%	49%	63%
A specific budget for design	21%	11%	25%	44%	56%	67%
A specific budget for research and development	19%	9%	23%	32%	52%	73%
A specific design department or unit	14%	6%	16%	32%	46%	63%
A specific research and development department or unit	13%	5%	16%	24%	49%	71%
Any R&D	23%	11%	27%	41%	63%	84%
Any design	39%	24%	47%	68%	74%	87%
Unweighted bases	1006	192	188	97	182	345

Source: *Design Economy* survey of UK firms 2018

There is substantial crossover between R&D and design, with 46% of those with any R&D functions or facilities having a specific design department or unit, while 32% of those with any design functions or facilities have a specific R&D department or unit. More than four-fifths of organisations with any R&D functions or facilities (85%) have some design functions or facilities, while 50% of those with any design functions or facilities have some R&D functions or facilities. In terms of the impact of these observations, we found that organisations with R&D and/ or design functions in-house are significantly more likely than those without them to report growth in employment in the last three years. Employment growth is particularly likely within organisations with an R&D function. It should be noted, however, that a reduction in employment is no more likely within organisations that do not have R&D and/or design functions in-house.

Case study: **Monzo – Transforming banking with design**

Monzo is an innovative digital 'challenger' bank in the retail banking sector which is using design to build loyalty, differentiate themselves to customers and investors, and promote better financial management.

Large financial institutions still dominate market share in the sector, but a new generation of digital-only banks is looking to redefine the modern banking experience. Monzo was started by a team of five co-founders, including a designer, who wanted to develop a banking service that would better fit the preferences and needs of younger consumers, removing the 'clutter' of the traditional banking experience. The company launched a prepaid debit card while they went through the two-year process of receiving a formal banking licence.

Since then the company has acquired 200,000 loyal users and has grown from an initial team of 13 to over 300 employees. The company's attention to design was a key differentiator in pitching to investors. Monzo also set a record for the quickest crowd-funding campaign in history, raising £1m through the platform Crowdcube in 96 seconds in March 2016. Instead of looking to their banking competitors, the design team draws inspiration from successful brands and digital products like Netflix, Deliveroo and Airbnb which prioritise simple, universal design principles and are easy for customers to navigate.

Photo: Monzo; Copyright Monzo 2018

Monzo conducts regular user testing to understand how different people budget, spend, save, invest and borrow money. This includes regular milestones like 'Testing Tuesdays' (all-day sessions every few weeks allowing users to try new functions) or collaborative 'show and tell' meetings with the design team. Each department within the company is also assigned a direct liaison on the design team.

"Design is a messy process – it's trial and error, it's getting the right people in the right room with the right ideas and vision and right skills."

Samantha Davies, User Research Lead

Design has also been central to Monzo's mission to help their customers make better decisions about their money, embedding financial well-being into the design of the app. In the future, the design team hopes to use more in-depth ethnographic research methods, spending time with people in their day-to-day lives to identify opportunities for innovation.

"When we started out almost three years ago, we began by identifying all the pain points customers encounter when dealing with their traditional banks, and designing features to eliminate them. However, as we move forward, we want to go beyond just solving the existing problems brought about by legacy banks' archaic systems, and meet more latent needs as well."

Samantha Davies, User Research Lead

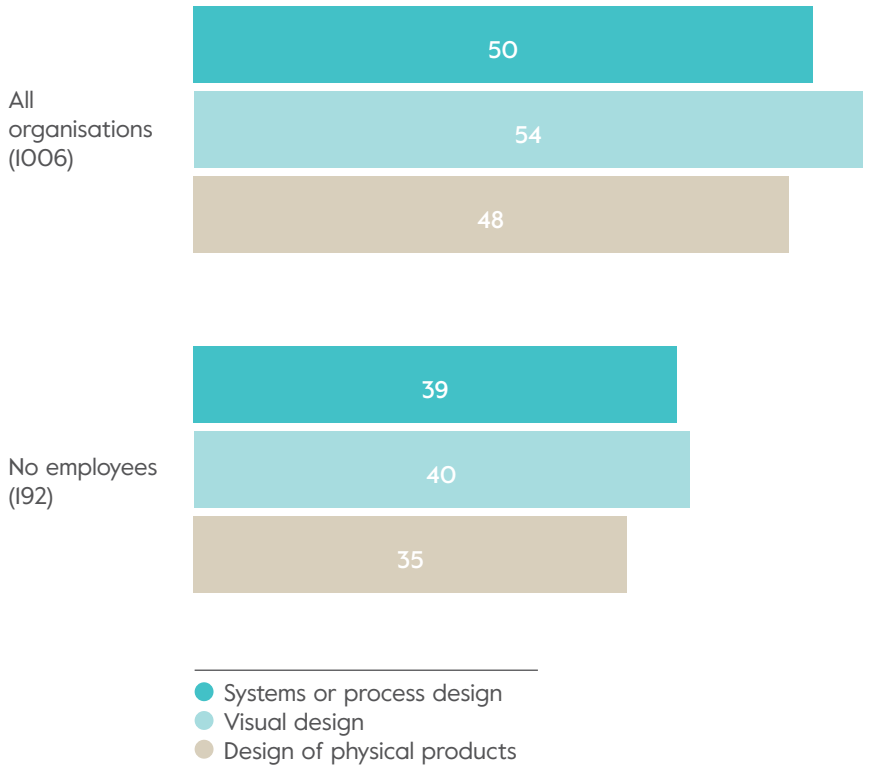
The impact of design on financial performance
Respondents to our survey of 1,006 firms were asked to state how important three forms of design (physical products; visual, and systems or process design) are to their organisations' sales turnover and competitiveness. Definitions of the three design forms were provided to respondents as follows:

- Design of physical products – such as a car, a building, an item of furniture, a silicon chip or a component – in order that the product is efficient, can be produced cost-effectively, and/or is aesthetically attractive to customers.
- Visual design – using traditional or digital media in order to market the company and its products or services and to develop brand identity, or to help create a visual experience as, say, in a video game or in film or on a stage set.
- Systems or process design – by which services to customers or production processes are organised for maximum efficiency. This might include for example the design of a website to maximise user experience and interaction, the design of external supply logistics or of internal workflow, or design to ensure that the internal units or functions within a complex business are fully co-ordinated within an overall business strategy.

By a slight margin, visual design is considered most important to sales turnover and competitiveness by UK firms. More than half the respondents (54%) consider it important (quite/very critical), which includes just over a quarter (28%) who consider it very important/critical. The design of physical products and the design of systems or processes are on a par in terms of how important they are considered to be. Each is considered important by around half the respondents (physical products, 48%; systems or process, 50%), while around a quarter consider each very important/critical (physical products, 24%; systems or process design, 23%).

The importance of each design form increases with organisation size, and there are also notable differences by sector. Both physical product design and visual design are most important to the wholesale/retail sector and, to a lesser extent, to the construction sector. The design of systems or processes was rated most important within the information and communications sector, and these trends reflect the differing products and services of these sectors. Firms in the transport and storage sector were least likely to rate any forms of design as very important or critical to their sales turnover and competitiveness.

Chart 6: Proportion of respondents rating design forms as important to sales turnover and competitiveness by organisation size[85]

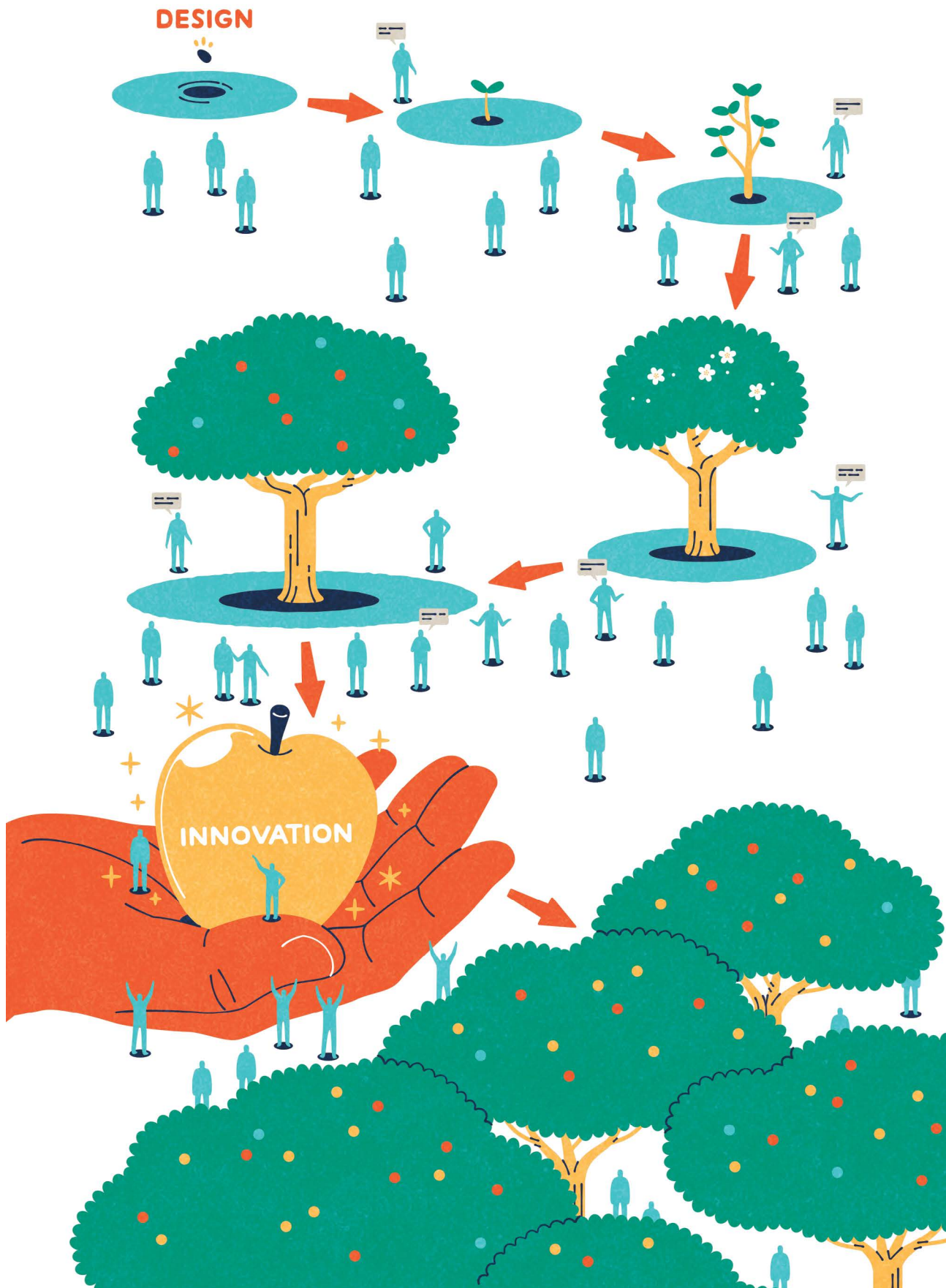


Source: *Design Economy* survey of UK firms 2018

[85] Unweighted bases in parentheses – % where quite important, very important and critical

Design and innovation in UK firms

Design can be both a resource for, and a form of, innovation. This can be driven by evidence of demand and a deep understanding of user needs, often gathered through applied ethnographic research or in the case of user experience/user interface design through user generated data. Yet design also generates innovations which push the boundaries, and the most forward-thinking businesses will combine user insight with data from other sources to generate innovations that are inherently novel or radical and that change perceptions and behaviours rather than accommodating them.

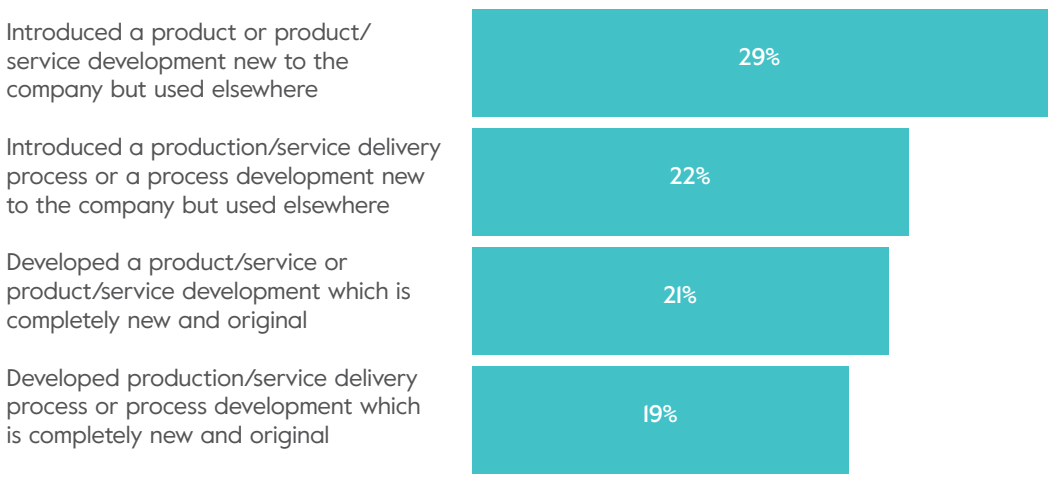


This chapter explores the relationship between design and innovation. This includes analysis of *The Design Economy 2018*'s survey of UK firms, as well as econometric analysis of the UK Innovation Survey.

Levels of innovation amongst UK firms
Survey respondents were asked if their organisation had undertaken any of a number of specified forms of innovation in the last three years. Forty-four per cent of respondents to our survey reported at least one form of innovation.

Most common was 'the introduction of a product or product/service development that is new to the company but used elsewhere', ie, not a new and original idea (29%). Around one in five said they had: introduced 'a production/service delivery process or a process development new to the company but used elsewhere' (22%); developed 'a product/service or product/service development which was completely new and original' (22%); or developed 'a production/service delivery process or a process development which was completely new and original' (19%).[86]

Chart 7: Forms of innovation undertaken in the last three years (all respondents)



Source: *Design Economy* survey of UK firms 2018

[86] Our findings differ from other UK surveys about innovation. The Longitudinal Small Business Survey 2017 reported 41% of UK SME employers as having innovated at all, slightly less than our survey finds (44%). The proportion reported in the 2015 UK Innovation Survey was 25%. However, both surveys involved samples that differed significantly from *The Design Economy* survey, and the difference with the Longitudinal Small Business Survey may be explained by the inclusion of larger organisations in our sample.

"Having R&D and design functions and facilities in-house is a key factor in introducing new products, services or processes to the organisation."

Analysis showed that having R&D and design functions and facilities in-house is a key factor in introducing new products, services or processes to the organisation, even if they are not completely new and original. Analysis also shows that having R&D functions and facilities is more strongly linked to the introduction of process developments, while having design functions and facilities is a more important factor for product or product/service developments.

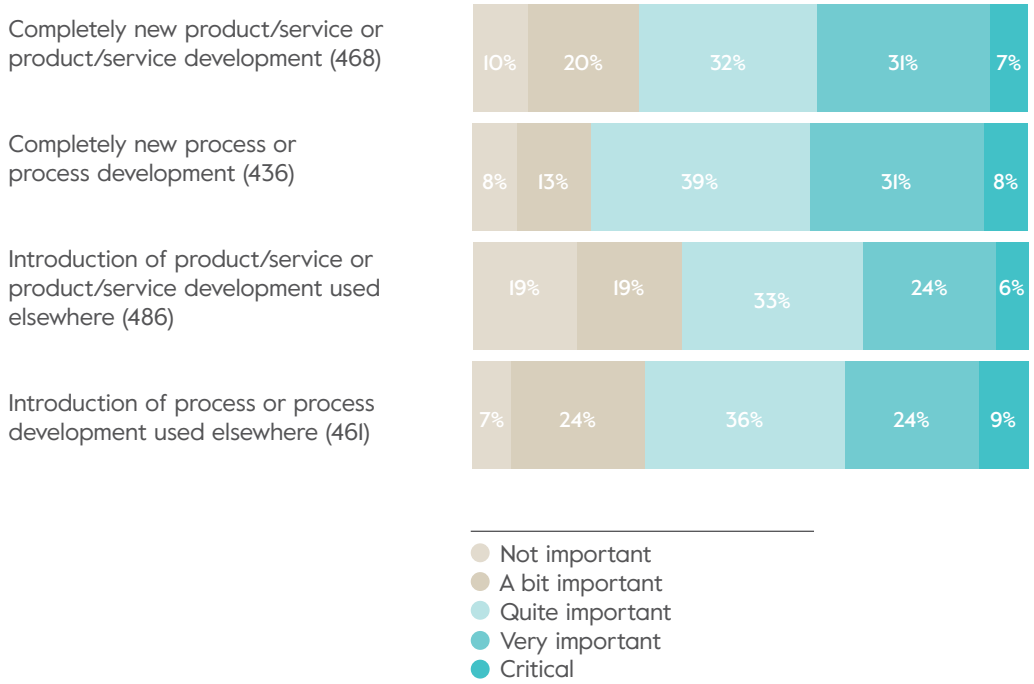
The importance of design to innovation amongst UK firms

Survey respondents who reported any form of innovation in their organisation during the last three years were asked to rate the importance of design to that activity. For a minority (fewer than one in ten) design was 'critical' to the innovation undertaken by the organisation. The highest proportion considered design critical to 'the introduction of process or process development already used elsewhere' (9%), while a lower proportion (6%) considered design critical to 'the introduction of product/service or product/service development used elsewhere'.

Overall, design activity is more likely to be considered very important or critical to the development of new products, services or processes than to the introduction of developments from elsewhere. In terms of the development of completely new and original products and services, 38% considered design activity to have been very important or critical, while 39% considered design activity as very important or critical to the development of completely new and original processes.

Around one in ten does not consider design activity as having been important to the development of completely new products, services and processes, nor to the introduction of processes that were new to the organisation. However, this increases to one in five with regard to the introduction of products, services or product and service development from elsewhere.

Chart 8: Importance of design activity in the innovation that was undertaken (all respondents)



Source: *Design Economy* survey of UK firms 2018

Note: Percentages do not add to 100% due to rounding

Case study: The Guardian – Using design to restate values

The Guardian is a news publication of The Guardian Media Group which also includes The Observer and digital platforms. The publication maintains a strong ethos of independent journalism, liberal values and a strong design culture.

"Editors really value the input of design right at the start of the process. I've worked in other newspapers and other media organisations where that is not so prominent. Here, you really do feel like you have that say."

Alex Breuer, Executive Creative Director

Like many news organisations today, The Guardian faces challenges to adapt to the growth in digital and has been running at an annual loss. In January 2016, editor-in-chief Katharine Viner and CEO David Pemsel launched the publication's three-year business strategy to secure new growth opportunities for the global news organisation and reduce losses with the aim of breaking even in 2018/19, which they are on track to achieve.

When these pressures necessitated a move from the Berliner size of paper to a standard size which could be outsourced, the design team approached the challenge as an opportunity. The resultant redesign, which was launched in January 2018 across all platforms and products, became an integral part of editor-in-chief Katherine Viner's work to reaffirm The Guardian's purpose and vision as a progressive global news brand, accompanied by an advertising campaign which promised a 'space for hope'.

Photo: The Guardian/David Levene; Copyright David Levene 2018

The redesign involved big, bold design changes, and an extensive user testing process gave the design team confidence that they weren't going to alienate their existing readers with the new visual identity and format. The impact of the redesign has been significant, with cost savings and increases in sales, subscriptions and donations. Subsequently, they have acquired almost four times more print subscribers compared to an average week before the redesign.

The Guardian has also been adopting a wider approach to using design. Led by the user experience and design teams, design approaches are being applied within multidisciplinary teams to address business challenges. These collaborative methods have been a powerful way to open up conversations about delivering the three-year business plan, providing transparency and enabling staff to engage with it.

To ensure a consistent and navigable user journey across The Guardian's products and platforms, there has been a focus on collaboration and integration across the organisation, for example by co-locating designers within product and editorial teams.

"It's much more powerful for us as an organisation to separate individual members of the design team and actually make them part of a collaborative multidisciplinary team."

Alex Breuer, Executive Creative Director

The strategic use of design by UK firms
To better understand how UK businesses use design, we asked them to rate themselves on the Design Ladder which rates design use on four steps – from design playing only a small part in a business's operations through to design being central to strategy.[87] Overall, 60% of firms use design in some way. Larger organisations are more likely than average to be positioned on the third or fourth step of the Design Ladder. Organisations of 10 to 24 staff are most likely to report design as being essential to their business strategy (19%). However, as Figure 8 shows, 40% placed their organisation on the bottom step – indicating essentially little or no involvement in design. As such, there is scope for greater design use amongst UK firms.

Our analysis suggests the Design Ladder is not an entirely linear model of design use. While step 1 to step 3 indicate an ascending scale of design use and involvement within an organisation, the difference between step 3 and step 4 does not adhere to this scale. While organisations on step 3 use design across their business functions and consider it important to their operations and delivery, it is essentially a means to an end. Organisations on step 4 are more likely to see design as the product or service that is delivered – hence it is central to their overall business strategy. This has wider implications for some other business behaviour and activity, such as innovation, productivity and growth.

The profile of design use by UK organisations is supported by similar analysis by the European Commission. In 2016, the EU Innobarometer[88] found that 45% of UK firms said they do not use design, with an additional 7% reporting that design is only used as a last finish.[89] Only five other countries among the 28 EU members – Estonia, Italy, Latvia, Lithuania and Poland – have a higher proportion of firms who do not systematically use design. Alongside earlier findings on design exports and registrations, this suggests the UK is at risk of losing an important competitive edge in terms of the use of design.

[87] The Design Ladder is a tool for rating a company's use of design. The Design Ladder was developed in 2001 by the Danish Design Centre, and enabled us to obtain a succinct but broad understanding of the role of design within UK firms.
[88] Design Council (2016) Measuring the use of design across Europe [online]
[89] The EU Innobarometer uses a five-step version of the Design Ladder. This includes an additional bottom step of 'Design is not used in the company'. However, this was intentionally omitted from *The Design Economy* survey of UK firms on the assumption that all firms inherently use some form of design, whether consciously or not.

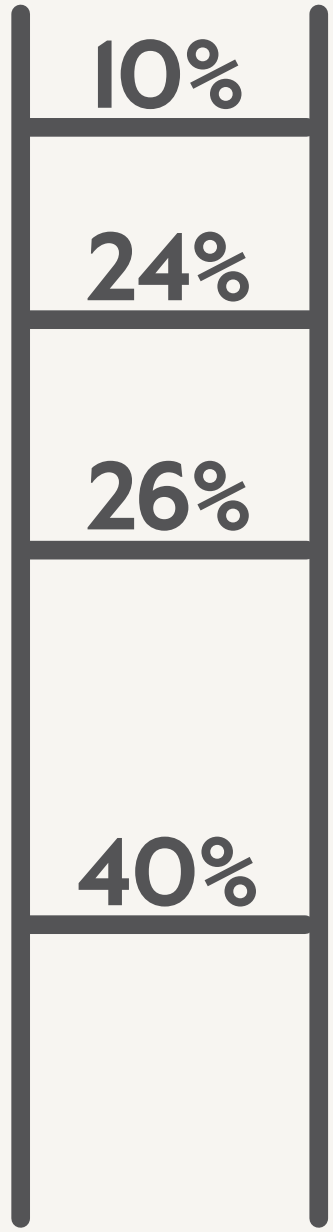
Figure 8: Design use by UK firms, as positioned on the Design Ladder (n=1,006)

Step 4
Design as strategy:
Design is a central and determining element in the business – it is an essential factor in the overall business strategy.

Step 3
Design as process:
Design is an important factor in the business and is integrated into many aspects of operations and delivery.

Step 2
Design as form-giving:
Design is not a fundamental contributor to what the business supplies or produces but it is used at the interface with customers, eg, in marketing or packaging or to bring a final finish to a product or service.

Step 1
Non-design:
Design plays only a small or very peripheral part in the operations of the business.



Source: *Design Economy* survey of UK firms 2018

The impact of strategic design use for UK firms
Our survey explored the relationship between where firms position themselves on the Design Ladder, and the outcomes they experience. Our analysis shows that firms placed higher up the Design Ladder are more likely to:

- have design functions or facilities in place
- have design staff or staff trained in design within their organisation
- agree that the design of physical products and visual design are very important or critical to an organisation's sales turnover and competitiveness (see Chart 9).

However, even some of those respondents that place their firm on the bottom step of the Design Ladder (around one in twenty), indicating that design plays a minimal part within their organisation, consider these design forms to be very important or critical to sales turnover and competitiveness.

However, the relationship with innovation is less clear-cut. Firms on steps 2 and 3 are more likely than those on the fourth to have developed completely new and original products, services or processes. The drop-off in innovation on step 4 is likely to reflect the nature of organisations on this highest step of the ladder. Design is a more integral process in the activities of these organisations, and it is therefore likely that it is not just used to generate new innovations.

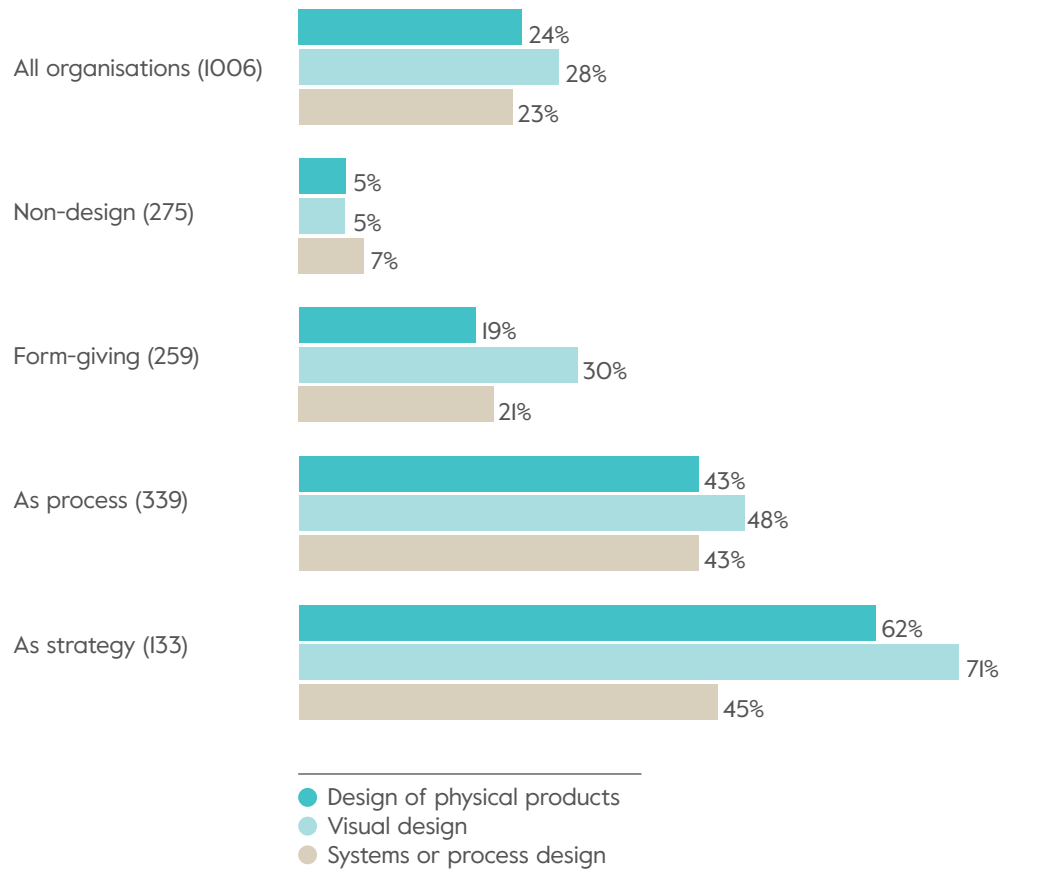
Table 27: Forms of innovation undertaken in the last three years, by position on the Design Ladder[90] (all respondents)

	Design Ladder				
	All organisations	Non-design	Form-giving	As process	As strategy
Developed a product or service or product or service development which is completely new and original	21%	11%	27%	34%	19%
Developed a production or service delivery process or a process development which is completely new and original	19%	14%	17%	30%	17%
Introduced a product or service or product or service development which is new to the company but has been used elsewhere	29%	18%	35%	40%	31%
Introduced a production or service delivery process or a process development which is new to the company but which has been used elsewhere	22%	13%	28%	31%	23%
Any of these	44%	29%	54%	58%	45%
Unweighted bases	1006	275	259	339	133

Source: *Design Economy* survey of UK firms 2018

[90] All respondents providing a response, showing where of no importance at all and very important/critical only (maximum unweighted bases in parentheses).

Chart 9: Proportion of respondents rating design forms as very important/critical to sales turnover and competitiveness, by position on the Design Ladder[90]



Source: Design Economy survey of UK firms 2018

Table 28: Ranking of key drivers of innovation[91]

Variable	Ranking[92]
Having an R&D budget	1
Having R&D staff	2
Position on the Design Ladder (the further up the ladder the more likely they are to innovate)	3
Agreeing that design has increased awareness and recognition of the brand and/or raised brand loyalty	4
Having an R&D department	5
Agreeing that design has enabled them to develop new markets	6
Considering the design of physical products as important	7

Source: *Design Economy* survey of UK firms 2018

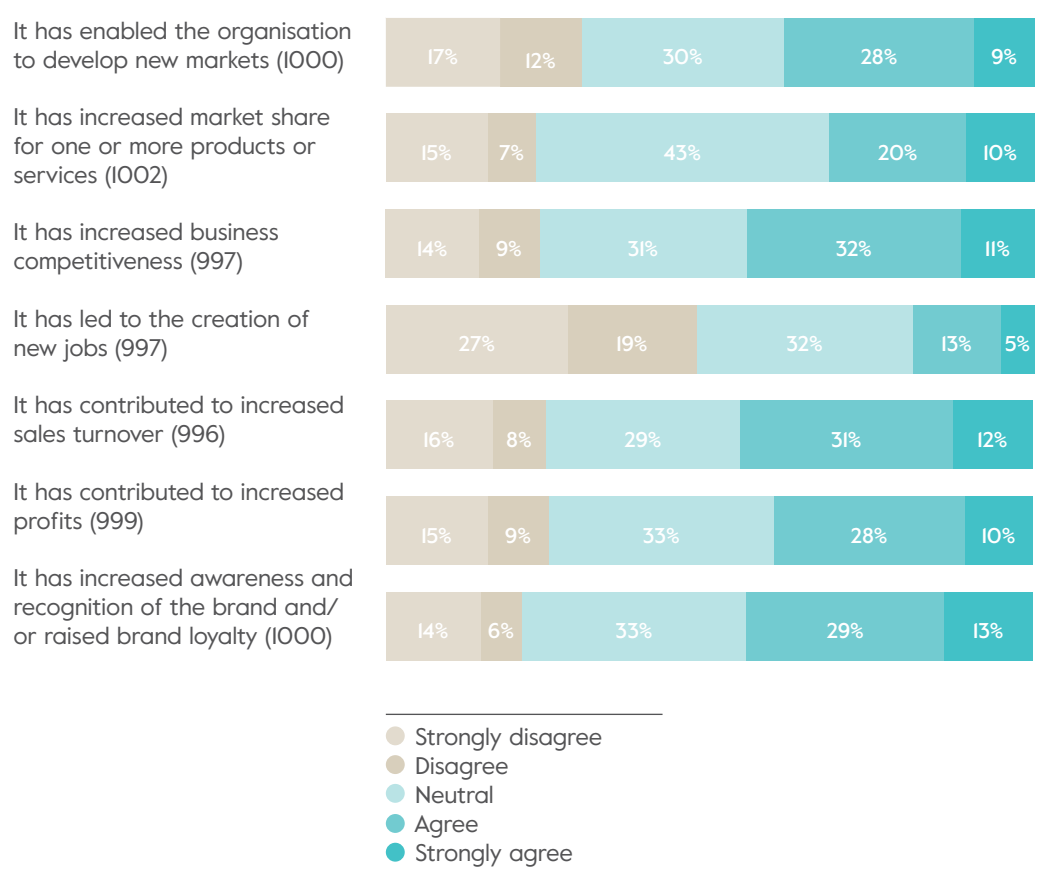
This study also undertook statistical regression analysis[93] to test whether positioning on the Design Ladder was a useful indicator of a firm's propensity to innovate. Our analysis found that, of the variables within the survey, the positioning that organisations give themselves on the Design Ladder appears to be a fairly accurate reflection of the propensity for them to innovate, and is ranked third as a driver of innovation (behind having an R&D budget and R&D staff). This provides a useful illustration of the potential benefits of design in stimulating innovation. However, as Table 28 highlights, the analysis found a mixture of motivations and facilitators. As such additional analysis was conducted using data from the UK Innovation Survey, which is presented in the next chapter.

[91] The independent variable here being whether organisations have developed or introduced new or improved products, services or processes in the last three years.
[92] The higher the ranking, the stronger the variable is as a driver of innovation.
[93] Regression analysis is used to understand which among a range of independent variables are related to the dependent variable, and to explore the forms of these relationships. Regression analysis allows an assessment of the unique relationship between the dependent variable and the independent variables, whilst controlling for all other variables in the model. Variables that have been used in the weighting schema were also included so that the analysis is able to control for these factors when assessing the relative importance of the variables of interest.

The additional benefits of design for UK firms
In addition to asking about the role design plays within their firms, survey respondents were asked to indicate the extent to which they agree or disagree with how the use of design has benefited their organisation. As Chart 10 shows, design is most likely to have been beneficial to their organisation with regard to their competitiveness (43% that provided a response agree), sales turnover (43%) and awareness and recognition of their brand and brand loyalty (42%). Fewer agreed that it has been beneficial to profits (38%) and developing new markets (37%).

The propensity to agree that the organisation has benefited in any of these ways from design increases with organisation size, although there is little difference between organisations with 25 to 99 employees and those with 100 or more employees in this respect. However, the largest organisations are more likely to report that design helps their organisation 'to increase market share', and leads to 'the creation of new jobs'.

Chart 10: Extent to which respondents agree or disagree that their organisation has experienced specified benefits from the use of design (all respondents that provided a response)



Source: *Design Economy* survey of UK firms 2018
Note: Percentages do not add to 100% due to rounding

Case study: **Fjord – Design as strategy**

Fjord is an international design and innovation consultancy which was acquired by Accenture Interactive in 2013. Fjord has since grown from 250 people to over 1,000 designers in 27 studios across the world. The acquisition is indicative of a recent trend of large global consulting firms acquiring design studios to expand their service offering to clients. Now five years into the merger, Fjord has seen a shift in the scale of its clients. It works with some of the largest companies in the world across telecommunications, finance and banking, energy, automotive and retail. In the same period, understanding of design within the business world has grown dramatically. This means that Fjord increasingly works with CEOs and board-level executives who are interested in the role that design can play in strategy.

Fjord helps clients embed design in their organisations as a mindset and process that has the potential to drive innovation. This means scaling design within an organisation, bringing different people together to solve problems and come up with ideas, and embedding an understanding of design within the organisational culture. Five years ago, Fjord's business design and strategy work was just emerging, while today there is a business or service designer embedded within nearly every project team.

Fjord designers are expected to develop and display high levels of 'soft skills' which include storytelling and coaching as well as 'hard skills' such as working with data and new software.

"I think more and more companies are looking for soft skills, EQ rather than IQ. Things like software are learnable by anyone. If you know how to learn, you can pick those things up. What's harder is often things like communication, like empathy, like observation, like being able to go into various environments and see how people are thinking and reacting to things."

Ross Tulloch, Design Lead

Photo: Fjord/Paul Raeside; Copyright Paul Raeside 2018

Changing meaning and experience through design

Analysis of design can often default to the lowest common denominator, with understanding limited to design as aesthetics and style. However, as this study has already shown, design is much more than that. In addition to exploring design's role in products, services, processes and systems, through our survey we also sought to understand how design contributes to innovation which is inherently novel or radical and which changes perceptions and behaviours rather than accommodating them. This approach, which has been described as 'design-driven innovation'[94] signifies that modern consumers do not just purchase products or services, they also buy 'meaning'.

Adopting similar questions to those used in the Danish Innovation Survey, our survey questioned firms on their use of customer experience activities to develop or promote products or services. These activities can be important in not only familiarising customers with what is being supplied, but also in stimulating particular feelings and associations towards the products, services or brand.

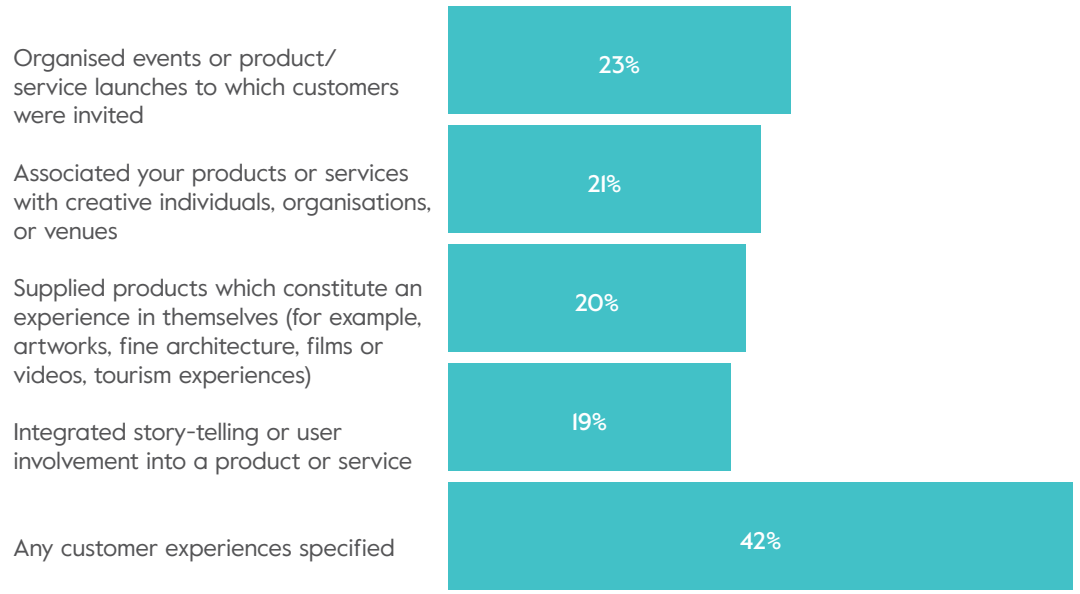
Around two-fifths of all respondents (42%) report that their organisation undertakes customer experience activities. Around a fifth undertake each of those listed in Chart II, with the most common being organised events or product/service launches to which customers were invited (23%). Slightly fewer associate their products or services with creative individuals, organisations or venues (21%); supply products which constitute an experience in themselves (such as artworks, fine architecture, films or videos, tourism experiences) (20%); and/or integrate story-telling or user involvement into a product or service (19%).

We also found that the higher an organisation's position on the Design Ladder, the more likely they are to undertake these activities. Seventy-one per cent of organisations placed on the fourth step have undertaken any of these customer experiences, compared with just 33% of those on the first or bottom step. Around half of those on the second (47%) and third (55%) steps have done so.

Among those on the fourth or top step, more than a third have supplied products which constitute an experience in themselves (36%) and more than two-fifths have associated their products or services with creative individuals, organisations or venues (42%).

[94] Verganti R (2009) *Design Driven Innovation: Changing the rules of competition by radically innovating what things mean* Cambridge MA: Harvard Business Press

Chart II: Firms reporting undertaking customer experience activities in the last three years



Source: Design Economy survey of UK firms 2018

Design and productivity in UK firms

The case studies and survey undertaken for *The Design Economy 2018* have suggested the different mechanisms through which design and designers can contribute to firm innovation and performance. To complement these findings, we used data from the UK Innovation Survey to undertake a causal analysis of the links between design, innovation of different types and productivity. Our analysis draws on data from around 15,000 UK companies that responded to two consecutive waves of the UK Innovation Survey.

Measuring the link between design and productivity
To explore whether firms engaged with design are more productive, we adopted a value chain perspective. This suggests design may influence innovation in the short term, but that any productivity benefits may take some time to emerge.[95] Figure 9 depicts the causal links we considered, reflecting the findings of the case studies and survey examined in this report that design investments may influence a wide variety of types of product, service and organisational change.

The starting point for our analysis[96] was the UK Innovation Survey indicator of whether or not each firm 'engages in design activities, including strategic, for the development or implementation of new or improved goods, services and processes'. In particular, we considered the extent to which firms' engagement with design drives (a) product/service innovation (b) process innovation and (c) organisational innovation.

Organisational innovation is broadly defined and covers changes to firms' strategy, work organisation and marketing activities. The second stage of our analysis explored the extent to which each of these three types of innovation results in improvements in firms' productivity.

A detailed methodology of how we approached this analysis is included in the appendices.

From design to innovation
Our analysis explored how design use changes the probability that firms will be a product or service innovator, a process innovator and/or an organisational innovator. We found that design engagement had a consistently positive and significant impact on the probability of product/service and process innovation. Detailed models for these analyses are reported in full in Appendix 3.

On average firms engaged in design are 8.1% more likely to be a product/service innovator than those with no design engagement. There is a smaller process innovation effect from design engagement (+3.5%), and a less significant link between design engagement and the probability that a firm engages in organisational innovation. This is consistent with the findings from our survey of UK firms, suggesting there is still some way to go for firms to consistently use design to innovate at an organisational level.

We also found that the effect of using design on innovation is largest among manufacturing firms and where firms are also undertaking in-house R&D. This reconfirms patterns observed in previous analysis.[97]

[95] Roper S, Du J and Love JH (2008) 'Modelling the innovation value chain' *Research Policy* 37(6-7) pp.961-977
[96] Our estimation approach comprises two elements. First, we use a series of simple probit models to model the impact of design engagement on the probability of innovation. The second stage of our estimation approach links the innovation probit models with a simple productivity equation. This model is estimated using the CMP procedure in Stata 14. A more detailed methodology is included in the appendices.
[97] Department for Business, Innovation and Skills (2010) *The Economic Rationale for a National Design Policy* [online]

Figure 9: Causal links – from design investment to productivity

From innovation to productivity
As Figure 9 above suggests, design engagement is linked to productivity through innovation. Modelling this whole process is relatively complex and involves two stages: the link between design and innovation, and then the link between innovation and productivity. Detailed models for these analyses are reported in full in the appendices.

Our analysis shows that engaging in design increases the probability of process innovation, which in turn contributes positively to productivity. Our analysis also shows that design has a significantly positive effect on product/service innovation (see Table 36, Parts B and C in Appendix 3) but no significant effect on organisational innovation (Table 36, Part D). The impact of these innovations on productivity differs.

While process and organisational innovation contribute to positive uplifts in productivity, process/service innovation has a negative effect on productivity in the short term. This suggests a disruptive effect when new innovative products are first introduced. The potential for such short-term disruptive effects has been noted in other analyses of both product and organisational change.[98]

[98] Bourke J and Roper S (2017)
'Innovation, quality management and learning: short-term and longer-term effects' *Research Policy* 46(8) pp.1505-1518

Figure 10: From design investment to productivity

How the use of design by UK firms will change

Our analysis shows that when non-design firms use design in their work, it can generate new innovations and create growth. We found that UK firms acknowledge that design will become a greater requirement to be competitive in the changing economy. Yet, there is significant ground to cover to get the majority of UK firms to use design to prepare for this future. Without the right support, failure to achieve this could prove costly as the UK enters a period of change and responds to the fourth industrial revolution.
Our recommendations set out policy on investment to support businesses across the UK to access and benefit from design.

This chapter explores findings from our survey of UK firms, including how they predict demand for design to change in the next few years, as well as the need for particular design skills. We also explore the types of support required to enable more UK firms to use design.

Demand for design in the next three years
Survey respondents were asked about how the role of design within their organisation might change in the next three years, if at all. Around half the respondents (54%) do not feel that the role of design will change, while one in ten is not sure (10%). A higher proportion of the remainder expect design to play a greater role than those that expect it to play a reduced role in the next three years (30% and 6% respectively).

Where there is a focus on design within an organisation already, there is more likely to be a further expansion of its role in the short to medium term. Respondents within organisations on the fourth or top step of the Design Ladder are significantly more likely than average to expect design to play a much greater role in their business in the next three years (22%), and overall just over half (52%, including 30% that expect it to play a somewhat greater role) anticipate that the role of design will increase.

These are organisations that are already placing design at the centre of their business strategy. This is further evidenced by the fact that respondents within organisations with a design department/unit and, to a slightly lesser extent, with an R&D department unit are more likely than average to expect the role of design to play a much greater role in the next three years (29% and 26% respectively).

At the other end of the scale, organisations on the bottom step of the Design Ladder are significantly more likely than average to expect that the role of design in the business will reduce in the next three years (10%). However, it is worthy of note that one in six of respondents within these organisations (17%) are not sure what will happen to the role of design within their organisation.

Future skills needs
Respondents were asked if they expected demand for specific skills in their sector or industry as a whole to increase, decrease or stay the same in the next three years. These skills areas are related to design to varying extents[99] and comprise:

- Originality and creative skills: The ability to generate new ideas for products, services and business processes.
- Systems analysis: The ability to organise business systems for maximum effectiveness and efficiency, including ensuring that systems work well for customers.
- Complex problem-solving: The ability to think through business challenges and produce the best outcomes.
- Digital skills: The ability to produce visual digital products (such as animations), software and database management systems.
- Design knowledge: The knowledge needed to design new or improved products, services or processes.

Across all the skills areas, more than half the respondents (53%) expect demand to increase in at least one of them. This increases to two-thirds in manufacturing (68%), arts/entertainment (67%) and wholesale/retail/repair (65%).

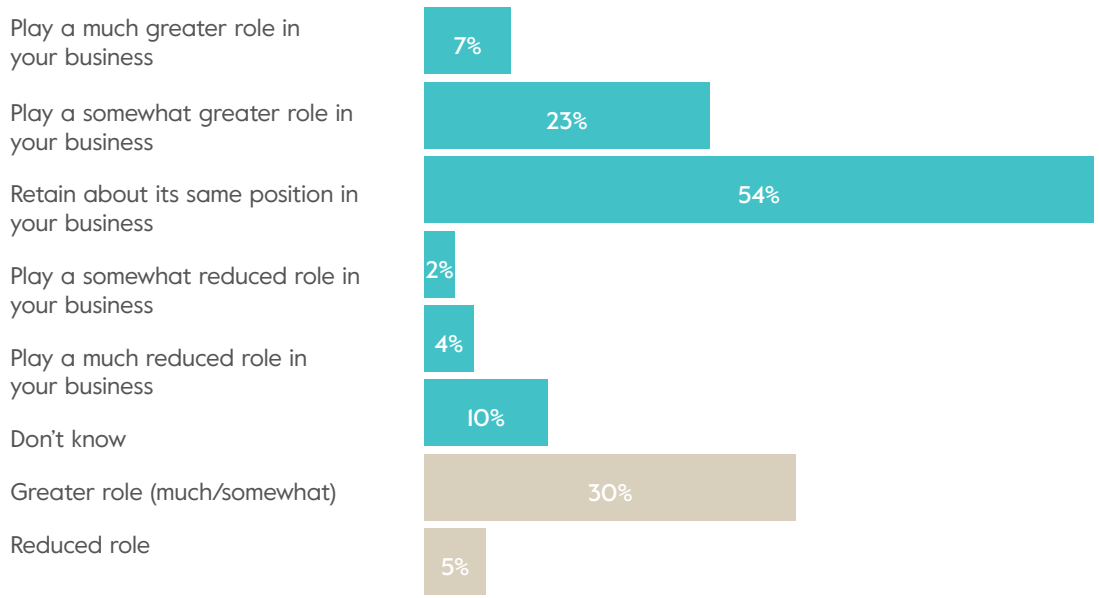
Seven per cent of respondents expect demand to increase in all these skills areas. This increases to 13% in the information/communications sector but is also slightly higher than average in manufacturing (10%) and construction (10%).

Respondents in organisations that are higher up on the Design Ladder or have in-house R&D and/or design functions are significantly more likely than average to expect an increase in demand in any or all of these skills areas.

Just 11% of all respondents expect some decrease in the demand for any one of these skills areas, with 2% expecting a decrease across all specified skills areas.

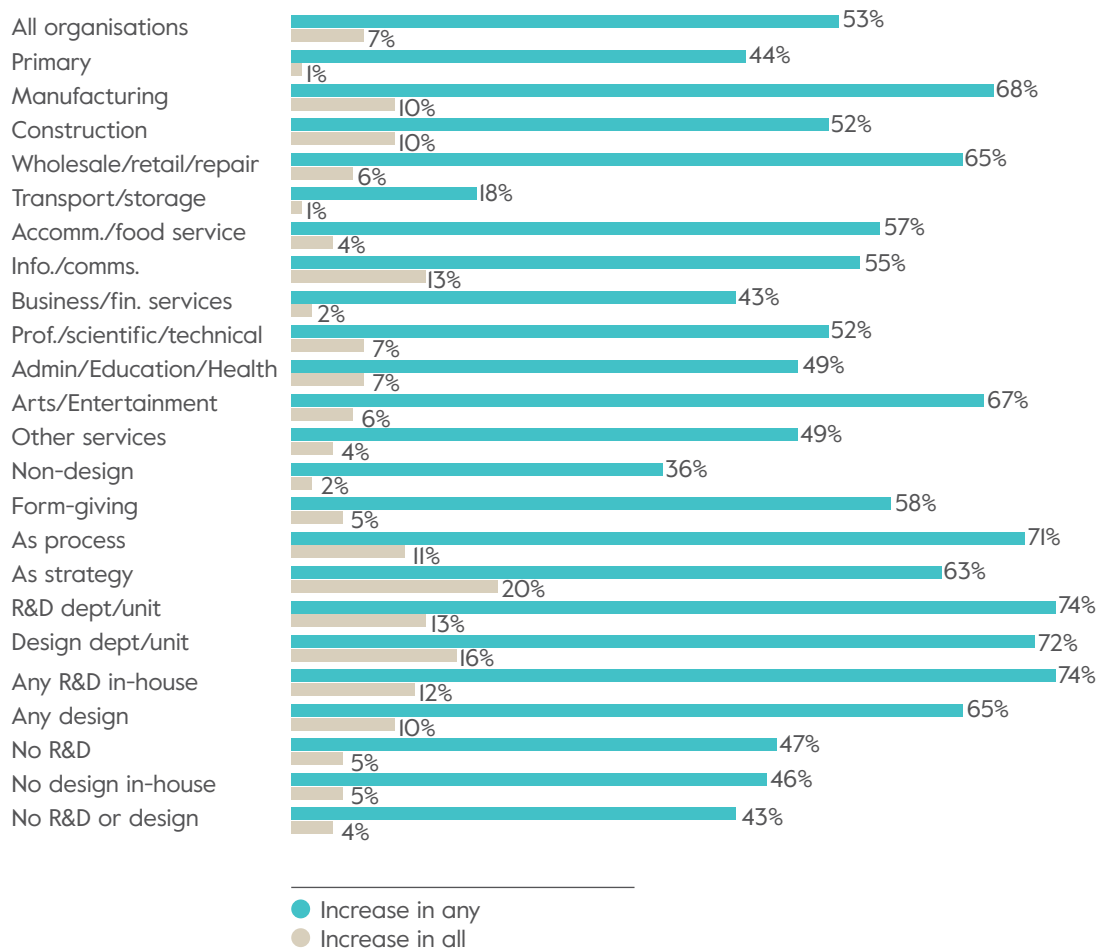
[99] Design Council (2017) *Designing a Future Economy: Developing design skills for productivity and innovation* [online]

Chart 12: Expectations of the change in the role of design within the organisation in the next three years (all respondents)



Source: *Design Economy* survey of UK firms 2018

Chart 13: Proportion of respondents expecting an increase in demand in their sector or industry for specified design-related skills in the next three years, by sector, position on the Design Ladder and R&D/design functions in-house (all respondents)



Source: *Design Economy* survey of UK firms 2018

The proportion expecting a decrease in the demand for any of these skills is higher than average among respondents within transport/storage (30%) and manufacturing (27%) sectors, and amongst those working in organisations that are on the bottom step of the Design Ladder (15%). However, a significant minority of respondents in organisations with an R&D department/unit (28%) or design department/unit (19%) expect a decrease in demand for at least one of these skills.

Taking each skill area individually, three in ten expect an increase in demand for originality and creative skills (30%), nudging slightly ahead of digital skills (29%), complex problem-solving (28%) and design knowledge (27%). One in four expects an increase in demand for systems analysis (24%).

There are large variations by sector, with originality and creative skills most likely to be mentioned within the accommodation and food services sector (54%). This is particularly interesting given the challenges this sector faces. Along with retail and administrative services, the accommodation (ie, hotels) and food sector employs a third of all UK workers and produces 23% of the UK's GVA. Yet on average they are 29% less productive than the UK average.[100] Greater use of design skills could therefore be one way to address this.

When reviewing these findings by the position of the organisation on the Design Ladder, it is apparent that respondents in organisations that are on the third or fourth steps, where design is important if not central to their operations or strategy, are similarly likely to expect an increase in demand for all skills areas, apart from design knowledge which is a skill area that is particularly likely to be considered an area for expansion by those on the top step of the Design Ladder.

Respondents in organisations on the second step of the Design Ladder are as likely as those in more design-led organisations to expect an increase in the demand for digital skills, while the expectation of growth in demand for complex problem-solving is where there is most consistency across the steps of the Design Ladder.

Contribution of design to improvements in organisational performance

Looking ahead to the next three years, survey respondents were asked if they anticipate that design will contribute substantially to a number of activities that their organisation might undertake to develop or grow. Around two in five anticipate that design will contribute substantially to efforts to increase sales in the UK (41%) and/or the development of new products or services (40%). More than a third anticipates that it will contribute substantially to an increased marketing effort or the development of a marketing strategy (36%). A quarter anticipate that it will contribute substantially to entry into new product or service or geographical markets (26%) while more than a fifth anticipate it will contribute substantially to efforts to start exporting or to increase existing levels of exports (22%). Considering that only around a fifth of organisations across the UK exports, a figure of 22% who think design will help them to build this activity is particularly positive.

Overall, around three-fifths of all respondents (59%) anticipate that design will contribute substantially to at least one of these activities within their organisation.

The key determinant of the positive contribution of design within any of these areas is organisation size. To a large extent, this reflects the propensity for these activities to be undertaken in larger organisations. Similarly, multi-site organisations are significantly more likely than single site organisations to anticipate the impact of design in these areas.

[100] IPPR (2016) *Boosting Britain's Low-Wage Sectors: A strategy for productivity, innovation and growth* [online]

Table 29: Activities to which design will contribute substantially over the next three years by organisation size and number of sites (all respondents):

		No. of employees (across all sites)					No. of sites	
	All organisations	No employees	1-9 employees	10-24 employees	25-99 employees	100+ employees	Single site	Multi-sites
An effort to increase sales in the UK	41%	27%	50%	61%	67%	69%	37%	55%
An effort to start exporting or to increase existing levels of exports	22%	14%	26%	28%	47%	55%	18%	36%
An increased marketing effort or the development of a marketing strategy	36%	18%	50%	41%	67%	66%	30%	56%
The development of new products or services	40%	31%	44%	56%	67%	75%	37%	52%
Entry into new product or service or geographical markets	26%	17%	30%	34%	54%	63%	21%	43%
Any of these	59%	45%	69%	73%	85%	90%	54%	77%
Unweighted bases	1006	192	188	97	182	345	492	509

Source: *Design Economy* survey of UK firms 2018

In terms of where the respondents position their organisations on the Design Ladder, those placing their organisation on the third step, where design is considered important to processes as well as to the products or services offered, are more likely than even those that are on the top step, where design is critical to the business, to anticipate that design will offer a substantial contribution to these business activities. This is particularly the case with regard to efforts to start or increase exporting and to increase UK sales.

Support required for greater design use

When asked about areas in which their organisation would like to benefit from greater support from industry bodies and government, respondents were most likely to select financial support for investment in design (32%). Only slightly fewer selected information and advice on design rights (intellectual property protection). Interest in these areas by organisation size, number of sites and sector is summarised in the table that follows. It can be seen that interest is high, with 88% overall showing interest in at least one area.

Table 30: Interest in support for design activities by sector (all respondents providing a response)

		No. of employees (across all sites)					No. of sites	
	All organisations	No employees	1-9 employees	10-24 employees	25-99 employees	100+ employees	Single site	Multi-sites
Training or formal education courses on design and design thinking	27%	24%	28%	34%	40%	45%	25%	34%
Access to designers and/or design firms	21%	11%	27%	39%	37%	34%	18%	31%
Financial support for investment in design	32%	23%	39%	33%	44%	34%	28%	42%
Information and advice on design rights (intellectual property protection)	30%	30%	29%	33%	33%	32%	31%	28%
Provision of best practice design advice or information	24%	16%	29%	36%	33%	43%	22%	30%
Any of these	88%	83%	90%	96%	99%	99%	84%	95%
Unweighted bases	984	181	181	97	180	343	474	505

Source: *Design Economy* survey of UK firms 2018

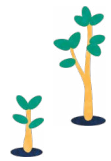
Conclusion

The Design Economy 2018 highlights the substantial contribution design makes to the UK. This value is growing. As advanced economies such as the UK embrace new technologies and business models, the demand for design skills and knowledge is building, and building at pace.

This presents a significant opportunity for the UK during a period of economic and social change. Addressing the UK's stagnant productivity, its regional imbalance and its response to global economic change requires new economic foundations. It requires access to skills and assets that drive innovation, accelerate growth and provide higher value, resilient jobs across the country.

The Design Economy 2018 demonstrates that design has a significant role to play in delivering these new foundations. The use of design in the UK economy is not only growing, it is helping firms to innovate, improve their productivity and increase turnover – but more needs to be done. The regional concentration of design in London and the south-east – and in specific clusters of design such as the West Midlands and the north-west – demonstrates that design is working to drive innovation and create higher value. Yet there is still significant scope for improvement.

If design is a key part of our economic future, it needs to be better distributed. Our findings demonstrate that whilst design offers a solution for localised growth there is evidence of a growing gap between firms, regions and people that use design and those that don't. Not only does this have implications within the UK domestic market, with a few large firms driving growth and pulling away from the wider SME population, it also has implications for the UK internationally. As we move into a new global context, our use of design risks falling behind other countries just when it is most needed.



The lack of diversity in design also presents multiple challenges. Firstly, while demand for design skills appears to be growing, with only 1.69 million people employed in a design role, there is a risk of growing inequality between those who have such skills and those who do not. This is accentuated by the lack of gender, social class and ethnic diversity in significant sectors in the design economy, meaning only a small portion of the population has access to this more creative, higher value work.

The continued growth of digital design also raises new questions for the design economy to consider. That design is at the forefront of economic and technological developments should not come as a surprise. However, with growing scrutiny on the negative effects of technology on people's lives as well as its benefits, digital designers will find themselves under the spotlight more than ever. Over the coming years it is essential that the sector leads on discussions about the ethics of digital design.

For everyone and everywhere in the UK to succeed and thrive in the 21st century, we need to build on the fundamental successes of the design economy. The opportunity for design to drive growth in the fourth industrial revolution is clear. We need to respond to the evidence to make this change happen. There is the potential to use design as the UK has done previously at key moments of industrial change in its history – to help UK firms, regions and people thrive. Now is the time to turn once again to design.

Recommendations

Design Council consistently champions the role and importance of design to the UK, based on the evidence from our research. Our evidence overwhelmingly shows that design is at the forefront of global economic change, key to UK innovation, helping to drive up business turnover and deeply connected to the success of some UK regions. It is therefore essential that design plays an important role in delivering the skills, knowledge and jobs of the future. As such Design Council recommends:

01.

A Research, Design and Development tax credit
Support from government can help improve the confidence of UK firms to invest in design. Design enables firms to better understand their users and shape their goods or services to meet their needs. In the context of R&D, this can provide structure and focus. It encourages practical applications for research insights and helps map the route from idea to market proposition. Yet four in ten firms only use design in a limited way, with too many still perceiving it to be a cost rather than an investment.

Alongside delivering on its global ambitions, the government could use the Research, Design and Development tax relief to deliver against its domestic policy objectives. Incentives should be targeted at the sectors with the lowest levels of productivity and the highest chances of automation (such as retail and administrative services). These would benefit most from an uplift in productivity while creating more meaningful, creative and higher value jobs in the process. Design Council is committed to working with key partners to develop an implementation plan for this solution.

02.

A UK Design Action Plan
The impact of design on innovation and economic growth is clear. To maximise this impact, the UK needs a consolidated, national action plan for design. This should bring together key stakeholders in design and beyond to help UK firms navigate how design can be used for innovation, as well as policymakers and service providers to operationalise design for economic and social impact.

The Design Action Plan should be measurable with responsibilities for central government, the regions and the design community. It should ensure design sits across policies and investment to drive innovation and growth, providing ministerial level responsibilities to deliver change. Design Council, along with our partners, will work with central government, regions and businesses to deliver the plan and develop tangible opportunities to grow the use of design across the UK.

03.

Improving access to design
The majority of the UK workforce does not currently have exposure to the advanced skills and knowledge required in future economies. Design spans sectors and occupations and will be in high demand in the future economy. Building on our pool of design skills is one way in which to create a future ready workforce and this can be achieved by focusing on the four following areas:

- The supply of designers will stagnate if the decline in students studying design between 14 and 18 years old is not addressed. Without state support, design will be left as a pursuit for only those who can afford it through their own means. To ensure young people from all backgrounds can study design, and that the UK has the diversity of thought and ideas required for the future, Design and Technology must become a core EBacc subject.

- Future engineers, scientists and digital pioneers will need design skills to generate new ideas, products and services and to enhance their benefit for users. These skills are also less likely to be automated. Along with art, the UK should incorporate design methods, tools and approaches into STEM subjects. This will teach future generations the skills required for a changing economy.

- As the fourth industrial revolution takes hold, boundaries will continue to blur between disciplines. This is already evident in the growth of multidisciplinary clusters across the country. Higher education institutions therefore need to do more to break down the boundaries between subject areas, whether figuratively (such as through Design Council's Design Academy programme[101]) or literally, as is the case at Manchester School of Art[102]), to ensure they are preparing young designers for the future.

- The design industry has a responsibility to start recruiting individuals who break the mould of the current designer stereotype and who could be the design leaders of the future. Urgent action is required to improve diversity. Disparities between men and women in the sector have persisted for far too long. Inequalities exist too for those from different ethnicities and social backgrounds. Design industries must lead on introducing measures to improve access to design occupations for these groups. This also includes exploring how women, ethnic minorities and those from less privileged backgrounds enter leadership positions. For some sectors this may require introducing diversity targets, although lessons should also be learnt from what other sectors such as engineering are doing to widen recruitment and design training amongst women and those from different social backgrounds. For designers to connect to the world around them, they need to reflect the world around them. Otherwise the world of design risks becoming disconnected from the design of the world.

04.

Putting in place the right intellectual property framework for design
Greater use of design would further cement the position of UK goods and services as the best in the world. Yet alongside this opportunity for growth there are risks for the design industry following the UK's exit from the European Union. Design and intellectual property rights are of critical importance. As part of any future trade agreements, the government should ensure it is creating a supportive framework under which UK firms can export, confident in the knowledge that the quality and integrity of their products and services will be protected.

[101] Design Council (2017) *Design Academy 2017-18 brochure* [online]
[102] Manchester School of Art provides opportunities for collaboration between students in its four main departments, including the innovative Unit X module offered to students across the School that encourages interdisciplinary study and collaboration on an external-facing project [online]

Appendix 1 Methodology for economic analyses

The majority of the economic analysis in this report was conducted by the Enterprise Research Centre. All analysis is based on the most recent data available. The data sources used are primarily those used in the Creative Industries Economic Estimates published by the Department for Culture, Media and Sport (DCMS), known since July 2017 as the Department for Digital, Culture, Media and Sport. The methodology for this research is designed to reflect that used by DCMS.

Identifying designers
To identify the occupations of those working in design, in 2015 we reviewed a range of existing literature and consulted with key stakeholders across the world of design. Using these outcomes we worked through a process of review and selection of best fit Standard Occupational Classification (SOC) codes to identify designers within ONS data, who are counted in the analysis regardless of the industrial sector they work in.

Table 31: Design occupations:

SOC	SOC description	Example designer
2121	Civil engineers	Building engineer, structural engineer
2431	Architects	Architect, architectural consultant, landscape architect
2432	Town planning officers	Planning officer, town planner
2435	Chartered architectural technologists	Architectural technologist
3121	Architectural and town planning technicians	Architectural assistant, construction planner
3122	Draughtspersons	CAD operator, cartographer
5113	Gardeners and landscape gardeners*	Garden designer, gardener, landscape gardener
3422	Product, clothing and related designers	Fashion designer, product designer, interaction designer
2473	Advertising accounts managers and creative directors	Advertising manager, campaign manager, brand identity
5211	Smiths and forge workers	Blacksmith, farrier
5411	Weavers and knitters	Carpet weaver, knitwear manufacturer
5441	Glass and ceramics makers, decorators and finishers	Glass blower, potter
5442	Furniture makers and other craft woodworkers	Antiques restorer, cabinet maker
5449	Other skilled trades not elsewhere classified	Engraver, goldsmith
2135	IT business analysts, architects and systems designers	Business analyst, systems analyst, technical architect
2136	Programmers and software development professionals	Database developer, games programmer, software engineer
2137	Web design and development professionals	Internet developer, web designer, user interface designer
5414	Tailors and dressmakers	Fabric cutter, tailor
3411	Artists*	Illustrator, portrait painter, sculptor
3421	Graphic designers	Graphic artist, graphic designer
2122	Mechanical engineers	Aerospace engineer, automotive engineer
2126	Design and development engineers	Design engineer, research and development engineer
2129	Engineering professionals not elsewhere classified*	Metallurgist, project engineer

* Subject to the following exclusions: employment/value in SOC 5113 is included only where this occurs within SIC 71.11 and 81.30; employment/value in SOC 3411 is only included where people are working outside of SIC 90.03 and excludes those working in an educational setting; employment/value in SOC 2129 is only included for those working in product and industrial manufacturing industries (SIC 13-32), other creative industries (as per the DCMS definition) or those identified as design industries).

Table 32: Design-intensive industries

Design subsector	SIC	SIC description	Example design business
Architecture and built environment	71.11	Architectural activities	Building design and drafting, eco design
Design (clothing)	14.19	Manufacture of other wearing apparel and accessories	Accessories
Design (craft)	23.41	Manufacture of ceramic household and ornamental articles	Ceramic tableware
	32.12	Manufacture of jewellery and related articles	Jewellery or watches, production of precious stones
Design (digital)	58.21	Publishing of computer games	Computer game design and publishing
	58.29	Other software publishing	Software publishing
	62.01	Computer programming activities	Designing structure and content of software, user interface design
Design (multidisciplinary)	74.10	Specialised design activities	Fashion design, sustainable design, industrial design
Design (product/ industrial)	16.29	Manufacture of other products of wood etc.	Furniture design
	26.40	Manufacture of consumer electronics	Electronic home entertainment equipment

Identifying design-intensive industries
We then used the design occupations to calculate the intensity of design employment in industries as set out in ONS individual Standard Industrial Classification (SIC) codes. The intensity is the proportion of people employed within an industry that are working within one of the design occupations. As per the DCMS/Nesta method, any industry with a design intensity of 30% or above is considered to be a design industry. All employment within a design industry is included in the analysis on the basis that those employed in non-design roles will be supporting the core design function.

This approach allows us to identify designers who are working in design-intensive sectors, but also the large number of designers working in other sectors across the UK economy. Throughout the report, the findings of the research are represented by the following three categories and broken down by design subsector.

- Designers in design industries (eg, digital design, architecture and built environment)
- Other roles in design industries (eg, support functions such as administration, finance, distribution)
- Designers in other sectors across the economy (eg, aerospace, finance, retail, etc).

These occupations and industries formed the basis for our analysis. Analysis is designed to show recent trends over a five-year period (except where data covering this period is not available). The latest available data for some indicators (firm counts and employment) relate to 2014, while the latest for other indicators (GVA, turnover and exports) relate to 2013. Time-series analysis is therefore not consistent for these indicators, covering the periods 2010-2014 and 2009-2013 respectively. Percentage change over these periods is shown for the purposes of comparison.

Suppression
Data is rounded and suppressed in line with the ONS' Disclosure Control Policy for Tables Produced from Surveys. These standards set out the requirements for disclosure control methods which ensure the confidentiality of respondents to government surveys such as the Annual Population Survey.

All values based on an unweighted count between 0 and 3 (ie, where one or two survey respondents have given a particular answer or combination of answers) are automatically suppressed. Further suppression is applied so that the value of a suppressed cell cannot be calculated using other data in the table (eg, where a single value in a row or column is automatically suppressed, it can be calculated by subtracting the other values in that row or column from the total; this is prevented by suppressing a second value in the same row or column).

While it is designed to protect survey respondents' confidentiality, a consequence of suppression is that the least reliable estimates (those based on the smallest sample, and therefore most likely to be subject to sampling variability) are those that are suppressed.

Counting design firm numbers
Firm counts are taken from the UK Business Counts, a public version of the Inter-Departmental Business Register (IDBR) available from Nomis.

The IDBR is a comprehensive dataset of UK businesses compiled by the ONS which covers 99% of UK economic activity. It holds records of approximately 2.1 million businesses. It does not cover very small businesses without VAT or PAYE schemes (self-employed individuals and businesses with low turnover and without employees); some non-profit-making organisations are also not included. Firm counts are rounded to the nearest multiple of five in the UK Business Counts. This means that values of one or two will be rounded to zero, meaning that not all reported zeros are true zeros.

Calculating design employment
Employment estimates are taken from the Annual Population Survey (APS). The APS is the largest ONS household survey, based on the Labour Force Survey but including a boosted sample designed to provide greater reliability at smaller geographical levels. Each survey includes around 130-140,000 individuals who are in employment (either employed or self-employed). The survey provides a wide range of indicators including demographics, employment, education and health, although a relatively small number of variables are used in this report.

The analysis uses APS microdata, analysed using SPSS and Stata. Employment estimates include main jobs and second jobs.
Estimates are weighted using the appropriate variables in each APS dataset.

Financial calculations
Turnover and GVA estimates are taken from the Annual Business Survey (ABS). The measure of GVA used in this report is approximate gross value added (aGVA), which is the measure recommended by the ONS when analysis at a detailed industrial level is required.

The ABS is the key ONS survey for understanding the detailed structure and performance of businesses across the UK, and is one of the main sources of business information in the UK National Accounts.

Around 47-49,000 businesses are surveyed each year. Because the survey sample is taken from the IDBR, the survey only includes businesses with VAT and/or PAYE schemes. In addition, the ABS covers only the non-financial business economy. It includes the production, construction, distribution and service industries, and represents about two-thirds of the UK economy in terms of GVA.

Turnover estimates include design industries only. Turnover is measured in current prices (ie, figures are not adjusted for inflation).

GVA measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom. GVA is closely linked to the more commonly used Gross Domestic Product (GDP): GVA + taxes on products – subsidies on products = GDP.

The ABS provides GVA figures for design industries only. This is apportioned to design and non-design occupations on the basis of their share of gross earnings in design industries. The earnings data used in this analysis are taken from the APS. Similarly, an estimate of the contribution to GVA of designers employed outside design industries is based on their share of gross earnings (derived from the APS). GVA is measured in current prices (ie, estimates are not adjusted for inflation).

Productivity figures are calculated by dividing GVA estimates by employment.

Export estimates are taken from the ONS International Trade in Services (ITIS) data and the UN Commodity Trade Statistics database (Comtrade).

ITIS collects data on UK resident companies' international transactions in services, combining data from survey and administrative sources. It provides data used by ONS to measure the UK's Balance of Payments and GDP, as well as in Input-Output Supply and Use Tables. ITIS is the only source used by DCMS to measure exports from the creative industries (the DCMS Creative Industries Economic Estimates cover service exports only).

Annual estimates from ITIS combine a quarterly survey (of around 1,100 businesses) and an annual survey (of around 14,500 businesses). ITIS data do not cover travel, transport, banking/financial institutions, higher education, charities and much of the legal profession.

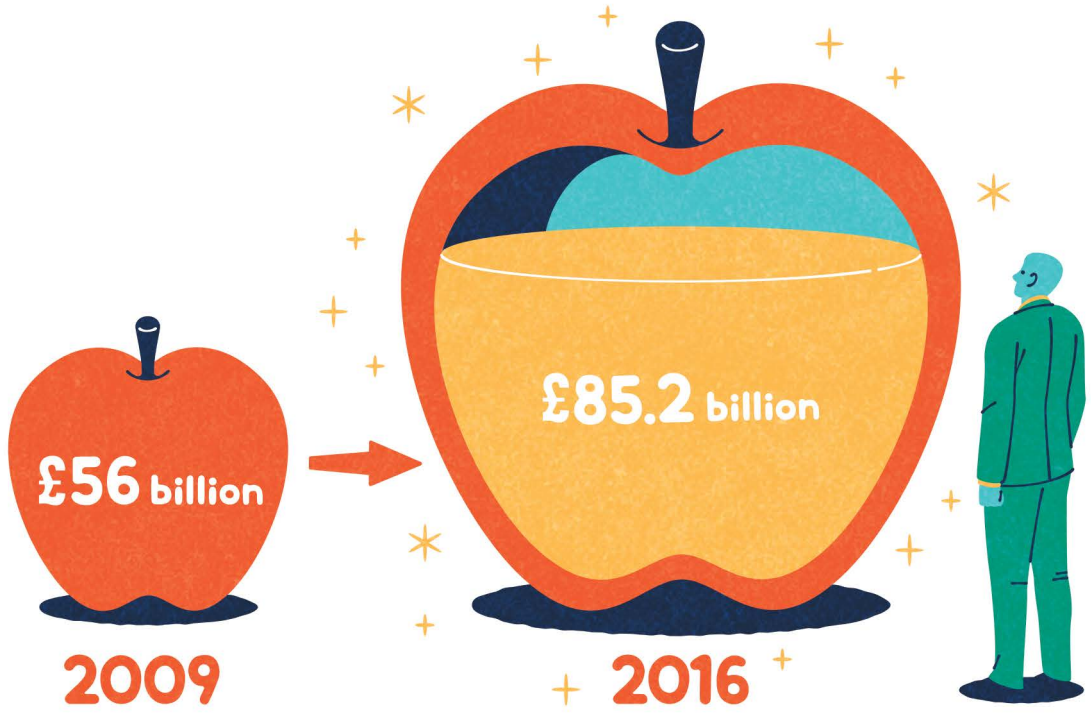
Estimates for service exports obtained from ONS's ITIS survey have changed as of 2013 to comply with IMF's Balance of Payments Manual 6 (BMP6) as required by Eurostat. This has meant that a revised ITIS questionnaire was used from 2013. The survey increased to 52 service products overall to comply with BPM6. Hence the estimates are much larger from 2013. Details are described in the International Trade in Services QMI (methodology paper published by ONS in January 2015).

Comtrade provides detailed global trade data. It is a repository of official trade statistics from countries around the world, including the UK. We use Comtrade to provide estimates of the value of design in the export of goods from the UK, to supplement service export estimates from ITIS. Comtrade is used in favour of data from ONS and HMRC because it provides a more detailed classification than other sources, which can be mapped to our design definition more easily.

Due to small sample sizes in ITIS, export estimates for the design (craft) and design (clothing) subsectors are aggregated (for consistency with ITIS, Comtrade estimates for these subsectors are also aggregated).

Making international comparisons
Additional analysis on international comparisons was undertaken by Design Council.
The following datasets were used for international comparisons:

- To compare different countries in terms of design registrations, data were analysed from the WIPO IP Statistics Data Center.
- For comparisons of exports, the United Nations Conference on Trade and Development (UNCTADSTAT) data were used.
- For comparisons on business use of design, the European Commission's Innobarometer 2016 was used.



Appendix 2 Methodology for identifying clusters

Additional analysis was undertaken by the Enterprise Research Centre to identify groups of businesses across the UK which could be considered clusters for the design industry. Clusters are geographic concentrations of firms within the same industry. Research shows that businesses within clusters benefit from agglomeration effects such as facilitated knowledge exchange, increased access to relevant skills and reduced supply chain costs.

The identification of design industry clusters helps to increase the evidence base surrounding the strength of the sector across the UK.

The analysis within this document builds clusters using a bottom-up approach, using location data for individual business premises from the ONS' IDBR.

The analysis replicates that undertaken by the Department for Business, Energy & Industrial Strategy entitled *Density-Based Spatial Clustering: Identifying industrial clusters in the UK*, but for different sectors of interest. For further detail surrounding the methodology used, please refer to the department's methodology report.[103] Table 33 highlights the design subsectors included within the research, alongside their respective SIC code(s) and description. A full set of results can be found in the accompanying spreadsheet.

Table 33: Detailed breakdown of design industries

Design subsector	SIC	SIC description
Architecture and built environment	71.11	Architectural activities
Design (multidisciplinary)	74.10	Specialised design activities
Design (craft)	23.41	Manufacture of ceramic household and ornamental articles
	32.12	Manufacture of jewellery and related articles
Design (digital)	58.21	Publishing of computer games
	58.29	Other software publishing
	62.01	Computer programming activities
Design (clothing)	14.19	Manufacture of other wearing apparel and accessories
Design (product and industrial)	16.29	Manufacture of other products of wood etc.
	26.40	Manufacture of consumer electronics

[103] Department for Business, Energy and Industrial Strategy (2017) Density-Based Spatial Clustering: Identifying industrial clusters in the UK – methodology report [online]

Identifying design industry clusters within the UK

Density-based spatial clustering of applications with noise[104] (DBSCAN) has been used to identify the design industry clusters. This bottom-up approach uses the location of individual businesses to form clusters. As such, results are not restricted to existing administrative boundaries and the clusters fall within and across administrative boundaries.

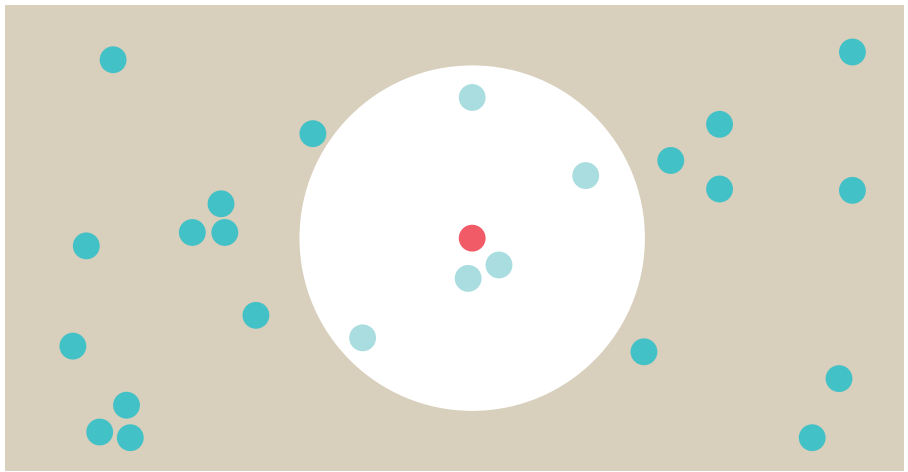
The shape of the clusters is not restricted by convex boundaries and hence represents the natural growth of clusters.

Outliers are defined as 'noise' within the DBSCAN approach if they do not meet the density requirements.

The analysis does not require users to specify the number of clusters in advance. Control over clusters is a more flexible approach that is based on two parameters (inputs) – a 'radius' and a 'minimum density threshold'. The radius defines the area of interest (shape, size) around each point, and the minimum density threshold sets the minimum number of points which must fall within the area for it to be considered dense.

Points are assigned as either core or a boundary/noise point. Core points are those where there are a greater number of other data points than the minimum point threshold within the area of interest. Boundary points do not meet the minimum density threshold but have at least one core point within their areas of influence ie, are part of a cluster but not dense themselves. Noise points do not meet the minimum density threshold and do not fall sufficiently close to a core point.

Figure 11: Point types



- Point of interest
- Point within an area of of interest
- Point outside an area of of interest

[104] Ester M, Kriegel HP, Sander J and Xiaowei X (1996) 'A density-based algorithm for discovering clusters in large spatial databases with noise' KDD'96 *Proceedings of the Second International Conference on Knowledge Discovery and Data Mining* pp.226-231

Weighting
In addition to looking at the density, each point can be assigned a weight. The processes for determining clusters are the same as described above. However, instead of counting the number of points within the area of influence, the sum of the weights is compared to the minimum points threshold. For this analysis, employment at each business premises was used to weight the points[105]. Essentially this creates clusters which are areas with a high employment density. Disclosure rules mean that clusters are suppressed if they do not contain sufficient local units,[106] therefore the final definition for these groups of points is: "A geographic area with sufficient individual businesses and a high density of employment in a given sector".

Final presentation
Disclosure rules associated with the IDBR mean that individual businesses are not shown on the map and as such, results show outlines of the clusters.

Convex outline
One of the advantages of the DBSCAN approach is the ability to develop more detailed cluster shapes (ie, concave) in order to produce outlines for presentation purposes. However, it was decided to produce the (minimum) convex outline due to the difficulty in extracting the boundary points from the algorithm.

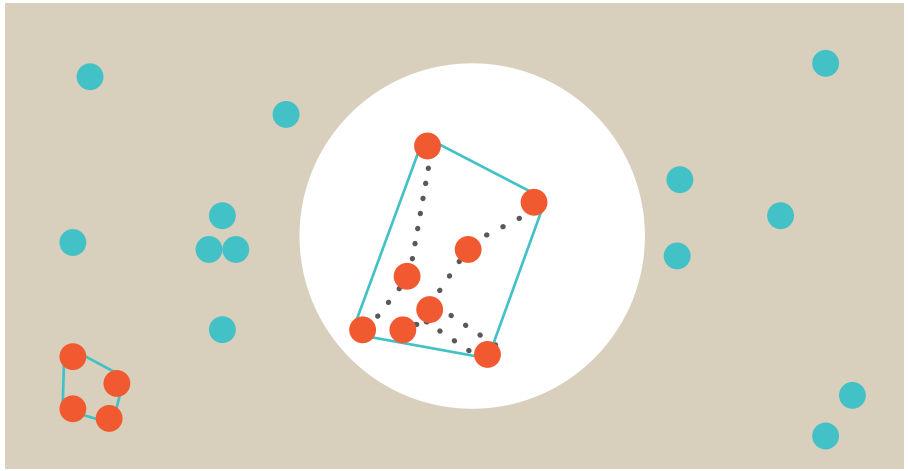
An advantage of applying a convex outline is that it ensures all points within the cluster are included (see figure below). There are also only a limited number of boundaries which can be defined around each cluster.

Limitations
Applying a convex outline rather than the 'actual' boundary loses some of the precision of the output. It is also possible that the convex boundaries may include areas with noise points (see figure below) or give the appearance that they overlap. This will not affect the analysis except when looking at employment growth within clusters. All 2015 figures in the tables are based solely on the businesses which were in the original cluster, whereas the comparison year (2010) takes into account all points contained within the convex boundary.

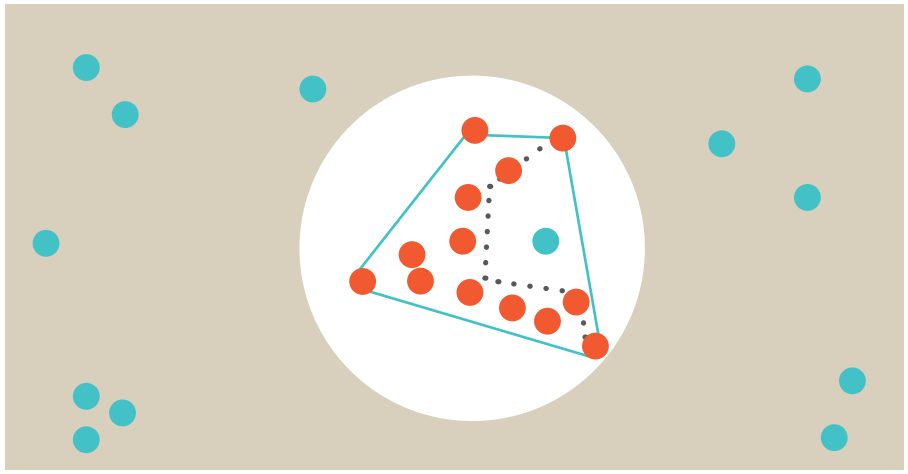
Establishing employment hotspots within the identified clusters
The Kernel Density Estimation (KDE) technique was used to create a heat map which is used to identify employment hotspots. This methodology does not take into account the number of local units, only employment. KDE produces a smooth image indicating where there is a high concentration of employment. The colours on the final maps were assigned to cells based on their relative density values, ie, the highest density is associated with one end of the colour distribution and the lowest the other. The remainder of the range was split linearly. The majority of the cells are not coloured because they do not contain any data points.

[105] Local units with employment equal to zero were excluded from the analysis.
[106] Disclosure rules resulted in the suppression of 18% of clusters in the design (craft) sector, 26% of clusters in the design (product and industrial) sector and 33% of clusters in the design (clothing) sector.

Figure 12: Identifying clusters



- Clustered point
- Noise point
- Convex hull
- 'Actual' boundary



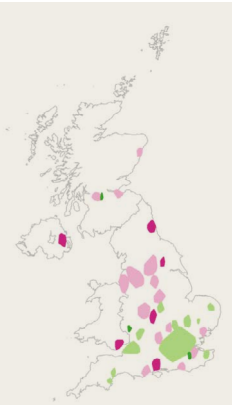
- Clustered point
- Noise point
- Convex hull
- 'Actual' boundary

Employment growth maps
These maps provide additional context to the DBSCAN clusters by illustrating employment growth within the cluster between 2010 and 2015. These maps also include figures for total growth in the sector and the change outside the sector. To find the employment growth, outlines of the 2015 clusters are overlaid onto the 2010 data. The total number of local units and employment in 2010 which fall within the 2015 cluster boundaries are then added together, allowing for a comparison against a baseline.

The main limitation of this approach is the use of convex boundaries. As described above, these may include areas which are not part of the original cluster. This does not affect the 2015 figures which are calculated based solely on the businesses identified as being part of a cluster. However, the 2010 data may contain points from outside these original shapes.

There is also the possibility that overlapping clusters are double counting some businesses. Therefore these statistics should be seen as indicative of the scale of growth or decline in an area.

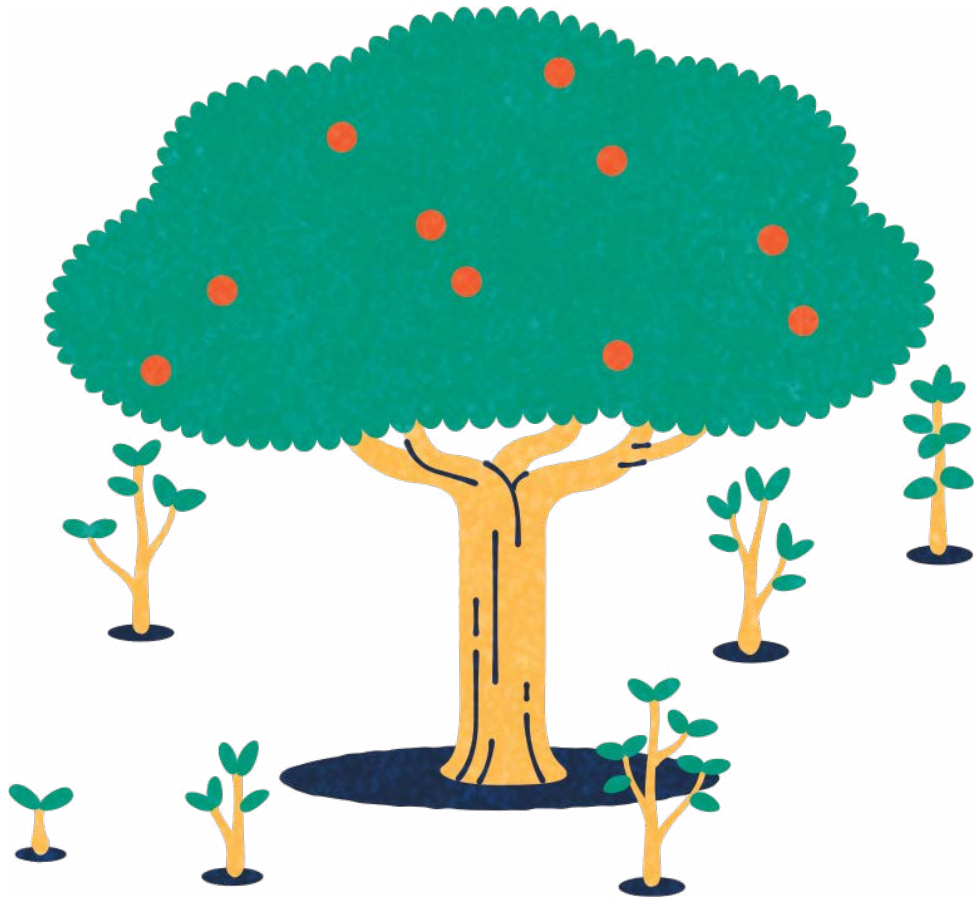
Chart 19: Employment growth within clusters for Architecture and Built Environment between 2010 and 2015



Parameters for Architecture and Built Environment in 2015 are:
radius=0.1 and minimum points=213
The percentage of noise is 32%
Total sector growth: -12%
Growth Outside Clusters: -18%

- Increase Greater Than 30%
- Increase Less than 30%
- Decrease Less Than 30%
- Decrease Greater Than 30%
- No Information

Design Economy 2018



Appendix 3 Methodology for causal analysis of the links between design, innovation of different types and productivity

The case studies and design survey undertaken for this project suggested the different mechanisms through which design and designers can contribute to firms' innovation and performance. We used data from the UK Innovation Survey to undertake a causal analysis of the links between design, innovation of different types and productivity. Our analysis draws on data from around 15,000 UK companies that responded to two consecutive waves of the UK Innovation Survey.

UK Innovation Survey

The starting point for our analysis was the UK Innovation Survey indicator of whether or not each firm 'engages in ... design activities, including strategic, for the development or implementation of new or improved goods, services and processes'. Are firms which are engaging with design more likely to be innovating? More specifically, we explore whether firms which are engaging with design are more likely to be engaging in product or service innovation, process innovation and organisational innovation. The second stage of our analysis explores the extent to which each of the three types of innovation results in improvements in firms' productivity.

The UK Innovation Survey has a number of advantages for this type of causal analysis. First, it is a large-scale survey and this means both national estimates and sub-sample estimates can be made. Here, we focus on firms of different sizes, whether or not firms are R&D performers and the contrast between manufacturing and services firms. Second, the survey provides details of design investment, innovation and a productivity indicator (sales per employee) for consistent reporting units. Third, the survey provides a number of variables which can be used as control factors to help identify more precisely the design effect.

The survey is not without its disadvantages, however. Central to this is the focus in the survey on technological innovation. To count as product or service innovation in the UK Innovation Survey a product/service must be 'new or significantly improved [and] excludes ... changes of a solely aesthetic nature'. One aspect of design clearly addresses exactly this aesthetic element of product/service change and this will not be captured in our analysis, and means our analysis may underestimate the contribution of design to innovation and productivity. Second, the UK Innovation Survey provides little information on how design or designers are engaged with any change process. Again, this limits our analysis and in particular the nature of any lessons which we might draw for the implementation of design as part of firms' innovation activity.

Estimation approach

We adopt a value chain perspective here suggesting that design may influence innovation in the short term but that any productivity benefits may take some time to emerge.[107] In particular, we consider the extent to which firms' engagement with design drives (a) product/service innovation (b) process innovation and (c) organisational innovation. Organisational innovation is broadly defined and covers changes to firms' strategy, work organisation and marketing activities. Our estimation approach comprises two elements. First, we use a series of simple probit models to model the impact of design engagement on the probability of innovation. Models are based on pooled data from waves 4-9 of the UK Innovation Survey and use all available observations. All models include wave and sectoral dummy variables.

The second stage of our estimation approach links the innovation probit models with a simple productivity equation. Innovation variables (and the determinants) are lagged to reflect the time taken for innovation to influence productivity. This model is estimated using the Conditional Mixed Process (CMP) procedure in Stata 14 which allows us to instrument binary right hand side variables such as the innovation indicators. The inclusion of the lagged productivity measure and the lagged innovation and design measures significantly reduces the number of observations available.

In considering the relationship between design and innovation and innovation and productivity we allow for a range of other factors which may influence firm performance. These are:

- Firm size – measured by employment. The argument here is that larger firms may have stronger internal design and innovation resources which may drive productivity.
- Skills – firms with a more highly skilled workforce may be better able to harness the productivity benefits of innovation and better incorporate design resources into the innovation process.
- R&D – has benefits both in terms of knowledge creation (discovery) and absorptive capacity, and may help firms to translate innovation into productivity benefits.
- Exporting – may facilitate learning-by-exporting processes enhancing both innovation and productivity.
- Innovation partnering – or open innovation – has been shown to be an important element of firms' innovation strategy and may complement knowledge generated from R&D or elements of design.
- Knowledge investments – related to market information or technical know-how may also drive innovation and performance.

[107] Roper S, Du J and Love JH (2008) 'Modelling the innovation value chain' *Research Policy* 37(6-7) pp.961-977

Table 34: Sample descriptives: pooled data from UK Innovation Surveys 4-9

Label	Variable definition	Obs.	Mean	Std. Dev.
Productivity	Turnover per employee at the end of the survey period	59,837	123.469	134.802
Product/service innovator	Proportion of firms introducing either new or improved product or service	78,237	0.242	0.428
Process innovator	Proportion of firms introducing new or improved processes	64,024	0.150	0.357
Organisational innovator	Proportion of firms introducing innovations in strategy, marketing or work organisation	78,242	0.369	0.482
Design engaged	Proportion of firms investing in design	69,708	0.174	0.380
Employment (log)	Employment at the end of the survey period	67,483	3.778	1.790
Science graduates	Proportion of the workforce which are science or engineering graduates	56,801	7.019	16.740
Other graduates	Proportion of the workforce which are other graduates	58,977	9.971	19.462
Exporting firm	Proportion of firms which are exporting	77,935	0.311	0.463
Innovation partners	Number of types of innovation partners (zero for non-innovating firms)	78,237	0.641	1.503
In-house R&D	Proportion of firms undertaking in-house R&D	77,933	0.247	0.432
External R&D	Proportion of firms undertaking external R&D	77,929	0.089	0.285
Training	Proportion of firms investing in training related to innovation	76,303	0.247	0.431
External knowledge acquisition	Proportion of firms investing in external knowledge acquisition related to innovation	77,928	0.087	0.282
Market intelligence acquisition	Proportion of firms investing in acquiring market intelligence related to innovation	77,928	0.264	0.441
Machinery acquisition	Proportion of firms investing in machinery acquisition related to innovation	77,935	0.404	0.491

Note: Data is pooled from waves 4-9 of the UK Innovation Survey. Observations are weighted to give representative results. Observation numbers differ due to non-response to specific survey questions. Productivity outliers with turnover per employee greater than £1m pa (c. 2% of all observations) are excluded.

Table 34 provides summary statistics and variable definitions for each of the variables used in our analysis. In all estimation we also control for the survey wave and the sector in which the firm is operating.

Table 35 models the effects of design engagement on the probability of different types of innovation amongst firms.

Table 35: Modelling the effects of design engagement on the probability of innovation: all firms

	Product/service innovator	Process innovator	Organisational innovator
Variables	b/se	b/se	b/se
Design engaged	0.081***	0.035***	-0.003
	(0.011)	(0.006)	(0.012)
Employment (log)	0.001	0.006***	0.041***
	(0.002)	(0.001)	(0.003)
Science graduates	0.001***	0	0.001***
	(0.000)	(0.000)	(0.000)
Other graduates	0	0	0.002***
	(0.000)	(0.000)	(0.000)
Exporting firm	0.051***	0.006	0
	(0.008)	(0.005)	(0.009)
Innovation partners	0.134***	0.073***	0.115***
	(0.007)	(0.004)	(0.009)
Innovation partners – squared	-0.015***	-0.008***	-0.012***
	(0.001)	(0.001)	(0.001)
In-house R&D	0.184***	0.062***	0.080***
	(0.015)	(0.006)	(0.014)
External R&D	-0.007	-0.007	-0.001
	(0.011)	(0.006)	(0.015)
Training	0.073***	0.058***	0.099***
	(0.013)	(0.006)	(0.012)
External knowledge acquisition	0.024**	0.014**	0.034**
	(0.011)	(0.006)	(0.014)
Market intelligence acquisition	0.191***	0.039***	0.282***
	(0.010)	(0.005)	(0.010)
Machinery acquisition	0.066***	0.088***	0.246***
	(0.009)	(0.005)	(0.009)
Number of observations	51586	44466	51586
chi^2	7203.15	4945.119	6366.339
Rho	0	0	0
Pseudo R^2	0.332	0.27	0.283
BIC	41006.626	28686.541	50954.794

Notes: Data is pooled from waves 4-9 of the UK Innovation Survey. Observations are weighted to give representative results.

Table 36: Design impacts on the probability of innovation (sample sub-groups)

Sample	Product/service innovator	Process innovator	Organisational innovator
All firms	0.081***	0.035***	-0.003
SMEs	0.081***	0.034***	0.011
Larger firms	0.041	0.079***	0.023
R&D performers	0.099***	0.079***	0.018
R&D non-performers	0.066***	0.021***	0.025
Manufacturing	0.117***	0.034***	-0.003
Non-manufacturing	0.070***	0.036***	0.006

Note: Marginal effects in the table represent the impact of design engagement on the probability of innovation.

Table 36 breaks down the analysis from the previous table in sample sub-groups.

Table 37 illustrates how we calculated the link between design and productivity. We used a lag of both design engagement and innovation to ensure a causal forward link to productivity. Table 37 reports the full models:

- Part A of the table is the model of (log) productivity which includes the instrumented (and lagged) product/service innovation, process innovation and organisational innovation terms.

- Parts B, C and D of Table 37 relate to the determinants of the three different types of innovation, and in particular include design engagement along with a set of other controls.

Table 37: Modelling the link between design engaged, innovation and productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms	SMEs	Larger firms	R&D Performers	Non-R&D Performers	Manufact-uring	Non-manuf-acturing
A. Productivity (log) model							
Productivity (log, lag)	0.585***	0.544***	0.419***	0.592***	0.575***	0.646***	0.573***
	(0.025)	(0.027)	(0.042)	(0.041)	(0.030)	(0.035)	(0.028)
Employment (log)	-0.091***	-0.077***	-0.072***	-0.03	-0.118***	0.024**	-0.116***
	(0.033)	(0.014)	(0.021)	(0.019)	(0.040)	(0.011)	(0.037)
Science graduates	0.001*	0.001	0.004***	0	0.002	0.002***	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Other graduates	0.002***	0.001**	0.006***	0.001	0.002***	0.001	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exporting firm	0.162***	0.156***	0.326***	0.080***	0.191***	0.079***	0.174***
	(0.020)	(0.022)	(0.044)	(0.030)	(0.025)	(0.018)	(0.026)
Product/service innovator (lag)	-0.388***	0.141	0.003	-0.277*	-0.408**	0.03	-0.452***
	(0.139)	(0.198)	(0.101)	(0.143)	(0.163)	(0.054)	(0.165)
Process innovator (lag)	0.191***	-0.316	0.193	-0.155	0.261***	0.008	0.203***
	(0.065)	(0.249)	(0.123)	(0.178)	(0.062)	(0.077)	(0.078)
Organisational innovator (lag)	0.418**	0.181*	0.04	0.492***	0.382**	0.044	0.453**
	(0.193)	(0.094)	(0.100)	(0.149)	(0.189)	(0.057)	(0.201)
B. Product/service innovator (-1)							
Design engaged (lag)	0.228***	0.237***	0.315***	0.239***	0.220***	0.261***	0.219***
	(0.054)	(0.061)	(0.110)	(0.067)	(0.079)	(0.071)	(0.069)
Employment (log, lag)	-0.063**	0.026	-0.054**	-0.091***	-0.048	-0.021	-0.069**
	(0.025)	(0.030)	(0.025)	(0.026)	(0.031)	(0.025)	(0.028)
Science graduates (lag)	0.002	0.002	0.008**	0.003*	0	0.003	0.002
	(0.001)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.001)
Other graduates (lag)	0	0	0	-0.001	0	-0.001	0
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)

Table 37: Modelling the link between design engaged, innovation and productivity (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms	SMEs	Larger firms	R&D Performers	Non-R&D Performers	Manufact-uring	Non-manuf-acturing
Exporting firm (lag)	0.180***	0.213***	0.049	0.126*	0.173***	0.230***	0.166***
	(0.043)	(0.052)	(0.094)	(0.072)	(0.054)	(0.066)	(0.055)
Innovation partners (lag)	0.543***	0.492***	0.515***	0.376***	0.631***	0.481***	0.577***
	(0.042)	(0.043)	(0.068)	(0.057)	(0.054)	(0.055)	(0.052)
Innovation partners squared (lag)	-0.072***	-0.065***	-0.064***	-0.050***	-0.082***	-0.060***	-0.078***
	(0.007)	(0.007)	(0.010)	(0.009)	(0.009)	(0.009)	(0.008)
In-house R&D (lag)	0.517***	0.497***	0.427***	0.543***	0.410***	0.642***	0.462***
	(0.052)	(0.055)	(0.105)	(0.075)	(0.071)	(0.067)	(0.066)
External R&D (lag)	-0.021	-0.057	0.14	0.041	-0.024	-0.017	-0.028
	(0.064)	(0.074)	(0.092)	(0.080)	(0.104)	(0.083)	(0.085)
Training (lag)	0.262***	0.323***	0.097	0.272***	0.249***	0.202***	0.289***
	(0.046)	(0.052)	(0.110)	(0.068)	(0.061)	(0.068)	(0.057)
External knowledge acquisition (lag)	0.120**	0.115*	0.052	0.157*	0.092	0.149*	0.131*
	(0.057)	(0.067)	(0.087)	(0.082)	(0.082)	(0.086)	(0.073)
Market intelligence acquisition (lag)	0.652***	0.657***	0.560***	0.614***	0.635***	0.699***	0.647***
	(0.046)	(0.055)	(0.095)	(0.071)	(0.060)	(0.069)	(0.056)
Machinery acquisition (lag)	0.278***	0.227***	0.368***	0.058	0.347***	0.253***	0.269***
	(0.046)	(0.051)	(0.096)	(0.072)	(0.056)	(0.063)	(0.056)
C. Process innovator (lag)							
Design engaged (lag)	0.097*	0.142**	0.249***	0.068	0.132*	0.095	0.115
	(0.055)	(0.057)	(0.096)	(0.073)	(0.079)	(0.070)	(0.074)
Employment (log, lag)	0.067***	-0.006	-0.037	0.005	0.085***	0.073***	0.057***
	(0.018)	(0.041)	(0.038)	(0.030)	(0.023)	(0.024)	(0.021)
Science graduates (lag)	0.001	0.001	0	0	0.004*	-0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)

Table 37: Modelling the link between design engaged, innovation and productivity (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms	SMEs	Larger firms	R&D Performers	Non-R&D Performers	Manufact-uring	Non-manuf-acturing
Other graduates (lag)	0	0.001	0.001	-0.002	0.001	-0.001	0
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Exporting firm (lag)	0.068	0.095*	-0.255***	-0.018	0.103	0.021	0.102
	(0.049)	(0.056)	(0.087)	(0.077)	(0.064)	(0.066)	(0.066)
Innovation partners (lag)	0.430***	0.364***	0.528***	0.290***	0.542***	0.397***	0.450***
	(0.036)	(0.043)	(0.063)	(0.051)	(0.050)	(0.049)	(0.047)
Innovation partners squared (lag)	-0.050***	-0.042***	-0.064***	-0.026***	-0.069***	-0.041***	-0.054***
	(0.006)	(0.007)	(0.010)	(0.008)	(0.009)	(0.008)	(0.008)
In-house R&D (lag)	0.334***	0.382***	0.306***	0.213**	0.313***	0.231***	0.377***
	(0.052)	(0.056)	(0.099)	(0.084)	(0.071)	(0.072)	(0.069)
External R&D (lag)	-0.02	-0.052	0.071	-0.007	0.009	-0.096	0.024
	(0.065)	(0.067)	(0.094)	(0.076)	(0.107)	(0.080)	(0.089)
Training (lag)	0.285***	0.305***	0.178**	0.318***	0.256***	0.299***	0.283***
	(0.048)	(0.054)	(0.091)	(0.076)	(0.063)	(0.066)	(0.064)
External knowledge acquisition (lag)	0.074	0.104	0.06	0.119	0.033	-0.042	0.131
	(0.062)	(0.069)	(0.100)	(0.079)	(0.089)	(0.082)	(0.083)
Market intelligence acquisition (lag)	0.211***	0.267***	0.167*	0.179**	0.188***	0.150**	0.235***
	(0.047)	(0.061)	(0.096)	(0.074)	(0.062)	(0.070)	(0.062)
Machinery acquisition (lag)	0.643***	0.632***	0.545***	0.623***	0.648***	0.765***	0.602***
	(0.048)	(0.063)	(0.096)	(0.085)	(0.059)	(0.070)	(0.062)
D. Organisational innovator_ (lag)							
Design engaged (lag)	0.035	0.022	0.094	0.008	0.102	0.068	0.036
	(0.063)	(0.060)	(0.107)	(0.065)	(0.097)	(0.068)	(0.088)
Employment (log) (lag)	0.157***	0.153***	0.005	0.130***	0.167***	0.083***	0.168***
	(0.034)	(0.025)	(0.027)	(0.026)	(0.040)	(0.023)	(0.035)

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Table 37: Modelling the link between design engaged, innovation and productivity (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms	SMEs	Larger firms	R&D Performers	Non-R&D Performers	Manufact-uring	Non-manuf-acturing
Science graduates (lag)	0.003**	0.002	0.005	0.002	0.002	0	0.003*
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
Other graduates_ (lag)	0.004***	0.004***	0.001	0.003*	0.004***	0.003	0.004***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Exporting firm (lag)	0.026	0.035	0.062	-0.095	0.06	-0.035	0.066
	(0.043)	(0.047)	(0.082)	(0.069)	(0.054)	(0.060)	(0.055)
Innovation partners (lag)	0.235***	0.310***	0.328***	0.261***	0.193***	0.136***	0.279***
	(0.042)	(0.041)	(0.064)	(0.048)	(0.063)	(0.051)	(0.058)
Innovation partners squared (lag)	-0.029***	-0.041***	-0.035***	-0.034***	-0.021*	-0.018**	-0.034***
	(0.007)	(0.007)	(0.010)	(0.008)	(0.011)	(0.009)	(0.010)
In-house R&D (lag)	0.123*	0.232***	0.202**	0.187**	0.05	0.251***	0.061
	(0.071)	(0.054)	(0.094)	(0.073)	(0.118)	(0.064)	(0.099)
External R&D (lag)	0.144**	0.081	0.047	0.166**	0.165	0.163**	0.169*
	(0.067)	(0.075)	(0.105)	(0.072)	(0.113)	(0.079)	(0.094)
Training (lag)	0.278***	0.239***	0.207**	0.153**	0.357***	0.226***	0.299***
	(0.053)	(0.049)	(0.086)	(0.063)	(0.071)	(0.062)	(0.070)
External knowledge acquisition (lag)	0.094	0.136*	-0.055	0.1	0.102	0.092	0.097
	(0.060)	(0.071)	(0.095)	(0.078)	(0.085)	(0.079)	(0.078)
Market intelligence acquisition (lag)	0.667***	0.700***	0.553***	0.550***	0.709***	0.566***	0.708***
	(0.066)	(0.052)	(0.084)	(0.075)	(0.086)	(0.064)	(0.082)
Machinery acquisition (lag)	0.505***	0.455***	0.441***	0.177**	0.616***	0.488***	0.519***
	(0.065)	(0.046)	(0.082)	(0.072)	(0.074)	(0.061)	(0.073)
Number of observations	18735	11300	4178	6110	12620	5284	13450
chi^2	13678.124	16576.919	51405.068	7349.458	11685.31	2.50E+12	1.05E+05
Rho	0	0	0	0	0	0	0
BIC	7.93E+05	6.05E+05	41758.972	2.41E+05	5.42E+05	1.72E+05	6.10E+05

Note: Note: Estimated coefficients are reported. Data from waves 4-9 of the UK Innovation Survey (pooled CMP estimation). All models include wave dummies and 2-digit sectoral dummies. Observations are weighted to give representative results.

Appendix 4 Methodology for survey of UK firms

An online survey approach was adopted utilising BMG's large online panel network, totalling more than 750,000 unique panellists which include specialist business and executive panels. This allowed a range of employers from different business sizes and sectors to be reached, as well as ensuring the effective targeting of senior individuals who will have a design function/ responsibility.

In total, 1,006 panel members responded to the invitation and completed the survey. Respondents were invited to participate in the study via targeting of qualifying members of online panels.[108] In the course of drawing the sample, we also used a stratified or quota module. When issuing invitations we were also able to target panel members by industry sector, business size, region and other key information.

The recruitment processes for the panels are designed to be transparent and fair. Each new participant is given detailed information in advance about the rules of participation. Participation to these panels is voluntary and can be ended by both parties at any time. All personal data held on the respective participants is destroyed once the member leaves the panel. Panel members are invited to take part in each survey by email. They are informed in this email of the expected length of the survey, the period of participation and the incentive. Each participant may only register once for a panel.

In order to prevent cross-panel duplication, address registration and an IP tracking blocker are used. This also acts as a good measure to ensure a robust sample is drawn. All our providers reward their members for taking part and they receive points or cash for their answers. The details given by the panellists are treated in accordance with the strict laws on European data protection. The survey results were evaluated anonymously, ie, the answers given are never linked to names or addresses of the panellists in the analysis.

The survey invitation targeted heads of businesses, senior directors/managers and, specifically, heads of design or R&D within businesses. The survey 'thanked and closed' where survey participants did not self-classify into one of these job roles.

As the survey was self-completion and questions were non-mandatory,[109] not all respondents answered all questions that were asked of them. The lowest base recorded for a question asked of all respondents was 997.

Sampling
The survey represents the views of all UK businesses – England, Scotland, Wales and Northern Ireland, both employers and 'one-man bands', and across all sectors of the economy, both private and public sector.

A quota sample was structured in order to ensure that all sectors were represented by a minimum number of panel members (who represented the views of the organisation they work for) and that a range of business sizes (banded) were represented.

The targets by sector and size band were set as a tool for monitoring the sample and also for selecting appropriate panel members to invite to take part in the survey. When samples are self-selecting as they are in self-completion online surveys, there are inherent difficulties in delivering the exact number of interviews required. Furthermore, information held on panel members, which helps to target the survey invitations to maximise adherence to the sample specification, may not be up to date, with panel members changing jobs and sometimes moving to new sectors and/or bigger or smaller organisations.

The final sample achieved did, however, deliver close to the targets, with the number of completed interviews significantly short of the target in just one sector, that of arts, entertainment and recreation (SIC 2007 – R). However, at 39, the number of interviews achieved in this sector was still sufficient for separate analysis.

In total, 4,940 panel members were invited to participate in the survey. The number of completed surveys represents a response rate of 20%. Panel invitations are generally set up as an automated process so it is not possible to provide a figure for how many non-completes were due to ineligibility. Several reminders were sent but, again, it is not possible to provide a breakdown of reminders sent.

Data weighting
The sample was designed to deliver a minimum number of responses within sectors and size bands and these targets were not proportionate to the business population. To ensure the data is representative of the UK business population when it is analysed, it was weighted using information about the population from the Department for Business, Energy and Industrial Strategy – Business Population Estimates for the UK and Regions as at November 2017 (the latest available at the time of the survey).

The structure of the unweighted sample achieved by the survey and its weighted profile by sector and size are summarised in the following table.

[108] The panels we work with are ISO-certified. The internationally valid ISO 26362 is the first certification which reviews the quality of online sampling providers. The certification procedure specifically evaluates the design and effectiveness of their quality management.
[109] Rather than insist on a response, if respondents were not willing or able to provide a response they were allowed to continue to the next question.

Table 38: Sample: Targets vs. achieved vs. population

	Target	No. of interviews achieved	Sample distribution	Population distribution	No. of weighted cases
Sector:					
Primary	30	31	3%	6%	62
Manufacturing	220	225	22%	5%	53
Construction	80	83	8%	12%	124
Wholesale and retail trade; repair of motor vehicles and motorcycles	50	79	8%	15%	146
Transportation and storage	50	52	5%	4%	42
Accommodation and food service activities	50	34	3%	6%	57
Information and communication	100	107	11%	8%	84
Business and financial services	50	57	6%	5%	52
Professional, scientific and technical activities	100	108	11%	19%	185
Administrative and support service activities	50	45	4%	9%	86
Public administration and defence; compulsory social security	20	19	2%	1%	5
Education	40	48	5%	1%	15
Human health and social work activities	30	33	3%	4%	39
Arts, entertainment and recreation	100	41	4%	2%	21
Other service activities/other activities	30	44	6%	3%	35
Business size:					
0 employees	100	192	19%	47%	469
1-9 employees	200	188	19%	44%	437
10-99 employees	500	279	28%	9%	90
100+ employees	200	345	34%	1%	8
Total	1000	1006	100%	100%	1006

Appendix 5 Methodology for case studies

Detailed case studies were delivered by BOP Consulting.

Sampling
The guiding principle for sampling was to develop a compelling series of profiles that would provide a well-rounded story of the state of design and design firms in the UK in 2018. We aimed to create a group of profiles comprising a range of:

- Business sizes
- Geographical locations
- Design-intensive (design-focused) firms and design active firms (those firms in other sectors which use design)
- Sectors
- Diversity characteristics of ownership and management

In addition, we sought to engage with a diversity of voices within the firms in terms of function in the business, gender and ethnicity.

The process of getting to the final case study list involved the following steps:

- Design Council and BOP developing a long list of firms based on their networks and industry knowledge.
- Analysing against the sample criteria.
- Approaching firms to determine willingness to participate and identifying potential themes and interviewees.
- Reassessing against sample criteria.

The final agreed sample of seven firms provides a reasonable spread of business types and functions.

Table 39: Sample of case study firms

	Business size	Geographical location	Design intensive/design active	Sector
City ID	20	Bristol	Design intensive	Urban design
Fjord – Accenture	1,000 400,000	London, international	Design intensive/ Design active	Design/consultancy
MAP	12	London	Design intensive	Product design
Monzo	300	London	Design active	Financial
Page\Park	40	Glasgow	Design intensive	Architecture
Studio Moross	11	London	Design intensive	Design
The Guardian	1,700	London	Design active	Media/publishing

Table 40: Research framework

Theme	Areas for investigation
Doing design	· Understanding how firms view and use design · Understanding clients and customer needs · Resources and investment
Capabilities	· Skills, knowledge and understanding currently used · Future skills, knowledge and understanding requirements
Impact of design	· Ability to create new meanings and experiences · Relation to incremental or disruptive innovation

Research framework
The overarching aim of this research is to provide in-depth insight into the role design can play within businesses. To interrogate the question of how firms are using design and the impact it has in more depth, we drew on a light touch review of relevant literature to develop the following research framework:

Fieldwork
The fieldwork was carried out in two rounds. The first consisted of an initial 20-30 minute phone call with each firm to establish baseline information and confirm willingness to participate. This was followed by interviews on site with each of the firms which included interviewing the design leaders and senior teams within the firms as well as the designers undertaking project work. In some cases, we also conducted phone interviews with clients of firms profiled to better understand the impact of design on themselves. We aimed to have a range of voices and views represented.

Each of the interview rounds were guided by interview topic guides and were recorded and transcribed. Analysis was conducted by identifying recurring themes and then reviewing these with input from Lucy Kimbell, Director of the Innovation Insights Hub and Professor of Contemporary Design Practices, University of the Arts London. The team then continued to review the data and developed the case studies iteratively with another round of reviewing.

Case study films
As part of this project, three accompanying films were made on Map, City ID and Fjord.

Appendix 6
Data sources

Department for Culture, Media and Sport *Creative Industries Economic Estimates,* January 2016 London. https://www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2016

Office for National Statistics 'UK business counts, 2010-2017' Downloaded from Nomis Feb 2018.

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Office for National Statistics *UK Non-Financial Business Economy (Annual Business Survey), 2013 Revised Results (Sections A-S)*, 2008-2013 London: Office for National Statistics, June 2015 http://www.ons.gov.uk/ons/rel/abs/annual-business-survey/2013-revised-results/rft-abs-sections-a-s--revised-2013.xls

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WIPO IP Statistics Data Center (2018) 'Total design applications (direct and via the Hague system) total count by filing office 2016'

About the research

The Design Economy 2018 provides the most comprehensive insight into the economic value of design in the UK ever undertaken, and to our knowledge is the most authoritative model interrogating the state of design and its impact on national economic growth in the world. Building on our previous research in 2015, it explores a wider definition of design by analysing the Office for National Statistics' data to better understand the value generated by designers and design firms across the UK economy.

In addition to exploring the health of design firms and designers, the 2018 edition explores how they interact with the rest of the UK business population through a survey of over 1,000 UK firms. This wealth of data is complemented by seven in-depth case studies of firms that demonstrate the value of design every day.

For further information visit:
http://www.designcouncil.org.uk/

About Design Council

Design Council's purpose is to make life better by design. We are an independent charity and the government's advisor on design. Our vision is a world where the role and value of design is recognised as a fundamental creator of value, enabling happier, healthier and safer lives for all. Through the power of design, we make better places, better products, better processes and better performance.

Authors
Sally Benton
Stephen Miller
Sophie Reid

Researchers
Enterprise Research Centre:
Karen Bonner
Victor Ekpu
Professor Mark Hart
Laura Heery
Neha Prashar
Professor Stephen Roper

BMG Research
Emma Parry
Philip Roe
June Wiseman

BOP Consulting
Rebecca Greenwald
Eleanor Jubb
Dr Lucy Kimbell
Callum Lee

Art direction & design
Rebecca May
Calum Spence

Illustration
Kouzou Sakai – Folio Art

Kouzou Sakai lives and works in Tokyo, Japan. He began his career in Animal Science & Biotechnology, but the call of a career in the creative industries led him down a different path and Kouzou has been working as a freelance illustrator ever since.

Copyediting
Vanessa Richmond

Advisory Group
Representatives from:
Creative Industries Federation
D&AD
Engineering UK
Google
IBM
Innovate UK
Knowledge Transfer Network
Nesta
RIBA
UsCreates

Case study contributors
City ID
Fjord
Map Project Office
Monzo
Page\Park
Studio Moross
The Guardian

Marketing & Communications
Saphia Barrios
Abid Gangat
Hiten Kamari Popat
Deborah Kellard
Gareth Playford

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Guy Bilgorri
Kim Davids
Emma Dickson
Catherine Horwill
Sarah Weir

info@designcouncil.org.uk
@designcouncil #designeconomy

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