

Automotive Council Technology Group

The Value of Design in the UK Automotive Sector 2016





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Innovate UK



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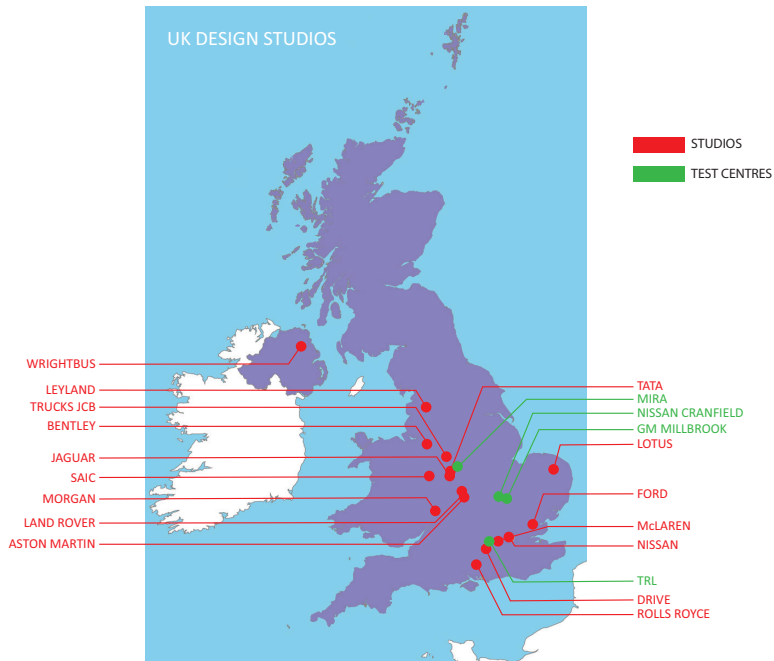
Background to the research

The UK automotive sector is experiencing the best vehicle production figures since the early 1970s. In 1972, car production was at a high of 1.92 million cars per annum. On current projections, the UK is expected to surpass this record with more than 2 million vehicles being produced annually by 2020. This is expected to result in 9,000 jobs being created with the potential for a further 28,000 new jobs within the supply chain¹.

Automotive manufacturing turnover rose from £41 billion in 2009 to £69.5 billion in 2014. The majority of vehicles built in the UK are exported (77.3% in 2015²), accounting for 11.2% of total UK exports².

The average export value per vehicle has also increased from £10,200 in 2004 to £21,900 in 2014². Much of this can be attributed to brave, innovative and quality design. Alongside high turnover and greater profits, a new-found confidence to invest in the industry for the future has started to blossom.

This trend can be seen by the work being undertaken by Bentley³ and TATA Motors⁴, who are each investing up to £40 million in new research and development (R&D) centres. In addition to this, Jaguar Land Rover will spend £3.5 billion⁵ this year on new vehicle creation and capital expenditure, whilst Nissan⁶ is investing £100 million in future model development. These investments are set to support the development of new designs, models and general growth of the industry in the UK.



There is a recognition that design is now one of the most important aspects to the success of a company. A Design Council 2015 report 'The Design Economy' reported on the value of design to the UK economy. This reported that for every £1 spent on design the average return on investment is £4⁷. The Design Council also reported that "*Workers with a design element to their work were 41% more productive than the average. Each delivers £47,400 in output (GVA per worker) compared with £33,600 across the rest of the economy.*"⁸ The automotive sector seeks to capitalise on the importance and validity of design as a vehicle for improving the UK Automotive Industry.

Automotive design is crucial at the early stages of the product development cycle. The discipline of automotive design has assisted in attracting other significantly high value research and development work from other disciplines across the UK. As an example, Bowers and Wilkins, the premium audio manufacturer, has collaborated with the automotive industry to adapt its innovative Kevlar speaker technology to provide systems suitable for automobiles. These innovations have been fed back into their mainstream product lines⁹.

“Car design is really starting to come of age. There’s a genuine realisation that we don’t just style cars anymore. We are involved in the very make-up and character of them.”

***Ian Callum, Director of Design, Jaguar Cars.
Car Design News, 21-05-2015 ⁹***

The automotive industry in the UK has become globally renowned for high quality prestige vehicles and the expectation is to be able to adapt any design to cater for the tastes and aspirations of a varied and culturally different marketplace.

Aims of the research

The UK has a strong international reputation for automotive design, and this strength in the early stages of the product development cycle is critical in successful product sales and in attracting further R&D work. To explore this, a factual analysis of the sector was required to enable the Automotive Council to identify what (if any) further support needs to be provided to sustain it.

Specifically this research aimed to:

- Understand the general strength of the UK automotive design sector
- Understand what automotive design roles and skills are required to maintain it
- Identify any relevant weaknesses within this part of the industry in order to put forward recommendations of where support may be needed.

Research Methodology

A questionnaire was developed and distributed to 49 manufacturers, designers and private automotive organisations within the UK. There was a 51% response rate, with returns from 25 companies and organisations. The questionnaires were typically completed by senior management with oversight of the organisational composition and structure.

The companies who responded with automotive design capability accounted for just under 2,000 design related job roles within these organisations.

Whilst some organisations declined to participate due to company policies surrounding confidentiality and commercial sensitivity, the sample included key UK automotive design organisations. Furthermore, the datasets generated represent new knowledge and provide a foundation for further research.

Detailed desktop research was undertaken to provide background information and validate the questionnaire response.

Key findings and implications

1. Workforce of design function

Finding: The average age of those working in the design function amongst the responding organisations is 38 years, and the average salary varies from £26,500 to £55,000. Looking at specific roles within the design function, the average data is summarised below:

Role	Average Age	Average Salary
Creative Design	32 years	£52,750
Physical Modelling	46 years	£57,600
Digital Modelling	36 years	£54,000
Studio Engineering	40 years	£55,167
Technical Administration and other	36 years	£49,917

“Clay Modelling: The average age of experienced clay modellers is higher than the rest of the design team due to the foundation of most UK modellers being derived from pattern making skills.” Tony Williams Design Director SAIC



Implication: Salaries across the design function (and the 2,000 roles considered) vary from an average of £26,500 to £55,000 per annum. This is as much as 50% higher than the national average¹⁰ of £27,500.

Over time certain skills may retire out of the industry and be lost, or will be in extremely high demand. This would mean that salaries would continue to inflate in this area due to the shortage. It would also imply that due to this shortage, some design function roles may be left unfilled, driving down quality within the industry. More likely, the activity would be driven off-shore, together with the related early stage engineering activity.

2. Contracting of staff

Finding: For every member of the design team, there are currently 1.22 contracted staff hired to carry out the same role across the various design disciplines. Looking at specific roles within the design function:

Design related roles	Permanent staff role (FTE)	Contracted staff role (FTE)
Creative Design	1	3.5
Physical Modelling	1	0.8
Digital Modelling	1	0.84
Studio Engineering	1	1.09
Technical Administration and other	1	0.2

For creative design and studio engineering roles there is a proportionately higher number of contracted staff. The qualitative responses from the sector indicated that the work within the design function is cyclical in nature, and therefore demand for roles may ebb and flow depending on the seasons, and design cycles between organisations, hence the reliance on short term contracts.

“As a group NMHG has around 400 engineers and tends to subcontract design when required, although there may be a future vision to have a ‘central’ internal design team.”

Nacco Materials Handling Group

Implication: Unlike other industries where staff are employed on a full time basis, and ‘off season’ or ‘downtime’ is used for R&D or continual professional development (CPD) among other things, this is not the case within the automotive industry. Organisations are looking for individuals ‘fit for purpose’ rather than investing in CPD and longer term careers of their design staff.

This can lead to fragility of design capacity, where there are more contractors than permanent staff members. In turn this volatility of design staff within an organisation reduces the continuity of design capability within in-house design studios, potentially affecting brand and reputation within the market.

“Our biggest shortfall with regards to staffing is digital modelling. Maintaining up-to-date skills and relevance is the biggest challenge.” UNN

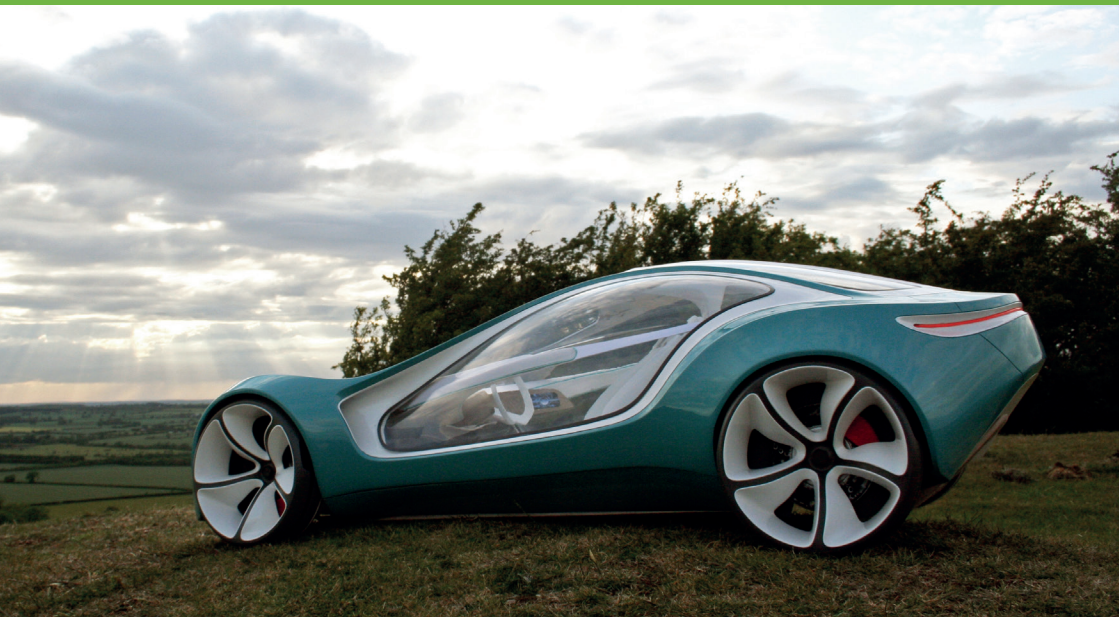
3. Educational institutions

Finding: Within the UK education system, individuals begin to specialise at 14 years into science or the arts, with the choice of their GCSEs or Scottish Standard Grades. The selection of these then impacts the further and higher education courses they may attend. Furthermore, between 2003 and 2013 there was a 50% drop in the GCSE completions for design and technology. Traditionally this has been part of a natural progression for students seeking to study industrial product and automotive design programmes.

The Royal College of Art (RCA) has reflected that recent changes in government policy with respect to the school curriculum favour ‘academic’ subjects as core. This is over those involving design, technology, the arts and a range of other creative subjects. This is having a damaging effect on a key asset of the UK education system and is at odds with industry’s increasing need for design and other creative skills seen as an essential complement to scientific and ‘academic’ expertise.



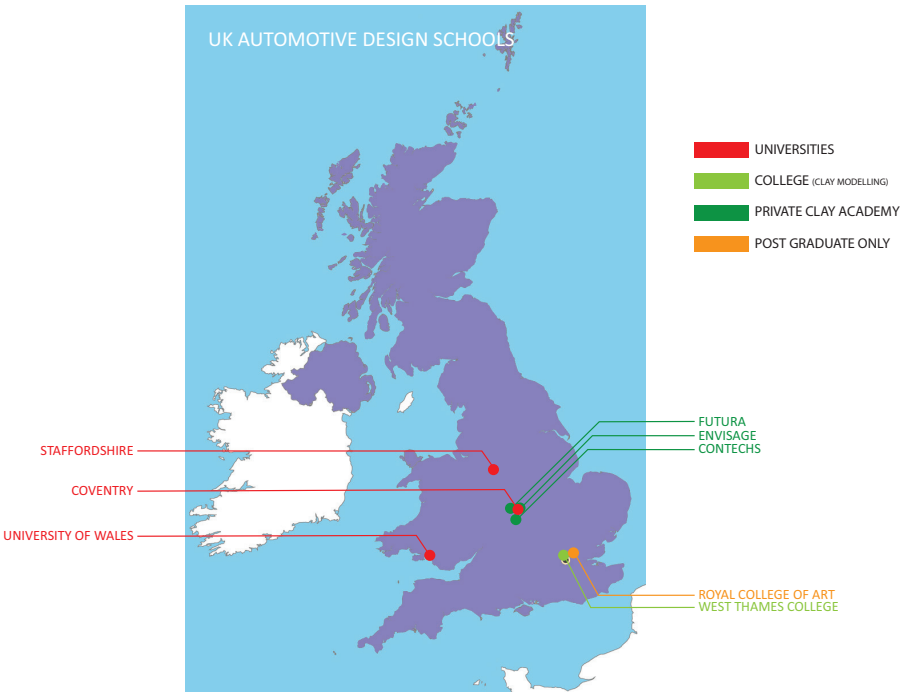
“Education is a massive problem, particularly for physical and digital modelling in this industry. OEMs are not supportive to fund the training, and margins for agency workers are extremely low – meaning there is no return on the investment into training the next generation. Safeguards are also not there to ensure the worker remains with the training company.” Futura Design Ltd



The sector has traditionally relied upon a pipeline of creative talent educated within a number of specialist undergraduate and postgraduate courses. However, recent changes to the funding of the higher education system, with student fees capped at £9,000 a year, appear to be affecting the number of institutions staying in this market.

Coventry University, which established the UK’s first undergraduate course in automotive design over 40 years ago, reported that the pressure of meeting industry expectations has to be balanced against overarching drivers in the sector to benchmark operational efficiency. Inevitably, maintaining academic excellence for niche courses that are highly resource-intensive comes at a cost and cannot always be offset against other provision.

There are currently only four key locations providing undergraduate and postgraduate educational expertise within automotive design discipline.



This has reduced from seven educational institutions in the UK in the past five years. The total annual number of graduates from these institutions is on average 120, with 30-40 students per year staying within the automotive industry. The Design Council reports that there is real strength in the UK creative economy. Between 2009-2013, the Design Council states that the design economy grew faster than the UK average, equivalent to 7.2% of total GVA, providing strong competition for graduates.

The cost to higher education in the UK of facilities and expertise for design skills, such as clay modelling and studio-based delivery, is recognised as being high. Whilst cost is almost certainly a factor in the closure of some vehicle design programmes in recent years, this also raises the question of the balance between short term needs and long term strategy.

The level of engagement between universities and industry is high in terms of co-researched and co-produced projects, as well as work placements, experiences and skills requirements. Although it is notable that many of these interactions derive from immediate, near-market design problems, unlike engineering, there remains an issue in developing sustained design research programmes that resolve known issues (such as the digital car) in five to ten years' time.

Implication: With a reduced focus on creative subjects within the national curriculum, schools and colleges will increasingly lack resources and career advice in automotive design. The general focus is on engineering jobs rather than the number of creative roles that this industry offers alongside these more traditional roles. This, with a potential smaller pool of art and design specialised students, may further reduce the number of potential students looking at automotive design as a career option and entering the job market.

The move towards Science, Technology, Engineering and Maths in higher education ignores the obvious need for design and other creative capability in UK industry. STEAM (Science, Technology, Engineering, Art and Maths) is seen as a more complete solution to this.

Universities are multi-disciplinary in nature, and need to meet the demands of a range of students and their desired courses. Keeping up with the highly specialised equipment, alongside the ever-changing technical and skill requirements is an expensive and time consuming exercise.

UK education institutions will need to keep up with their global competition to maintain and exceed their current rankings. European educators involved in automotive design (e.g. Phorzeim in Germany, Umea in Sweden and Strate University in France) and those in the USA (Art Center College of Design in

Pasadena USA) appear to be flourishing. Car Design News reports that UK universities have secured 33% of industry-recognised competitions in the last five years, compared to 67% for overseas institutions¹¹. Given the limited UK government funding and capped student fees, alternative sources of incomes to maintain their knowledge, equipment and resources may be required.

In addition, universities will need to work at a more strategic level with industry to engage government and influence policy working elevating discussion around the needs and priorities of the marketplace.

“The UK has an amazing pool of creative talent, some of which is going to waste with a lack of opportunities in specialised areas. Automotive design in the UK will suffer dramatically if all of the current clay modellers move into retirement, which is likely within the next 10 years. Without trainees or apprentices coming behind we will clearly lose this edge, something that is unthinkable.”

Colin Hart, Modelling Manager, Nissan Design

4. Future implications on headcount

Finding: The average number of unfilled permanent and contract roles within the organisations who responded is 12. All organisations highlighted roles that were currently undersubscribed. The vast majority of these undersubscribed roles were found in digital modelling.

Looking at specific roles within the design function, the average number of unfilled roles (both permanent and contracted) per organisation is:

Creative Design: 12
Physical Modelling: 11
Digital Modelling: 22
Studio Engineering: 6
Technical Administration and other: 8

Qualitative feedback provided by participants suggests there is a shortage of experienced and suitably qualified staff available to meet the needs of the sample organisations.

Within the sample of automotive design Tier-1 suppliers, Futura, Majenta, Contechs and Envisage have also begun to provide their own apprenticeships to serve the industry, and address some of the headcount issues identified above.



Implication: There are currently posts unfilled and not enough individuals going into the industry with the right skill sets to fulfill the job roles available. There is a potential lack of career path for graduates of other disciplines to move into this sector who have complementary skill sets, but may not be aware of the sector needs.

Wide reaching R&D can be fuelled by a successful creative design function within automotive design. Without full time permanent design staff, and with a focus on task-oriented contract staff, this creative design strength in the early stages of product development cycles may be lost.

Although there are undersubscribed roles across the design function, this could be due to the cyclical nature of contracting within the industry and individuals preferring to contract and dictate their own terms.

Given the rate of industry growth and annual turnover in the previous five to ten years, along with the staffing numbers, for each organisation that responded, an estimated projection of required staff can be made. If growth is expected to continue on its current trajectory of 20% over a five-year period, it would mean potentially over 400 new design roles created (taking into consideration both permanent and contract staff within the organisations that responded).

On average there is one design role for every £440,000 of turnover across the automotive industry¹². With an already large proportion of staff contracting, or roles undersubscribed, this could severely limit the potential for growth within the industry.

The estimated number of graduates during the same five-year period would be in the region of 120 per annum. However, looking at historical leaver survey information, 64% of these will go into other sectors, leaving a total of 30 graduates to fill the required roles. There may be a need to increase numbers within these current institutions, retraining from other sectors or employment opportunities for overseas candidates.

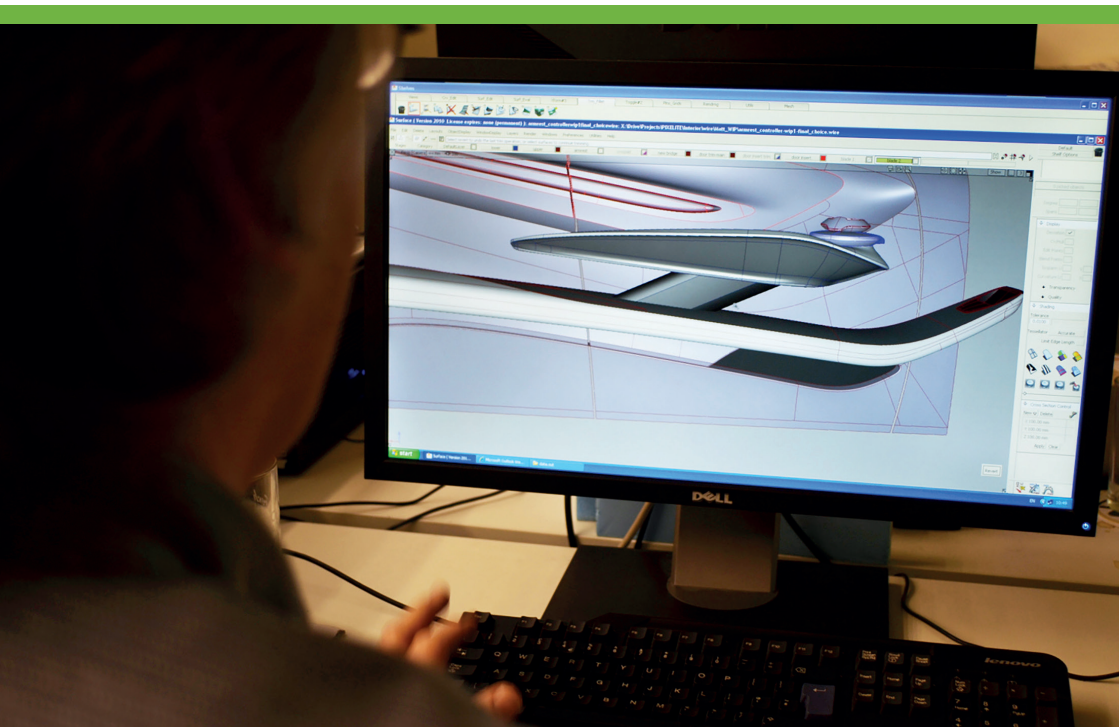
Government has responded to the need for increased skills in some areas with the provision of degree apprenticeships. *“Apprentices will split their time between university study and the workplace and will be employed throughout”*¹³. However, the sector needs to respond to this opportunity beyond automotive engineering and work with educational establishments to develop an apprenticeship standard for automotive design.

This would help to support the future proofing of the Industry in the UK.

5. Digital design tools

Finding: The qualitative data indicated that the adoption of digital tools within the automotive industry has helped to shorten the design development phase. However there are still areas where improvements and efficiencies can be gained.

An example of this is the use of both Alias (computer aided design software) and ICEM (computer aided manufacture software) where the original concept model built in Alias by the designer is then duplicated, almost completely, in ICEM for the production data. This takes time and different skills to undertake the same process, but in two different systems.



Implications: Inefficient and unnecessary aspects of the process create a time delay in getting the product to market. If the systems were streamlined and compatible, the current staffing levels highlighted in this report may be reduced. There would be obvious role areas, such as physical modelling, that would not be affected. However the potential to reduce staffing requirements in a difficult market, and the time to market makes this a desirable area on which to focus.

Conclusion and recommendations

This report has highlighted the growth potential in the automotive design industry, but has also highlighted a gap in the ability to meet and sustain that growth.

To summarise, this report highlights the need to:

1. Increase the skills and capability of the emerging workforce to ensure it is equipped to meet the needs of the automotive design industry
2. Create a robust pipeline and succession planning to ensure there are strong and varied career paths into automotive design
3. Increase new talent and education structures to support the industry
4. Investigate new technologies to support the design teams that are accessible through the educational pathway.

Higher education institutions (HEI), industry leaders and government need to come together to discuss the recommendations and plan a sustainable future for the UK automotive industry.

The suggested approach to this would be for:

Government: Capitalise on the success of the research, and commission a detailed review of skills required for the automotive design sector in its current format and its sustainability into the future. The review needs to investigate how to broaden the overall numbers of skilled individuals (whilst taking into account demographic mix) in the sector given its importance to UK PLC.

Industry: Commission further research to create integrated design and engineering tools that work for the sector and improve the design lead-time. The sector and its supply chain need to work closely together with HEIs to understand how design staff could transfer from other industries and what CPD requirements this potential workforce would need.

Education: There is a need to develop clearer career pathways for schools and further education in HEI in order to increase numbers and cater for the reduced design focus at school level. Support industry in the development of degree apprenticeship standards to increase supply of new talent and improve educational opportunities for the industry.

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Note on the authors:

Helen Cuthill is Associate Dean for Enterprise and Commercial within the Faculty of Arts & Humanities at the Coventry University

Chris Johnson is Senior Research Fellow within the Faculty of Arts & Humanities at the Coventry University

Prof. Seymour Roworth-Stokes is Executive Dean, Faculty of Arts & Humanities, and Professor of Design at the Coventry University

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