AMUK Annual Action Plan

2025


Additive
Manufacturing
UK

Executive Summary

Additive Manufacturing UK (AMUK) was established in 2014, by the Manufacturing Technology Centre (MTC), with the purpose of uniting the UK's Additive and 3D Printing community, so that it could leverage the world-class AM research, development, and manufacturing expertise in the UK. This led to the delivery of the 2017 strategy document 'Additive Manufacturing UK National Strategy 2018-25: Leading Additive Manufacturing in the UK' which set out the key challenges and recommendations for the UK to remain a leader of AM technology.

One of the recommendations was for the establishment of an organisation to represent AM in the UK. In 2020, AMUK was transferred to the Manufacturing Technologies Association (MTA) with the requirement for them to establish AMUK as that organisation. AMUK was restarted as a network at MACH 2022 and established as a trade association in April 2023.

In 2023 AMUK delivered measurable progress, including increased membership, new and enhanced services, further progress on strategic initiatives, that all worked towards strengthening the UK's position in the global additive manufacturing market.

This report provides a top-level view of the current state of AM technology in the UK, as well as updating the progress on the member set challenges and subsequent actions that AMUK has been working on for the last 12 months and will continue to work on for the next 12 months, to drive forward the development, adoption, and use of AM technology in the UK. The three challenge areas are as follows:

- Supply Chain – Education, Adoption, Visibility and Qualification
- Skills – Education, Training and Recruitment
- Standards – Roadmap, Testing, Certification, Inspection and Materials.

These challenges have been assessed as still the most pressing issues by the membership. Updates on the actions being taken have been provided, and their directions have been tweaked to ensure they are providing the necessary impact in helping drive forward the AM eco-system in the UK. There have also been new actions added such as Online Part Printability Assessment and Free Standards Access which are now being explored.

The UK share of the global AM market is currently around 4 - 5.5%, which values it in the range of $0.90 billion (£720 million) to $1.22 billion (£900 million). There is an opportunity for this to market share to grow with the right supportive environment put in place. It is assessed, that based on the level of AM R&D being undertaken in the UK, that the UK could capture around 7% of the global market which would value the market in excess of $6billion by 2030.

Contents

AMUK aims to establish the UK as a world leader in the development, adoption and use of 3D Printing and Additive Manufacturing Technology.

AMUK: An Introduction

Background

AMUK is the trade association representing UK companies engaged in every aspect of the additive manufacturing value chain, spanning materials manufacture to post-processing of parts. Established in 2014, the original aim was to disseminate knowledge, guide and drive the strategic direction of additive manufacturing technology in the UK.

In 2015, AMUK published its first report, The Case for Additive Manufacturing[1], a positioning paper developed from extensive consultations and workshops conducted across the UK. This marked the beginning of an ongoing dialogue with industry, academia, and professional bodies, aimed at refining the understanding of the opportunities, challenges, strengths, and barriers hindering the full commercialisation of additive manufacturing in the UK.

In 2016, a second report was released, "Leading Additive Manufacturing in the UK: A platform for engagement to enable UK industry to realize the full potential of Additive Manufacturing & 3D Printing." This report provided a structured framework for engaging with the UK's additive manufacturing community, a foundation upon which the 2017 report, "Additive Manufacturing UK National Strategy 2018 – 25: Leading Additive Manufacturing in the UK"[2] was written.

The 2017 report outlined seven strategic challenge areas, each essential to unlocking the UK's additive manufacturing and 3D printing potential in research, development, design, and manufacturing. The details of these challenges are outlined in the table below:

Challenge Title	Challenge Summary
Design	One of the key drivers for using additive manufacturing is the design opportunity it presents. This challenge looked at supporting effective design, resolving CAD workflow issues, and providing optimised design tools for additive geometries. Businesses need to provide designers with additive manufacturing design capability and leverage design thinking to help identify, validate, and communicate high-value propositions enabled by additive technology.
Materials and Processes	The range of materials and processes covered by the term additive manufacturing is broad. This challenge covered equipment options, materials properties, processing parameters, research on knowledge gaps, and innovation opportunities. Uncertainty surrounding future supply chain capacities and sector-specific challenges such as process selection, scale-up, automation and digital manufacturing approaches may slow the adoption of additive manufacturing.
Inspection, Test and Standards	Additive manufacturing brings a new approach to manufacturing while still relying on established standards. This challenge considered the standards, inspection, certification, and regulations for additive within the context of industry, safety, compatibility, processes, and materials. The wide range of technologies, materials and processing steps underline the importance of identifying production steps and relevant standards for additively manufactured parts.

[1] https://additivemanufacturinguk.org.uk/wp-content/uploads/2023/02/AMStrategyPositioningPaper.pdf
[2] https://additivemanufacturinguk.org.uk/wp-content/uploads/2023/02/AM-UK_Strategy_Publication_Amends_Novermber_Digital.pdf

Challenge Title	Challenge Summary
Commercial, IP and Data Management	Key lenders are keen to fund additive manufacturing adoption. This challenge looked at the need for quick and easy wins to help generate momentum for additive within the commercial community. Many of the barriers to greater investment are not additive specific, for example Brexit, Skills Shortages, and security concerns. Protecting IP and ensuring production integrity are vital for maintaining quality and reaping financial benefits.
Skills and Education	Additive specific skills and the education and training needed to harness the benefits are a key component to the success of additive technology. This challenge considered the standards, delivery mechanisms, industry needs, and building awareness across the additive and education sector. Managing difference in skills between new recruits and experienced employees was recognised, and various options were developed to address the lack of a compelling commercial case for additive manufacturing training due to volume requirements.
Supply Chain Development	This challenge had no specific working group in the previous strategy. However, several recommendations to raise visibility of the UK supply chain, identify gaps and address areas of strategic weakness were made.
Implementation	This challenge area was co-ordinated by the top-level AMUK Steering group and brought together the work of the original working groups. It looked at the implementation of the National Strategy from a top-level view and considered the actions required to make it a success.

Following the release of the 2017 report, the working groups established by AMUK continued their work to address specific challenges and implement the recommendations as outlined in the report. However, a clear structure for ownership, execution, and coordination of these recommendations was not firmly established. This, coupled with significant external factors like Brexit, shifts in government leadership, evolving policies, and a growing emphasis on digital technologies, including Artificial Intelligence, caused a slowdown in the work being undertaken[3].

In the final quarter of 2019, the Manufacturing Technology Centre (MTC), custodians of the AMUK network, initiated discussions with the Manufacturing Technologies Association (MTA) with the aim of transitioning AMUK to the MTA. In 2020, this transition was successfully completed, with the MTA assuming stewardship of AMUK, and an intent on establishing it as the preeminent national association for companies contributing to and shaping the Additive Technology value chain. This value chain encompasses materials, design, AM build, post-processing, testing, inspection, and more.

[3] The report: 'The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending', released in August 2022, undertook a full review of the status of the recommendations set in the national strategy from 2017. In conclusion, the report stated that AM in the UK is a healthy and active field, however it was found that the recommendations to be lacking in progress and that this was something that needed to be addressed. Reference: Hague, R., Tuck, C. and Sutcliffe, C. (2022). *The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending*. Website: https://mapp.ac.uk/uploads/files/The_UK_Additive_Manufacturing_Landscape.pdf

Following its integration into the MTA, AMUK experienced a successful restart at the MACH 2022 exhibition. This moment signalled the beginning of AMUK's official re-establishment as an association, a process that culminated in April 2023 with it being recognised as the professional body for companies operating in the additive technology value chain. For an overview of key milestones in AMUK's journey, please refer to the timeline depicted below:

- **AMUK Established by MTC**
- **Report Released: The Case for Additive Manufacturing**
- **Report Released: Leading Additive Manufacturing in the UK**
- **Report Released: AMUK National Strategy 2018-25**
- **AMUK Network and Branding passed from MTC to MTA**
- **AMUK Network restarted at MACH 2022 Exhibition**
- **AMUK Estbliahsed as a trade association.**

Aim and Services

AMUK's main aim is to position the UK as one of the world leaders in the research, development, adoption, and application of technologies and services that comprise the AM technology value chain. This objective underlines our commitment to fostering innovation, creating economic growth, and enhancing the UK's reputation as a key hub for AM technology advancements and applications.

Through collaborative initiatives with industry partners, academic institutions, and governmental bodies, AMUK is seeking to leverage the transformative potential of AM technology, to create opportunities, bolster productivity, and effectively tackle diverse challenges across a variety of sectors. In doing so, AMUK will actively contribute to enhancing the overall technological landscape and competitiveness of the UK on the global stage.

AMUK's membership services are there to benefit our members, equipping them with the tools and support necessary to thrive both within the UK and on the international front. The following table provides an overview of the services provided:

Service	Description
Business Support	These services aid with the administrative side of running a business, allowing companies to do more of the things which are core to their mission. The services cover areas such as, HR, HSE, Legal and Tax advice and providing access to training at significantly reduced rates.
Industry Intelligence	Members are provided information on Additive Market Trends, Technology Trends as well as insights into wider additive industry around areas such as standards, IP, and funding as well as networking opportunities.
Marketing and Promotion	These services aim to promote the membership and aid in raising awareness of their brands, as well as the additive industry. There are discounts to exhibit or attend at certain events and opportunities to speak at conferences.
Academic/Industry Engagement	These services are around helping the academic and industrial community engage to ensure that members have opportunities to take advantage of the world class R&D that happens in the UK.
Strategic Partnerships	This area looks at creating collaborations with organisations which are already providing world class services to the additive industry and helping our members access them.

Current Membership

The current membership of AMUK is 78 organisations. This has grown from 64 members back in December 2023 (an increase of 14 members in 12 months).

3D Metal Ltd	3D Squared	3D Printing Industry	3DPRINTUK	76 Additive	Additive Industries
Additive International	AMGTA	Additive Manufacturing Solutions	Additive-X	Advanced Forming Research Centre	Airframe Designs
All 3D Labs	AME-3D	AMufacture	APEX Additive Technologies	Arrk Europe Ltd	Atomik AM
Autentica Industrial Platforms	Atomic Weapons Establishment	Bowman 3D	Broder Metals Group	Cookson Industrial	CREAT3D
Create Education	Digital Manufacturing Centre	DiManEx	DNAam	Donaldson GB	Duet3D
Dyndrite	EOS	FDM Digital Solutions	Gateshead College	GKN Aerosapce	Globus Metal Powders
Hamuel Reichenbacher	HP 3D Printing	Incremental Engineering			

IPFL

JCB

Kaizen PLM

Kene Partners

Kerstar

Laser Lines

Laser Trader

M A M Solutions

Marks & Clerk LLP

Matsuura Machinery

Measurement Solutions

MGA

Midlands 3D Printing

Ogle Models & Prototypes

Pelagus 3D

Phoenic Scientific Industries

Piab

Plastometrex

Primetals Technologies

Reliance Precision

REM Surface Engineering

Renishaw UK

Ricoh 3D

Russell Finex

Siemens

The MTC

The TCT Group

Theta Technologies

TRUMPF

UK Design for AM Network

University of Exeter

University of Warwick

ValCUN

Valuechain Technology

VBC Group

Voestalpine Bohler Edelstahl

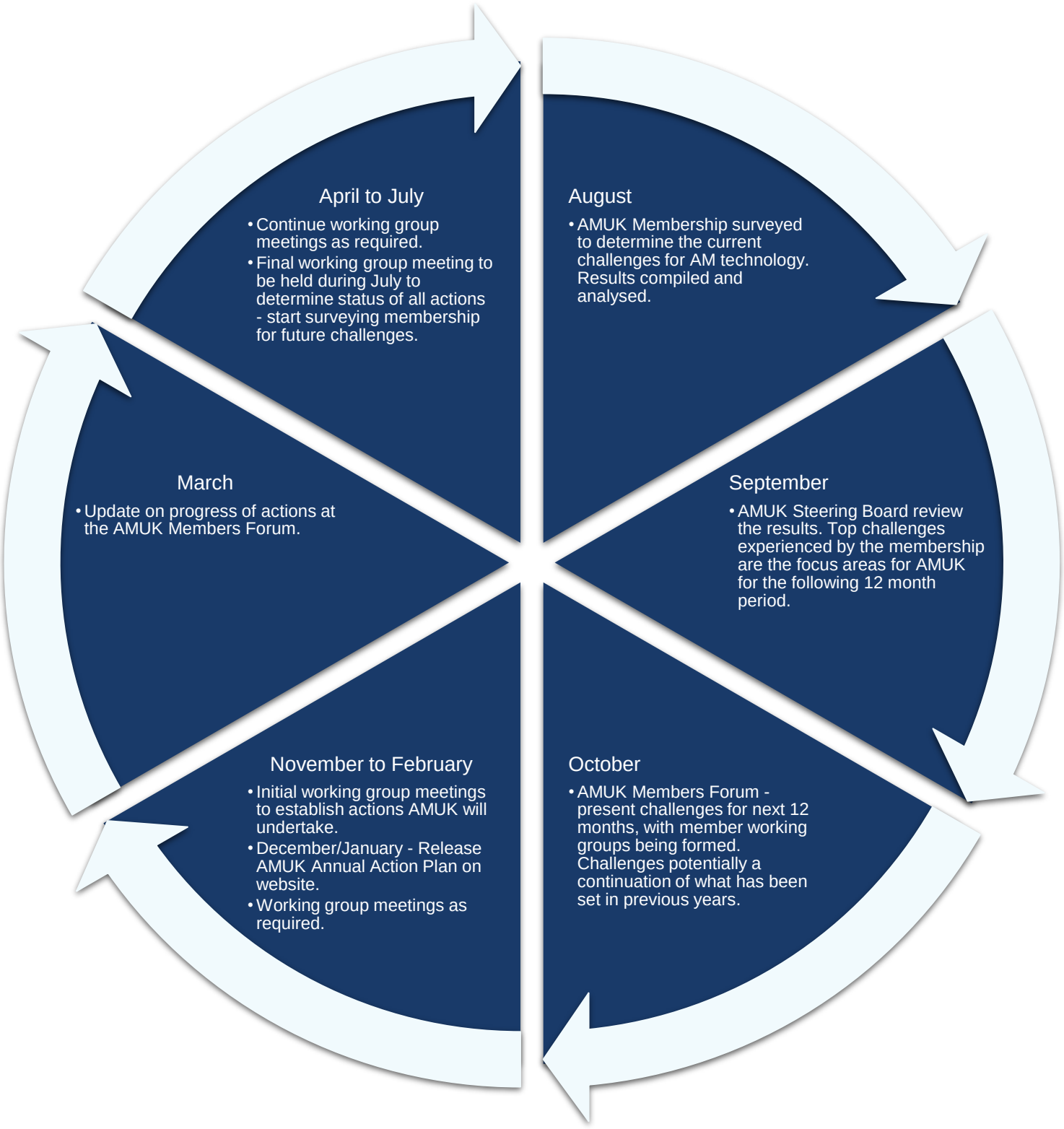
WAAM3D

William Rowland

Zentech International

AMUK Annual Action Plan Process

The purpose of this report is to provide an annual update on the work achieved by AMUK during the previous 12 months, along with updating the actions for the next 12 months. The process by which this annual action plan will be updated is as follows:



Additive Technology in the UK

Current State of Play – Market Size

In the report titled: ‘‘Additive Manufacturing UK National Strategy 2018 – 25: Leading Additive Manufacturing in the UK” it stated that the UK Additive market in 2015 was valued at approximately $359 million (£235 million), which was roughly 6.9% of the $5.2 billion[4] global market value at that time. In 2022 the global market for Additive Manufacturing was valued at $17 billion[5], with the UK market being valued at approximately $690 million[6] (approx. £560 million). This equated to an approximate UK share of the global AM market of 4%.

The 2023 global market for Additive Manufacturing was valued at $22.14 billion[7]. There is a lack of consistent data around the size of the UK Additive Manufacturing market each year, making it difficult to compare the year-on-year changes (i.e. the source for the 2022 UK market figure hasn’t provided a 2023 figure). For 2023 a different market size source has been used which estimated the UK market to be valued at $1.22 billion[8] (approx. £980 million). This would equate to a UK market share of 5.5% of the global AM market. It is assessed that the UK AM market share of the global AM market has grown during 2023, however, it is likely that the 5.5% is at the top end of that, and that it is likely that the UK market is in the range of 4% to 5.5%. This would mean that the UK market is estimated to be valued in the range of $0.9 billion (£720 million) to $1.22 billion (£900 million).

The UK global market share showed a drop from 2015 to 2022. This could have been due to several reasons. Firstly, the COVID pandemic was seen as a stimulus for the increased use of AM technology, due to its ability to respond quickly to sudden demands. It could be that other countries, that were initially trailing the UK, responded with greater impetus allowing them to catch and surpass the UK position. Furthermore, events such as BREXIT have introduced other issues for UK companies to deal with, such as exporting and supply chain resilience, which has potentially diverted their focus towards operational adjustments rather than looking to adopt novel technologies, such as AM.

2023, potentially saw some growth in the UK market share of the global AM market. It is assessed that this is due to lots of marginal gains across a variety of areas such as Made Smarter funding, AMUK activities, maturing of technology, organisations increasing their knowledge, making the UK a more supportive environment for Additive technology to thrive.

With regards to the future of the global AM market, there are numerous perspectives and growth rates around its size and potential. Predictions for the size of the global AM market by 2030 range from $45 to $105 billion. The 2024 Hubs 3D printing trends report estimates that it will be valued at $88.3billion. If the UK can maintain its 2023 position, it will capture around $3.5 billion to $4.9 billion of that market. However, if the right environment can be put in place in the UK, where companies are encouraged to develop, adopt and use Additive technologies, then the UK can look to aim towards its 2015 global position. This would position the UK additive manufacturing market in excess of $6 billion.

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[4] $5.2billion is from the report titled “3D Printing Trends Q1 2019” from the Hubs website. The average USD to GBP exchange rate during 2015 was 0.6545.

[5] $17billion figure from the report titled “3D Printing Trends Report 2023” from the Hubs website. The average USD to GBP exchange rate during 2022 was 0.8115.

[6] https://www.nextmsc.com/news/uk-additive-manufacturing-market

[7] $22.14billion figure from the report titled “3D Printing Trends report 2024” from the Hubs website. The average USD to GBP exchange rate during 2023 was 0.8042.

[8] https://www.expertmarketresearch.com/reports/uk-3d-printing-market

UK Research and Development Landscape

A comprehensive overview of the state of AM in the UK was covered in the August 2022 report: 'The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending'[9]. This report detailed the status of the recommendations that had been set in the September 2017 report, 'Additive Manufacturing UK National Strategy 2018 – 25: Leading Additive Manufacturing in the UK' as well as providing a detailed analysis of the UK in the following areas:

- Additive and 3D Printing Research Funding Landscape
- Research Publications
- Patent Landscape
- Start-up Landscape

As part of the AMUK Annual Action Plan, the amount of funding in the UK which goes towards projects related to AM technology, and the number of AM patents registered in the UK along with origin country of the applicants will be tracked. Though not as detailed as the August 2022 report, it is assessed that tracking these metrics will provide a top-level indication on the state of AM in the UK on an annual basis.

Funding Landscape

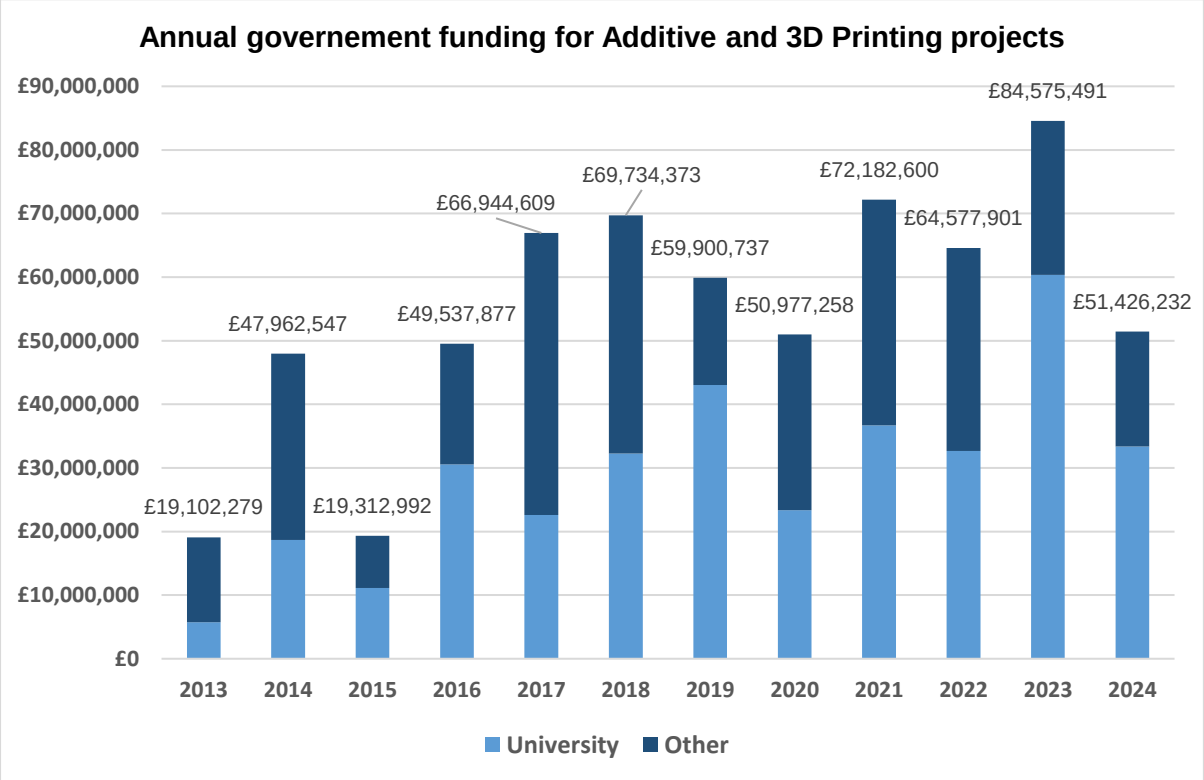
As per the process set out in the August 2022 report, 'The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending', using the search terms "Additive Manufacturing" and/or "3D Printing"[10] in "Project Abstract" or "Project Title" in the publicly available UKRI data (https://gtr.ukri.org/) between 1/1/2013 and 28/10/2024 resulted in the following data:

[9] Hague, R., Tuck, C. and Sutcliffe, C. (2022). *The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending*. Website: https://mapp.ac.uk/uploads/files/The_UK_Additive_Manufacturing_Landscape.pdf

[10] Search term to be written as follows: "additive manufacturing" "3D Printing". Note that studentships will need to be removed from the data to identify the number of projects undertaken.

A total of £656,234,896 has been spent funding 972 Additive Manufacturing and 3D Printing technology related projects between the 1st January 2013 and 28th October 2024. This is an increase of just over £100million in spend and an extra 161 projects since the last review of public spending on AM and 3D Printing projects in July 2023[11]. This is a significant amount and highlights the continued significance the government is giving the technology; with the potential it provides in strengthening supply chains and contributing towards net-zero economy.

The year-by-year analysis in the following graph indicates that public funding for AM ramped up between 2013 and 2016, levelled off during 2017 and 2018, took a slight dip during 2019 and 2020 (assessed to be due to the change in priorities by government funding bodies because of the pandemic), before picking up again to pre-pandemic levels in 2021, with a slight drop seen again in 2022. 2023 saw a large increase in funding, especially on the academic front, with 2024 showing signs that it has dropped back to 2019 and 2020 levels. The increase in funding for academia in the 2023 year seems to focus a lot on applications for AM technologies in health care with Imperial College London receiving over 25% of the academic funding provided in this area. Other notable research trends in 2023 academic funding were around the developments in AM materials and the integration of electronics in AM.



The split of funding between University or Industry/RTOs lead projects over the period, showed a greater bias towards university lead projects, which received 53.4% of the funding and with Industry lead projects receiving 46.6% of the funding.

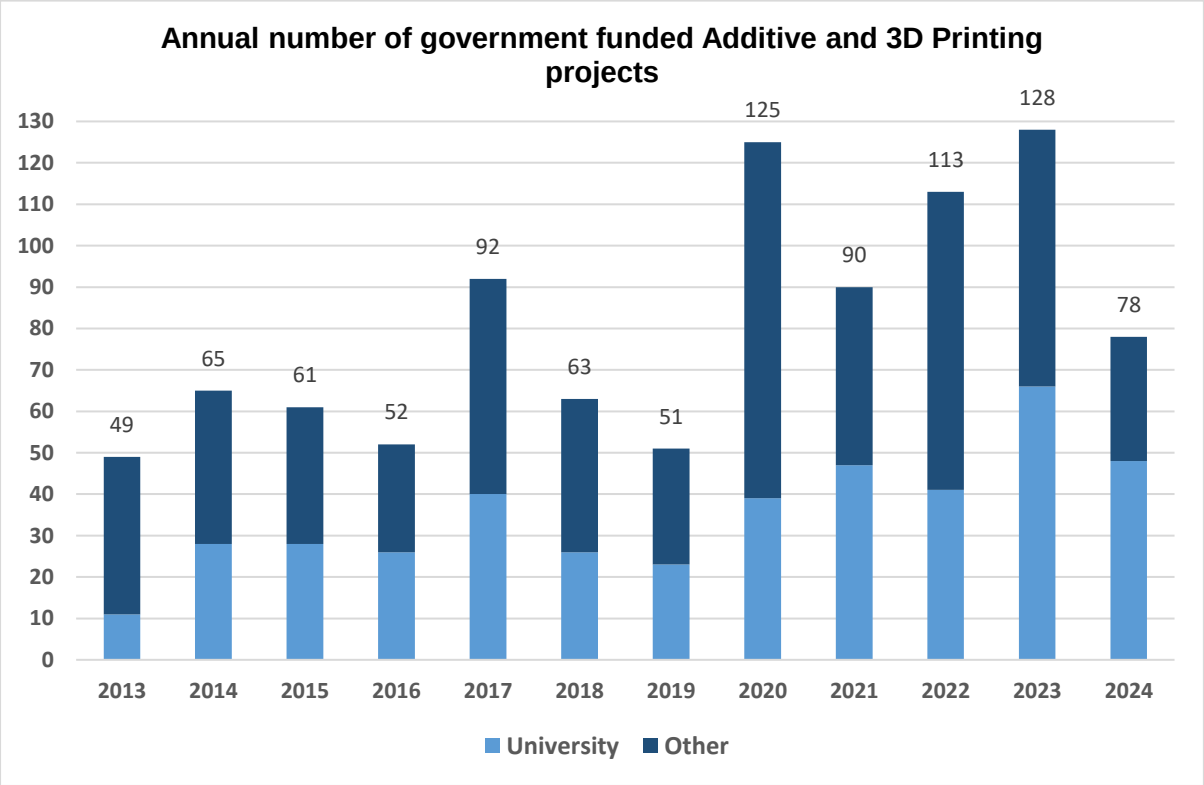
From a total number of projects perspective between the 1st of January 2013 and 28th October 2024 we can see from the following graph, that the number of projects doesn't necessarily correlate directly to the level of funding available. For example, 2014, 2016 and 2020 all saw similar total levels of funding given to projects – just under £50million a year on

[11] July 2023 Figures: £552,816,634 Total Funding | 811 Total Projects

average. This is lower than the annual funding provided in the years 2017, 2018, 2019, 2021 and 2022 where average funding was approximately £67million a year. However, despite a low level of funding, 2020 saw the second largest number of projects undertaken at 125. For context, 2014 saw 65 projects and 2016 saw 52 projects. It is assessed that this large number may be in due to the big number of industry projects that happened that year which were likely in response to the COVID pandemic for national initiatives such as addressing the shortage in PPE and the Ventilator challenge.

The latest full year data, 2023, shows a reasonably equal split on number of projects, despite significantly more funding going towards academia. Interestingly the projects undertaken by industry during 2023 somewhat mirror the research being undertaken in academia in terms of topics, in that large proportion had a focus on healthcare and AM materials. However, there were other noticeable trends in the industry lead AM projects such as sustainability, digital supply chains and application of AI.

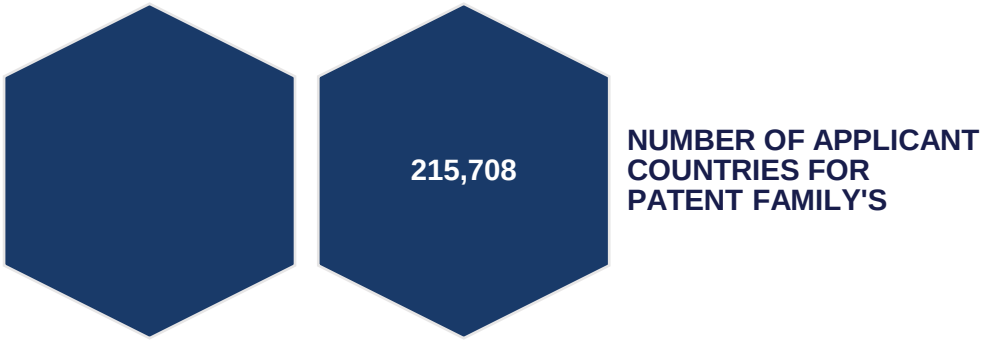
The split between University or Industry/RTOs lead projects over the period, shows an industry leading far more projects at 56.1% and universities leading just 43.9%. This imbalance mostly stems from the years 2020-22 where there is significant number of industry/RTO lead projects which as stated above are assessed to be linked to the national response to the COVID pandemic.



In conclusion, the R&D landscape for AM technology in the UK continues to be healthy and well-funded. There are lots of projects occurring in both industry and academia, which look at areas such as applications of AM technology in healthcare, developments and applications for new materials, the of AI in improving designs and automating supply chains and using additive to make products more sustainably. There does look like there will be a potential fall in funding in 2024, when compared to 2023, however the landscape for additive R&D continues to look healthy and competitive in the UK.

Patent Landscape – UK and Abroad

Adapting the process used in the August 2022 report, 'The UK Additive Manufacturing Landscape: A Data-Centric Review of AM Innovation and Entrepreneurship 2010-2020 based on Public Spending', using the search terms "Additive Manufacturing" and/or "3D Printing" in either the "Title", "Abstract", "Description" or "Claims" in the Espacenet database (https://worldwide.espacenet.com/) between 1 January 2005 and 31 December 2023[12] returned the following number of total number of applicant countries for patent family publications for Additive and 3D Printing technology:



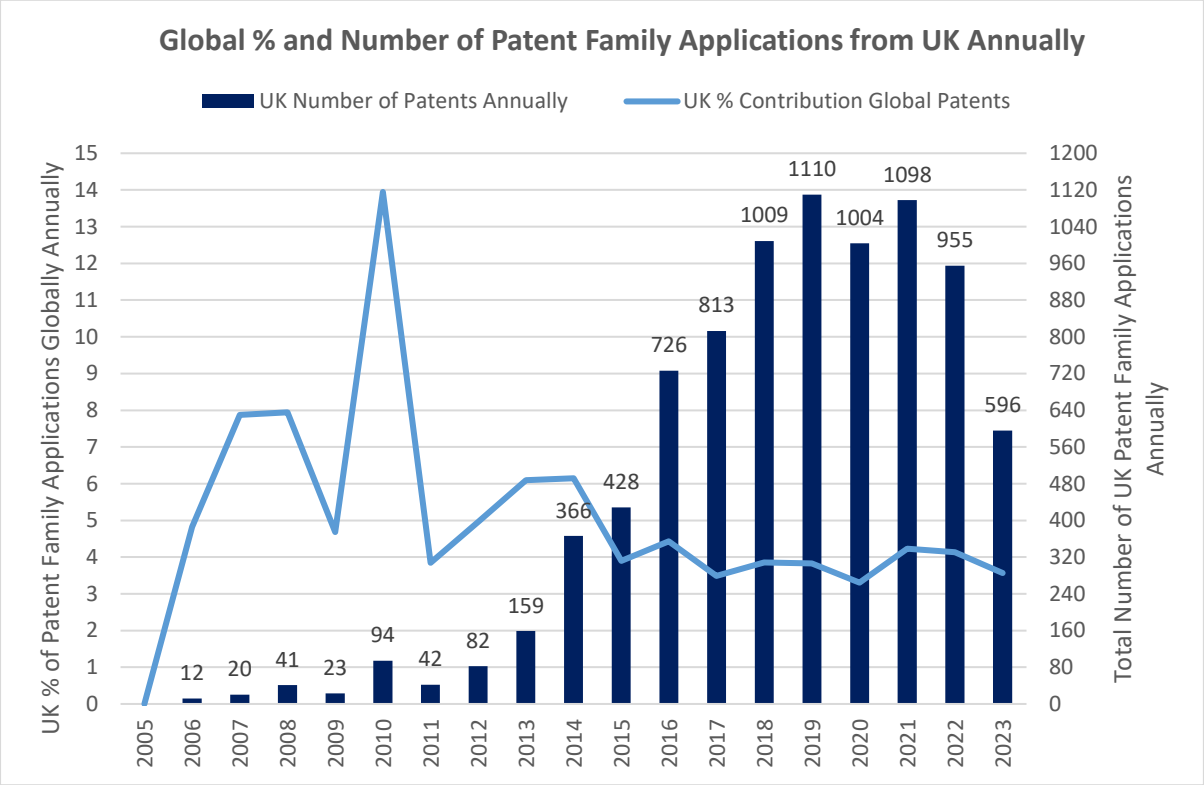
Firstly, to note, this is not a total number of patents – rather it is a of the number of countries where a patent family[13] application has been made from. This method of analysis does have significant limitations to the results obtained.

There is no differentiation made between awarded and pending patent applications. Furthermore, there are occasions where there may be multiple applicant countries on an application, therefore duplicating a result (i.e. in 2005 there are 140 patent family applications, however there are over 200 applicant countries). Moreover, there is likely extra patents that have been included which aren't applicable to AM technology, or maybe miss patents which would have been applicable if a different term has been used (i.e. SLS, Solid Freeform Fabrication etc). Finally, there are potentially duplicate entries as a company may put in the same patent application in multiple jurisdictions.

However, it is assessed that the information obtained via the search undertaken provides a good indication of the strength of the UK AM eco-system, as you can compare countries and assess the level of innovative research and development being patented and therefore potentially commercialised.

[12] Specific search term used as follows: ta = "Additive Manufacturing" OR ta = "3D Printing" OR desc = "Additive Manufacturing" OR desc = "3D Printing" OR claims = "Additive Manufacturing" OR claims = "3D Printing"

[13] A patent family is a collection of patent applications and patents filed in multiple countries or regions to protect the same invention.

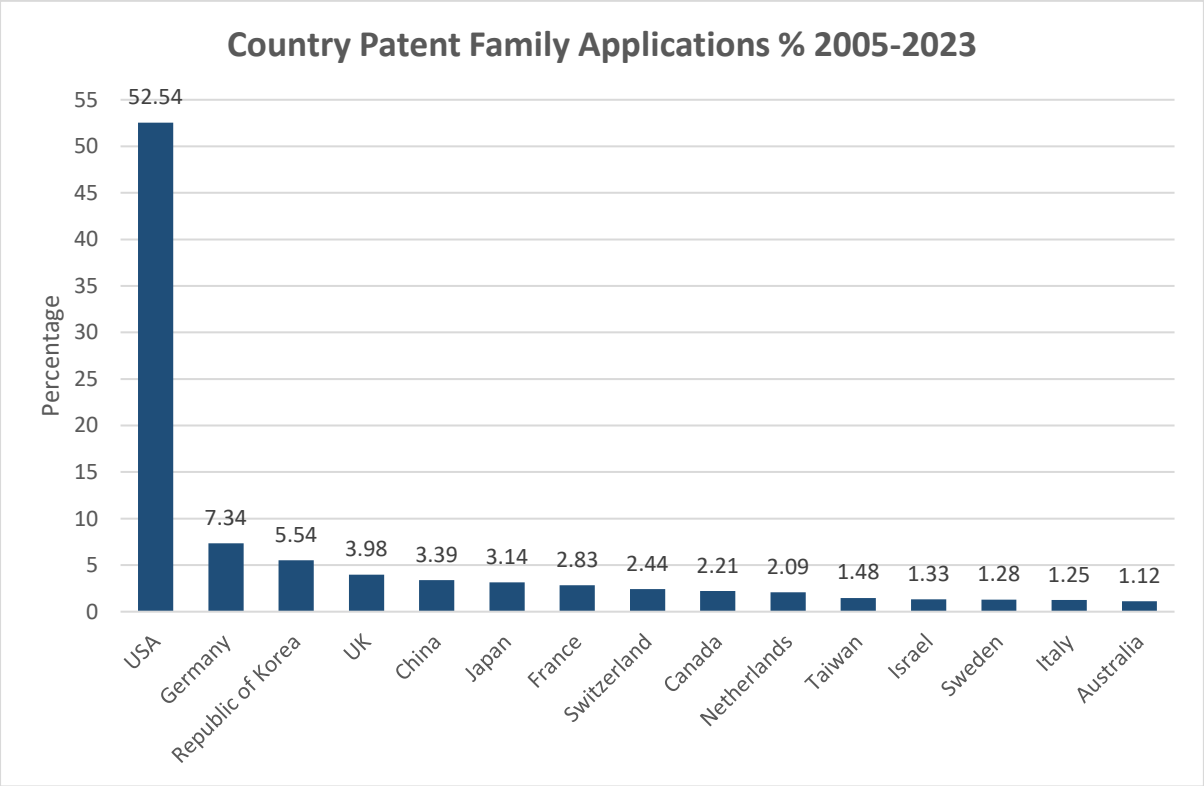


Looking at the dark blue bars in the graph above, we can see the total number of patent family applications each year from UK based applicants. From 2006 to 2017 there was a steady period of growth in applications with 2018 to 2022 showing a peaking and levelling off. The drop in number of applications in 2023 is assessed to be due to it taking 18 months post filing for a patent to appear on the database (i.e. anything filed in June 2023 will not be published until December 2024 at the earliest) rather than the start of a downward trend for the UK.

However, looking at the global trends in patent family applications, there has been a steady decline since 2020. This suggests that the technology is starting to mature as the R&D slows down and that the technology is moving from a development phase to in-service production phase.

Since 2015, the UK has remained annually at around 4%of the global total number of applications each year. It will be interesting to see the full results for 2023, to see if the increasing in public funding that year has had a direct impact on patent family applications from UK organisations.

Looking at the total number of patent family applications made by countries from 2005 to 2023 gives the following view:



The UK currently sits in 4th place with a share of just under 4% of global patents family applications. Though the percentage has slightly decreased since 2022, where it has 4.06%, it is still above both China and Japan, suggesting that the UK is providing an innovate R&D landscape for AM technology.

Additive Adoption in the UK

Though there is data on the level government funding and AM patents in the UK – which is assessed to be an indication that AM technology is being developed here – there is currently a lack of data around the adoption (i.e. AM machine installation numbers) and use of AM technology (i.e. AM material consumption).

Therefore, using AMUK member data and some basic data analysis tools we have started to put together the potential install base of industrial Additive machines in the UK. The following table provides the top-level assessed figures based on current knowledge:

Organisations who could be AMUK members	**300**
Assessed number of AM technology suppliers[14] in UK	**75 - 100**
Assessed number of AM technology users[15] in UK	**130 - 200**
Additive technology users split	**Polymer Only: 84 – 129** **Polymer & Metal: 21 – 32** **Metal Only: 25 - 39**
Polymer Machine Industrial Installations	**Powder: 203 – 311 (high confidence – range assessed to be correct)[16]** **Filament: 237 – 363 (low confidence – potential to be higher than quoted)** **Resin: 101 – 155 (low confidence – potential to be higher than quoted)**
Metal Machine Industrial Installations	**125 – 193 (low confidence– potential to be higher than quoted)**

Note that the figures in the table above do not consider any consumer market installations.

Economy and Industries

This section of the report looks at some of the key application areas for Additive Manufacturing, covering where the opportunities lie, the size of those industries in the UK and the outlook for the next couple of years.

Aerospace

This is an important sector for the UK which has a diverse range of elements in the sector. According to international data collated by Oxford Economics, the UK has the 2nd largest sector in terms of value-added output in Europe, behind Germany and just ahead of France - globally this puts us in 4th place with the USA and China taking the top two spots. However, another way of looking at this is the importance of the industry within the manufacturing sector of the country and this measure, the UK tops the global league table as aerospace has the largest share of the manufacturing sector of any country at just over 5% and ahead of France and the USA (although it is not the largest industry in the UK).

The UK has a wide spread of activity with a significant presence in the supply chain for Airbus, Boeing and Embraer, as well as a relatively large defence aerospace sector (although nothing like as large as that in the US). This industry faces a number of supply chain challenges in the short term with, for the UK, issues around engine reliability top of the list. Globally, the well-known difficulties on various product lines at Boeing are adding to the problems in the civil aircraft part of the sector. As a result, we estimate that output of the UK

[14] Supplier of AM Materials, AM Machines, Post Processing Equipment etc.
[15] Could be a company using AM, or academic institution to conduct R&D.
[16] This is the confidence we have in the range that has been provided.

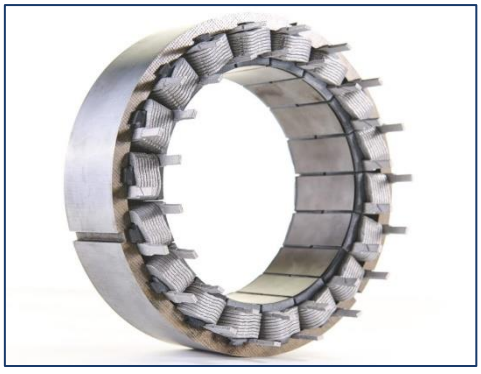
aerospace sector will have fallen by -2.5% in 2024 but forecast modest growth of +1.6% and +2.9% respectively over the next two years.

The underlying fundamentals for this sector remain strong with very large order backlogs for civilian aircraft and increasing global geo-political tensions driving increases in defence spending combining to give a strong outlook for the medium-term.

The AM sector is important in the aerospace market because of the focus placed on whole-life costs (manufacturing, operating and maintenance) in this sector and, in particular, the drive to reduce weight to save on fuel costs over the life of the aircraft. This creates opportunities for the use of AM technologies in the manufacturing process where the volume requirements are relatively low but weight-reduction while maintaining strength is highly valued. The main issue is around certification of new manufacturing processes which is a high-level requirement in this industry, so the prospects for adoption of AM techniques is greatest in new models where that certification process would be required anyway.

Automotive

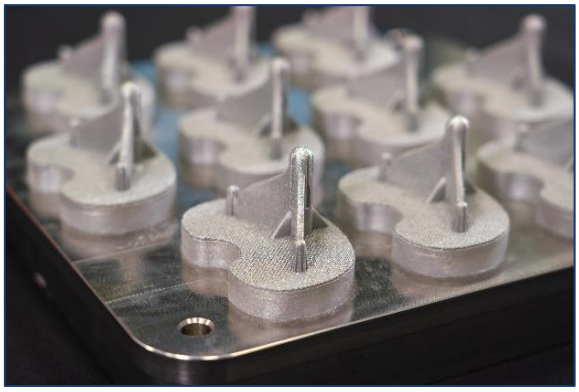
This is another important industry for the UK but although it accounts for a larger share of the manufacturing sector (around 8%) than aerospace, it is further down the relative global league table which is dominated by Japan and Germany where the automotive industry accounts for 16% and 13% of manufacturing respectively. Again, the UK has the 2nd largest automotive industry in Europe behind Germany (helped in part by the fact that large Italian and French manufacturers make a lot of vehicles outside their home countries) but the global picture is dominated by China, the USA and Japan who all have larger output than Germany, with Mexico and South Korea also ahead of the UK.



Despite closures over the past few years (including Ford at Bridgend and Honda in Swindon, plus the ending of Stellantis production in Luton) and the challenges of moving to electrically powered vehicles, UK activity in the automotive industry remains significant, especially if we look beyond the headlines to specialised areas such as motorsport. Output in the UK has grown by an estimated +8.5% in 2024 and the latest forecast is for this to fall back in 2025 (-4.1%), a modest recovery should then begin in 2026 with growth of +2.5% predicted.

The medium-term prospects for the UK automotive industry are the combination of a number of factors with divergent implications for the adoption of AM technology. In the core area of conventional vehicles, widespread use of additive techniques is unlikely to occur given the challenges of producing parts at high volumes in a mature market. The move to electric vehicles offers more opportunities given the need to reduce weight of vehicles to maximise the range of batteries; however, the challenge of what are likely to be high volumes for AM parts will remain as this sector does not benefit from the same whole-life focus that we saw for aerospace. In other parts of the sector, most notably motorsport, which have lower volumes, opportunities for AM techniques are greater.

Medical & Metal Products



Here we run into the problem of classifications on which data analysis is based as while there are headings for medical equipment, this really refers to instrumentation of various types rather than the typical applications for AM technologies which lie, for want of a better term, in “body parts”. Typically, these are included in the category for metal products (as part of sub-contract engineering) and, therefore, data for the medical element of this category is not available. Although this is also a relatively large sector in the UK, accounting for 8.7% of total manufacturing output in 2023, it only ranks 3rd in Europe (behind Germany and Italy but just ahead of France) and 6th in the world - China and the USA are the biggest players, with Japan also ahead of the UK.

Thanks to the inclusion of a couple of well-performing product categories, UK output of the metal products industry grew by +7.7% in 2024. The latest forecasts suggest a more modest pace over the next couple of years at +2.2% in 2025 and +1.0% in 2026.

The diverse nature of this industry means that opportunities for the use of additive manufacturing techniques varies widely. Clearly the opportunities are greatest in producing medical parts sector, but this has a carry-over into other types of specialised machining, especially where low batch numbers enhance the advantages of AM.

Machinery

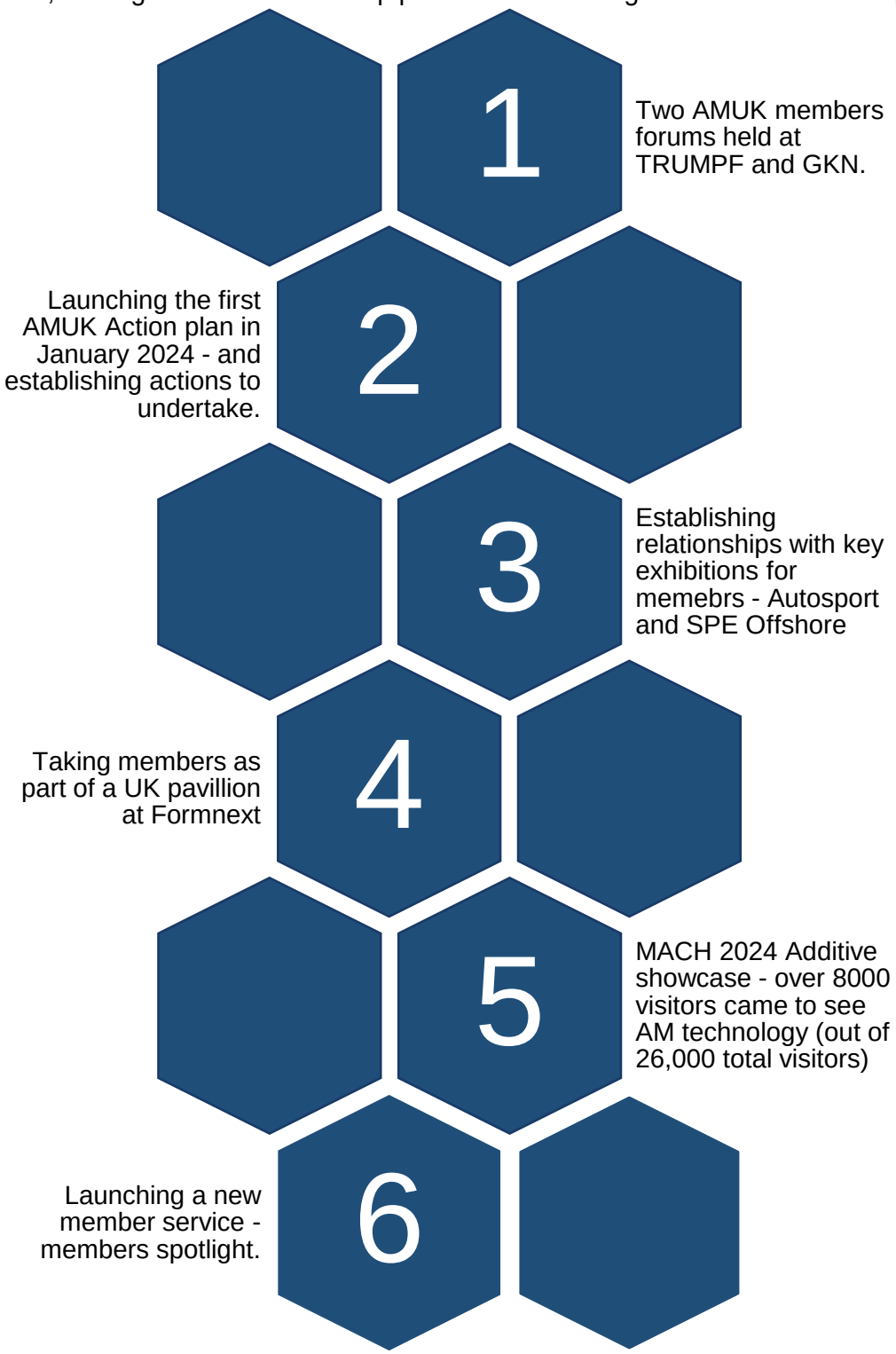
Despite Machinery (or Mechanical Engineering as it is sometimes called) accounting to 8% of total manufacturing output in the UK, it ranks relatively low in terms of the total value on both a European and Global scale. Based on output in 2023, the UK Machinery industry is the 4th largest in Europe behind Germany, Italy and the Netherlands (where this group is dominated by machinery for the production of semi-conductors); in the rest of the world, the UK also ranks behind China, Japan and South Korea.

This has been a weak industry recently with total global output falling in 2024 (measured in US$ at 2015 prices) and the UK was no exception with a decline of -7.6% on the same basis. No change in output is forecast for 2025 before growth returns in 2026 at +2.6%. Of the 4 groups that we have considered, this industry is most exposed to high interest rates and changes in exchange rates often influence relative competitiveness. This is because many of the types of products in this industry are sold on a contract-by-contract basis rather than the supply chain type relationships which are more common in the aerospace and automotive industries.

As with metal products, the diverse nature of this industry makes generalised statements about the medium-term prospects and opportunities for adoption of Additive Manufacturing difficult. Some areas, such as pumps & valves, especially in smaller sizes, look to offer promising levels of demand, as do some types of mobile machinery that are looking to move to electric propulsion, but in larger, static machinery such as machine tools and machinery for specific products the scope for the use of AM is likely to be lower.

AMUK: November 2023 to November 2024

Since relaunch, AMUK has embarked on a journey, with the aim of establishing its position as the primary industry voice for companies comprising the AM technology value chain in the UK. This covers companies operating the areas of materials, design, manufacture, post-processing, and testing & inspection. In the last 12 months, AMUK has achieved several milestones, moving from its initial startup phase to a delivering of value to members' phase:



AMUK: December 2024 to December 2025

In February 2023, AMUK held a series of regional meetings with members, starting the process to explore the future for AMUK and establish its longer-term objectives. These meetings brought together the AMUK membership to engage in open discussions regarding the challenges slowing the progress of the adoption and use AM technology in the UK, as well as the hurdles preventing companies from expanding their operations.

Members were encouraged to articulate these challenges, offering insights into their specific issues, as well as provide recommendations aimed at addressing them. A detailed compilation of these challenges and the ensuing recommendations can be found in Annex 1.

Following the regional meetings, an in-depth analysis of the members challenges was conducted. This highlighted that certain challenges were reoccurring, which allowed for the creation of thematic challenge groups. The table below lists these groups, along with the total number of members who identified each challenge as a pertinent issue within their company:

Challenge Group:	Number of Responses:
Supply Chain – Education, Adoption, Visibility & Qualification	**9**
Skills – Education, Training & Recruitment	**9**
Standards – Roadmap, Testing, Certification, Inspection & Materials	**8**
Government Engagement (incl Funding)	**6**
Technology – Sustainability & Recycling	**2**
IP Protection	**1**
Bid Writing Support	**1**
Technology – Software to Generic	**1**

These results were presented to the AMUK Steering Board. Following discussion with the Steering Board, the decision was made that it would be most practical for AMUK to allocate its resources toward tackling the top three challenges, or Supply Chain, Skills and Standards as determined by the membership.

A further set of meetings was held with working groups and the steering board in July and August 2024 where it was assessed that these challenges were still seen as the most pressing. The following sections provide an update on the actions set by the working groups that were presented in the previous version of this report.

Challenge 1: Supply Chain – Education, Adoption, Visibility and Qualification

The challenge with the UK manufacturing supply chain, with regards to Additive Manufacturing technology is multi-faceted. At one end of the spectrum there are still companies who need educating on what the technology can do for them, and at the other end you have companies looking for pathways into sector supply chains with the capability they can offer. This challenge looks at what AMUK can do to support the supply chain in the following areas:

1. Education of the supply chain on the capability of Additive technologies.
2. Aiding companies in their adoption journey of Additive technologies into their design to manufacturing processes.
3. Making the capabilities and capacity of the UK Manufacturing supply chain with respect to Additive technologies visible.
4. Determining how to qualify the UK Manufacturing supply chain with regards to Additive capabilities.

The following people are part of the AMUK Working Group looking at the supply chain challenge:

NAME	COMPANY
Martin McMahon	M A M Solutions
Ben Chadwick	Bowman Additive
Kartik Rao	Additive Industries
Olivier Diegerick	Siemens
Simon Chandler	CREAT3D
Rhodri Evans	Primetals Technologies
Mikael Olsson Robbie	Phoenix Scientific Industries
Anthony O'Riordan	Kazien PLM
Ruaridh Mitchinson	MTC
Len Pannett	DiManEx

The following table provides an update on the actions agreed by the Supply Chain working group and includes two new actions:

TITLE	DESCRIPTION
Comprehensive Case Study Database	On the AMUK website the case study database will be be further populated and look to provide a full range of AM examples across a range of processes, sectors, and materials.

TITLE	DESCRIPTION
Update: There are now 32 case studies on the AMUK website covering a range of processes, sectors and materials. There will be continued to requests to member to add further case studies with the aim of adding another 12 during 2025 to further illustrate the real-world application for Additive technology.	
Greater Membership exposure and engagement via existing social platforms (i.e. LinkedIn)	Explore the possibilities with using existing social networks to promote the AMUK membership, as well as platform for member communication. In the first instance LinkedIn should be looked at due to volume of members already engaging with the network.
Update: We have continued to grow the AMUK social presence. We now have almost 3000 followers on LinkedIn and have a further group we run with around 1500 followers. We will continue to push for growth on both to ensure that we have a good coverage of the UK manufacturing supply chain with which we can promote the membership too. Furthermore, as part of promoting members we have launched a new membership service – Membership Spotlight – which will once a month give a focus on a member and what they do via our social platforms.	
Creation of an Adoption Guide	Identify the current tools and guides already publicly available which help companies adopt AM technology. Form them into a single process and fill any gaps identified to create a comprehensive AM adoption guide. This guide should then be part of the AMUK website for any company to engage with.
Update: A basic process has been developed which is being complemented with case studies. The intention is that it will part of the AMUK website in early 2025.	
Get Into AM Event/Mastering AM	AMUK to organise an annual event where both beginners and experts can attend and knowledge share and improve their knowledge on AM technology.
Update: For 2025 rather than establish a new event, AMUK is going to support the TCT AM Users Group which takes place before the TCT exhibiting in June.	
Funding Guide	AMUK to create a guide to what funding routes are available for UK companies along with a guide on what companies need to do to apply. This should be an AMUK member benefit.
Update: Information on funding is now available on the Valuechain platform which AMUK uses. However further work is ongoing to make the information more directly available about appropriate funding pots that members can apply for (i.e. direct email, Valuechain platform etc). Furthermore, work has started to see if AMUK can provide a form of assessment service around whether a funding bid will be successful or not.	

TITLE	DESCRIPTION
NEW ACTION: Supply Chain and Professional Body Engagement	AMUK to talk to several Supply Chain exhibitions and Professional Bodies to enable members to get in front of new and different audiences/potential customers.
NEW ACTION: Online Part Printability Assessment	AMUK to investigate the benefit of having a platform on the website which will provide a basic assessment as to the potential printability of a part. The intention is that this could help companies assess if AM is for them, and potential reach out to members who offer certain capabilities (i.e. can we generate leads for members).

Challenge 2: Skills – Education, Training and Recruitment

Having the right skills in place is essential to the growth of Additive technology in the UK. Without the skills, companies will be unable to adopt and take advantage of Additive Manufacturing in their own design to manufacturing processes. This challenge will look at what AMUK can do to aid in the creation of a talent pathway for individuals to come into the Additive technology sector in the UK.

The following people are part of the AMUK Working Group looking at the skills challenge:

NAME	COMPANY
Jono Munday	APEX
Bradley Hughes	GKN Aerospace
Joe Winston	Measurement Solutions Ltd
Gwilym Rowbottom	Reliance Precision
Robert Higham	Additive Manufacturing Solutions
Mark Dickin	Ricoh 3D
Rhodri Evans	Primetals Technologies
Anthony O'Riordan	Kaizen PLM
Tom Wasley	MTC

The following table provides an update on the actions agreed by the Skills working group:

TITLE	DESCRIPTION
AM training course review.	Working with AM companies (users and technology providers) understand the skills requirements that are out there and consequently create an AM curriculum. Map this against currently available training and identify any gaps that need filling. This should be a precursor to a form of AM certification.
Update: A pathway of skills/knowledge has been agreed for upskilling and engineer with specific AM skills. Work is ongoing to develop this into a proper curriculum so that they can get approval from higher/further education and can be used as part of any CPD. There is also conversations ongoing with ADDIMAT (the Spanish AM Association) who have also developed an AM Masters course to see if there are opportunities to utilise some of their material.	
AM Open Days	AMUK will look to organise a series of regional open days with members with the purpose of promoting the technology to Non-AM companies.

TITLE	DESCRIPTION
Update: This action has been split into two parts: Schools Outreach and Industry Outreach. For the schools' outreach there are currently two pieces of work underway. Firstly, AMUK is developing a set of pre-made AM projects for schools to complete in conjunction with a member. These will be free of charge with information being hosted on the AMUK website. The second aspect of work is the development of an annual project with Create Education which can be undertaken in collaboration with members over a year. Final costs are just being determined before this is launched. For the Industry Outreach, AMUK is engaging with both he Marine and Rail associations and looking to run two industry specific events in April and May 2025.	
AM Competition	Working with AM companies look to scope out a competition which is aimed at apprentices, student and graduates which aims to get expose them to AM technology and has them solving a real industrial issue.
Update: A draft process has been created, for the competition and there have been some initial discussions about the competition with industrial partners. Work is underway just to understand how we can connect with members with student competitors to ensure they get the industrial experience which is the purpose of the competition. The current planned launch date for the competition is September 2025.	

Challenge 3: Standards – Roadmap, Testing, Certification, Inspection & Materials

Additive Manufacturing has created a whole new way of manufacturing parts and components. There are many standards out there for companies to use when using AM technology, however the standards landscape for Additive is complex – especially for companies who are entering AM for the first time. Furthermore, the Materials data to make parts and components through Additive is not easily accessible for all companies. This challenge will look at what AMUK can do to aid companies in understanding the available standards for them to adopt and use when manufacturing parts and components and look at ways of creating a centralised Materials database that AMUK members can take advantage of.

The following people are part of the AMUK Working Group looking at the standards challenge:

NAME	COMPANY
Matt Parkes	Renishaw
Charan Prakash	Bowman Additive
Rob Poyner	Siemens
Ian Marsh	Digital Manufacturing Centre
Anna Terry	AWE
David Macknelly	AWE
Ruaridh Mitchinson	MTC

The following table provides an update on the actions agreed by the Standards working group and includes two new actions:

TITLE	DESCRIPTION
Sector Standards Database	Engaging with the regulators for different sectors, AMUK will document the standards the regulators are expecting companies to follow with regards to AM parts. This list of standards should be accompanied by regulator guidelines on what they are looking for to meet those standards.
Update: AMUK has engaged with Team Defence Information (TDI) who are running the Additive Manufacturing as a Service (AdMaaS) Project – Project TAMPA. As part of the project they are developing a roadmap of standards that need to be followed for the Land, Marine and Air platforms. Once it has been agreed this will be made available to AMUK members. •	
Peer Review of Materials Databases	AMUK to produce a guide on the currently available materials databases for AM. Peer review each of the databases and identify where there are gaps.
Update: AMUK is working at providing a top level assessment of the available materials databases – this will be made available during 2025 to members either via the Valuechain platform or on the website.	

TITLE	DESCRIPTION
AM Standards Event	AMUK will host an AM standards event – this could potentially be part of another event. This should look to include speakers from LRQA, a Regulator, BSI and opportunities to share best practice between members.
Update: It is planned for the next AMUK members forum in March 2025 to be the AM Standards Event. Team Defence Information (TDI) have agreed to support and be part of this event. AMUK are looking to get a speaker talking about adopting and using standards from BSI, having a speaker to talk about the project TAMPA roadmap from TDI and a further speaker from an OEM to talk about their expectations from companies working to the presented roadmap.	
NEW ACTION: Free Standards Access	This action was about offering the most used AM standards to members for free. AMUK are investigating the feasibility and cost of this and will report in due course.
NEW ACTION: UK Standards Activities	This action was for members to have place where they could find out about the ongoing Standards activities in the UK and learn how they could get involved with the different activities. AMUK to investigate and provide an area on either the website or Valuechain platform.

Annexe

Annex 1: Regional Meeting Responses

#	Challenge Title	Description	Recommendations
1	Recycling Centre for Materials	No centre to recycle/reuse material. There are schemes in the US and mainland Europe. UK currently goes to incineration or landfill.	Collate all users/ pink xx using powder, for example PA12 nylon. Advise how materials can be stored, collected and recycled.
2	Materials and Methods	So many manufacturing methods. Don't always uses methods that have work in the past	Material comparisons against injection moulded material.
3	Design	Products in Polymer designed for Injection. Restricts manufacturing design.	Training existing designers Training with India and Conxxx USA Casxx Short/mid-term
4	Sustainability/Supply Chain	Lack of visibility as part of supply chain solutions/ sustainability. 3 Fold – Not being used anywhere to cxx as supply chain solution Not recognised by supply chain solutions No one organisation looking at recycling of waste and materials.	Look at/set up a roadmap for Polymer waste recycling. Set no?
5	Dedicated Software for Prices?	Industry software is too broad and as a result too costly, i.e. Materidise Mags = £10K+ we only use half the functionality.	
6	Government rush to grow the UK AM industry	UK AM market lags behind the USA, Germany, France etc.	Government initiative similar to Biden government. AM Forward scheme whereby large US companies (particularly those who receive US govmt. Money) pledge to purchase 3D printed parts from small to mid-size US AM manufacturers.
7	Government Engagement	Some other trade bodies have huge influence in government and attract their own funding to support industry (look at Niche Vehicle Network and Advanced Propulsion Centre)	Long term – 10 years. Look to be the holder of grant funds for distribution into the AM sector. It will take several years of lobbying but could be hugely beneficial to the industry. Aim for funds like the Automotive Transformation Fund. The AM sector requires significant capital investment which is typically the hardest to find finance for. A Transformation fund can help to change that.
8	Funding	Lack of AM-focused CRCSD funding in the UK. Preventing industry (particularly SME) to exploit AM - New materials - New applications	Lobby UK Gov/ UK NI to address this lack.
9	Cross funding (sustainability and AM Automation)	-	-
10	Funding (Government) around R&D	Fraunhofer Germany examples (not strictly AM focused). 76 sites €2B funded/year! Expand Catapult centres	
11	Key Industries are shrinking in the UK	Industries like Oil and Gas, Steel, Automotive etc would be good fundamental growth market for industrial high margin AM, if they are shrinking then AM has less market for growth.	Contact trade bodies from other key industries and help lobby on their behalf via MTA or by itself. Generally for manufacturing to grow UK has to ensure fundamentals for it: dead-cheap electricity and access to cheap resources, AMUK would also keep lobbying for it via MTA.
12	Map of AM Industry	State of UK AM industry. Difficult to identify who is doing what. Connecting potential users to suppliers.	A database for industry (2-5 years)
13	End User Hand Holding	Ensuring new potential customer (machines, material or parts) find the best supplier(s) and or technologies for their needs. We are losing opportunities when new users use the wrong technology /provider and it goes wrong.	Mid-Term – 5 years. Marketing Training & Education Sign-posting Opportunity diagnostics AMUK needs to be the place that new customers turn to first to find out what

#	Challenge Title	Description	Recommendations
			technology/service is the right one for them.
14	Companies Relocating to Europe	Manufacturing moving out of UK to Europe due to Brexit/cheaper labour etc.	Suggest incentives for manufacturers to move back into UK, for example; - Better access to key markets (USA/Japan) - Tax incentives - Less political risk - Help fxx manufacturing sites - Access to resources - Cheap electricity - Access and collaboration with British universities.
15	Industrial Digitisation	Definitely need to link up with industrial digitalisation groups and programmes.	SIC Codes and a recognised sector/industry "Additive Manufacturing"
16	Recruitment	Difficult to recruit, especially applications. Slows down our growth in developing new materials and applications. Having to look outside of the UK.	More links to education institutes, right down to high schools. Industry specific qualifications?
17	Hiring location	-	Matching skills
18	General/ Skills & Education	You need SME's to adopt the tech by working with UK suppliers. Awareness is not there.	Focus awareness campaign on SME manufacturers – address the reasons not to adopt up-front. Accessible Easy to learn UK experts to help you Government funding – 3D printers, training, re-training.
19	Getting the Government Involved/Education	How do we get AM into the school curriculum! Who do we talk to? Keeping the industry from growing and stopping the correct skills for the future workforces.	EDUCATION EDUCATION EDUCATION
20	Specific Academic Qualifications at Universities	AM is a bolt on for many engineering courses, needs to be a standalone course. Not enough understanding of design for AM or design for applications.	Work with Uni's of academic institutes to establish qualifications.
21	Skills & Education	No curriculum for AM. Lack of trained students coming through to employment. Employment/skilled workers gap.	- Easy picking: amend D&T GCSE qualification to specifically include AM. (5 Years) - Develop an AM Curriculum – attracts girls into STEM, include post 16 course at colleges/FE/HE (5-10 Years). - Gather intel on current curriculum/training, e.g. Lulzbot, 3DGBIRE – World Schools, NCAM – AM course, others… (2 Years).
22	Skills and Knowledge to adopt AM	There currently isn't enough knowledge and skills tin industry for successful adoption of AM. Therefore industry is reluctant to adopt AM or train 1 individual so don't support growth.	- Roadmap for AM adoption of skills - Make clear what skills and knowledge and tech/team are required for successful AM adoption in an organisation. - Training on to skills – 3DGBUK offer this. - Certified recognised endorsed courses/training.
23	Slow rate of adoption of AM/manufacturing methods incompatible/uneconomic for AM	Education skills problem. Engineers are set in their usual way of manufacturing, not "sticking their neck" out to trial new ways, possibly not knowing about AM or not thinking it can be economic/make economic sense, while in other countries same level of manufacturing is applied via AM.	Some sort of education of young generation of engineers/business managers of AM, enabling the use of AM in educational institutions early on. I think this is a long-term solution but it will make a huge impact once the new generation comes.
24	Adoption	Narrow approach to cost analysis – no adoption.	Business case = Print costs – understand re-usability – design for AM – Future state production (2 years).

#	Challenge Title	Description	Recommendations
25	Adoption of 3D technology	Difficult to get manufacturing companies onboard with AM, use traditional manufacturing methods. Industry remains stagnant which impacts innovation within specific industries.	Implement success stories/use cases within AMUK to show how adoption can improve companies etc. More awareness of how AM applications can benefit customers. Short to mid-term priority.
26	Lack of awareness of 3D Printing at lower-level education	Current 3Dp education all appears to be only from Uni level onwards. Impact means a smaller workforce as lots of people are either less educated or don't know AM is an option when Job/education searching. Lots of 3D designs are poorly optimised for 3D printing.	3Dp needs to be integrated in lower level educations. Lots of establishments cant afford the "professional" printers without realising cheaper alternatives exist. There is also very little reason for schools to use 3D printers with their current education plans.
27	Technical Innovation, Developing new Technologies	I think UK academic IP could be better exploited and utilised to help existing or new AM companies to introduce and develop new solutions. UK has very good IP potential within its universities and that could be used better.	Add British IP related to AM that is ready for licensing or development at value chain website. This would be both short and long term solution. UK also have good grant funding opportunities for development of technologies (Innovate UK) so this would have good combined effect.
28	Digital Modelling	Digital modelling of existing data and physical verification – needs parallel studies to drive innovation and optimisation of processes.	Upskilling and collaborative forums with primes to leverage lessons learnt.
29	Design for AM/Change of Design for AM	The expectation of management that AM can be used as a direct replacement to conventional manufacturing. Lack of AM adoption as it can't directly replace conventional manufacturing. Furthermore, people can't decide for AM so the technology can't be up taken.	Update Training modules from universities and teach people the process. Showcase the potential of parts and industries benefits. Short term: training of design engineer. Mid term: change to university education to get AM a full module in university Long term: Apprenticeship for additive manufacturing.
30	Bid Writing (Skill)	Specialised skill set. Difficult to develop in house for an SME and expensive to engage an expert.	Part-funded bid-writer supported by AMUK.
31	Standards	Understanding what Standards apply to AM and what can be introduced. Adhoc production parts	Draw up a list of relevant Standards – Qualification £/p 2- 5 years
32	Inspection, Test, Standards	Pt 3 – develop and maintain an accessible AM material properties and standards database for current and emerging additive manufacturing technologies.	Use current existing materials centres to collate info and feed into centralised database. (2 Years). Could use collected data for FEA analysis.
33	Testing and Valuation	No defined regulations or testing. Expensive to offer and deliver consistent value or performance.	Standard testing procedures /practices to cover all grades and guidelines for custom grades.
34	Test Data	Not enough test data to go with materials. Material is being compared to injection moulded of extraction grade of materials.	Tighter standards/regulations for material data of testing.
35	Standards/Accreditation	In particular Auto/Repo	Standards/Accreditation for parts not just materials
36	Standards	Industry Standards for power and printing. Slows the implementation of stress loaded parts in Aerospace industry.	International standards bodies to work together to write Global Standards. Short to mid-term 2-5 years.
37	Standards Landscape Confusing	Which standard body to follow – seems to be no single source of truth.	Map of standards – what standards to adopt for which processes. Which standards to adopt for which sectors.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