



## **Preparing for a Future-Ready Workforce - A Review of Additive Manufacturing**

### **Jobs in Europe**

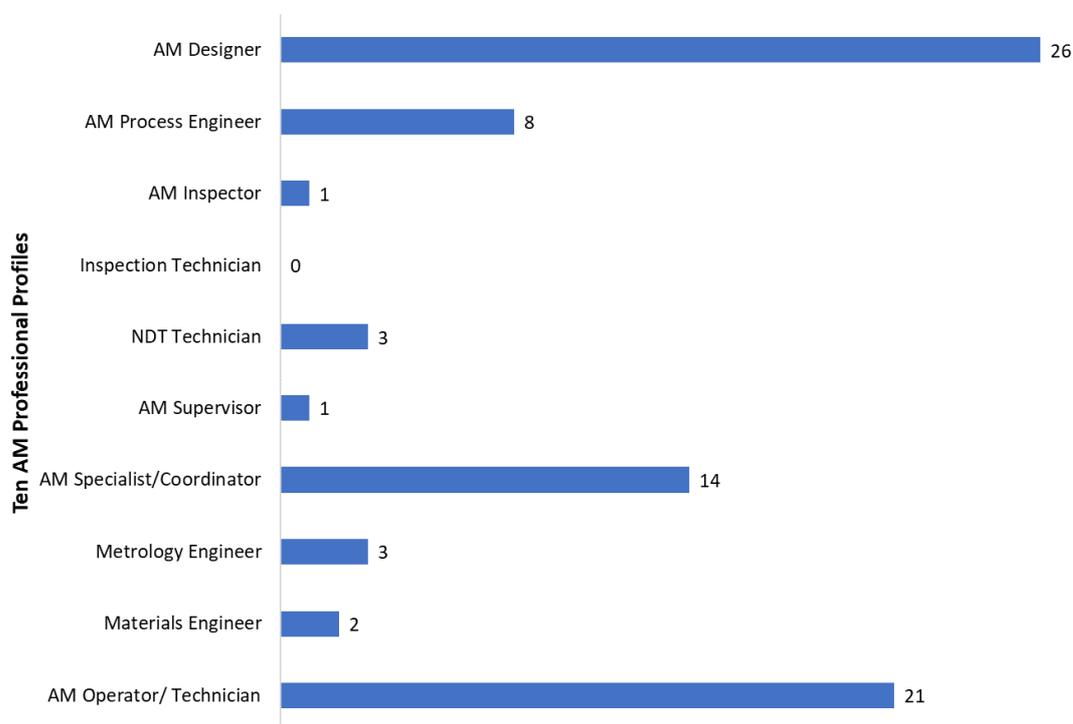
Sector Skills Strategy in Additive Manufacturing (SAM) is a four-year EU-funded project, launched in January 2019 with the aim of developing an industry-specific qualification strategy for the Additive Manufacturing (AM) sector, so that Europe retains its overall international competitiveness. Brunel University London is a UK partner, along with 15 other members of the consortium. For this project, Brunel University London was responsible for mapping the relevant professions working in AM at the moment. The objective was to carefully gather, analyse, categorize, and summarize existing information about professionals working in AM, as a starting point to develop a forecast methodology to assess current and future skills needs in AM. Having relevant and up to date skills and qualifications from a workforce will be key to a successful factory. Taking a step further, we compiled results from the literature review of AM professionals in the industry at the moment; and collected data from recruitment advertisements and other available statistics across Europe. Beyond this mapping activity, Brunel University London would also be responsible to support the implementation of the qualifications. The provision of standardised training for AM would be beneficial to support continuous learning, training and education for a future workforce.

From the literature review, most researchers claimed that in the near future, there would be fewer lower-skilled human jobs as they would be replaced by the use of technology. This would mean that the remaining work available would become more complex and comprehensive. Bowles (2014) highlighted that Northern European countries such as France, Germany, Sweden and the UK would potentially be less affected by the use of computers as compared to Southern European countries where up to 45 to 60 per cent of the workforce could be affected by high and persistent unemployment due to the implications of Industry 4.0. A survey by Naudé, Surdej and Cameron (2019) involved eight Central and Eastern European countries (CEECs) including Bulgaria, the Czech Republic, Lithuania, Hungary, Poland, Romania, the Slovak Republic and Slovenia. It was found that Czech Republic, Lithuania, Hungary and Slovenia were Industry 4.0 ready; and Bulgaria, Slovakia, Romania and Poland were least ready for Industry 4.0. The authors highlighted that unpreparedness for technological changes may result in poor international competitiveness or regions may experience a risk of deindustrialization. The European Commission (2017) identified policies to strengthen each country's industrial competitiveness and modernization to ensure sustainable growth of the



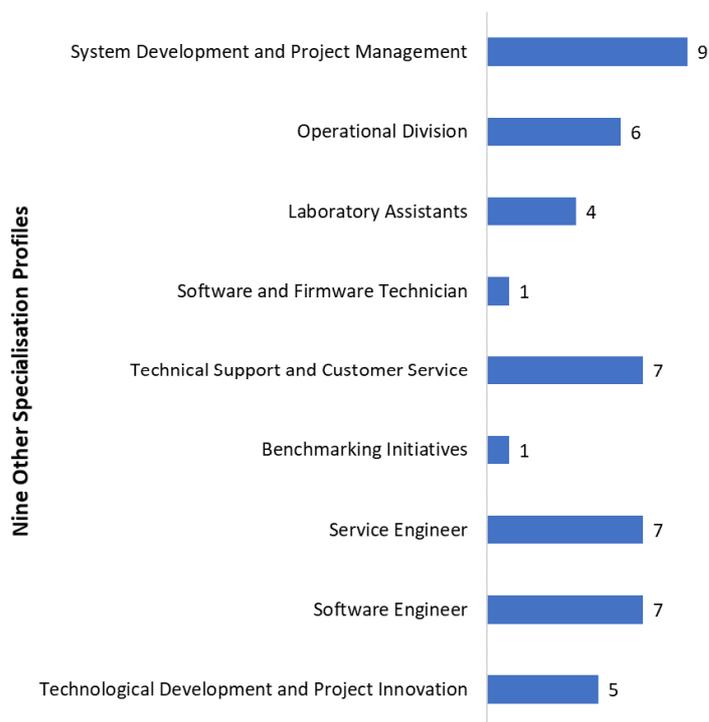
manufacturing sector and noted that “national industry 4.0 initiatives tend to focus on technology and infrastructure, with skills development a secondary goal”. Gress and Kalafsky (2015) claimed that while AM machines will be expected to perform most production tasks, there will be an increased demand for specific roles such as technicians, trouble-shooters, repairmen, and computer programmers. As manufacturing processes become more complex, it will lead to jobs requiring higher qualifications, and consequently less demand for lowly qualified jobs (Hecklau et al., 2016). Researchers suggested that for readiness, companies should qualify their employees for more strategic, coordinating and creative tasks and assign them with higher responsibilities. One of the predicted impacts of Industry 4.0, including the use of AM is the replacement of a low-skilled workforce by machines (Ciffollilli and Muscio 2018). Greater use of robotics and computerization will reduce the number of jobs in assembly and production. But this decline will be more than offset by the creation of even more new jobs in the information technology (IT) and data science sector. The findings by Bonekamp and Sure (2015) undertaken in Germany indicate that Industry 4.0 would see a substantial decrease in lowly-skilled jobs and an increase in highly-skilled jobs which have a greater emphasis on IT-related tasks.

Taking a step further, we utilised a total of 21 online recruitment search engines using two main keywords “3D Printing” and “Additive Manufacturing” to obtain relevant AM Professionals jobs in the Industry. The duration for active job search took place from June to November 2019 to collect an “across-the-board” list of jobs advertised for AM Professionals. Among the websites used to search AM jobs across the EU, was “EURES - The European Job Mobility Portal” (<https://ec.europa.eu/eures/public>) that provides the most comprehensive search results across more EU countries. The countries captured for this study include Austria, Belgium, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the UK. Due to the nature where this study was conducted in the UK and in English, jobs that appeared within the UK took up a higher percentage, followed by Germany. The 10 listed AM Professional Profiles included AM Designer, AM Process Engineer, AM Inspector, Inspection Technician, NDT Technician, AM Supervisor, AM Specialist/Coordinator, Metrology Engineer, Materials Engineer and AM Operator/ Technician, and their vacancies are shown in Figure 1.



**Figure 1: The Ten AM Professional Profiles and their number of vacancies**

Also, the other Specialisation Profiles included System Development and Project Managers, Operational Managers, Laboratory Assistants, Software and Firmware Technicians, Technical Support and Customer Service Officers, Service Engineers, Software Engineers, and Technological Development and Project Innovation Officers, with their vacancies given in Figure 2. These findings from the online recruitment adverts, as well as the literature have provided a better understanding of the relevant jobs and employability in the current AM Industry.



**Figure 2: The Nine Other Specialisation Profiles and their number of vacancies**

### About SAM project

More information about the SAM project can be found on the project homepage: [www.skills4am.eu](http://www.skills4am.eu). Join us by supporting the SAM project to identify current and future qualification requirements as well as participating in workshops to shape education and training for AM throughout the EU. You can get involved such as through participation in workshops to support the identification and validation of qualification requirements and the development of competence units; in the implementation of training courses and dissemination of project results; and also through participation in the information campaign for pupils, students and professionals. Contact details and more information on how you can get involved as an associated partner can be found here: <http://skills4am.eu/associatedpartners.html>

### References:

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**EU-Disclaimer:**

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