



ADDITIVE MANUFACTURING, ENGINE OF INDUSTRIAL REVIVAL

SPECIAL REPORT | 12 - 15 SEPT. 2017
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Europe looks at **3D printing** to pursue its industrial renaissance

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By Jorge Valero



Black 3d printer finishing printing a businessman in the black suit, isolated on the white background. [Shutterstock]

The European Commission backs additive manufacturing as one of the pillars to strengthen its industrial sector and step up efforts to maintain the EU's global advantage.

Europe is looking for durable sources of economic growth. As the ECB will soon start phasing out its massive monetary stimulus, the EU authorities see trade deals as a valid tool to boost European GDP. Within our borders, the European Commission and experts acknowledge that the industrial sector still holds a

great untapped potential, in particular against the backdrop of the ongoing industrial revolution.

Within our borders, the European Commission and experts acknowledge that the industrial sector still holds a great untapped potential, in particular against the backdrop of the ongoing industrial revolution.

"The issue is not whether manufacturing is or should be important for economies, nor is it how many manufacturing jobs to have or save," the Bruegel think tank said in a study published last week.

The authors called for creating the right conditions for facilitating higher-value added jobs across sectors.

EU officials explained that Commission President Jean-Claude Juncker is expected to announce during his state of the union address on 13 September a new industrial policy communication to review the progress made in this field and the opportunities ahead in the context of the digital disruption.

The communication, part of the

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Commission's work programme for 2018, should provide a "holistic EU industrial policy strategy for the future", including medium to long-term strategic goals, the Council requested last May.

In the context of the emerging megatrends, the executive already identified advanced manufacturing, including additive manufacturing, as one of the six technologies that could contribute the most to the industrial rejuvenation in Europe.

Additive manufacturing, or 3D printing, was the first and one of the most visible technologies brought by the digital revolution introduced in the European industry, EU officials underlined.

In order to support this priority with €95 million in financing, the Commission backed 21 projects between 2014-2016 through Horizon 2020, its research programme.

PRINT AN AIRBUS

The introduction of 3D printing in industrial processes has helped reduce the cost of manufacturing in high-value sectors like aeronautics, or in cases where the economies of scales are difficult to apply, like processing spare parts for machines.

For example, the Airbus A350 contains more than 1000 3D printed flight parts, mostly not critical parts.

By doing this, aircraft parts weigh 30% to 55% less, while reducing raw material used up to 90%, an important advantage in such a competitive sector.

But it was the automotive industry that pioneered the use of 3D printing technologies. From prototypes, its use

was extended to final parts as in the case of eco-efficient cars, and more recently in the realm of F1.

BRINGING BACK JOBS

Once this technology gains ground across Europe, experts believe it could help bring back to Europe skilled jobs that have been offshored in recent years.

Additive manufacturing will make "manufacturing on demand" more economically feasible, which would enable placing factories closer to the demand.

"With robots, artificial intelligence, 3D printing and other advanced manufacturing technologies, the cost of labour will be a less important factor in deciding where to locate manufacturing facilities and jobs. As a result, production of industrial goods might as well take place in high-wage western countries. If this is indeed happening, we should see in the aggregate data an end to offshoring and even signs of re-shoring, at least of the return of jobs that were offshored in search of lower labour costs," the Bruegel report reads.

GLOBAL COMPETITION

Despite tough competition from Israel, the US and Japan in plastic additive manufacturing and hybrid manufacturing, and China in bioprinting, the bloc still maintains a leading role in the field, officials said.

Europe also remains a world leader in metal manufacturing, as well as other cutting-edge areas such as biomedical 3D printing.

But as the EU executive already warned in a report last year, Europe's capabilities in this field remain

fragmented and barriers are still numerous.

Industry representatives and EU officials agreed that providing the right set of skills and education, intellectual property rights, standardisation and more research funding are some of the top priorities.

"It is imperative to act fast and determined," said Filip Geerts, director general of the European Association of the Machine tool Industries (CECIMO) in a recent position paper.

At an operational level, additive manufacturing in Europe still misses some capabilities or need to address some flaws in order to reap all the benefits.

According to the European Commission's report, national and regional authorities should facilitate access to critical materials needed for additive manufacturing, including titanium, aluminium, magnesium.

Besides, Europe should acquire some missing capabilities, for example during the finishing process (Hot Isostatic Pressing in the field of metal additive manufacturing).

The bloc also faces important challenges at early stages, including during the simulation and the testing phases.

Despite these outstanding issues, officials and the industry are confident that Europe can remain at the forefront of the global race for dominance in a cutting-edge industrial sector.

For that to happen, the Commission acknowledged that smaller manufacturers must be on board of this digital transformation from the outset.

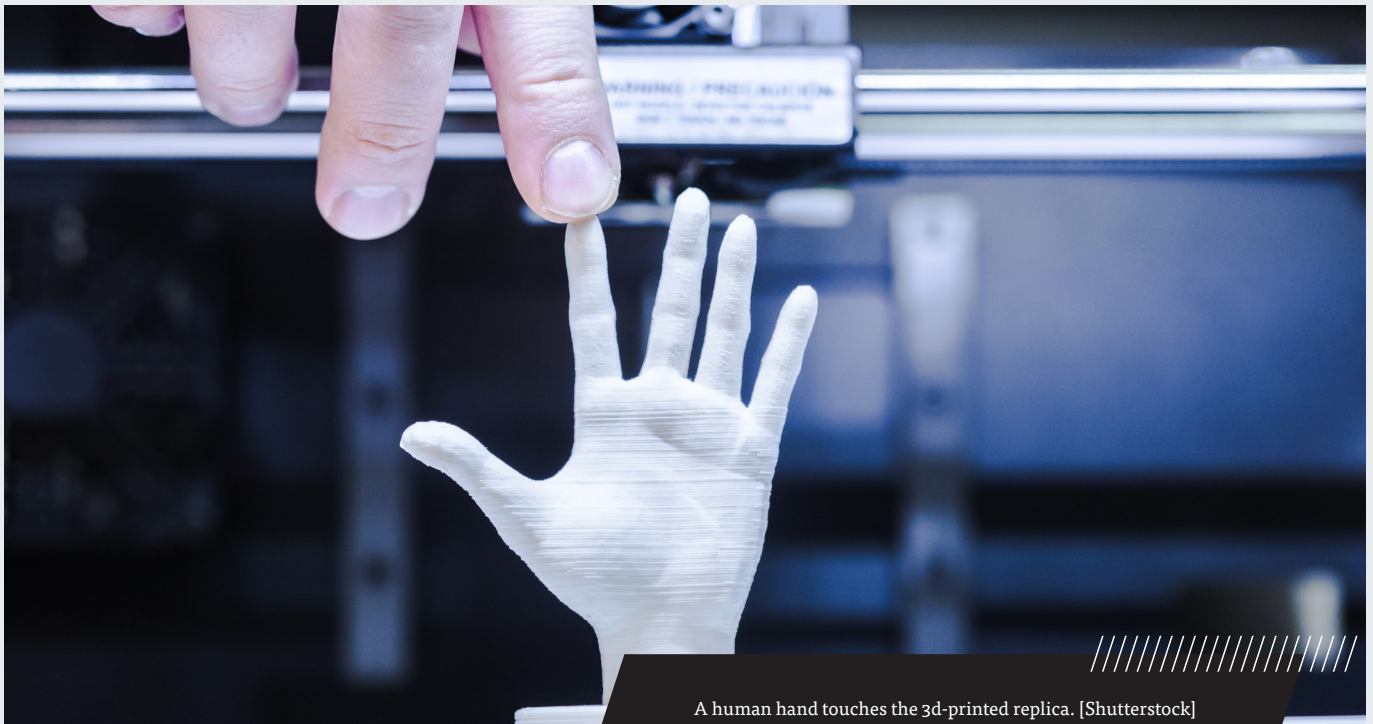
As a result, the EU executive is setting up a virtual support centre for advanced manufacturing for SMEs.

OPINION

DISCLAIMER: All opinions in this column reflect the views of the author(s), not of EURACTIV.com PLC.

FP9: An unmissable chance to boost European additive manufacturing industry

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A human hand touches the 3D-printed replica. [Shutterstock]

The new EU Framework Programme offers an unmissable opportunity to step up public research investment in additive manufacturing/3D printing. Let's make the most out of this key technology for Europe's future, writes Filip Geerts.

Filip Geerts is the director general at CECIMO.

As the end of Horizon 2020 is approaching, the EU has started preparations for its successor, FP9.

This new Framework Programme is crucial to truly upgrade the European industry. The EU must increase R&D funding commitments for additive manufacturing, an innovative sector where Europe's competitors on the global stage are revealing ambitious R&D strategies. Indeed, a large-scale deployment of additive manufacturing

(AM) will bring plentiful advantages for industry and the whole society.

But what is additive manufacturing? Generally known as 3D printing, additive manufacturing generates 3-D objects directly from a computer model.

The process leads to less waste during production, as the material is deposited only where required, an

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extended product life cycle, as new design opportunities are possible, and streamlined value chains, as parts can be created on demand closer to the customer's location and the need to keep large inventories is reduced.

Factories across the world are more and more familiar with additive manufacturing. But to make it really mainstream, actors developing additive machines need to advance knowledge of properties and applications of the components generated. So, research and innovation are fundamental to further push additive manufacturing into the industrial mainstream.

Europe has been at the forefront of research efforts in this field.

Horizon 2020 catalysed the interest of the EU community around additive techniques and translated it into significant R&D investments. In 2014-16 alone, a total of €95 million in EU funding gave rise to more than 20 additive manufacturing projects.

This means more than 20 research collaborations have been generated, in which some of the best actors in the field have offered their precious European resources — be they leading market knowledge, long manufacturing experience or testing facilities — to tackle current challenges for the industrial deployment of additive production methods.

These collaborations have certainly borne fruit. Horizon 2020 allowed us to create additively manufactured car parts, whose higher strength and lesser weight reduce a car's fuel consumption.

Aircraft maintenance can now be done with additive techniques,

decreasing transport costs and streamlining supply chains. Implants can be customized according to the unique anatomy of the patient, leading to a shorter recovery time and a lesser risk of implant rejection. These examples show the undeniable added-value of such EU initiatives.

But we absolutely need to go beyond that in FP9.

Europe is a key player in the additive manufacturing ecosystem and a leader in the development of additive machines for fabrication of metallic parts, which are then sold across the world. The expertise of our companies and research centres in this industry makes our continent a major pole of attraction for investments.

However, there are serious concerns due to rising foreign competition.

With the objective of becoming a driving industry innovator, China indicated additive manufacturing in its "Made in China 2025" master plan as one of 10 strategic sectors to be expanded. The country's research priorities have aligned with this goal in recent times. And results start to be tangible.

More than one-quarter of the total first patent applications in 3D printing came from Chinese applicants between 2005 and 2011. In late 2015, the government announced 2 billion RMB (about €240 million) in R&D activities for the development of the national additive manufacturing industry over the following three years.

The technology has attracted attention also on the other side of the Atlantic. America Makes, a PPP launched by the US government to boost its additive manufacturing sector and to relaunch the competitiveness of the US industrial base, is now in its

fifth year of life. The initiative has so far managed 100 mn USD of technology R&D and workforce portfolio in

The initiative has so far managed \$100 million of technology R&D and workforce portfolio in total and funded 66 projects spanning across the entire additive field. The IP generated by these projects is reckoned to value about \$79 million.

Faced with the initiatives of USA and China, Europe risks being outperformed in its quest to drive the advancements in additive manufacturing. We must deter this risk with decisive actions. Forging an ambitious R&D approach to additive manufacturing, which starts with a large pool of funds at disposal, is a key ingredient of the EU strategy to fend off these threats.

In early 2018, the European Commission is expected to send the first formal proposal to the Council and the European Parliament on the new EU multi-annual financial framework (MFF). By then, talks on the shape and priorities of the next Framework Programme will heat up.

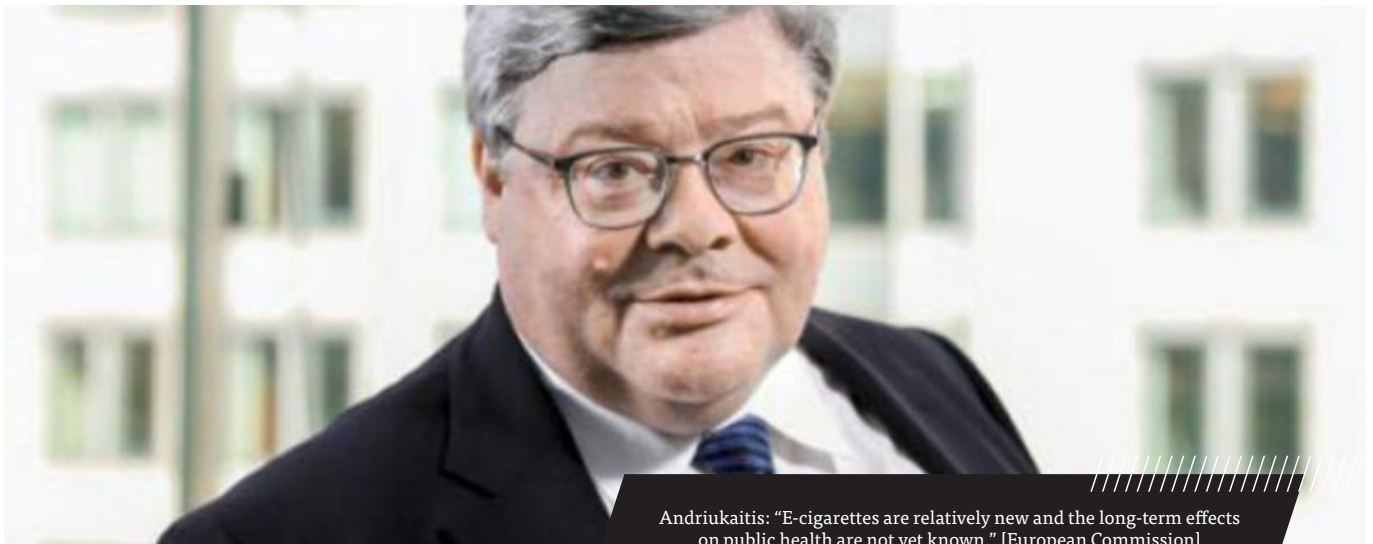
The EU policy-makers sitting at the MFF negotiating table, and those afterwards allocating funds within the areas of FP9, must remember the importance of this sector for the competitiveness of European industry as a whole.

They must also bear in mind that the growth of the European additive manufacturing sector will benefit European citizens, in the form of greater resource efficiency, a cleaner environment and more sustainable and customized products. FP9 must show an ambitious increase of R&D funds for additive technologies.

INTERVIEW

Bütikofer: 'The priority to support additive manufacturing is financing research'

By Jorge Valero



Andriukaitis: "E-cigarettes are relatively new and the long-term effects on public health are not yet known." [European Commission]

Reinhard Bütikofer is one of the most authoritative voices in the European Parliament on 3D printing. In his view, Europe will have to struggle over the next decade to be a leader in industry, and will get there only if it turns research efforts into innovative results.

Reinhard Bütikofer is a Green MEP from Germany and a member of the committee on Industry, Research, and Energy.

Bütikofer responded in writing to questions submitted by EURACTIV.com's

Jorge Valero before Commission chief Jean-Claude Juncker's 2017 State of the Union address.

The European Commission is expected to announce a new strategy on industrial policy soon. Do you expect an important role for additive manufacturing (AM)?

I expect President Juncker to address the need for a European Industrial Policy strategy in his State of the Union speech. I don't care how he will call the baby, important is only the substance. I hope he will not get

bogged down in discussing specific technologies.

Yes indeed, additive manufacturing will play an important role in the future. But an Industrial policy strategy has to overcome the silo-dominated approach of looking at specific technologies.

The strategy has to answer to the need for the right framework conditions which for instance concern access to finance, the competition and efficiency and sustainability rules under which the market operates,

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the provision of adequate skills and finally the right balance between sustainability and competitiveness.

How would you summarise the added value that this booming sector brings?

Additive manufacturing can promote resource efficiency because it creates less waste than traditional manufacturing. Additive manufacturing can strongly support the development of a circular economy by providing solutions for repair and reuse.

Additive manufacturing allows the individualisation of consumer-oriented production right down to lot size one. Additive manufacturing together with IoT technology allows producing completely new products and shaping new business models.

What actions would you prioritise to support AM in Europe, given that we risk losing our competitive advantage? Are we doing enough to maintain our leadership in the emerging fourth industrial revolution?

I don't believe we can pat ourselves on the back and happily proclaim that we do indeed lead the fourth industrial revolution. We are still in contention with the US and East Asia, in particular, China. But the next five to ten years will decide whether we will indeed be able to at least be on the podium when the winners and the losers will be announced.

Additive manufacturing may indeed help to strengthen the competitive position of European industry if we manage to turn our research efforts into innovative results. In addition, additive manufacturing is a technology that reduces the relevancy of labour cost which would also contribute to Europe's advantage.

For policy makers, the one obvious priority to support AM in Europe

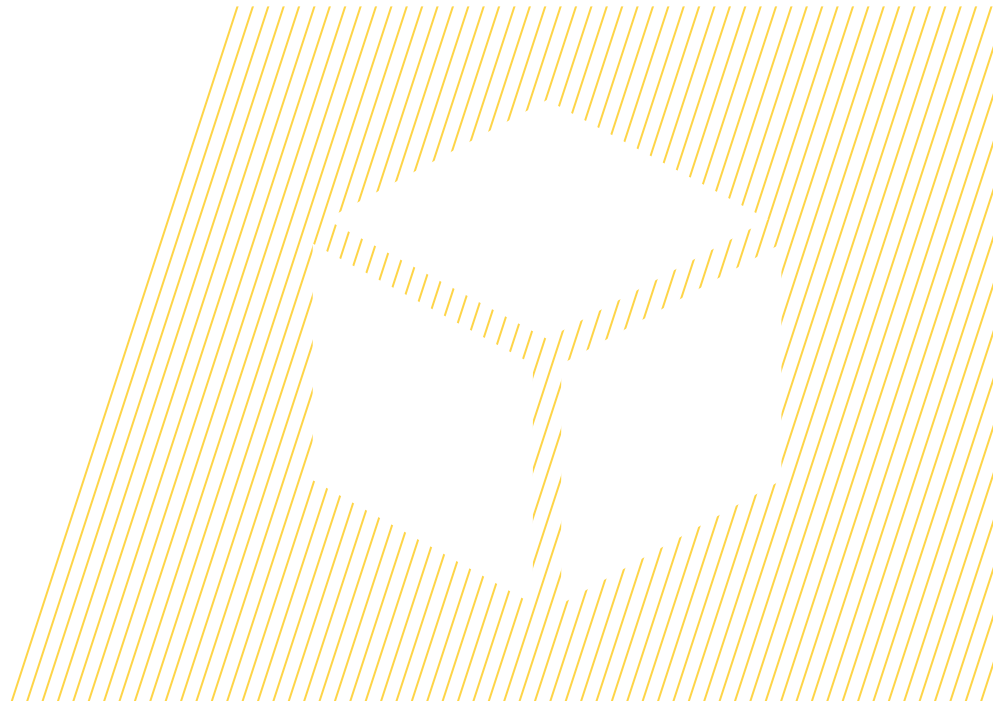
is financing research. Secondly, we should see to it that we avoid unnecessary regulatory burdens by creating one harmonized European set of rules and standards.

What are the sectors in Europe where the AM could have a significant impact?

The two sectors where AM already has practical relevance are health technology and aerospace. AM will thrive the most in sectors where cutting weight and individualization of products play a major role.

Globalisation is blamed for sending thousands of jobs to countries with cheap labour. To what extent could AM help in bringing some of those jobs back to Europe? Or would the impact be rather limited in terms of new jobs created?

I would be cautious with regard to promises of hauling back "thousands of jobs" from third countries through AM. AM can contribute to limiting further offshoring of jobs. It can contribute to a strong role of European industry in advanced manufacturing. But factors other than labour cost will play more decisive roles.



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.@GEMO_HANNOVER was a great success and proved once again to be the leading global tradeshow for the world of manufacturing, thanks to all!

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Last week during @EMO_HANNOVER, CECIMO held a conference on #AdditiveManufacturing, check out the press release [bit.ly/2X0xial](#)



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...@FilipGeerts will be attending on the 27/09 the @TCTEvents as a member of the jury ! Stay tuned for more tweets bit.ly/2xEI33z



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#EMOHannover2017: read our report on how additive manufacturing could contribute to Europe's industrial renaissance



Additive manufacturing, engine of industrial revival
As the European industry struggles to maintain a leading position in the digital era, the sector and legislators call for continuous support to ensure that key technologies

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