

M

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a New Future

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New Opportunities for Manufacturing

Manufacturing manages to take up a central position in politicians' agenda. This is because it used to provide plenty of jobs for people. Hence the need for products to be "Made in..." advocated in many countries. The problem with such rhetoric is that it uses an old version of manufacturing that no longer holds. Manufacturing has changed and hence why it matters for the economy. The new version of manufacturing (sometimes called Industry 4.0) also requires attention from politicians, but for different reasons than for it to provide millions of production line jobs.

There are good reasons for politicians to "love" the new version of manufacturing. The manufacturing sector is using new technological opportunities, especially new digital technologies, to meet future demand, bringing new kinds of manufacturing products to the market, reinventing existing products into new offerings and improving the efficiency of their manufacturing processes. Examples include 3D printing, artificial intelligence, robotics, new materials, smart communication systems and "Big Data" management among others.

The policy discussion on the future of manufacturing requires an understanding of the changing face of manufacturing and its changing role as driver of economic growth. The innovations behind the manufacturing sector's resilience have changed how many, which and where jobs are created. Digitization and robots have powered the automation of production processes. Better transportation and information technology allowed firms to unbundle the different tasks — from design to assembly to sales — making it possible to design and coordinate more complex supply chains which cross country and firm boundaries. Digital technologies, such as 3D printing, allow keeping high-tech production close to the designers and engineers who thought up the product, shortening lead times. Shorter value chains will allow production jobs located close to where the markets are and/or the sources for technological know-how. This may bring back some of the previously offshored jobs. Value creation has shifted from the production and assembly of parts to developing and designing them and after-sales servicing. Manufacturing firms are increasingly turning themselves into sellers of services. Car manufacturers, for example, are reinventing themselves as providers of mobility services rather than producers and sellers of "machines on wheels". Thanks to digital Big Data technologies, manufacturers

can use the amount of data they accumulate on their products to sell related services. This may lead to a growth in jobs within these former manufacturing firms, but in services type of jobs. Apple is still classified into manufacturing, while it owns no factories of its own.

These new opportunities for manufacturing fuel expectations of a hefty potential for the sector to feed economic growth through new high value-added creation. But the realization of this potential requires that (new) manufacturing firms fully exploit the potential offered by new (digital) technologies and that incumbent firms are able to reinvent themselves. These (re)new(ed) manufacturing firms will provide good jobs, but these new production jobs will however no longer be the massive number of jobs associated with old-style assembly line production jobs. But these will be jobs of the future, not the past; they need skill and adaptability.

European Firms' Response to New Opportunities

How well are European manufacturing firms responding to the new opportunities for growth? And even if European firms are taking up the new opportunities, the question remains whether rejuvenation will generate the same number and type of jobs as in the past. This discussion goes beyond a discussion about manufacturing production activities. It cuts across sectoral boundaries and the classic divide between manufacturing and services.

Bruegel Blueprint *Remaking Europe: the new manufacturing as an engine for growth* (available at <http://bruegel.org/2017/09/remaking-europe/>) updating and complementing a previous Bruegel Blueprint: Veugelers, R. (ed) (2013) *Manufacturing Europe's future*, at <http://bruegel.org/2013/10/manufacturing-europes-future/>) illustrates how the European economy is taking advantage of new technological opportunities, and is reshaping into international value chains to revitalize and refocus on high value-added activities. However, this revitalization process is slow and remains concentrated in few firms and few countries. It could take place much faster in Europe and could be spread more broadly across more countries, companies and sectors.

To boost EU manufacturing, greater capacity for creative destruction and reallocation of resources is needed. What matters in this process is reallocation to (i) sectors with scope for high value-added growth and (ii) reallocation within sectors to higher value-

TABLE

Creative destruction characteristic of the corporate R&D landscape comparing the EU, US & Japan

2015	World	EU28	US	JAPAN
R&D to sales ratio	3.6%	2.6%	5.6%	3.25%
Share of IBG sectors in total corporate R&D	36%	31%	52%	15%
R&D to sales ratio in IBG sectors	9.2%	7.95%	10.3%	3.25%
Share of young among R&D leaders	38%	19%	54%	10%
Share of young among R&D leaders in IBG sectors	46%	19%	64%	8%

Notes: Calculations based on R&D expenditures of the 2,500 firms in the Global R&D Scoreboard of largest spenders, 2015. For the EU28 (N=1000) this corresponds to almost all of the BERD (Source: Eurostat/OECD). For the US (N=837) the coverage is 83%, for Japan (N=356) the coverage is 98%.

IBG=Innovation Based Growth Sectors: sectors which (i) have R&D intensity above average, (ii) R&D growth rate above average and/or (iii) above average share of young companies. These sectors are: aerospace, biotech, computer hardware & services, healthcare equipment & services, Internet, pharmaceuticals, semiconductors, software, telecom equipment.

Young: born after 1975.

Leaders: Scoreboard firms belonging to the top decile of R&D spenders in their sector.

Source: Bruegel calculations on the basis of EC-JRC-IPTS Global R&D Scoreboard, 2015

added activities.

Much of the sustainable value-added growth will come from innovation. But when looking at the EU's capacity for innovation-based growth, the evidence shows that the EU's corporate R&D landscape is, like the Japanese, less dynamic compared to the United States. The [Table](#) illustrates this with some key numbers.

The EU has already been struggling for a long time with a corporate R&D deficit relative to the US and Japan, as witnessed by a lower corporate R&D to sales ratio, which is very persistent. This persistent R&D deficit is due to a failure to specialize in those sectors where there is most scope for innovation-based growth. The most prominent Innovation Based Growth (IBG) sectors are the digital sectors and Bio/Pharma. While the US has more than half of its corporate R&D based in these sectors, for the EU this is less than one third and for Japan it is even less. The corporate R&D landscape in the EU is much more focused on medium-tech sectors. For example, about a quarter of the EU's corporate R&D comes from car manufacturers. A failure to specialize in IBG sectors matters, because these sectors offer more scope for innovation-based value creation and growth, as their high R&D to sales ratio illustrates.

Correlated with the failure to specialize in innovation-based growth sectors, and further demonstrating its failing creative destruction

capacity, is the low presence of young firms in the European corporate R&D landscape. In the US, more than half of R&D by top R&D spenders (i.e. the top 10% of spenders in their sector) is accounted for by firms born after 1975. For the EU this is less than 20%. For Japan this is only 10%. These young leaders are particularly pivotal actors in innovation-based growth sectors, particularly in the digital sectors and in the US. The EU (like Japan) has, however, fewer young firms even in innovation-based growth sectors.

The European "New Industrial Policy"

The evidence on the EU struggling with its innovation-based growth and creative destruction capacity highlights the challenge for European policymakers to promote and attract the high value-added activities of the new manufacturing. Such activities are not necessarily production related, but will increasingly have service-like characteristics and do not necessarily require all the activities of the whole value chain to be located in Europe. Does Europe have the right conditions for its economies and firms to create and capture value from new activities?

The potential for growth in manufacturing-related jobs feeds the

inclinations of politicians to support the revival of manufacturing with “a new industrial policy”. But what should this policy look like? What are the recommendations for EU policymaking to speed and spread manufacturing’s revitalization process?

In the “new industrial policy” discussion, the issue should not be whether manufacturing is or should be important for economies, nor how many manufacturing jobs to have or save. A policy target of bringing the share of manufacturing in overall jobs or value added to a pre-determined value (like the 20% target stated in the 2012 EU industrial policy after communication) is completely missing the point. What matters is what type of activities to focus on in the value chain for goods. This focus on high-value activities cuts across sectoral boundaries. High-value activities can be identified within all manufacturing sectors, both low-tech and high-tech, and extend into service activities. We thus need a clear horizontal perspective on Europe’s competitiveness, rather than a sectoral view. The discussion should be about establishing the right conditions for economies and firms to create and capture value from the activities that contribute most strongly and sustainably to Europe’s growth and external competitiveness, wherever their geographical or sectoral home base might be.

A priority should be a policy framework that removes barriers and creates the framework conditions that give firms, wherever their sectoral base is, the incentive to develop innovative strategies to create new higher-value activities. As large, open and interconnected consumer markets remain a major motivator for business, an effective internal market and an innovation-friendly regulation and competition policy will and should remain EU priorities. Completing the single market, particularly the single market for supporting business services (including cross-border transport, digital and energy infrastructure), is perhaps the most important policy objective for reinforcing manufacturing’s role in driving growth.

A further challenge is the structural shift from classic production jobs towards higher value-added types of jobs, and the implications this has for the labor market. Governments will need to facilitate this structural shift. This implies an education policy agenda to ensure that engineers and technical workers are in good supply and to provide more vocational training and retraining programs to refresh the skills of current workers or laid-off workers.

On May 29, 2017, the Council of the European Union called on the European Commission to provide a holistic EU industrial policy

strategy in time for the spring 2018 European Council meeting. The Council of the EU emphasized that this should be based on integrated value chains and inter-clustering linkages, encompassing enterprises of all sizes operating in the manufacturing industry and related services sectors. It highlighted that “*this should embrace, amongst others, human capital, research, development and innovation, digital transformation, tackling efficiently and robustly unfair commercial practices, sustainable and affordable energy sources, resource efficiency, industrial servitisation and better regulation.*”

The direction taken in the latest communication towards a holistic, horizontal EU growth policy seems to be the right one. But to ensure that the EU is walking its talk, the effectiveness of its industrial policy deployment should be closely monitored, with regular empirical analyses and feedback to inform follow-on policy making. This monitoring should include a sectoral perspective, concentrating particularly on how Europe is faring in new emerging sectors that are still fragile. Such sectoral monitoring would allow assessment of how the multitude of policy instruments, from various policy domains and from EU, national or regional levels, interact to affect the efficiency of the sectoral eco-system and would underpin policy realignment when needed. Sectoral monitoring within an effects-based holistic horizontal growth policy can thus substitute for *ex ante* targeting with specific actions and funding for selected “strategic” sectors and technologies. **JS**

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