Eurofound

The future of manufacturing in Europe

Key messages

- The future of manufacturing must be in Europe.
- Europe will benefit more than other trading blocs from full implementation of the Paris Climate Agreement in terms of growth and jobs.
- Increased tariffs will lead to more jobs lost in Europe than in other parts of the world.
- Taking the lead in the commercial adoption of emerging technologies will give Europe a decisive competitive advantage over other trading blocs and will create more jobs.
- Europe will create more jobs from actively engaging in international production networks. Reshoring is not likely to lead to many more jobs.
- The future of manufacturing is expected to lead to better jobs, requiring new and higher skills.

Introduction

The Future of Manufacturing in Europe (FOME) is a pilot project proposed by the European Parliament and delegated to the European Foundation for the Improvement of Living and Working Conditions (Eurofound) by the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. It is an explorative and future-oriented study, as reflected in the exploration of the future adoption of some key game-changing technologies and how this adoption can be promoted across the EU, even regionally. The implications for working life focuses primarily on tasks and skills, not only at the white-collar, tertiary-education level, but also for blue-collar occupations, including a focus on challenges facing national and company apprenticeship systems. The future orientation also includes quantitative estimates of the employment implications of the Paris Climate Agreement, of large increases in global tariffs and of radical automation.

Several studies emphasise the crucial global context for the future of manufacturing in Europe. The European Reshoring Monitor measures the return of previously offshored jobs to Europe. Other research examines how the deepening globalisation of recent decades has led to new opportunities for small companies to engage in international supply chains. This final report summarises the 10 project reports, which are complemented by 47 case studies, 27 policy instruments and 4 associated publications.

Policy context

The key industrial policy context lies in the nexus between emerging digital technologies and the challenges of new forms of international competition, not least from China. This is prominent in the gathering momentum for a more active European industrial policy as expressed, in February 2019, by both the German National Industrial Strategy 2030 and the Franco-German Manifesto for a European industrial policy fit for the 21st Century. The publicly funded promotion of European industrial champions inherent in such approaches must, of course, be tempered with due regard for the efficiency and innovation-enhancing benefits of fair and open competition. The large single market is a key asset for Europe and the basic rationale of European competition policy is to ensure the benefits of fair competition.

The policy perspective extends to other key European policy priorities, such as the Digital Agenda, climate change and trade policies. From an employment perspective, the most immediate policy context is the Skills Agenda for Europe. Action to promote the acquisition of relevant skills in Europe is key, both to foster a faster diffusion of digital technologies in the workplace and to ensure that the benefits of these new technologies are widely distributed.

Key findings

- Macroeconomic modelling of the implementation of the Paris Climate Agreement estimates that GDP in the EU will increase by 1.1% and employment by 0.5% up to 2030. Manufacturing employment is projected to increase by 0.7%. While this scenario implies more jobs, mainly in areas such as construction, many of them are at the bottom and the middle of the wage and skills distribution.
- Macroeconomic estimates indicate that a further increase in global tariffs will have a more severe impact for jobs in the EU than in other parts of the world. They lead to a 0.3% fall in employment in the EU by 2030. Of all sectors, manufacturing sees the largest percentage decline, of 1.1%.
- Currently, the commercial application of the technologies studied is limited and mainly in highly productive firms. However, they can have a game-changing impact. The commonality of data processing suggests both an application in many sectors and, at some critical juncture, an acceleration of synergetic diffusion all along the supply chain of manufacturing production.
- The diffusion of advanced technologies may accentuate regional disparities within Member States, due to economies of scale and the high investment costs in advanced manufacturing, together with the need for a highly skilled workforce.
- Europeans are concerned about the negative impact of these technologies and there are numerous estimates of huge potential job losses. However, these predictions take little account of the economic rationale of the substitution of workers by machines or of the macroeconomic feasibility of the scale of capital investment implied by the estimates of job loss.
- Historical evidence shows that employment growth goes together with technological progress. There are job creation effects when technology increases productivity. The more the productivity gains go to consumers and workers, the more positive are these effects.
- It is striking how perceptions of recent technological change are occurring when productivity growth in manufacturing is at an historical low. It may be that the productivity gains lie in the future as the technologies become more widespread.
- However, the productivity growth during the first ICT boom (associated with the rise of the big US tech companies) was small and short-lived. It is not improbable that a more widespread adoption of the new technologies will eventually boost manufacturing productivity but with a similar growth pattern – as in the first ICT boom.
- Nevertheless, the realities of international competition make the adoption of productivity-enhancing technologies in manufacturing an absolute imperative.
- Few jobs have been reshored back to Europe since 2014. However, very highly productive manufacturing may open up new options to reshore. Any significant job creation would, however, be in other more employment-intensive stages of the supply chain, such as R&D and marketing.

- A deeper globalisation, through the expansion of the market effectively available to companies, allows new opportunities for small companies to engage in global supply chains in niche markets. These are very active informal networkers and the building of trusting relationships with their partners is crucial for them.
- Since 2011, manufacturing employment growth has been in well-paid jobs requiring tertiary education. This trend will continue. The need for better literacy, information processing and problem-solving, even in blue-collar jobs, is driven not only by digitalisation but also by more quality control and standards. Despite a projected decline in physical tasks, dexterity will still be important, notably when operating machinery.
- New and higher skills are the most relevant labour market implication of advanced manufacturing. Newer skillsets, notably those of industrial data scientists, and data security analysts, will be in high demand. The most sought-after profile will be a combination of engineering and IT skills. Other often-mentioned skills include: creativity, communication, leadership and problem-solving.
- The focus on high-end skills tends to mask the challenges facing blue-collar occupations which will also change as traditional production is merged with ICT.
- Further automation will remove many arduous and potentially dangerous physical tasks. There are, however, several health and safety issues related to specific technologies. Moreover, the availability of data on individual employees can lead to unacceptable degrees of monitoring and control, both in terms of personal integrity and surveillance at the workplace.

Policy pointers

- Given the encompassing nature of digital technologies, their adoption can involve significant coordination issues. The systemic approach is best exemplified by the German Industrie 4.0 initiative. None of the other initiatives identified has the scope of the German model.
- A fundamental role for policy is to provide some certainty towards which companies can orient their investment strategy, such as industrial standards, future policy declarations and targets. Strategic public investment is generating much current policy discussion – where the importance of an initial leading position in strategic technologies is viewed in the context of global competition, especially from China.
- The three common features of strong regional industrial policy capacity to develop regions in Europe in light of the challenges of advanced manufacturing are: the existence of multilevel governance cooperation procedures and instruments, the widespread use of participatory methods in the agenda-setting process, and the development of strong policy implementation and executive agencies.
- The energy scenario is driven by policy measures aimed at reducing carbon emissions to a level compatible with the Paris Climate Agreement. These include carbon emission pricing, programmes to improve the efficiency of energy consumption, an aviation fuel mandate and various measures targeting the power generation and road transport sectors.
- There is little evidence of either a significant number of jobs being reshored to Europe or successful specific reshoring polices that include, for example, economic incentives. Reshoring can be best facilitated by improving the industrial infrastructure and hence is practically indistinguishable from other forms of industrial policy. However, as there is some future potential to reshore advanced manufacturing, the relevant jurisdictions could usefully engage in information campaigns and administrative facilitation of reshoring processes.
- When SMEs engage in global supply chains shortly after start-up, they need specialised assistance with legal and administrative issues in the foreign country. Their main policy needs are, however, the same as those entrepreneurial start-ups in general.
- The protectionism, climate change policy and radical automation scenarios all assumed no labour market frictions, for example as regards, skills and geographical mismatch. Any projected job creation will be diminished or delayed according to the extent of these frictions.
- The need for new and higher skills poses challenges for education policy at all levels. While some of the new skills are specific to the production process, the spread to and interaction with other stages of the manufacturing supply chain, not least in the context of increased servitisation, implies similar skill needs even in other economic sectors.
- New and higher skills, also for blue-collar workers, present a challenge to apprenticeship systems. The revision of existing occupational profiles, to incorporate compulsory basic ICT skills and optional specialisations, is preferable to the creation of new occupational profiles.
- Higher skills require more vocational training with tertiary education institutions. In contrast to the best designed initial apprenticeship systems, the lack of national frameworks and quality control is an issue, as is progression from initial apprenticeships to tertiary education.
- A crucial question is whether the productivity gains of new technologies lead to higher profits for companies, lower prices for consumers or higher wages for workers. If there are in fact highly significant productivity gains in the future, this will be the fundamental distribution policy issue.
- Previous experience of large-scale structural change shows that this change should be anticipated and managed. This is the most critical matter for social dialogue in the context of the future of manufacturing. It requires well-functioning social dialogue at company level as regards information and consultation and the active and responsible involvement of social partners in the strategic orientation of industrial policy.

Eurofound's pilot project **The Future of Manufacturing in Europe** is an explorative and future-oriented study. It explores the future adoption of some key game-changing technologies and how this adoption can be promoted, even regionally. The analysis of the implications for working life focuses primarily on tasks and skills, not only at the white-collar, tertiary-education level, but also for blue-collar occupations, including a focus on the challenges facing national and company apprenticeship systems. The future orientation also includes quantitative estimates of the employment implications of the Paris Climate Agreement, of large increases in global tariffs and of radical automation. It also measures the return of previously offshored jobs to Europe. Other research examines how the deepening globalisation of recent decades has provided enhanced opportunities for small companies to engage in international supply chains. This final report summarises the 10 project reports, which are complemented by 47 case studies, 27 policy instruments and 4 associated publications.

This is a publication from the Future of Manufacturing in Europe (FOME) project, a pilot project proposed by the European Parliament and delegated to Eurofound by the European Commission (DG GROW).

More information on the FOME project, including available and forthcoming publications and events and relevant data, can be found on the FOME page of the Eurofound website at: **http://eurofound.link/fome**

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Further information

The report *The future of manufacturing in Europe* is available at https://eurofound.link/fomeef18002

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