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From: Presidency

To: Permanent Representatives Committee/Council

Subject: *Preparation of the Council ("Competitiveness") of 27-28 September 2018*
Rethinking European industry: Artificial intelligence and robotics
- *Presentation by the Commission and the Presidency*
- *Policy debate*

Presidency note on "Reinforcing European Industrial Policy"

Delegations will find attached a Presidency note on the subject mentioned above.

As a follow up of the fruitful discussions at the Informal Meeting of Competitiveness Ministers (Internal Market and Industry) in Vienna on 15-16 July 2018, Austria wants to contribute to a reinforced industrial strategy for the EU and attribute to the Presidency goal of “Securing prosperity and competitiveness through digitalization”.

During the Informal Meeting of Competitiveness Ministers, we tried to find a common understanding around the challenges and opportunities that Artificial Intelligence brings to European industries.

The intention of this paper is to present an input helping to find the appropriate policy response taking into account the Commission proposals on Artificial Intelligence, the data package and the next financing framework.

Introduction

European industry is a world leader in many areas, especially in high value added, low carbon and sophisticated products and services. It is responsible for over half of Europe's exports, around 65% of investments in research and development and provides more than 52 million jobs (direct¹ and indirect). In the manufacturing industry, in 2017 the number of jobs increased by 1.7%² compared to 2016 to a total of 32.5 million.

However, the increasing speed of transformation in areas like digitalization, robotics and artificial intelligence – to name just a few – are transforming the nature of employment and growth. In order to design evidence based policy measures, we need to establish a **viable monitoring tool** for assessing the EU’s industrial competitiveness as well as the implementation of industrial policy. The work of the High-Level Group on Competitiveness and Growth (HLG CompCro) on a general indicator framework³ serves as a solid basis in this respect.

1 Manufacturing industry 32.5 million

2 Eurostat - monitoring framework for industrial competitiveness (11244/18)

3 Doc. 11244/18

Major efforts are needed to adjust to the challenges and reap the vast opportunities. Industrial policy has had a negative and often old-fashioned image. We therefore need a level-playing field, raising the profile of industrial policy. **The attractiveness of the EU as business location will not be driven by cheap wages, but rather by its innovative capacity, investments in R&D&I as well as the functioning of its labour markets, its job creation potential and availability of skilled labour.** A globally competitive strategy is the key for economic, political and cultural competition. It is time for a future-oriented reindustrialisation of Europe.

1. Strengthening the innovation capacity of EU Industry

Making industry stronger in Europe is closely linked to our ability to bring to the market innovative products, services and technologies, in an era of intensifying global competition for innovative solutions. Europe needs to overcome the “Valley of Death”⁴ regarding its innovative strength. The capacity to innovate is fundamental to Europe’s ability to attract and retain high-quality, high-productivity jobs, and take forward the digital transformation that is needed across all sectors to ensure we are able to compete successfully in the global economy. In this respect, Key Enabling Technologies (KETs), including production technologies, digital technologies (e.g. AI) and cyber technologies, provide the basis for innovation in a range of products across all industrial sectors. KETs and industrial power serve as the new geopolitical “currency” as they are system-relevant for global competitive strength and are nowadays linked to economic autonomy, societal sovereignty and security. The work of the High-Level Strategy Group on Industrial Technologies on a new industrial policy and the KETs of the future provides proposals crucial to maximize the industrial deployment of KETs, leadership in strategic technologies of the future and societal impact.

4 EU witnesses major difficulties in translating its knowledge base into marketable goods and services. Lack of KETs-related manufacturing will dismiss opportunities for jobs and growth in the short term and might cause a loss of knowledge generation as R&D is closely linked to manufacturing.

Moreover, investments are a key recipe for innovation. Gross domestic expenditure on R&D as a percentage of GDP ('R&D intensity') in the EU stays at 2.03%. The resulting gap between the current performance and the 3 % target envisaged in the Europe 2020 target would require an additional €150 billion per year. Moreover, R&D intensity remains much lower in the EU than in Japan (3.3%) and the USA (2.8%), also reflected in the low number of EU patent applications. In order to scale up investments from businesses (around 2/3 of total R&D spending), we need the right framework conditions for research, development and innovation.

In this respect, the next multi-annual financial framework (MFF) will need to reflect the new context and speed-up the important transformations with a focus on future-oriented European competitiveness.

Box. 1 - What is needed?

- Increase growth-enhancing public and private investment, including R&D as well as digital infrastructure. Key role of the next MFF (Horizon Europe, Digital Europe, InvestEU, etc.) with a budget structure oriented towards Europe's future competitiveness. This includes the set-up of the European Innovation Council.⁵
- Support PPP-Public Private Partnerships as successful models for enforced funding for strategic topics.
- Strengthen collaborative research and innovation projects to facilitate the process of bringing ideas to the market.

⁵ European Council's conclusions of 28 June 2018: "The European Council invites the Commission to launch a new pilot initiative on breakthrough innovation within the remaining period of Horizon 2020. A European Innovation Council will be set up under the next Multiannual Financial Framework to identify and scale up breakthrough and disruptive innovation".

- Support the development of new IPCEIs (Important Projects of Common European Interest) to develop strategic value chains.
- Review framework conditions in Europe such as State Aide Rules, in order to set a globally comparable level playing field.
- Implement a mission-oriented policy approach (e.g. by defining grand European Challenges for industrial Leadership), taking advantage of KETs, thus fostering knowledge-based competitiveness with tangible results acceptable to a wider public.

2. Capturing the potential of digitalisation and AI

According to a recent study, the industrial sectors will see more disruption within the next five years than in the past 2 decades. This development will be driven among others by massive advances in data generation, computing power, and connectivity (including 5G at the heart of the Internet of Things (IoT), and interoperable data and standards). The number of connected devices continues to grow exponentially – from USD 18 billion in 2016 to USD 75 billion in 2025.⁶ The economic impact of the automation of knowledge work, robots and self-driving vehicles could reach between EUR 6.5 and EUR 12 trillion annually by 2025. Europe has strong assets in Artificial Intelligence (AI) and the potential to boost its competitiveness with a rapid adoption of these technologies. However, other regions of the world are investing massively. Overall, Europe is behind in private investments in AI, which totaled around EUR 2.4-3.2 billion in 2016, compared with EUR 6.5-9.7 billion in Asia and EUR 12.1-18.6 billion in North America.⁷

⁶ McKinsey&Company: Disruptive forces in the industrial sectors - global executive survey, March 2018

⁷ COM (2018) 237 final

In this context, the European Commission proposed an AI strategy⁸ in order to capture the full potential of digitalization on the basis of the three pillars: i) boosting the EU's technological and industrial capacity and AI uptake across the economy, ii) preparing for socioeconomic changes and iii) ensuring an appropriate ethical and legal framework. The Communication was also accompanied by a Commission Staff Working Document on liability.⁹ In parallel, the Commission proposed legislation to open up more public sector data for re-use, and other measures to make data sharing easier.¹⁰ In addition, we might need to find a way that US internet companies with market-shares over 30% provide their data for machine learning purposes to European companies.

The EU needs to join forces and work together towards a coordinated plan on AI in order to maximize the impact of investments at EU and national levels, encourage synergies and cooperation across the EU, including on ethics, exchange best practices, and collectively define the way forward to ensure that the EU as a whole can compete globally. In this regard, it requires a well-designed institutional framework, a clear governance structure and a common understanding, what has to be achieved on European level and on national level.

Completing the Digital Single Market (DSM) remains a prerequisite for a true digitalization of the EU Industry. But without data, the EU will not make the most of game changing technologies (e.g. Artificial Intelligence, high-performance computing). Hence, it will be crucial to provide access to (public) data in order to facilitate innovation in new technologies, particularly for SMEs and startups (e.g. swift adoption of the re-cast of the PSI Directive).

It will be vital to create a vibrant ecosystem that supports the digital (AI) transformation of our economy. In this respect, the creation of a network of Digital Innovation Hubs (DIH) will help SMEs, start-ups, mid-caps and the public sector to embrace digital solutions and enhance competitiveness.

8 European Commission, Communication on Artificial Intelligence for Europe (25.4.2018). <https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe>

9 Doc. 8507/18 ADD 1, SWD(2018) 137 final

10 <https://ec.europa.eu/digital-single-market/en/news/communication-towards-common-european-data-space>

Box 2. What is needed?

- Common European data space and data policy, as Artificial Intelligence depends on the availability of Big Data and real-time data.
- Ensure that international dominant data companies operating in the EU open their databases for anonymous machine learning purposes (tracked and secured by a public institution).
- Shift in Public Sector services towards digital and AI.
- Establish Digital Innovation Hubs focussing on AI to facilitate technology transfer as well as testing experimentation.
- Educate SMEs and corporates on AI: What is AI and how can companies reap the benefits?
- Building ecosystems and networks: clusters of Stakeholder (e.g. AI-scientists and research facilities, AI companies and start-ups, public and private AI-Investors, Suppliers in the AI-industry, SMEs, etc.)
- Research and Development tasks need to be identified and EU-wide goals need to be backed by sufficient resources (e.g. PPP models)
- Increase funding massively and implementation of necessary infrastructure, e.g. accessible connectivity, widely installed broadband and the adoption of EU-wide security standards
- Develop core principles to recognise access to fast and secure internet as a key enabler for democratic participation, the rule of law, societal inclusion and equality.
- Right ethical and regulatory framework conditions for digitalization and AI (e.g. competition law, liability issues, security issues, etc.) to foster investment security and trust for society at large. Cooperation on these issues with third countries also regarding international standards for ensuring global market access and fast uptake of digital technologies, including AI.
- Regulatory cooperation with third countries also regarding international standards for ensuring global market access and fast uptake of digital technologies, incl. AI.

3. What skills will be needed in order to embrace the digital transformation

Addressing future potential skills challenges is a priority goal for the EU and the Member States. As recent waves of transformations have shown, some jobs will become obsolete while others will be created. The demand for appropriately skilled people with multidisciplinary and digital competences is increasing.

To follow the path of digital transformation successfully, industry needs more engineers as well as innovators, in particular in fields like robotics, cyber security, software and hardware integration and Big Data. Our common goal must be a better coordination between industry, start-ups, research and educational institutions in order to better match the skills required on the labour market and the education, learning and training provided at school, in training institutes and in higher education.

To become fit for the digital transformation, vocational education and training (VET) is a key area following two strands: First, new occupational profiles must be implemented, reflecting the digital transformation. For example, online retailing is still increasing, therefore the need of high-qualified e-commerce-traders, online marketing experts or app-programmer are increasing. Second, existing occupational profiles need to be adapted along new technological trends. Both aspects will need to be reflected in a future oriented digital skills program at all educational levels.

A common European approach is based on exchange of best-practice experience and investments in the development of digital skills throughout Europe. In this respect, Austria has developed a best-practice example, establishing a well-functioning dual vocational and education training system (dual VET) with its core principle: “Learning in practice for practice”. The approach follows three cornerstones:

- Company-based training takes place at the most advanced level of economic and technological development.
- Entrepreneurial skills are acquired through direct experience in the implementation of process- and/or product-related innovations.

- Training follows current economic developments and impacts essential (soft) skills that are needed in professional life.

As far as higher education is concerned, general knowledge of STEM (science, technology, engineering, and mathematics) and ICT will be crucial. To meet the demand of skilled workers in the European industries and bridge the digital gender divide, this is all the more necessary with regard to female participation in STEM education and employment.

The lack of skilled labour cannot be solved with only 50% of the population. The underrepresentation of women in entrepreneurship, economic leadership and the digital economy is detrimental to the economic development of Europe. The latest study on Women in the Digital Age shows that more women in digital jobs could create an annual €16 billion GDP boost in the EU and improve the start-up environment. As of today, only 17% of the 8 million digital technology experts in the EU are women and there is a severe shortage of skilled ICT professionals. 40 % of enterprises recruiting ICT specialists report difficulties in getting qualified people. That paradox results in a loss of value for Europe on all fronts: economic, societal and human capital. The reasons for the limited participation of women and girls in the digital economy are lack of skills and their lower interest in STEM studies and ICT professions, but also skewed perceptions, stereotypes and lack of role models for them to draw inspiration from. Although society and policy makers are more and more aware of the Digital gender gap, it is though still peripheral place in the digital policy arena.

Finally, targeted measures supported by the Digital Economy and Society Index (DESI) should contribute to the safe handling of digital and mobile channels throughout all aspects of life and work, particularly with the elderly, young people and women. The aim is to foster internet comprehension and utilization in a broader manner than just focusing on social media (e.g. Austria's Fit4Internet Initiative)

Box 3. What is needed?

- Strong presence of technical and practical skills in educational programs/curricula. Digitalization is an instrument as well as a future-oriented learning tool for modern VET but also part of new occupational profiles and professions.
- New Skills Agenda as a step in the right direction and as a good initiative contributing to better transparency.
- Lifelong Learning as an instrument to make sure that digitalization reaches out to the citizens, to enable them to reap the chances and potential of digitalization, and to cope in a competent manner with the dangers from early childhood on.
- Increased awareness of the gender gap in the European digital sector with even more notable initiatives, at both local and national levels. “Women in Digital Initiative” should also be addressed at various levels in order to match the multi-faceted character of this challenge.

4. Questions for debate

1. Which of the above mentioned action items would you see as most pressing?
 2. Are there any additional measures you would consider as top priority for the future industrial strategy?
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