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Key issues paper for discussion

on new approaches to digitalization and artificial intelligence

Digitalisation of the society and progress in the Digital Single Market have become core elements of the European economy in recent years. European competitiveness is increasingly based on concepts such as digital platforms, automation, artificial intelligence and big data.

In this key issues paper, we have identified European level challenges and actions to be debated within the next few months, but also looked beyond existing strategies and initiatives to enable a strategic view on future actions for new digital Europe in the next decade. A number of the issues raised here have also been recognized by other Member States in recent discussions. We hope that these perspectives can contribute to further elaboration of the key issues related to digitalization and artificial intelligence.

Whilst a lot has already been achieved on e.g. the Digital Single Market strategy, the EU needs a renewed vision, strategy and a roadmap as well as an action plan, beyond 2020, for identifying societal implications and capitalizing on business opportunities that the 360-degree digital disruption brings us. We need concrete and scalable actions and investments as well as an enabling framework for European businesses to succeed in digital transformation. We hope that this issue paper will be useful for development of the vision and strategy for 2020’s.

The overall objective of EU level actions should be to facilitate value creation in Europe as well as to ensure that societal challenges arising from the arrival of digital economy are managed for the benefit of citizens. The strategy should build on the potential of existing European strengths and simultaneously enable and encourage new ecosystems and disruptive business models to take off. What Europe needs to focus its activities on, could be captured for example in the following picture.
Ensuring competitiveness in digital economy

Digital platforms are expected to capture 30 to 40 per cent of the value created in industrial value chains. Europe has a lot of unlocked potential to transform and digitalize various business sectors by using the rapidly growing public and private data resources. Currently, global companies other than European, heavily dominate digital platform business.

In order to have more European platform-based business ecosystems led by European companies and expertise, we need to respond faster in Europe to the speed of change and transformation brought by digital platforms.

- We need to develop new collaboration methods, scalable pilots and faster commercialization models through impact-focused mission-oriented PPPs that help European platforms and ecosystems to grow.

- We need to invest in knowledge, innovation and sharpening our skills in order to successfully grasp the possibilities and take the lead in this crucial change. Agility to adopt new technologies and to learn that renewal is the key for success in the era of accelerated pace of emerging technology and business disruptions.
• We need to ensure that Digital Single Market is completed quickly and functions seamlessly. Strong single market creates the market pull that companies need in order to grow and invest in Europe.

• It should however be equally seamless for European companies to operate on digital markets outside Europe. Therefore, we need active European participation in fora that shape the operating environment of platform economy on a global level.

• We need to facilitate digital transformation that is based on better availability and utilization of data in industrial value chains and across sectors. Data-driven business requires improved/better access to data and data interoperability.

**Role of artificial intelligence**

**As one of the most potential change agents today, artificial intelligence** provides enormous possibilities for enhancing productivity by automation, for speeding up decision-making and for solving problems that require advanced computational capabilities. While artificial intelligence creates opportunities in all business areas, it also raises concerns, particularly for safety and jobs. Europe is in a particular position to find adequate globally relevant responses to these concerns. Early attention to ethical issues is necessary, as this is a key to improving the acceptability of artificial intelligence in the society. At the same time, it is important to note that artificial intelligence also contains extensive potential for inclusive growth.

We need EU level strategic autonomy and a strong competence base on AI-technologies as well as an environment that best supports smart use of AI in our industries and public sector solutions. Leadership in innovative use of big data analysis, cognitive algorithms and digital platforms will offer possibilities for new business creation and productivity improvements in both the private and the public sector.

Artificial intelligence is an enabler and accelerator for value creation. However, it will have no real added value without data pools, platform business models and tools as well as clear rules on data governance. The General Data Protection Regulation is an example of European enabling approach to personal data protection and governance. Practices and rules on utilization of non-personal data are under development. We need to speed up this process.

From societal point of view, several concerns have been raised related to AI and digitalization of business and society. One of the key concerns relates to jobs. While it is evident that adoption of AI solutions affects many jobs, it is also shown that only a relatively small share of work tasks will be completely automated. This shows the importance of digital skills and reskilling of employees. Finding solutions to legislation regarding e.g. taxation and liability will build a solid ground for the deployment of AI from ethical and safety point of views and reduce the legal uncertainty slowing down the uptake of AI technologies. It is important to proceed with piloting and experimenting AI in different industrial sectors. Risk management approaches should be developed in close cooperation between the public and the private sector. These pilots should address human-machine interaction and skills development, which could help in identifying the needed future skills sets. Governments do have a strong mandate to take the lead in this approach.
Significant scientific breakthroughs and societal impacts are achievable only if the EU funds high-risk, high-gain research, and allows and accepts the possibility of failure in them. To cope with highly complex and multidimensional grand societal challenges such as artificial intelligence, it is fundamentally important to ensure a strong knowledge base and develop long-term solutions. It is also vital to recognize that societal impact comes in many forms, in many different channels and timeframes. Social sciences and humanities should be integrated into the development of artificial intelligence.

**A practical approach to speeding up the adoption of AI and developing a favorable environment for AI adoption could include:**

1. Enhancement of business competitiveness through the use of AI
2. Effective utilization of data in all sectors with the help of AI
3. Ensure AI can be adopted more quickly and easily
4. Ensure top-level AI expertise and attract top experts
5. Make bold decisions and investments in AI-based solutions
6. Build the world’s best public services with the help of AI
7. Establish new models for collaboration for tapping into AI value creation possibilities
8. Incentivize data utilization [especially] for building cross-sector value chains for AI adoption and solutions, f. ex. in education and skills, health care, energy, transport

**Building blocks for a well-functioning digital economy**

A strategic approach to artificial intelligence does not mean a focus on pre-selected AI technologies but requires Europe to be sensitive to many other existing and emerging enabling technologies¹, and to ensure that they are underpinned by a strategic approach to business models.

We need a critical mass of open innovation driven, data-intensive and strategically led European platforms and ecosystems. These platforms can be based on existing initiatives at EU and MS level or be emerging new ones. Several EU-initiatives deal with digital platforms and ecosystems. The Commission should make sure that there is coherence between different platform-based initiatives and policies.

While, the US and China have a clear dominance especially in digital platforms serving consumers, Europe has competencies in several industrial sectors and can take a leading position in the growing area of B-to-B platform business by moving fast. The key is to maintain a strong research base and to enable agile piloting of AI and other technologies in a range of and across application areas; e.g. manufacturing, transport, health and well-being, energy, space, finance, circular and - bio economy as well as agriculture. We need to strengthen the role of European actors in shared data infrastructures, cloud environments, and mobility, essential for all platform business.

**Ecosystems** are the core of creating innovations and value in the platform economy. We need to create globally competitive conditions for scaling up the most innovative start-ups and SMEs and rooting them in Europe. Besides supporting individual innovative enterprises, we need to focus on speeding up digital innovation and business ecosystems across different sectors. Thus, increasing investments and reformulating our policies for ecosystem research and innovation co-operation is a
clear prerequisite. The following building blocks need to be in focus e.g. when planning for future research and innovation policy and funding activities at EU level:

1. **Completing the Digital Single Market and ensuring favorable framework conditions for data economy**

   In addition to funding and policy actions on ecosystems and platforms, improving the quality, access, portability and interoperability of growing data resources is needed. Data producer and user rights for wider sharing and usage of data need to be enhanced and balanced to build data economy and to enable digital transformation.

   - The European network infrastructure needs to be strengthened in order to meet the growing demands of transmission and processing of big data and latency critical applications. New solutions like autonomous driving, smart grids, etc. set new capacity requirements for data networks. Data connections such as the North Eastern cable connecting Europe and East Asia can improve the competitiveness of Europe in data and platform economy.

   - Ensuring free flow of data is essential for data-driven economy. Regulation should be used to achieve this only in well-justified cases with priorities in fostering access to data and open interfaces, sharing data and securing interoperability of data for data businesses and digital transformation to take place. Overarching data principles need to be put in place to secure data-driven development within and across sectors. The focus should be in promoting efficient and innovative use of data to open avenues for competitive new markets based on data availability.

   - There is no need for new exclusive rights to data but a need to concentrate on creating clear data usage rights that promote sharing of data. We need a clear right to re-use of data with fair, reasonable and non-discriminatory terms in data ecosystems. Data access needs to be seen in degrees varying from open access to limited access with well-justified legal or commercial restrictions. Forming well-established degrees to rights to use data improves possibilities for innovative use of data that would in turn encourage also companies to invest in data. Furthermore, industries need to be encouraged to speed up the development of already emerging shared data revenue models.

   - There is an urgent need to start discussions on principles that guide and enable data re-use and sharing. These principles should include data usage rights, open interfaces and interoperability through APIs, MyData principle (right to one’s own data/human-centric management of data) and data protection by default.

   - European High Performance Computing and cloud capabilities for all-scientific, innovation and industrial-use should be ensured and leveraged to global level. The solutions should be developed in the most efficient pan-European way, by facilitating investments, and matching the needs and growth of European platforms and ecosystems.

   - The European Commission should continue to support open science. The EU has a central role in creating and supporting optimal procedures for making
data available, storing and managing data and ensuring the usability of data. The use of standardized metadata, leading to easy access and interoperability, quality-controlled open access data and long-term maintenance of high-quality repositories, guarantees full use and impact of open access data.

- Policy measures promoting ecosystem creation and data usage can be particularly efficient in domains where the public sector has a strong role, such as health, transport, education etc. Governments have an important role i.a. in public procurement of innovative solutions, in ensuring interoperability and opening public sector data resources. Legislative measures may speed up data usage e.g. in transport and in secondary use of health data. The number of experts should be raised by programs boosting talents and skilled labor-force; and furthermore focusing on aspects, which make European working environment more attractive than competitive labor markets throughout the world.

- Intellectual Property Rights legislation should be fit for data economy. As an example, text and data mining exception to Copyright Directive should be extended from use by research organizations also to offer possibilities for AI startups and small companies that are currently at a disadvantageous position vis-a-vis global companies.

- As market structures are constantly developing, regulation adopted today may not fit for the purposes in the near future and may become a barrier to the development of new business models. Therefore, care should be taken before introducing new regulation. Instead, the attention should be on keeping the existing regulation up to date as well as ensuring effective enforcement and monitoring.

- However, if the Commission finds it necessary to introduce new legislation (as for example regards the relationship between online platforms and businesses), it should be targeted to issues that are not already covered by horizontal legislation such as EU competition rules, EU consumer legislation or legislation of unfair business practices.

- Citizens and users need to be able to trust that the digital environment is safe, therefore high standards of product safety is a prerequisite for AI-driven products to enter markets. However, the regulation needs to be structured in a way that does not prevent the development of innovations and new technologies.

### 2. Strong framework for ecosystems built on partnerships

Ensuring sufficient level of funding to innovation ecosystems and related innovation instruments and initiatives that speed up the path from research to commercialization in different sectors. Emergence of ecosystems with strong focus on customer value requires platform economy thinking and effective interplay of big corporations, SMEs, start-ups and researchers. Cross-fertilizing large companies’ resources with small companies’ agility and speed in creating new business models could lead to significant joint ventures that both renew industry and provide scale-up opportunities to SMEs. On the other hand, mobility of individuals between different type of ecosystem players should be strongly encouraged and supported.
Ensuring that the **industry can and is motivated to take the leadership and ownership of the ecosystems is important**. While the public sector cannot and should not force ecosystem formation, it can motivate industries to ecosystem creation and support them in the process. This requires smart regulation, industry-driven innovation funding and advanced internal markets for platform-based solutions. Megatrends and sustainable development goals open new global market opportunities for platform innovation in strong areas of European industry. Public procurement should be focused on new innovative solutions, and new, stronger co-operation models for that are necessary at EU level. Mission-driven research and innovation initiatives that are under discussion at EU level could provide a good frame for growing the ecosystems.

- Mobility as a Service and autonomous transport are examples of areas where launching large scale ecosystem initiatives requires a strong system integrator at European level supported with simultaneous broad-based innovation funding and policy measures.

**Various partnership instruments** are needed for improving the European added value in research and innovation co-operation. Especially important is the before mentioned role of **system integrators** when different ecosystem building activities take place at the same time. **Contractual public-private-partnerships (cPPPs)** are well suited for areas 1) where there is a critical mass of innovation and industrial activities in Europe, 2) where business ecosystems can grow by using digital opportunities and sharing digital platforms, 3) where common discussion on objectives as regards to European competitive assets, contribution to big challenges and missions is necessary and 4) standardization plays an important role. Also, **Joint Technology Initiatives** continue to be important vehicles for future platform creation provided that SMEs and wider ecosystem viewpoint are duly taken into account, in a previously described manner (big company-SME-Research ecosystemic co-operation).

- Supporting development of **contract - and trust-based data sharing** and other data-driven co-operation mechanisms between companies and ecosystems. Enabling models where access to data is cascaded by letting the core critical mass of partners create a business model before opening application interfaces and the community to wider ecosystem. This will allow the ecosystem to organically develop the market and engagement for its partly proprietary solutions. Creating common data spaces, openly sharing algorithms as well as joint development of innovations that algorithms enable, should be encouraged in an industry-driven manner.

- Examples: Support to innovation ecosystems that are by their nature networks and require collaboration in data sharing: development of distributed ledger solutions (blockchain solutions) for identity management in data sharing, mobility as a service networks or Real Time Economy data models as well as interoperability standards. Distributed ledger infrastructure pilots could support MyData solutions (smart insurance, media preference re-use, competence prove etc) like TrustNet.

- Data sharing between private players could be promoted by defining more extensively the notion of data of public and general interest and
mandate data sharing, e.g. in exchange for a fair compensation, and by developing a trusted third party (-ies) for voluntary data sharing between private players.

- Supporting **open business environment** that enables interoperability and possibility to change services without "data locks" (also opt-out). Also usability of data, application programming interfaces (APIs) and open formats.
  - Examples: GDPR portability requirements to be implemented fully and applied also to non-personal data. PSD2 requirements of open API's adopted in other sectors. Real Time Economy data models and standards (XBRL).

3. **More testbeds and piloting environments**

- Testbeds and piloting environments should offer **playgrounds for experimentation, standardization and paths to commercialization**, where various players from industry, academia and public organizations can co-create. This would include testing available commercial solutions and their interplay, developing globally scalable open source based platforms with open APIs and creating new research-based innovations. Typically these environments can be costly (appr. 40-80 Meuros) and therefore risk-sharing facilities are important.
  - 5G test networks example: 5G Test Network Finland (5GTNF) is to enable Finland to provide the best and most appealing 5G test network environment and ecosystem in the world for research and business development purposes. 5GTNF is a joint effort from industry, academia and Finnish government with global manufacturers such as Nokia, Ericsson, Huawei, Coriant and Intel as well as internationally recognized research organizations like VTT, University of Oulu, University of Helsinki, Tampere University of Technology and Aalto University.

- Experimentation can also be supported by creating **sandboxes and "regulation free zones"**, where the regulators could offer flexibility regarding the existing legislation in order to speed up the understanding of new phenomena and in order to create better laws matching the digital era opportunities.
  - Examples: Automated driving test areas (like Aurora in Northern Finland) and automated maritime test areas like Jaakonmeri in Western Finland).

- Moreover, Europe should enable creating new **technology and business accelerator environments** that could serve academic, industrial and public organization needs in a PPP (Public-Private-Partnership) sense. As part of this, one should ensure long-term development of R&D environments and support the continuums from R&D environments to (pre-) commercial environments, ensuring at the same time a seamless European research to markets pipeline. This requires novel approaches in creating and investing in joint R&D platforms and piloting environments - including coordinated investments from academia, industry, national funding organizations, EU and governments - so
that one can avoid fragmentation and enable global scale relevance.

- Example: Artificial intelligence accelerators

- In order to materialize the full potential of the different kinds of experimentation environments, it would be beneficial to have relevant **innovation and competence hubs** with matching profiles to be tightly integrated to their operations. For rapid progress, we should build the network on top of the already existing strong hubs by encouraging the international cooperation of them, while supporting new hubs and network creation in areas seen missing.

- Example: Digital Innovation Hubs

- Fostering experimentation and new ways of working should also promote **changing the general mindset** of the European organizations and encourage them endeavor to reach competitive advantage in the global markets through more collaboration that is open and partnering.

4. Enabling disruptive business models

- Increasing **interdisciplinary** co-operation and cross-fertilization of different research and industrial fields are important means of speeding up platform innovation.

- Building a **European financing model for the risk-intensive and disruptive start-ups and businesses** (European Innovation Council, EIC) in order to keep them Europe-based is essential.

- Investing in **systemic platform innovation enablers**, including new type of financial, insurance, risk management and **MyData** (that place the individual at the center of personal data management) solutions can help data valuation models to mature (e.g., with the help of block chain technologies). When machine-to-machine communication is widely adopted in B2B context, it will replicate B2C platform models in volume, and different side effects will occur.

- **Sharing economy** must be linked with platform economy as the disruptive technologies enable new business models based on sharing resources.

- The Ministry of Economic Affairs and Employment of Finland will publish a memo on challenges and possibilities of EU regulation on sharing economy.

- Advancing **cybersecurity solutions** is indispensable for all above-mentioned development and in all parts of the value chains from industry to end-customers and public sector services. EU should work actively to increase the availability of safe and secure ICT and IoT devices, software and services (such as encryption products) in the Single Market. Continuing and strengthening the strategic agenda and co-operation models initiated in the Cybersecurity cPPP is important. In addition to technological competences, Europe needs to develop
its systemic cybersecurity leadership in order to turn this asset into a global competitive advantage.

5. **Ensuring a future-oriented skills base and labor market policies that support the transformation of work**

- Focusing on innovation readiness, social adaptation, inclusion and leading the change in work life and society. Digital skills should be highlighted at all education levels e.g. by creating digital skills accelerators, nominating digital skills ambassadors and including more digital and data experts in EU-funded RDI projects. As a support measure, also formation of European level online (MooC) curricula of digital courses by the leading universities could be offered to students and companies.

- An action plan for companies and organisations to ensure that digital skills are updated to a certain commonly agreed level. Digital skills should also be a focal point in lifelong learning schemes.

- Increasing the number of specialists in cybersecurity, big data, artificial intelligence and machine learning is an urgent challenge.

- Upgrading digital leadership skills and leadership skills in digital environment is also much needed. This links to the importance of ecosystemic development where cross-fertilization between small and big companies can lead to increased understanding of digital opportunities and skills.

- Facilitating mobility of digital experts inside Europe and attracting digital experts from elsewhere in the world.

- Developing policies supporting transitions to e-work and responding to the labour market challenges caused by the new forms of work, including cross-border e-work and other work based on cross-border platforms.

6. **Strengthening European platform strategy and standardization**

- Provide an analytical outlook of the status and potential of European platform based value creation. Identify major impediments to emergence and expansion of European based platforms in comparison with leading global operating environments.

- Carry out experimentations in order to map policy responses to deal with shortcomings of operating environments and existing policy instruments.

- Using leading global national platform initiatives such as Industrie 4.0 as a framework for many EU Member States to align activities and support common goals. This will lead to a global and European deployment of shared best practices with new working cross-sectoral ecosystems.

- Joint EU-level/MS-level work on industry standardization activities for best practices, scale and interoperability should be further promoted. This calls for faster development of industrial/technical specifications leading to industrial standards.
- A **center of excellence / observatory / high-level group** for monitoring, collecting information and speeding up the platform economy initiatives, related regulation, innovation policies and investments should be formed. Leaders need a common fact base and assessment of the gravity of the competitive position that Europe is facing. This should lead the efforts towards a balanced roadmap for wealth and socially safe Europe in digitalizing markets, comprising of innovative and balanced measures. The center should keep the common European actions aligned with the global development and ensure the national activities alignment inside Europe. The risks of slow, bureaucratic approach should be mitigated and potential overlapping mechanisms should be avoided.