Digitising European Industry

Working Group on
Future Partnerships

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Contents

Executive Summary

The Working Group on Future Partnerships is one of the working groups within the "Digitising European Industry" (DEI) strategy of the European Commission. The DEI initiative aims to reinforce the EU's competitiveness in digital technologies and to ensure that every industry in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations.

Only at EU level the combination of public resources and private investments can reach the critical mass needed for Europe's industry to compete worldwide. To reinforce the EU's competitiveness in digital technologies, a number of Public-Private Partnerships (PPPs) have been created where the public (mostly European Union) and the private (mostly industry) sides committed to jointly invest in the development of new technologies. Such partnerships are key players in the development of new technology building blocks, such as new data analysis methods, smart sensors, 3D printers, etc.

To reach critical mass, create more impact, and foster more innovation, partnerships need to join forces with other players, including other partnerships and national programmes. Future partnerships may require close cooperation and co-investment of industry, Member States and the European Union.

The overall objective of the DEI Working Group on Future Partnerships is to derive recommendations on how to better achieve European strategic goals through future partnerships and how to create significant impact. The specific objective of the working group is to derive recommendations on how to synchronise future partnerships and Member States Research & Innovation programmes.

The Working Group so far organised a workshop on 6 March 2018. The main conclusions of the Working Group so far are:

- In future, partnerships should be put in place for strategic parts of the value chain. For those technologies, the EU needs to be self-sufficient and independent from other regions in the world. Such sovereignty or independence may require complementary efforts between Member States, bringing together different competences and strengths.

- Increased synchronisation of EU level and national Research & Innovation programs is perceived as necessary, not just welcomed. The European Commission, Member States, and partnerships have roles to play in aligning research and innovation activities and roadmaps. However, alignment is also needed in funding rules, timing of calls, etc.

- Many discussions between Member States and partnerships are already taking place. In fact, ongoing contractual PPPs feel that they are confronted with too many bilateral synchronisation discussions with Member States. Vice versa, Member States feel they need to synchronise/discuss with too many partnerships. In terms of the announced rationalisation of partnerships, there are reasons for having different communities in different partnerships. Forcing communities together takes time to deliver meaningful synergies. During the March 6 workshop, participants perceived little need to reduce the current number of PPPs, but insisted on their openness, accessibility, and collaboration with other PPPs and Member States.

1   Introduction

1.1   Background

The Working Group on Future Partnerships is one of the working groups within the "Digitising European Industry" (DEI) strategy of the European Commission, initiated in 2016.[1] The DEI initiative aims to reinforce the EU's competitiveness in digital technologies and to ensure that every industry in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations, for instance to upgrade its products, improve its processes and adapt its business model to grasp opportunities offered by digital technologies. The DEI initiative covers 5 areas, namely national initiatives, Digital Innovation Hubs, Regulatory Framework, Skills & Jobs, and Partnerships & Platforms.[2]

Figure 1 Digitising European Industry

Following the high-level governance meeting of the European Platform of National Initiatives on Digitising Industry on 21 November 2017, three Working Groups have been launched to discuss and make progress on the implementation of the Digitising European Industry initiative, respectively on:[3]

- Digital Innovation Hubs

- Digital Industrial Platforms and standardisation

- Future Partnerships

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[1] https://ec.europa.eu/digital-single-market/en/policies/digitising-european-industry

[2] https://ec.europa.eu/digital-single-market/en/news/digitising-european-industry-2-years-brochure

[3] https://ec.europa.eu/digital-single-market/en/news/new-working-groups-advance-digitisation-european-industry

The Working Group on Future Partnerships starts from the observation that only at EU level the combination of public resources and private investments can reach the critical mass needed for Europe's industry to compete worldwide. Therefore, to reinforce the EU's competitiveness in digital technologies, a number of Public-Private Partnerships (PPPs) have been created where the public (mostly European Union) and the private (mostly industry) sides committed to jointly invest in the development of new technologies. Such partnerships are key players in the development of new technology building blocks, such as new data analysis methods, smart sensors, robot arms, 3D printers, etc.

Most of the partnerships are dedicated to specific technologies, which might easily lead to some silo thinking. A strict focus on certain technologies may be necessary to a large extent to build up specific ecosystems and obtain core competences in targeted technologies. However, it may prevent partnerships from reaping the full benefits of working towards common goals, such as increasing the overall competitiveness of European industry.

To reach critical mass, create more impact, and foster more innovation, partnerships need to join forces with other players, including other partnerships and national programmes. Future partnerships may require close cooperation and co-investment of industry, Member States and the European Union.

Similar statements were made by recent reports on partnerships and preparations for FP9. The Working Group builds upon these reports and their recommendations, in particular[4]:

- The Digitising European Industry Communication states that "the European Commission in co-operation with Member States will focus investments in the PPPs to reinforce the role of PPPs as coordinators of EU-wide R&I effort, national initiatives and industrial strategies by focusing on key technologies and their integration including through large scale federating projects" (April 2016)[5]

- Recommendation #9 of the 'Lamy report' is to "better align EU and national R&I investment" (July 2017)[6]

- Recommendation #5 of the mid-term review of the contractual PPPs under Horizon 2020 suggests that "in order to enhance the impact of the cPPPs on national and regional policies as a way to increase their EU value-added, Member States should be represented in the cPPPs. The Commission should explore jointly with Member States suitable mechanisms" (September 2017)[7]

- The Council Conclusions of 1 December 2017 "calls on the Commission and the Member States to jointly consider ways to rationalise the EU R&I partnership landscape, e.g. by [..] ensuring closer links between partnership initiatives and EU and national policies" (December 2017)[8]

- The Communication on the Horizon 2020 interim evaluation states that "the Commission also intends to explore […] ways of rationalising partnerships […], improve their openness and transparency, and link them with future EU R&I missions and strategic priorities" (January 2018)[9]

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[4] Relevant reports and their recommendations are described in more detail in Section 5.1 in the Annexes.

[5] Digitising European Industry – Reaping the full benefits of a Digital Single Market. COM(2016) 180. http://eur-lex.europa.eu/legal-content/TXT/?uri=CELEX:52016DC0180

[6] LAB – FAB – APP, Investing in the European future we want. http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/hlg_2017_report.pdf

[7] Mid-term review of the contractual Public Private Partnerships (cPPPs) under Horizon 2020. https://publications.europa.eu/en/publication-detail/-/publication/6de81abe-a71c-11e7-837e-01aa75ed71a1/language-en

[8] https://www.consilium.europa.eu/media/31888/st15320en17.pdf

- Commissioner Moedas emphasised the success of PPPs for Europe's industry in his speech on the occasion of the European Industry Day, 23 February 2018, and suggested to simplify the landscape of partnerships, to open up partnerships, and to create more flexibility (February 2018)[10]

1.2 Objectives

Following the mandate given by the high-level governance meeting of the European Platform of National Initiatives on Digitising Industry on 21 November 2017, and taking into account the above-mentioned recommendations from various reports, the **overall objective** of the DEI Working Group on Future Partnerships is:

> **To derive recommendations on how to better achieve European strategic goals through future partnerships and how to create significant impact**.

The **specific objective** of the working group is:

> **To derive recommendations on how to synchronise future partnerships and Member States R&I programmes**

The Working Group will report to the European Platform of National Initiatives on Digitising Industry. Its recommendations will be submitted to the high-level governance meeting at the end of 2018.

1.3 Working Group workshop of 6 March 2018

The first workshop of the DEI Working Group on Future Partnerships took place on 6 March 2018. Discussions at the workshop meeting focused on three key questions:

- To what extent should future partnerships and Member States synchronise programs?
- What factors determine the desired extent of synchronisation / alignment of future partnerships and Member States programs? For instance,
  - Industry structure, e.g. large players vs small ones?
  - Technology, e.g. clear, universally agreed roadmaps vs unclear directions?
  - Market, e.g. consolidated vs growing?
- What kind of mechanisms are needed?

Presentations of ongoing partnerships and Member States addressed these issues.

To obtain inputs from workshop participants via interaction, the working group meeting was split into breakout groups that discussed two essential questions:

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[9] Horizon 2020 interim evaluation: maximising the impact of EU research and innovation. COM(2018) 2. http://ec.europa.eu/transparency/regdoc/rep/1/2018/EN/COM-2018-2-F1-EN-MAIN-PART-1.PDF

[10] Commissioner Moedas, "A New Ecosystem for Science, Start-ups and Industry", http://europa.eu/rapid/press-release_SPEECH-18-1164_en.htm

Q1: Suppose you represent a Future Partnership, give concrete examples of strategic/economic/… impact you want to achieve and what you expect from the Member States? What are the two major changes you think need to happen?

Q2: Suppose you represent a Member State, how can we actively integrate/cover the full value chain, and what do you expect from Future Partnerships? What are the two major changes you think need to happen?

Summary reports of the presentations as well as from the breakout sessions are presented in the Annexes and referenced in the synthesis in Chapter 3.

2 Future Partnerships

2.1 Value Chains and Essential Digital Technologies

Michael Porter first described the concept of a Value Chain in 1985 as a set of activities that a firm performs to deliver a valuable product or service for the market.[11] Five primary activities in the value chain give a company the ability to create value that exceeds the cost of providing its good or service to customers, namely inbound logistics, operations, outbound logistics, marketing and sales, and service. In addition, support activities help the primary activities and include procurement, technology development, human resource management and infrastructure. Value Chain is a way of getting a competitive advantage, through which a company can beat its competitors along with fulfilling customer requirements. In contrast, Supply Chain is a 'tool' of business transformation, which minimises costs and maximises customer satisfaction by providing the right product at the right time at the right place and the right price.[12]

These days the term "value chain" is prominent in discussions on R&I investments and takes a different meaning than in Porter's original work. A very schematic illustration of a value chain is given below. It shows how different technologies relate to each other, and how they need to be integrated for concrete products and services. Different technologies are rarely used in isolation; instead, a mixture of technologies can be found in products and services. Take for instance connected and automated driving (see also Figure 2, 'autonomous driving'). Here, one sees combinations of vision systems, robotics, artificial intelligence, mobile communication, and more. Some technologies depend on other technologies, for instance artificial intelligence heavily depends on micro-electronics and software engineering, *inter alia*. Figure 2 illustrates such dependency relations between different technologies.

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[11] Porter, Michael E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York.: Simon and Schuster

[12] http://keydifferences.com/difference-between-supply-chain-and-value-chain.html
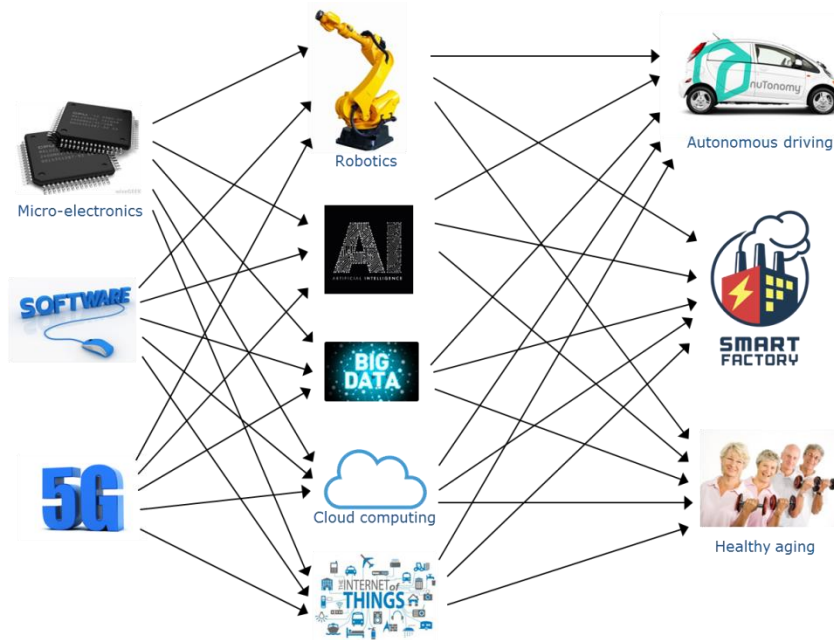
Figure 2 Exemplary links between essential digital technologies

On the level of individual firms, companies try to control those elements of the value chain that deliver most value for their operations, or at least try to get reliable access to critical components and technologies. In the past, companies aimed to own the whole supply chain, from raw materials via intermediate components to final products. This tendency to vertical integration and desire to obtain synergies among different subsidiaries led to the emergence of industrial conglomerates, such as Philips, Siemens, General Electric, *chaebols* in South Korea (e.g. Samsung), and *keiretsus* in Japan (e.g. Toyota). Later, companies focused on their core competencies, sold or spun off non-mission-critical subsidiaries, and tried to depend on commodities available from a wide range of suppliers rather than specialised components and technologies from few other companies. Ownership was replaced with contracts and other business relations to guarantee both the supply of components and technologies, and access to channels to put their products and services in the market.

A recent example of a company obtaining access to technologies that are essential for its internal operations (rather than for the products or services it puts on the market) is Amazon's acquisition of mobile robot maker Kiva Systems, now known as Amazon Robotics. Kiva makes robots that automate the picking and packing process at large warehouses. Amazon considers the acquisition as a potential solution to efficiency problems in its fulfilment centres, and seems to see it as well as a competitive advantage it does not want to share with other companies.[13] Another example in the robotics area is Midea Group's acquisition of KUKA, which would help in Midea's ambition to transform itself from the world's largest maker of home appliances into an industrial automation powerhouse.[14] Obviously, acquisitions are not the only means for companies to gain access to the technologies and IP they need.

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[13] https://www.bostonglobe.com/business/2013/12/01/will-amazon-owned-robot-maker-sell-tailer-rivals/FON7bVNKvfzS2sHnBHzfLM/story.html

[14] https://www.ft.com/content/c7cac15a-df0b-11e7-a8a4-0a1e63a52f9c

What applies at individual firm level, also largely applies at the level of the European Union. Rather than obtaining access to technology, European technological sovereignty is then the issue. What are the essential digital technologies where Europe needs to have sufficient competencies and IP for its industry to effectively compete on the world stage?

Part of the answer is in the so-called Key Enabling Technologies (KETs). These technologies provide the basis for innovation in a range of products across all industrial sectors. They drive the development of entirely new industries, are instrumental in modernising Europe's industrial base, and underpin the shift to a greener economy. Their importance makes them a key element of European industrial policy.[15]

The European Commission has set up a High Level Strategy Group for Industrial Technologies, which has been tasked to review the European strategy on Key Enabling Technologies and to recommend how to best place them in the forthcoming mission-oriented research and innovation programme. The Group presented its preliminary results via a conference document, in which it distinguishes 6 KETs, namely advanced manufacturing technologies; advanced materials and nanotechnology; life sciences technologies; photonics and micro- and nano-electronics; artificial intelligence; and digital security and connectivity (see Figure 3).[16]
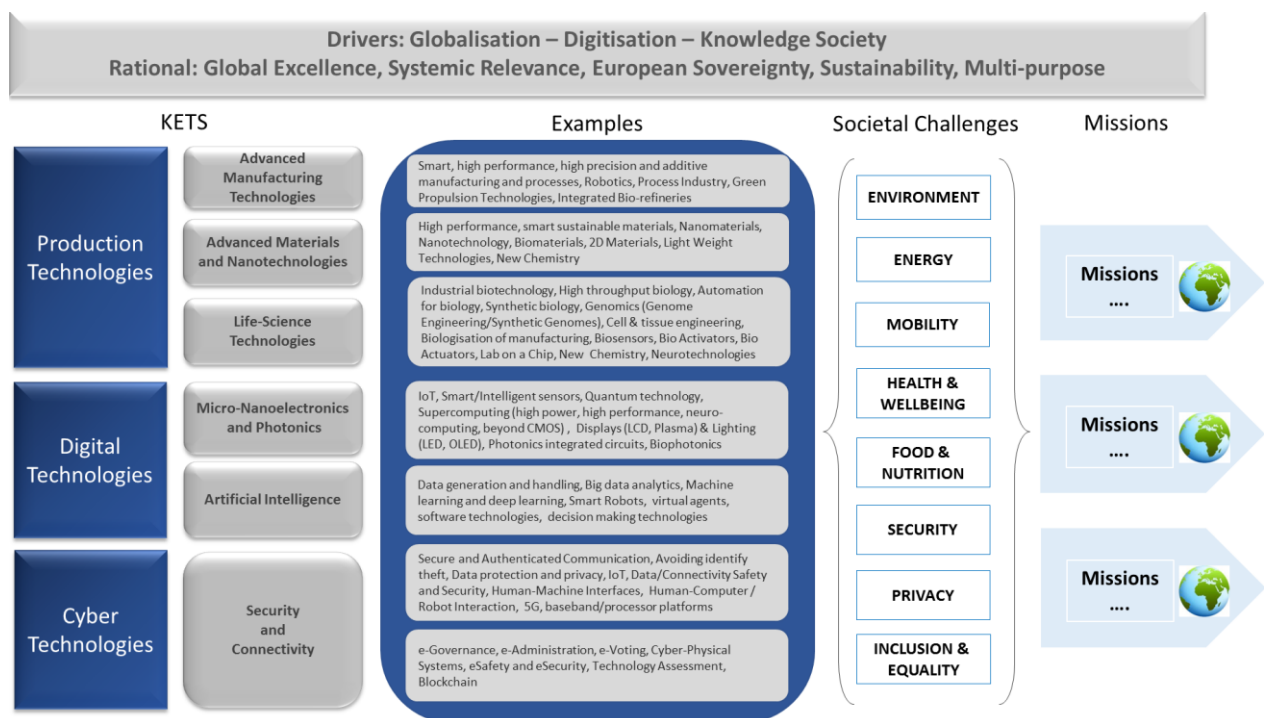
Figure 3 Key Enabling Technologies[16]

It should be noted that different industrial sectors might have different essential digital technologies, or at least put different values on different essential digital technologies. The KETs Observatory

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[15] http://ec.europa.eu/growth/industry/policy/key-enabling-technologies_en

[16] Re-Finding Industry, http://ec.europa.eu/research/industrial_technologies/pdf/re_finding_industry_022018.pdf

provides reports that highlight the value chain structure, key players, and identified constraints for 8 KETs-based products from different industrial sectors.[17]

2.2   Current partnerships

Public-private partnerships (PPPs) are one of Europe's main instruments to maintain and develop design and production capabilities in essential digital technologies in Europe and to ensure European technological sovereignty. In these Public-Private Partnerships, the public side (mostly the European Union) and the private side (mostly industry) commit to jointly invest in the development of new technologies. Nowadays, EU support for the development of new technology building blocks is mostly channelled via these partnerships.

Two types of Public-Private Partnerships are supported under Horizon 2020, namely Joint Undertakings and contractual Public-Private Partnerships (cPPPs). Joint Undertakings, launched under article 187 of the Treaty on the Functioning of the European Union, are a special legal instrument of implementing Horizon 2020 through a public-private partnership in key strategic areas. Their aim is to implement research and innovation activities to enhance competitiveness and to tackle the grand societal challenges with the active engagement of Europe's industry.[18]

The seven Joint Undertakings currently in operation implement specific parts of Horizon 2020 in the areas of transport (CleanSky2, Shift2Rail and SESAR), transport/energy (FCH2), health (IMI2), bio-economy (BBI) and electronic components and systems (ECSEL). For the duration of the framework programme, they will manage around 10% of the global Horizon 2020 budget and, through the leverage effect, will mobilise additional resources from the private side of the Joint Undertakings.[19] A new joint undertaking is currently being set up in the High Performance Computing area, namely the European High-Performance Computing Joint Undertaking (EuroHPC JU).[20] For the purposes of the Digitising European Industry initiative, ECSEL and the EuroHPC JU in formation are the most relevant joint undertakings.

The contractual Public-Private Partnership instrument is designed to implement strategies to increase the competitiveness impact of European R&D funding through Horizon 2020. It offers a more active role to industry in defining roadmaps (including Strategic Research and Innovation Agendas), in significantly contributing to work programmes and calls, and in promoting higher technology readiness levels for new technologies funded under the projects concerned.[21]

To date, there are ten cPPPs under Horizon 2020, covering a variety of industrial sectors and technological domains: Factories of the Future (FoF), Energy-efficient Buildings (EeB), Green Vehicles Initiative (EGVI), 5G, Sustainable Process Industry (SPIRE), Robotics, Photonics, High Performance Computing (HPC), Big Data, and Cybersecurity.[22]

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[17] https://ec.europa.eu/growth/tools-databases/kets-tools/kets-observatory/value-chains

[18] Interim Evaluation of the Joint Undertakings operating under Horizon 2020. SWD(2017)338.
https://ec.europa.eu/research/evaluations/pdf/20171009_a187_swd.pdf

[19] Ibid.

[20] https://ec.europa.eu/digital-single-market/en/eurohpc-joint-undertaking

[21] Mid-term review of the contractual Public Private Partnerships (cPPPs) under Horizon 2020.
https://publications.europa.eu/en/publication-detail/-/publication/6de81abe-a71c-11e7-837e-01aa75ed71a1/language-en

[22] Ibid.

In addition, alliances can be instrumental in bringing together the required resources and coordination to develop new technologies, for instance AIOTI in the Internet of Things[23].

Figure 4 illustrates how existing public-private partnerships cover the exemplary essential digital technologies of Figure 2.
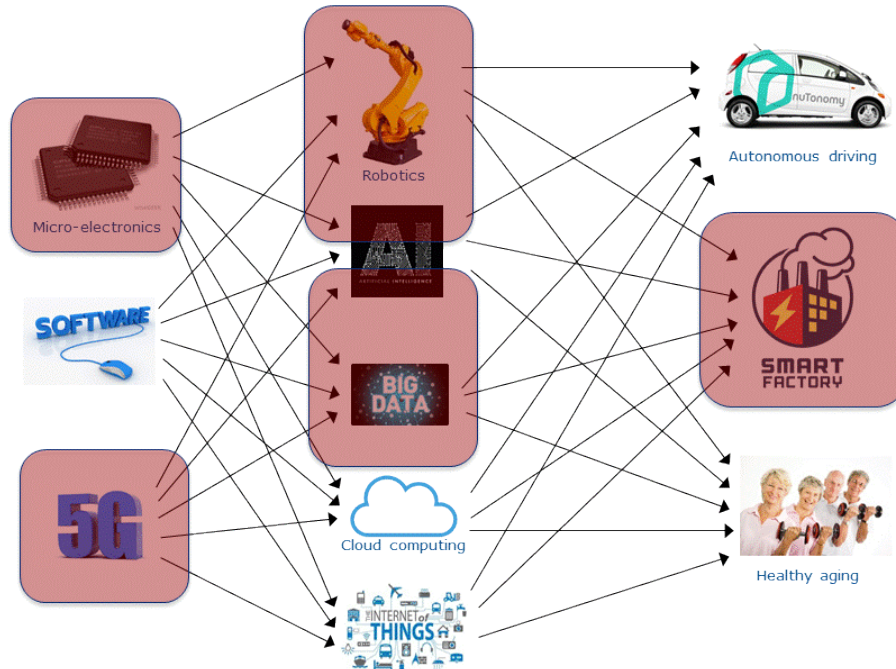

Figure 4 Exemplary coverage of essential digital technologies by existing PPPs

The PPPs have proven to be effective in developing the technology building blocks which underpin today's digital revolution. Such partnerships are key players in the development of new technology building blocks that industry needs today.

2.3   Towards future partnerships

Just like today's PPPs are main instruments to maintain and develop design and production capabilities in the essential digital technologies that European industry needs today and in the near future, future partnerships are expected to fulfil that role post-2020. To define such future partnerships, questions to be answered include: what are the future essential digital technologies where Europe needs to have sufficient competencies and IP for its industry to effectively compete on the world stage? In what industry sectors does Europe want to be a global market leader in future? And what are the future essential technologies in those sectors? Future partnerships should follow the strategy for future essential digital technologies.

Such discussions often focus on current strengths and weaknesses, where strengths in certain technologies might help in gaining leading positions in neighbouring technologies, but with the inherent pitfalls to dedicate a large amount of resources to strong but outdated incumbents or to be

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[23] Alliance for Internet of Things Innovation. https://aioti.eu/

too late to obtain leadership where Europe is currently weak. Other considerations may be marred by me-tooism and national pride, as for instance pointed out by The Economist.[24]

The debate should be on the big priorities for industry in future, the essential digital technologies for industry in future, and their expected value for competitiveness of European industry. The above-mentioned review of the European strategy on Key Enabling Technologies by the High Level Strategy Group for Industrial Technologies is input to the debate. This debate is expected to intensify soon for the future FP9 partnerships.

The Working Group on Future Partnerships currently does not focus on the choice of essential digital technologies for industry in future. The working group is neutral to the outcome of those choices to be made. Instead, the working group considers how to synchronise future partnerships and Member States R&I programmes in order to better achieve European strategic goals through future partnerships and to create significant impact.

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[24] https://www.economist.com/news/briefing/21738903-blocking-broadcoms-takeover-qualcomm-donald-trump-showed-america-worried-about

3 Synchronisation of Future Partnerships and Member States Programmes

This chapter reports on the discussions during the first working group meeting on 6 March 2018, as mentioned in Section 1.3.

3.1 Views from current partnerships

The representatives of the cPPPs and the ECSEL Joint Undertaking showed a certain "unity in diversity" when discussing the main issues of the meeting focus (see Section 1.3). However, it became also clear that the topic and structure of a PPP determines its needs for collaboration or openness. By its nature, a PPP that is largely based on national initiatives has a stronger (and easier) relationship to regional and national initiatives than a PPP that is by its nature cross-sector and cross-border. The heterogeneity of the PPPs will lead to a variety of solutions and mechanisms as "not one size fits all". It would make sense to differentiate between application-driven PPPs (e.g. Clean Sky) and cross-sector PPPs (e.g. Big Data). Overall, workshop attendees are happy about the number of partnerships.

In future a closer alignment between EU and Member States activities is needed. Some examples from existing PPPs were given where collaboration works already well. These success stories can guide future partnerships into the right direction and will help shaping effective and efficient collaboration paths for current and future partnerships.

3.1.1 Successful examples of collaboration/synchronization with Member States

One key element of collaboration with Member States was to engage with them from the beginning. An essential point was made that not all PPPs need to collaborate necessarily with all Member States. Some PPPs established tools and mechanisms for a fruitful collaboration:

- Strategic Research and Innovation Agendas and Multiannual Roadmaps: In some cases these documents were drafted with the input of Member States through dedicated working groups or Committees involving all stakeholders. For the Smart Specialisation Strategy[25] (S3), Member States already used some roadmaps, also in view of their Operational Programmes 2021-2028. This appears to be a best practice case as it would allow aligning ESIF funding with the priorities of the respective PPPs.

- Setting up Committees with National Authorities: These committees provide advice on strategies to partnership boards, different Working Groups, or Strategy Committees, inform about national initiatives, and liaise with intergovernmental groups. *Mutatis mutandi*s, the involvement of vertical sectors and end users in PPP working groups and/or committees is useful to allow for an alignment with national strategies.

- "Open innovation spaces" or incubators: They help the take-up of PPPs' results and support stakeholder engagement at national/regional level. They are open to public and private members and non-members of the PPP. They may act as a "hub" in the concept of the DEI. Other activities like workshops, roadshows, and studies are in the same vein and foster collaboration.

- Other instruments like ERANETs, CSAs etc. can improve the alignment of activities at all levels.

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[25] For more info on S3 see: http://s3platform.jrc.ec.europa.eu/what-is-smart-specialisation-

A strong community is a success factor: One needs to bring together industry and academia, widen this community at national/regional level and then, enhance the technical community with other topics such as jobs and skills. Creating a vibrant ecosystem is essential and seems to be easier for horizontal PPPs that collaborate closely with other actors like ERANETs, EUREKA, etc. and industrial verticals. Synergies with other PPPs must be closely investigated.

Openness is essential to create a thriving ecosystem, awareness is essential for acceptance and closer relations to citizens. The openness refers also to collaboration with other PPPs. Many PPPs are open but not all have the same degree of openness.

3.1.2 Mechanisms needed for a common strategy

Replicating projects at local level is important, but it means increased collaboration between H2020, FP9, ESIF and national/regional funds.

Where PPP topics are a national prerogative, it is key to align national strategies with EU ones for a working ecosystem in Europe. More generally, the EC should share and align initiatives with Member States.

Closing the gap between technology development and policy-making: identify mechanisms and develop suitable links with the different relevant policies to promote understanding and awareness of technology developments.

Promoting PPPs and main/large projects: identify interlocutors in MSs, to develop a dialogue, inform and stimulate activities leading to definition of relevant demonstration projects based on PPPs.

3.1.3 Challenges

For PPPs:

- PPP governance: The governance of PPPs can become complex, in particular when a PPP is of cross-over interest to many/all sectors and Member States. Topical working groups, sectoral working groups, and different stakeholder working groups add to the complexity, but are necessary to reach decisions. In this respect, a dialogue with other PPPs is essential, as is the inter-PPP collaboration on defined topics which should be reinforced.

- Another challenge is that there is a lot of overlap with competing interests. One solution might be to develop meta-roadmaps across different PPPs. At the other hand, there are also many complementarities among PPPs that could foster stronger collaboration.

- Activities must be impact-oriented to achieve not only figures but practical output (like ECSEL reversing the decline in digital component production in Europe). Strategic impact would be to gain leadership for the EU and keep it where Europe does a good job. Knowledge transfer is also strategic; ongoing best practice is green mobility with convergence across the value chain, from EU level research to (market) applications.

- Balanced and transparent contributions in terms of funding by industry: define clearly what industry can bring to the initiative and what will they get out of it.

The following challenges are not typical for PPPs but may have an impact on their results and outputs:

- Access to markets, in particular for SMEs.

- Mobilise private VC to fund the innovation pipeline.

For the collaboration between PPPs and Member States:

- <u>Stronger and more systematic involvement of Member States</u> is needed.

- <u>Efficiency in the use of the resources</u>: this refers not only to financial resources but also to R&I efforts at national/regional level. To avoid "reinventing the wheel", awareness of national/regional projects in the areas of PPPs should be enhanced.

- <u>Streamlining, prioritisation and simplification</u> seem to be the key words for future cooperation between partnerships and Member States but the "how" is not yet found.

- <u>The "How"</u>: how to align strategies, how to align or even harmonise structures and funding mechanisms, how to link together different aspects, such as technical, non-technical, or political aspects? How to interact with Member States on broad PPP topics where there is far more than one spokesperson or institution? These are the challenges to which the Working Group may bring solutions.

3.2   Views from Member States

Although seen from "the other side", <u>views of Member States converge to a large extent with those of PPPs</u>, in particular where a stronger involvement in PPPs exists. Member States' funding agencies are faced with similar challenges in interacting with multiple PPPs: they (the PPPs) often have the same problems, but a Member State has to talk with each partnership separately which adds complexity and is time consuming.

Member States (and Associated Countries) have similar strategies, e.g. an "Industrial Digital Transformation Platform" where all stakeholders from industry, academia and the public administration meet.

There are <u>interdependencies</u> with national innovation platforms and strong interaction with stakeholders in these fields. The experiences of Member States are similar to those of PPPs, only in the other direction: the more heterogeneous and fragmented a subject is, the more difficult it is to organise meaningful interactions.

Member States promote and support PPPs with various financial instruments and foster the creation of <u>mirror PPPs</u> at national level with national funding. Sometimes, these mirror PPPs have their origin or at least their incentive in EU projects or cPPPs.

For <u>Future Partnerships</u>, some <u>essential elements</u> should be taken into consideration:

- Commitment of Member States from the beginning
- Regular exchange of results between Member States
- How to manage synergies? Not all Member States can be involved in all PPPs
- Simplification, better accessibility, clear transparency criteria
- Reinforced openness
- Central EU budget open for all

Regarding <u>combining funding</u>, the landscape is heterogeneous, also within one single Member State which adds to the complexity. Depending on beneficiary, activity, and location, funding agencies, contribution percentages, selection criteria and instruments may differ considerably. Additionally, co-funding is often avoided not to risk double funding.

As noted by the Irish representative at the meeting, only 30% of beneficiaries applying for the EI Innovation Partnership national scheme also apply for EU funding. However, when they do so, their success rate is considerably higher than average (37%).

Another issue concerns <u>Associated Countries</u>: it is essential to increase synergies with other EU funding programmes and EU policies. H2020, ESIF, and CEF have good synergies but associated countries cannot participate in all programmes. This needs to be taken into account when planning new mechanisms of collaboration.

3.3   Experiences from ECSEL

ECSEL is a Joint Undertaking with a tripartite structure, where the European Union, Member States and industry contribute, respectively EUR 1.17B, EUR 1.17B, and EUR 2.5B, as opposed to other Joint Undertakings and the contractual Public-Private Partnerships where contributions come from the European Union and industry.

The ECSEL JU creates ecosystems along the supply chain to accelerate the social impact and links to respective national and regional activities. Within these efforts, a standardisation strategy is essential. As a success story, ECSEL achieved to reverse the decline of production of digital components production in Europe.

ECSEL's tripartite funding leads to the launch of calls that are funded by H2020 and the Member States in a combined effort, with sometimes additions from regional budgets or ESIF. Up to now, 51 projects with 1600+ participants were funded.

ECSEL has proven that alignments between regional, national and EU strategies are feasible. But there are drawbacks: there is additional administrative work to sign for national contracts and the complexity of different funding rules and rates is a challenge.

4   Conclusions & Recommendations

4.1   Overall Conclusions

The first meeting of the DEI Working Group on Future Partnerships brought together representatives from:

- National Digitising Industry initiatives and MSs ministries
- The Horizon 2020 ICT Committee
- Relevant cPPPs and the ECSEL Joint Undertaking

The participants agree that the continuation of the partnership 'instrument' in FP9 as a mechanism to reach impact is essential. Furthermore, cooperation between all stakeholders must be improved and new mechanisms on how to do so must be developed. Resources must be used efficiently, including from various options, such as FP9, ESIF, national/regional, industry, and VC.

Main conclusions can be summarised as follows:

- In future, underlined partnerships should be put in place for strategic parts of the value chain. For those technologies, the EU needs to be self-sufficient and independent from other regions in the world. Such sovereignty or independence may require complementary efforts between MSs, bringing together different competences and strengths.

    o   There is a need to simplify (and perhaps rationalise) partnerships and to find mechanisms where and how to do so.

    o   Changes must be impact-oriented: what do we want to achieve? And then promote changes widely.

    o   Impact should not be only numbers but also practical output.

    o   Instead of working directly on technologies, rather work on missions (high level goals) and how technologies can contribute to the success of these missions.

- Increased synchronisation of EU level and national R&I programs is perceived as necessary, not just welcomed. The EC, Member States, and partnerships have roles to play in aligning research and innovation activities and roadmaps. However, alignment is also needed in funding rules, timing of calls, etc.

- Many discussions between Member States and partnerships are already taking place. In fact, ongoing cPPPs feel that they are confronted with too many bilateral synchronisation discussions with Member States. Vice versa, Member States feel they need to synchronise/discuss with too many partnerships. In terms of the announced rationalisation of partnerships, participants pointed out that there are reasons for having different communities in different partnerships. Forcing communities together takes time to deliver meaningful synergies. In general, the workshop participants perceived little need to reduce the current number of PPPs, but insisted on their openness, accessibility, and collaboration with other PPPs and MSs.

    o   Mechanisms are needed to break up silos, to use synergies, and to foster collaboration.

    o   Create trusted environments: all is very open but not all is trusted.

    o   Reduce bureaucracy

4.2   Recommendations

• Many PPPs at the workshop emphasized their openness. It was suggested (to the EC) to engage in bilateral meetings to investigate the degree of openness of the different PPPs.

• Identify what works, why it works, and how it might be transposed to other partnerships. This relates to successful collaboration with Member States (see Section 3.1), alignment of policies (between PPPs and MSs, but also EC and MSs) as well as the combination of different funding sources (e.g. ECSEL, see Section 3.3).

• The EC should ask National Contact Points if they are aware of alignment of national projects/funding with PPPs.

• Mapping of topics and interests:

   o Mapping of PPPs' activities and results: this is essential to identify overlaps/ complementarities and to exploit practical results cross-PPPs and cross-sectors. Exploitable results are crucial if aimed at impact.

   o Mapping of national/regional activities and results in the areas of PPPs: such an exercise would foster collaboration and avoid "reinventing the wheel" in future activities.

   o Mapping the VC landscape in EU MSs: This would support the last mile of innovation cycles and help SMEs to gain market access and growth.

5   Annexes

5.1   Recent reports on partnerships and FP9 preparations

The mandate for the Working Group on Future Partnerships builds on relevant recommendations:

- The Digitising European Industry Communication states that "the European Commission in co-operation with Member States will focus investments in the PPPs to reinforce the role of PPPs as coordinators of EU-wide R&I effort, national initiatives and industrial strategies by focusing on key technologies and their integration including through large scale federating projects" (April 2016)[26]

- Recommendation #9 of the 'Lamy report' is to "better align EU and national R&I investment" (July 2017)[27]

  - EU R&I programmes should focus on topics and objectives with high EU added value, beyond specific national priorities and interests

  - EU Member States should develop multi-annual national R&I strategies outlining priorities for national R&I investments and their alignment with the EU R&I programme

  - EU should limit its co-investment in partnerships with Member States to those which help achieve the EU's missions and have a high degree of EU added value

  - The EU contribution should maximise the leverage of national and private investments

- Recommendation #5 of the mid-term review of the contractual PPPs under Horizon 2020 suggests that "in order to enhance the impact of the cPPPs on national and regional policies as a way to increase their EU value-added, Member States should be represented in the cPPPs. The Commission should explore jointly with Member States suitable mechanisms" (September 2017)[28]

- The Council Conclusions of 1 December 2017 "calls on the Commission and the Member States to jointly consider ways to rationalise the EU R&I partnership landscape, e.g. by [..] ensuring closer links between partnership initiatives and EU and national policies" (December 2017)[29]

  - CALLS on the Commission and the Member States to jointly consider ways to rationalise the EU R&I partnership landscape, e.g. by [..] ensuring closer links between partnership initiatives and EU and national policies

  - STRESSES that R&I partnerships in the FP should be implemented based on the principles of EU added value, transparency, openness, impact, leverage effect, long-term financial commitment of all the involved parties, flexibility, coherence and complementarity with EU, national and regional initiatives

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[26] Digitising European Industry – Reaping the full benefits of a Digital Single Market. COM(2016) 180. http://eur-lex.europa.eu/legal-content/TXT/?uri=CELEX:52016DC0180

[27] LAB – FAB – APP, Investing in the European future we want.
http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/hlg_2017_report.pdf

[28] Mid-term review of the contractual Public Private Partnerships (cPPPs) under Horizon 2020.
https://publications.europa.eu/en/publication-detail/-/publication/6de81abe-a71c-11e7-837e-01aa75ed71a1/language-en

[29] https://www.consilium.europa.eu/media/31888/st15320en17.pdf

- o INVITES the Member States to ensure the coordination of relevant national policies and resources towards agreed priorities of partnerships

- Towards a Mission-Oriented Research and Innovation Policy in the European Union (An ESIR Memorandum, Dec. 2017[30]):

  - o During the MOP definition phase coordination between EU commission and MS can follow the established pattern of program definition. However, during the implementation phase a higher degree of flexibility will be needed as a more complex set of stakeholders (national ministries) need to be and wants to be involved. One possible mechanism to ease coordination could be a larger use of co-funding between MS and EU commission during the implementation phase (e.g. for near market projects) at the project or the instrument level. In this way, missions might be more easily adjusted to specific needs of a Member State.

  - o Consistent involvement of the Member States is necessary to define the strategic orientation of FP9 and its concrete design; furthermore, all programme modules should be evaluated regularly and conclusions should be drawn for future programs. There should be different levels and ways of coordination between the EC and MS depending on e.g. the closeness to the market of missions. As a rule the closer to the market the larger should be the say of MS and (of course a financial co-investment of MS).

- The Communication on the Horizon 2020 interim evaluation states that "the Commission also intends to explore […] ways of rationalising partnerships […], improve their openness and transparency, and link them with future EU R&I missions and strategic priorities" (January 2018)[31]

- Commissioner Moedas emphasised the success of PPPs for Europe's industry in his speech on the occasion of the European Industry Day, 23 February 2018, and gave 3 recommendations:

  - o 1st: Many people get confused by the number of different types of partnerships: cPPPs, JTIs, ETPs, JPIs, ERA Nets, FET, KICs. So let's simplify this. With fewer acronyms.

  - o 2nd: Let's make these Partnerships more open. Open to new entrants. But also open to other funders. For example, why not open the Public Private Partnerships to investments by Member States, by regions, and by foundations.

  - o 3rd: We also need to create more flexibility so that, when the time comes, we will have the capacity to adapt to our current and future needs.

- Mission-Oriented Research & Innovation in the European Union (Mazzucato report[32]), Feb. 2018

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[30] https://ec.europa.eu/info/sites/info/files/an_esir_memorandum-towards_a_mission-oriented_research-and-innovation_policy_in_the_european_union-executive_summary.pdf

[31] Horizon 2020 interim evaluation: maximising the impact of EU research and innovation. COM(2018) 2. http://ec.europa.eu/transparency/regdoc/rep/1/2018/EN/COM-2018-2-F1-EN-MAIN-PART-1.PDF

[32] Mission-Oriented Research & Innovation in the European Union – A problem-solving approach to fuel innovation-led growth. https://publications.europa.eu/en/publication-detail/-/publication/5b2811d1-16be-11e8-9253-01aa75ed71a1/language-en

o While EU investments in research and innovation are a basic condition, a broader political commitment to align policy objectives at both the EU and Member State level will be critical to implement a successful mission.

o Europe's unique multilevel governance system is highly suitable for mission-oriented policies: member states and regions can experiment within larger EU-wide missions.

5.2 Annex 2: Summary reports of cPPP presentations

All presentations are available online[33].

ECTP – European Construction, built environment & energy-efficient buildings Technology Platform

ECTP was presented by **Paul Cartuyvels**.

Key issues of his presentation:

♦ ECTP has 17 countries involved that helped setting up national networks; more will commit themselves in 2018.

♦ We need to make sure that construction/building are part of the digitizing industry landscape. In 2018, MSs to commit themselves to the network.

♦ The ECTP multiannual roadmap for FP9 started together with MSs.

♦ For the Smart Specialisation Strategy[34] (S3) MSs already used the ECTP roadmap, also in view of their Operational Programmes 2021-2028.

♦ In France particularly good collaboration.

♦ At Programme Committee level, communication can be improved.

Main message: Replicating projects at local level is important which means increased collaboration between H2020, FP9 and ESIF.

ECSO – European Cybersecurity Organisation

ECSO was presented by **Roberto Cascella**.

Key issues of his presentation:

♦ 132 Founding members, now 230 members including different stakeholders: solution providers and users; SMEs, Universities, national public administrations (17) that are full members. Other national public administrations are part of a national Committee (NAPAC) that provides advice to partnership boards, different WGs or the Strategy Committee. Also

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[33] https://ec.europa.eu/digital-single-market/en/news/working-group-future-partnerships-highlights-first-meeting

[34] For more info on S3 see: http://s3platform.jrc.ec.europa.eu/what-is-smart-specialisation-

important for cybersecurity in vertical sectors (e.g. transport, energy etc.). Furthermore, it liaises with intergovernmental groups.

♦ Collaboration with regional clusters
♦ Governance is complex
♦ Develop a SRIA in a specific Working Group
♦ Standardisation/certification important
♦ End user/verticals important Working Group to align with national strategies.
♦ Future perspectives:
  o Industrial policy: closing the gap between technology dev and policy-making
  o Promoting PPP and large projects
  o Current dialogue essential.

Main message: Cybersecurity is a national prerogative. Therefore, it is key to align national strategies with an EU strategy for a working cybersecurity ecosystem in Europe.

BDVA – *Big Data Value Association*

BDVA was presented by **Ana Garcia Robles**.

Key issues of her presentation:

♦ After Big Data SRIA, implementation roadmap is in the first phase with currently 33 projects running: There are also data incubators, large scale pilots (lighthouse projects)
♦ Big Data has a tremendous social and business impact: "data economy"
♦ BDVA is present in almost all MSs; 30% SMEs, 40+% research
♦ Different task forces (Working Groups) deal with policy & social, technical, application business and skills & education
♦ Data innovation spaces: Strengthening engagement with MSs and regions: "i-Spaces" that are open
♦ CSA with the specific task to align BDVA PPP actions and national initiatives.
♦ Upcoming activities: wider coverage of countries; roadshow; events in Bulgaria and Vienna, to connect with BD local communities

Main message: Stronger and more systematic involvement of MS is needed: new ways need to be found; also European exercises need to be done in collaboration with MSs: share and align initiatives.

SPARC – *euRobotics*

SPARC was presented by **Reinhard Lafrenz**.

Key issues of his presentation:

♦ Founded in 2012 with funding EUR 0.7 B from EC and EUR 2.1 B from industry; members include Industry, research and associate members
♦ Created SRIA and MAR – multi-annual roadmap
♦ SPARC is open, workshops are open to the community, not only to members

- Input to EC is structured: 4 priority areas to focus on: network of innovation hubs: healthcare, agrifood, agile manufacturing inspection and maintenance of infrastructures
- Some MSs use roadmap, e.g. Lithuania or more indirectly, Austria
- Success factors: Strong community across Europe. At the beginning, still fragmentation between industry and academia, but good progress made to bring them together. Now also regions/countries; and also engaging with non-technical issues, e.g. skills and job aspects.
- Recommendations:
  - EC should ask NCPs if they are aware of alignment with PPPs
  - Money should come from ESIF, EU, innovation agencies, and investors.
- Questions: How to link things together? How to align structures?

Main message: Openness is essential to create a thriving ecosystem, awareness is essential for acceptance, closer relation to citizens.

EFFRA - Factories of the Future

EFFRA was presented by **Željko Pazin**.

Key issues of his presentation:

- EFFRA based on national work, NCPs promote cooperation and participation
- Lot of activities around PPP: ERANET ManuNET, EUREKA clusters
- Manufacturing is present in every region: very broad topic (no specific technology) and different from other PPP and JU; national/regional aspects are strong
- Learning process on both sides: national – EU, national initiatives are very important: therefore, close collaboration with MSs since the beginning, very open regarding members and countries
- Digital angle: accompanying manufacturing companies, modernization through digitization leads the path towards autonomous smart factories
- Digital issues: AR, IoT, AI robotics etc.

Main message: We are open and want more cooperation, also with other PPPs

EGVIA - European Green Vehicles

EGVIA was presented by **Josef Affenzeller**.

Key issues of his presentation:

- EGVIA encompasses not only car industry, but also EpoSS (software/hardware etc)
- ERTRAC = the platform dealing with roadmaps: integrates different sectors, all stakeholders, also national authorities that contribute to the different roadmaps, e.g. long distance trucks, road infrastructure, mobility, automated driving etc.
- 165 projects since 2009
- Additional activities with MSs: ERANET Europe, Public workshops, Studies e.g. CO_2 evaluation group: what to do to reach the targets? ; 2-days conferences; mapping national authorities' activities.

- Austria example: Association for advanced propulsion system, became a PPP; good job to bring the ecosystem forward.
- Sweden: Strategic vehicle research & innovation programme, PPP-style

Main message: Cross-cooperation is essential!

5.3   Annex 3: Summary report of ECSEL JU presentation

The presentation is available online[35].

***ECSEL JU** - Electronic components and systems for European Leadership*

ECSEL JU was presented by **Berta Ferrer Llosa**.

Key issues of her presentation:

- ECSEL is a Joint undertaking (JU) where EC, Member States and industry contribute: 1.17/1.17/2.5 BEUR (as opposed to contractual PPPs where the EC and industry contribute)
- Essential capabilities address vertical segments, amongst them digitizing industries such as
    - o Digital twins/simulation
    - o AI machine learning
    - o Condition monitoring
    - o Digital platforms
- Structure: Different bodies: Private Members Board, Public Authorities Board with EC and MSs: to approve launch of calls, establish funding budgets, and select projects
- 3 lighthouse projects: industry - mobility - health
- Create ecosystems along the supply chain: to accelerate the social impact + links to respective national and regional activities; also standardization strategy is essential
- Success story: ECSEL achieved to reverse the decline of production of digital components production in Europe
- ECSEL projects: funded by H2020 and MSs: different funding rates; some MSs provide additional regional budgets, e.g. Saxony; also ESIF funding. 51 projects, 1600+ participants.

Main message: ECSEL has proven that alignments between regional, national and EU strategies are feasible. But there are drawbacks: additional administrative work to sign national contracts, and complexity of different funding rules and rates.

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[35] https://ec.europa.eu/digital-single-market/en/news/working-group-future-partnerships-highlights-first-meeting

5.4   Annex 4: Summary reports of presentations by Member States and Associated Countries

All presentations are available online[36].

Turkey

Presented by **Mete Karaca**, TUBITAK, ICT NCP.

Key issues of his presentation:

♦ Turkey has an "Industrial Digital Transformation Platform" with an Advisory Board that includes members from public authorities, academia and industry
♦ 3 programmes in Turkey for International projects: 1001 academia; 1509 R&D grants ; 1071 International collaboration R&D support programme
♦ cPPP: we promote and support them e.g. we cover membership fees for non-profit organisations at 100%, 90% for SMEs, and 75% for industry for all related cPPP fees.
♦ Mirror PPP: 5G TR Forum, smart mobility, robotics, cyber security with 22 partners in a single project valued EUR 50 M.
♦ TUBITAK supports tripartite model like ECSEL

Main message: Increase synergies with other EU funding programmes and EU policies. H2020, ESIF, CEF have good synergies but associated countries cannot participate in all programmes. This needs to be taken into account when planning new mechanisms of collaboration.

Austria

Presented by **Lisbeth Mosnik,** Ministry for Transport, Innovation, and Technology

Key issues of her presentation:

♦ Ministry responsible for national programmes: ICT, intelligent production, mobility, security and space etc. They have all something in common: to help achieve lead positions in competitive markets
♦ EC collaboration: e.g. Big Data; Future Internet Forum; mirror groups; stakeholders are active in Austria in PPPs linked to Industry 4.0, ECSEL, Photonics.
♦ Interdependencies with national innovation platforms; strong interaction with stakeholders with lot of exchange in these fields; from "networked islands" to "stakeholder/innovation platform" e.g. in the areas of Big Data and AI. But: heterogeneous, more fragmented, therefore difficult to organize.

Main message: For Future Partnerships, some essential elements should be taken into consideration:

o Commitment of MS from the beginning
o Regular exchange of results between MSs

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[36] https://ec.europa.eu/digital-single-market/en/news/working-group-future-partnerships-highlights-first-meeting

- How to manage synergies? Not all MSs can be in all PPPs!
- Simplification, better accessibility, clear transparency criteria

Spain

Presented by **Enrique Pelayo**, CDTI, NCP.

Key issues of his presentation:

- Funding landscape in Spain heterogeneous: national: CDTI, Digital Agenda (MINETAD), regional, different conditions
- Spanish strategy: Talent, Science, Industry, social challenges with 3 strategic actions: (1) Health, (2) Digital Society, (3) Industry 4.0
- 28 technology platforms
- No co-funding (e.g. JU Clean Sky) to avoid double funding
- Complexity of funding: different beneficiaries, different %, different funding agencies, different instruments (grants and loans)

Main message: Combining different funding sources is feasible but complex.

Ireland

Presented by **Stephen O'Reilly**, Enterprise Ireland

Key issues of his presentation:

- Enterprise Ireland helps companies to become competitive global players
- R, D & I priorities: ICT, Health, Food, Energy, Manufacturing…well aligned with PPPs
- Openness of PPPs is appreciated
- Irish PPP AgriChemWay biggest PPP in a EU PPP (stemming from a EU IP)
- Only 30% of companies participating in national programmes participate also in EU programmes. Where they do, success rate is 37%.

Main message: PPPs should continue with reinforced openness, with a central EU budget open for all.

Luxembourg

Presented by **Géraud Guilloud**, LuxInnovation, NCP.

Key issues of his presentation:

- ICT as a vector for national economic development supported by Digital Luxembourg
- National funding programmes fully bottom-up: "Fit4…" programmes
- Hot topics in Luxembourg:
  - Data-based economy
  - Autonomous driving
  - Industry 4.0

- o euroHPC
- o Cybersecurity
- o Blockchain

5.5 Annex 5: Summary Reports of Breakout Sessions

The final part of the Working Group meeting consisted in interactive groups style "World Café" that brainstormed around two questions:

Q1: Suppose you represent a Future Partnership, give concrete examples of strategic/economic/… impact you want to achieve and what you expect from the Member States? What are the two major changes you think need to happen?

Q2: Suppose you represent a Member State, how can we actively integrate/cover the full value chain, and what do you expect from Future Partnerships? What are the two major changes you think need to happen?

Moderated by 4 experts, the findings can be summarized as follows:

Group 1 answering to Q1:

PPPs must be split into application driven PPPs (e.g. Clean Sky) and cross-cutting PPPs (e.g. Big Data, cybersecurity).

Challenges are:

- o get to market
- o digitisation
- o access to market particularly for SMEs
- o mobilise private VC to fund innovation pipeline
- o active role in promoting ethical, legal and trust issues to European citizens e.g. autonomous cars, AI

Funding schemes should be transnational and multi-organisational and allow funding across different MSs.

Bring MSs at the table and raise awareness; need for synchronization of activities and calls; harmonization of participation and funding rules; very difficult to engage in the different programmes and PPPs themselves.

Group 2 answering to Q1:

Strategic impact: gain leadership for the EU and keep it where we do a good job; knowledge transfer is also strategic.

Ongoing best example: green mobility; convergence from EU level research to application.

Economic impact: alignment of future partnerships with regional/national programmes; provide attraction of private money; employment and use of skills within the different areas of work in PPP.

Alignment EU approach to national/regional level: not only money-based but also how different technologies are used, avoid duplication of development etc.

Not all PPPs are equal, need different approaches. Needs improvement

Different changes that would be expected: Consultation of MS and stakeholders group: important in early stages of PPPs, very interesting part to be improved in all groups.

Alignment across different DGs in EC on horizontal instruments if interesting for different players.

Efficiency in the use of the resources and to try to promote some type of structure or improvement for new MSs in participation in PPPs.

Group 3 answering to Q2:

How to cover value chains?

More cooperation between initiatives is needed with a view to make sure that Europe is not dependent on technology that comes from abroad.

Concepts like digital innovation hub to bring actors together; instruments that bring all stakeholders together, also from different sectors.

Give incentives for the last mile of the value chain.

Demotivate silos!

Create trusted environments: all is very open but not all are trusted.

Reduce bureaucracy!

Expectation: Many initiatives are open but not all have the same degree of openness.

Modularity: in principle people are happy about number of PPP; the interfaces and interoperability between different modules is needed.

APIs / interfaces: to quickly understand what the environment is, what PPP can help you, etc.

Balanced contribution in terms of funding: what they provide to the initiative and what they get out of them.

Looking at things to change:

1. Harmonisation within the EC
2. Instead of working directly on technologies rather work on missions – high level goals and how technologies can contribute to cover these missions.

Group 4 answering to Q2:

1. Cannot cover the full value chain but an *integrated value chain*
2. Main contribution: helps to connect to overall integrated value chain

Requirements: some kind of transparency/map of what is available elsewhere. Exploitable results are crucial if aimed at impact. Not an academic map!

Low threshold of access if you want to enter a PPP. The problem is: they do not need all the same kind of support, e.g. university or SME need other supports; life cycle of technology and TRL are different etc.

VC capabilities in other countries would be useful knowledge.