

DEI Working Group 2

Strengthening Leadership in Digital Technologies and in Digital Industrial Platforms across Value Chains in all Sectors of the Economy

Kick-off Meeting, 21 October 2016

Meeting Report

1. Introduction

1.1 Background to DEI Working Group 2

The Digitising European Industry initiative (DEI) aims to ensure that any industry in Europe, big or small, wherever situated and in any sector can fully benefit from digital innovations to upgrade its products, improve its processes and adapt its business models to the digital change. This requires not only dynamic digital capabilities in Europe but also the full integration of digital innovations across all sectors of the economy. The DEI initiative is based on an ambitious collective effort involving public and private stakeholders across Europe at regional, national and EU level.

A key element of the DEI is concerted action to strengthen Europe's leadership position in digital technologies and digital industrial platforms across value chains in all sectors of the economy.

The Commission proposes the following actions:

- Reinforce the role of public-private partnerships (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.
- Focus a significant part of the PPPs and national investments on cross-sectorial and integrated digital platforms and ecosystems, including reference implementations and experimentation environments in real-world settings.

The proposed approach is to maintain and reinforce the European support in Horizon 2020 to the PPPs in core technologies and to synchronise national programmes and the priorities defined within these PPPs. The Commission will monitor the commitment by the private sector to invest, on average, at least four times as much as the EU investments in the PPPs and the use of the opportunities offered by financial instruments under EFSI and ESIF.

The policy is set out in detail in a Communication¹ adopted in April 2016. Its implementation is being supported by a Roundtable of High-Level Representatives of Member States' initiatives, industry leaders and social partners, to be held twice a year.

To support its work the Roundtable has set up two Working Groups in order to make progress on aspects of the implementation of the DEI Action Plan. Each Working Group (WG) is tasked to

¹ Digitising European Industry (DEI): Reaping the full benefits of a Digital Single Market. Communication (COM(2016)/180)

produce a report supporting the implementation of specific DEI actions. They will perform fact finding, collect best practices and formulate recommendations, for example on policy matters and mobilisation and leveraging of investments, addressed to the High-Level Representatives attending the Roundtables.

1.2 Mandate of Working Group 2

Working Group 2 is entitled Strengthening Leadership in Digital Technologies and in Digital Industrial Platforms across Value Chains in all Sectors of the Economy.

The Roundtable has issued the Working Group 2 with the following mandate:

- Reflect on the **priority development of building blocks by the PPPs**, as well as how **Member States could commit to align and co-invest** on the same industrial priorities in order to reach critical mass. The reflection shall include consideration for the role of Member States in the PPPs.
- Reflect on how **building platforms should be approached on a European and national level**.
- Reflect on the form and objectives for **further EU and national platform-related projects and/or large-scale testing and experimentation pilots**, how PPPs can align their strategic research agendas to develop the necessary platforms, large-scale pilots and standards, and how national efforts could be combined in an overall support.
- Reflect on the **prioritisation of several initiatives under preparation**, covering both: integration platforms addressing cross-sector challenges (Leadership in IoT, Industrial Data Platforms, and 5G demonstration); and sectoral platforms and full solutions (Connected Smart Factory, Connected and Automated Driving, and Robotics, IoT and AI for healthy living and active ageing).
- Reflect on further support to **the full roll-out of digital integration platforms**. The WG is invited to reflect on **more integrated funding schemes** (covering European, national and regional as well as private investments, including the use of financial instruments like EFSI) for other technology roll-out initiatives in areas such as 5G or Connected Automated Driving. It shall also encompass considerations for public procurement of innovations and framework conditions.
- Propose whether specific platform initiatives would deserve attention of one or more subgroups.

The WG was tasked to develop a report on strengthening European leadership in digital industrial platforms according to the following schedule:

- A first draft of the report before the end of December 2016
- Revised draft for the DEI Stakeholder Forum (end of January 2017)
- Final version for Hannover Fair, April 2017.

The WG held a first meeting in Brussels on 21 October 2016. Around 80 representatives from industry (including SMEs), Member States, regions, and social partners attended and addressed a series of questions related to the above Mandate. The meeting comprised a series of scene-setter presentations and more focused discussions and exchanges within a series of parallel sessions.

This Meeting Report summarises presentations and discussion from this first meeting and starts to elaborate ideas for the WG's draft report.

1.3 Meeting Focus

Discussion at the WG Meeting focused on four key issues:

- What is the **current landscape** of activities in Europe?
- What is the **vision** for where we should go next?
- How do we **bridge the gap** between what we have and what we want to achieve?
- Who are the **main stakeholders** to be involved?

Each of these issues was broken down into a series of sub-questions to aid deeper analysis.

Much of the reflection was undertaken within five parallel sessions focusing either on specific vertical areas (Connected Smart Factory, Digital transformation of health and care, Smart Agriculture), or horizontal issues (Industrial Data Platforms, Internet of Things).

While the contexts were very different, many of the issues identified were common across the five topics. Reports from each of the subgroup topic sessions are presented in the annexes and referenced in the synthesis below.

2. Establishing European Leadership in Next Generation Digital Platforms

2.1 Mastering Digital Value Chains

Digital technologies are key to competitiveness in the modern world. Across all industry sectors mastery of digital technologies, platforms and value chains offers unbounded opportunities to create value for the customer and strengthen the competitiveness of industries and firms.

In the automotive sector, for example, the share of electronic components in vehicle production is projected to reach 35% by 2020 and around 50% by 2030.² The market for ICT for automotive is already worth around €800bn worldwide and will more than double in the next five years. Europe accounts for 30% of world production of embedded systems used in automotive, industrial, medical, aerospace and defence applications, but is less strong in other areas, such as data processing, telecoms equipment, and consumer goods. The EU also accounts for around 50% of global production of professional service robotics and around 25% of industrial robotics, both of which are strong growth areas.

The change is driven by the convergence of three key technological trends: physical meets digital (driven by Internet of Things – embedded software, sensors, actuators, connectivity, low power ICT); value from knowledge (driven by Big Data, HPC, cloud, analytics, etc.); and autonomous systems (driven by AI, robotics, automation, machine learning, etc.). Together these facilitate digital innovation in products, processes, services and business models in all industry sectors.

While Europe has key strengths, there are also important gaps in key parts of digital value chains. Efforts from R&D to experimentation to deployment are often spread across Europe, making it difficult to reach critical mass.

² Forecast by PwC Germany, www.pwc.de

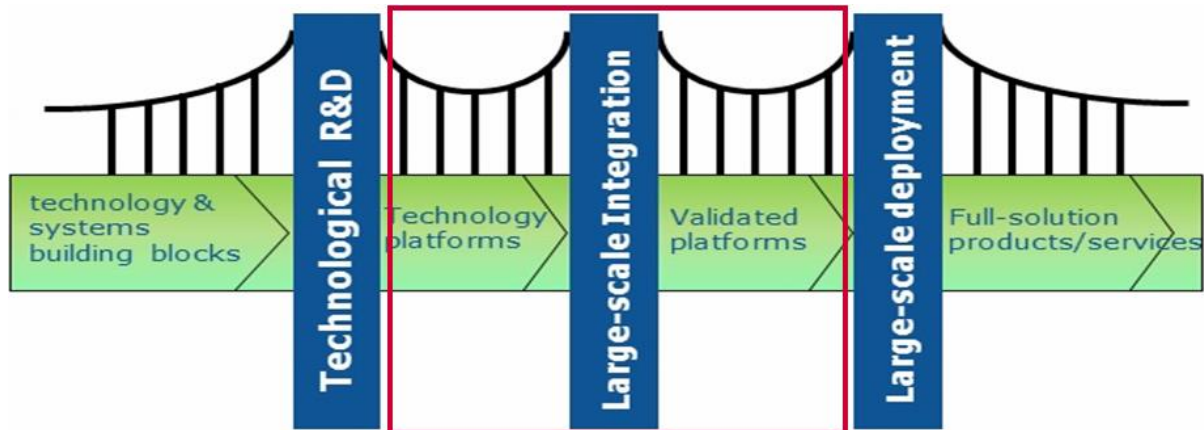
2.2 The Role of Platforms

The challenge is to seize the opportunities arising from digitisation to establish European leadership in next generation digital platforms and re-build the necessary, underlying digital supply chain on which all economic sectors are increasingly dependent. It also aims at removing obstacles, including cross-border obstacles, which currently prevent large-scale testing and experimentation and block the full deployment of these technologies into the market. This is particularly relevant for the autonomous connected vehicles and the connected smart factory.

The Background Note to the 20 September 2016 Roundtable on Digitising European Industry foresees three stages, each with different requirements in terms of the means and intensity of public intervention:

- 1) Research and development of technology and systems building blocks: addressed through better alignment of national RD&I programmes, both with each other and with EU programmes around strategic priorities established in PPPs.
- 2) Development, validation and piloting of digital industrial platforms: addressed through co-investment in large-scale integration, testing and experimental facilities.
- 3) Roll-out of digital industrial platforms: addressed through co-investment in large-scale deployment actions (support to first production, infrastructure, etc.).

The focus for this First WG Meeting was primarily Stage 2: Large-scale Integration.



The term ‘platform’ here has several different meanings. The DEI Communication defines it, rather narrowly, as "multi-sided market gateways creating value by enabling interactions between several groups of economic actors".³ A broader, and more useful, interpretation would be “agreements on functions and interfaces between industry players that create markets and market opportunities leading to ecosystems and standards.” This encompasses platforms (the narrow interpretation above) together with reference architectures, interaction protocols, and interoperability frameworks. Thus, **the emphasis is on aligning RD&I initiatives on digital industrial technology platforms and large-scale integration.** Large-scale deployment will need to be addressed at a later stage.

Public Private Partnerships (PPPs) are an important means to develop the technology building blocks which underpin the digital revolution. The plan is to continue this development and focus them even more on the goals outlined in the DEI action plan. This means that greater coordination is required

³ COM(2016) 180 final, 19 April 2016

between the different PPPs and that their Strategic Research Agendas should be better aligned to reach critical mass. SRAs should also contain plans for development of standards through large-scale testing, and should be shared with the Multi-Stakeholder Platform for standardisation.

As well as alignment and better articulation of efforts, the DEI Communication foresees focused investment by the EU, Member States and industry, as summarised below.

Investment Targets for Digitising European Industry⁴

2016/2020	EU (planned)	Member States (digital focus)	Industry
Digital innovation hubs	€500m (from Horizon 2020)	€5bn (ESIF, regional budgets, ...)	Part of the below
Public-private partnerships	Close to €4bn (from H2020)	Close to €1bn (contribution ECSEL)	Close to €17bn
Focus of national policies on strategic priorities	-	€15bn (national programmes on digitisation)	tbd
Important Project of Common EU Interest (IPCEI) on electronics - planned	~ €300m in ECSEL	~ €1bn from participating Member States	~ €5bn

2.3 The Current Landscape

Europe has a wealth of activity concerned with the development of digital industrial platforms. Initiatives are to be found at national, regional and European levels (including public-private partnerships, PPPs) and in dedicated private sector efforts.

As a working framework, industry-driven platform initiatives may be categorised as follows, taking Connected Smart Factory platforms as examples:

- 1) **Community-led sector-specific:** These aim to develop reference architectures in specific industry verticals. Examples include: RAMI 4.0, a Reference Architectural Model developed under Germany's Industrie 4.0 programme; and FITMAN, a reference architecture for digital manufacturing based on the FIWARE technology of the FI-PPP.
- 2) **Community-led cross-sector:** These are more horizontal (i.e. non sector-specific) initiatives. Examples include: S3P (Smart, Safe & Secure Platform), a software development and execution platform for the IoT;⁵ Industrial Data Space (IDS), a reference architecture for big data ecosystems;⁶ AIOTI's work on reference architectures for the IoT;⁷ and Crystal, a reference technology platform for safety-critical systems developed under the ARTEMIS Joint Undertaking.⁸
- 3) **Commercial platforms with open interfaces:** Such as Siemens' MindSphere and Dassault's 3DEXPERIENCE.

Many of these European initiatives are of a high level of technical excellence and some are developing beyond their original partnerships and beginning to gain critical mass. Developments in

⁴ Not including the Cloud Strategy and the planned IPCEI on HPC.

⁵ See www.esterel-technologies.com/S3P-en.html

⁶ This development was discussed in greater detail in the IDP Session.

⁷ See www.aioti.eu

⁸ See www.crystal-artemis.eu

smart agriculture, for example automated tractors and farm machinery, are in some ways more advanced than those in smart cars.

In one sense, this diversity is a strength, as there are many competing models and approaches for users to choose from. On the other hand, few existing platforms are compatible or interoperable and, with little or no coordination between them, this leads to a highly fragmented marketplace.

The current landscape of activities in Europe in the five areas considered by the subgroups is summarised in the Annexes. As a general conclusion, it was noted that **efforts are fragmented and in all sectors there is a need for better mapping of EU, Member State and private sector initiatives.**

3. Building the Strategy

3.1 Visions for the Future

Building partnerships for the data economy

Europe’s vision for the future of digital industrial platforms must be one that puts users – in all their different contexts – at the centre of the new digital value chains.

The data economy is based on sharing: but sharing data does not necessary come easily. Stakeholders – particularly those who under traditional frames of reference would see themselves as the ‘data owners’ – need to be given incentives to share, either through financial compensation or other benefits. They will also need training and education on how to exploit data and to understand their rights and responsibilities in a digital world. As ‘data generators’, users – such as farmers, factory operators, health practitioners – will acquire a new and very central role within the value chain. They are more likely to give access to data if they understand how it is to be used by third parties. Hence, there is a need for transparent discussions that build trust and partnerships.

The whole issue of ‘data ownership’ is increasingly controversial. There can be no copyright on sensor data and thus questions of ownership often arise in sensor-intensive applications. With a factory machine, for example, data may be collected and shared for various purposes (e.g. preventive maintenance) between several parties: the equipment operator, the maintenance provider, the manufacturer, the lessor, etc. The legal regimes can be time consuming. Many lawyers would argue that there is no such thing as ‘data ownership’: from a legal point of view there are just the competing rights of different parties to access, store, transform, license, etc. data, which can only be enforced by contracts.

Without a defined legal framework governing data access and use, the issues that arise are governed by private contract law, with those having “technical access to the data” having a stronger position.

A fair legal regime has to accommodate the interests of those who originate the data and those who wish to use it. It may be necessary to develop a series of legal templates so as to ensure that the interests of the various parties are protected and without any party taking exclusive rights. The more technically precise the specification, the easier the legal contract becomes because lawyers cannot then pick holes in it. A good maxim might be: “just start sharing according to technology needs and the legal structures will follow.”

The blurring boundaries between business and consumer markets

The traditional boundaries between business-to-business (B2B) and business-to-consumer (B2C) are becoming increasingly blurred. As value chains become more integrated, it becomes ever more difficult to separate the business and consumer dimensions. Google, Amazon and Facebook, for

example, largely position themselves as consumer platforms, yet the majority of their revenues come from B2B activities. In some areas the consumer market is already more sophisticated than the industrial space and it is necessary to look at how these experiences can be transferred. The media industry, which has suffered significantly at the hands of new entrants who have become monopolistic gatekeepers, shows the dangers of reacting too late. Europe cannot afford other sectors – automotive, smart homes, smart cities – to go the same way. To safeguard their position these sectors have to become more focused on the end-user/consumer.

Growth of the cloud and M2M communication

Technology boundaries are also blurring. Physical devices – machine tools, environmental sensors, agricultural equipment, etc. – are becoming part of the cloud, requiring new levels of interoperability to ensure that all connected systems are able to talk to each other.

Machine-to-machine (M2M) platforms present an important opportunity and are already being applied around the world. Standardisation organisations, such as OneM2M, are looking to develop international standards in this area as the basis for creating commercial platforms. M2M will also benefit from the increased availability of massive stores of data as a learning resource.

Falling costs opening the way to new approaches to exploiting big data

Until now big data applications, such as preventive maintenance, have relied on targeted data collection, with data being systematically collected and analysed across a relatively limited set of parameters. Falling storage costs and ubiquitous connectivity and computing are opening the way to new approaches. A ‘store everything, search later’ approach allows all possible data to be stored for a particular scenario (e.g. from a car, aeroplane, machine tool, medical device) and for the analysis to be done later with a view to finding correlations not identified before.

The Circular Economy as a key market driver for digital industrial platforms

The Circular Economy will require enormous traceability of industrial and consumer products to define where individual products are sourced, produced and disposed. This will create major data requirements across the whole value chain and could bring key first mover advantages for Europe. Focusing on individual elements, at the expense of the bigger picture, risks losing that advantage. Ultimately, the Circular Economy could be a potential proving ground for a platform approach.

Federating initiatives as a means to build scalable solutions and demonstrate new business models

Large-scale federating initiatives would help convince industry of the value of digital platforms and start to build the necessary partnerships and ecosystems. They should facilitate mutual access to shared data between originators and other stakeholders, such as service providers. This may mean the development of new business models, which need to be scalable. Such models may be disruptive, such as coalitions of users (farmers, machine owners) pooling their data to increase their power over suppliers, or service providers working with users to share and process data in ways that create value. Obstacles to federation may include: the desire of originators to protect ownership and maintain the privacy of data owners/subjects; the need for guarantees on the provenance of data; and ensuring the security of data.

While existing technologies and platforms should be the main focus, federation activities could also address disruptive technologies – such as Blockchain. Here too the emphasis would be on demonstrating scalable solutions and business models. A focusing of mutual efforts could help give such technologies an accelerating boost.

3.2 Bridging the Gap and Addressing the Issues

Interoperability based on open platforms and APIs

Interoperability and integration of legacy systems should be a key focus for testing and validation efforts. This is especially important in the context of federating initiatives where activities seek to build on what has gone before ('a brownfield approach'). Such an approach is being followed in the five large-scale pilots being launched in IoT, for example. Open standards and open APIs are important elements to allow SMEs to access and exploit digital platforms.

Promoting industrial partnerships

As noted above, industrial partnerships of varying maturity are evident in all of the topic areas. The need now is to intensify the dialogue across a critical mass of stakeholders, including large companies as well as SMEs. Communities need to be encouraged to align their strategies and to develop a consensus on a roadmap for the up-scaling of specific platforms, both vertical and horizontal.

Promoting standards

Standards have a key role to play in platform development. The focus should be on a European approach to standards that would eventually influence standards at an international level. Convergence of existing standards should be the primary emphasis rather than generating new platforms and standards. Large-scale pilots are instrumental to validate emerging standards and thus support standardisation activities. The policy and regulatory framework also needs to support this.

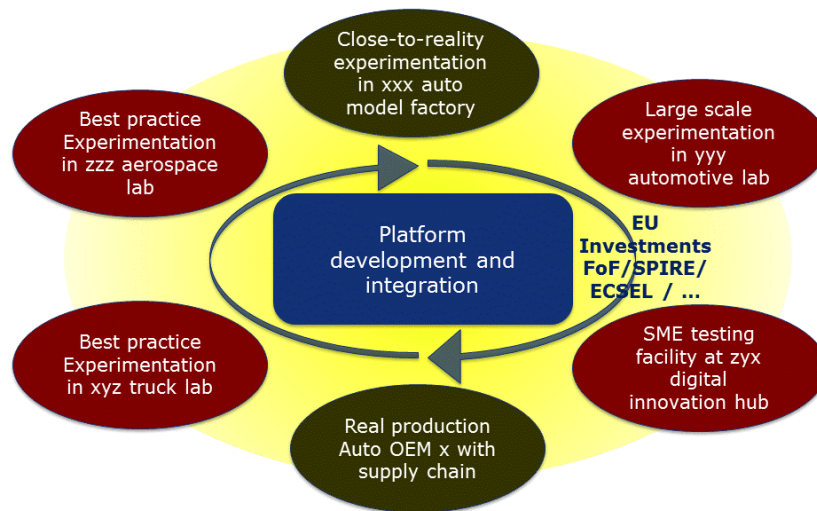
Supporting large-scale experimental facilities

Ready access to large-scale experimental facilities will promote acceptance of platforms and encourage their take-up. Such facilities should:

- enable testing and demonstration of novel standards, architectures and platforms driven by selected verticals;
- demonstrate the benefits of platform interoperability, in particular cost efficiency and sustainability gains;
- bring together supply and demand sides;
- strike a balance between visionary real-world scenarios and more innovative, lab-based approaches. Creating 'digital twins' of physical assets and digital models that span the product/service lifecycle will be unifying concepts;
- combine similar demonstrators across the EU and be linked to national activities where relevant.

Experiments must be representative of users, especially SMEs where the benefits may be much smaller and less distinct. Funding schemes need to be flexible, involving different actors in different phases.

By way of example, in the automotive sector a platform-based large-scale pilot production initiative could bring together investments at industry, national and regional levels and include a wide range of stakeholders (automotive OEM, truck manufacturer, tier 1 & 2 suppliers including SMEs) for a variety of purposes (best practice experimentation, close-to-reality experimentation, testing facilities for SMEs through a digital innovation hub, etc; see diagram).



A Potential Platform-Based Large-Scale Pilot Initiative in the Automotive Sector

Building the ecosystem

Measures to build the ecosystem around specific digital platforms will also be needed. These should include:

- Innovation spaces that bring together service providers and users and allow the two to experiment in a secure environment;
- Incubators that allow start-ups and entrepreneurs to develop new business models and skills;
- Access to finance, to take the necessary investments forward.
- Coordination actions to connect national/regional initiatives across Europe, spread best practices and facilitate convergence.

Reaching out to SMEs and start-ups

Initiatives must reach out to engage with SMEs (including family businesses such as farms), startups and entrepreneurs. Like other stakeholders, SMEs will engage if they see the benefits of digitisation: competition, new customers, price advantages, etc. They will need to be equipped with the technical and business skills necessary for them to exploit the opportunities presented by digitisation. Specific measures – spaces, support projects – will be needed for this and should be part of concrete actions, including digital innovation hubs.

Leadership in digital value chains requires world-class infrastructure

Europe lacks relevant infrastructure to exploit digital platforms effectively. For example, the amount of data that can be generated by a single aeroplane journey vastly exceeds the available storage and analytical capabilities. In remote regions, even basic connectivity is still an issue. The uptake of digital technology depends on a level playing field for all businesses, no matter what their size or location. Europe must invest in world-class infrastructure with both the public and private sectors playing their part.

3.3 Main Stakeholders Involved

Platforms that know no borders

There is a risk that the segmented sectoral and national initiatives develop in isolation. This must be avoided at all costs. Europe cannot afford an Industry 4.0 with a national flavour or a specific sectoral orientation. We have to break down silos and circumvent building 28 national systems.

The PPPs, as representatives of industry, have a vital role to play here. They should be encouraged to align their strategies so as to create consensus on industrial platforms, and then follow through in terms of implementation so as to exploit synergies and find new approaches. While we should continue to build ecosystems at national/regional level, interfaces between them will need to be defined at European level through the PPPs. Convergence of national initiatives at policy level should also be encouraged. In effect, we have to aim towards platforms that know no borders.

Building on European initiatives

There are clear and tangible opportunities at European level in areas such as:

- The Lighthouse Projects, large-scale pilots being launched within several PPPs (Big Data Value, SPARC);
- Project clusters on smart manufacturing within the FoF and SPIRE PPPs;
- Innovation Spaces (iSpaces), a Big Data Value PPP initiative to promote cross-sectoral sharing of data in very secure environments;
- Innovation Hubs within AIOTI; and
- Large-scale pilots foreseen in the 5G PPP.

However, these key projects were cited in many different contexts in the WG sessions (agriculture, healthy ageing, connected smart factories, industrial data platforms) and **there is a risk that too much is being expected from relatively few initiatives**. Additional activities will certainly be needed.

4. Conclusions and Next Steps

4.1 Overall Conclusions

The First Meeting of Working Group 2 brought together for the first time stakeholders with interests in developing and operating digital industrial platforms as well as potential beneficiaries in industry. As such it marked a milestone in terms of practitioners ‘on the ground’ taking ownership of this aspect of the DEI initiative, which up to now has focused at political and strategic level.

Key messages from these preliminary discussions overall were:

- **Drivers for digital industrial platforms** come from many directions. Ever more integrated value chains make it essential for Europe to become more focused on the consumer. Falling costs are opening the way to new approaches for exploiting big data that will provide major opportunities to create value. The growth of the cloud, IoT and M2M communication present important opportunities to link the physical and digital worlds. The Circular Economy, with its enormous traceability requirement for industrial and consumer products, could also be a key market driver for digital industrial platforms.

- Europe has a wealth of activity in the development of digital industrial platforms but efforts are highly fragmented. There is **an urgent need for better mapping** of EU, Member State and industry initiatives across all of the sectors/topic areas.
- Europe’s vision for the future of digital industrial platforms should put **users** – in all their various contexts – **at the centre of more integrated digital value chains**. This means building partnerships for the data economy based on trust, so as to clearly demonstrate the benefits of the new digital value chains and provide incentives for data sharing between stakeholders.
- **Legal regimes must keep pace** with technological and business innovation within digital industrial platforms and must not be allowed to become a brake on the development of integrated digital value chains.
- **Next generation platforms** should aim to:
 - Promote integrated digital value chains that span the business and consumer dimensions, including innovative business models;
 - Facilitate convergence between the physical and digital dimensions of products and processes (e.g. ‘digital twins’);
 - Promote cross-sectorial approaches;

Actions should also focus on interoperability and standardisation for connecting platforms; consensus building; and cross-sectorial compatibility. The extent to which ‘horizontal’ platforms need piloting with a cross-sector or a sector-driven approach is an open question.

- **Large-scale federating initiatives** would help convince industry of the value of digital platforms and start to build the necessary partnerships and ecosystems. They should build scalable solutions, demonstrate new business models, and facilitate mutual access to shared data for stakeholders on transparent terms. Key obstacles remain to be addressed on issues such as: data ownership, data provenance, and data security.
- While the priorities and approach will vary by topic (see below), at a generic level the priorities should include:
 - **Promoting interoperability based on open platforms and APIs.** Interoperability and integration of legacy systems should be a key focus of testing and validation efforts, such as the large-scale federating initiatives.
 - **Promoting industrial partnerships**, by intensifying existing dialogues and making sure a critical mass of stakeholders is involved. The alignment of strategies and development of roadmaps for the up-scaling of existing platforms – both vertical and horizontal – should be key areas for discussion.
 - **Supporting large-scale experimental facilities** that enable testing and demonstration within selected verticals, demonstrate the benefits of interoperability, and bring together supply and demand sides. Links to similar demonstrators at European and national level should be promoted.
 - **Building the ecosystem around specific digital platforms**, through measures such as clusters, innovation spaces/hubs, incubators, access to finance and coordination actions. Such measures will play a key role in reaching out to SMEs and start-ups.
 - **Investing in infrastructure to exploit digital industrial platforms** across both the public and private sectors.

4.2 Subgroup Conclusions

Discussions and conclusions from the topic sessions are elaborated in detail in the Annexes and summarised below.

Connected Smart Factory

Europe has a rich landscape of initiatives within Connected Smart Factories. At industry level, community-led sector-specific, community-led cross-sector, and proprietary platforms with open interfaces are all evident. Challenges for the future include: more agile and flexible approaches and zero-defect production; mass customisation of products (so-called 'lot size one'); integration of autonomous and AI systems within the manufacturing environment; bridging between the physical and digital worlds in both products and processes; and more sustainable value networks, in particular in terms of energy and resource efficiency. Europe also needs the relevant infrastructure to exploit digital industrial platforms effectively.

Options for piloting actions include:

- To develop platforms that connect manufacturing assets and IT systems, within a factory and with its network of suppliers and customers, disclose data from various sources, and enable third-parties to develop value-added applications. These platforms could be piloted in different manufacturing areas, which have different characteristics, e.g. in terms of sectors or challenges addressed.
- Similar to (discrete) manufacturing mentioned above, platforms could be developed for the process industry, with emphasis on particular aspects for continuous and batch production.
- Implementation within building and construction as a relevant sector for platform development and piloting. In particular, issues such as energy efficiency could be addressed here.

Digital Transformation of Health and Care

Healthcare is a highly complex sector involving not just the EU and Member States, but also regions and cities (major providers of care in some countries) and technology providers. Framework conditions such as regulation of medical data, privacy and security, and confidentiality feature prominently. The vision is for holistic data platforms for future eHealth and care, focusing on interconnectivity and interoperability, cross-sectorial approaches, mobility, and standardisation. Efforts should be made to combine EC initiatives and align efforts of the PPPs. For example SPARC, the PPP for robotics, is proposing a Lighthouse project on robotics in healthcare. It would address healthcare & ambient assisted living as a long term innovation strategy and span the whole care value chain from home to hospital and with a personalised approach. Funding would be mobilised from different sources, public and private.

Options for piloting actions include:

- To accelerate the introduction of robotics, IoT, Big Data and AI as cost-effective technologies into the healthcare system by establishing large pilot projects demonstrating added value in diagnostics, surgical procedures, clinical services, prosthetics, rehabilitative care, smart hospitals, healthy living and active ageing or age-friendly housing.

Smart Agriculture

Digital technologies play an increasingly important role in agriculture. Although some farmers are embracing these technologies and already using a variety of platforms to support and manage their activities, the majority have yet to be convinced. Development is highly fragmented and there is a

clear need for increased connectivity and interoperability between platforms. Data sharing presents major opportunities for the sector but the benefits will only be realised by building trust and partnerships between farmers, technology providers and others involved in the new digital value chains. Large-scale demonstrations are needed to show the benefits of interoperable platforms and new data-driven business models within smart agriculture.

Options for piloting actions include:

- To contribute to the development of smart solutions (e.g. decreasing use of water, lowering ecological footprints, reducing costs, increasing traceability and food security) for precision agriculture through large-scale pilots and demonstration projects integrating robots, sensor networks, data management technologies and other IoT technologies in different agricultural sub-sectors.

Connected Autonomous Driving

Connected autonomous driving was addressed within the plenary session. It was noted that many activities are already underway here that bring together digital, physical and mobility elements. In addition to industry, cities and regions are also key players. Governments can play a role in accelerating these developments. Key initiatives at European level include the ITS Master Plan (currently being proposed) and Gear 2030, which focuses on what the car of the future will need to deliver and how it will work. Efforts are also foreseen to remove regulatory hurdles, in relation to driverless cars for example. Through the DEI Roundtable the sector will work with telecoms and others to ensure a convergence of visions.

No subgroup meeting on this topic was held on 21 October. However, based on previous discussions it is apparent that options for piloting actions in this sector include:

- To support the move to more secure, more efficient and cleaner transportation systems by setting-up a cross-border testing facility pooling investments across Europe and connecting various stakeholders from AI-experts to automotive OEMs and communication service providers.

In terms of horizontal topics:

Industrial Data Platforms

Industrial Data Platforms will be crucial for the digitisation of industrial production and of other sectors' activities. They provide the technical infrastructure allowing data to be shared with the players able to make best use of them while respecting the rights and interests of the party that has invested in collecting the data. Key legal and technical issues remain to be addressed. Ensuring data sovereignty and trust in data transactions is also an important objective. Initiatives under the PPPs (such as Lighthouse projects, iSpaces and innovation hubs) as well as initiatives emerging in some Member States (such as Industrial Data Space) provide valuable building blocks which could be replicated in various environments. Ensuring a secure value chain by respecting the requirements in the different stages is also a key requirement.

Under the DEI, the aim is to support the development of competitive data platforms and the availability of world class data infrastructure in Europe. The data platforms should typically be open to members willing to adhere to the rules of the platform. Piloting actions would aim:

- To support the development of virtual environments facilitating the connection and exchange of data between different companies and organisations through a shared reference architecture, common governance rules and within a secure business ecosystem. Key aspects include legal and technical conditions to help businesses to make safe and secure exchange, transfer, access and reuse of data.

Internet of Things

The IoT area has a ‘zoo’ of platforms and convergence is urgently needed. In some areas developments in the consumer markets are ahead of those in the industrial space and efforts should be made to ensure cross-fertilisation between the two. This needs to be driven by market pull and the opportunity for Europe is in strength areas such as mechatronics, systems engineering and automotive. Key priorities include: promoting industrial partnerships, building on the valuable work done by AIOTI; creation of open platforms and promotion of standards; and making sure that SMEs and startups have access to large-scale IoT experimental facilities with both a sectoral and cross-sectoral orientation.

Options for piloting actions include:

- To develop platforms cutting across sectors and accelerate innovation by companies and communities of developers, and to scale up IoT deployment in different sectors that includes integration of advanced IoT technology, contribution and validation of emerging standards and new business models at European and national level.

4.3 Towards a WG Draft Report

Discussions at the first meeting focused on defining a vision, identifying gaps and goals, and scoping priority actions. While these start to address the WG’s Mandate further work remains to be done in responding to the questions set out by the Roundtable. In its future meetings and discussions **the WG should engage more deeply with further issues highlighted in the Mandate**, namely:

- Alignment and co-investment between the PPPs and Member States around the same industrial priorities so as to reach critical mass in digital industrial platforms.
- The form and objectives for further EU and national platforms-related projects and/or large-scale testing and experimentation pilots.
- Further definition of certain EU initiatives currently under preparation.
- For a later stage, further support necessary for the full roll-out of digital innovation platforms (Stage 3 of the pillar diagram on p.4). For example: how to ensure the necessary mobilisation of resources? How can alignment of initiatives strengthen the European position in standardisation? What actions may be necessary in relation to public procurement of innovations and framework conditions? Which targets and indicators should be used to provide evidence and monitor progress?

More elaborated responses on these issues will provide a framework for the draft WG report.

WG Members are also invited to comment and provide feedback on the piloting options outlined in the bullets under section 4.2 above (by 18 November).