

BIG DATA VALUE cPPP

Monitoring Report 2017



BDV BIG DATA VALUE
ASSOCIATION

EXECUTIVE SUMMARY

The **European contractual Public Private Partnership on Big Data Value (BDV cPPP)** was signed on 13 October 2014 and marked the commitment of the European Commission, industry and partners from academia to **build a data-driven economy across Europe**, mastering the generation of value from Big Data and creating a significant competitive advantage for European industry, thus boosting economic growth and jobs¹. The **Big Data Value Association (BDVA)** is the private counterpart to the European Commission in implementing the BDV cPPP programme.

The **BDV cPPP activities** address **Big Data technology** and **application research and innovation development, new data-driven business models, data ecosystem support, data skills, regulatory and IPR environments** and a number of **social aspects**. The value generated by Big Data technologies empowers Artificial Intelligence to foster linking, cross-cutting and vertical dimensions of value creation at the technical, business and societal levels across many different sectors.

The BDV cPPP started in 2015 and was operationalised with the launch of the Leadership in Enabling and Industrial Technologies (LEIT) work programme 2016/2017 of Horizon 2020 (H2020) **with the first cPPP projects (Call 1) starting on January 2017**². This is the first Monitoring report of the BDV cPPP that includes input from running projects.

2017 has been a year of major advancements for the Big Data Value cPPP. Funded projects started in 2017 ramping up **from 0 to the 33 running projects**³ at the beginning of 2018. During its first year of operations projects have reported **over 40 innovations** of exploitable value including technology, services, software, methods and tools, and including products and software components in the field of **advanced privacy and security respecting solutions**. The PPP has already delivered services of high **societal value** and many are planned for 2018 onwards. There is also evidence of contribution to the **environmental challenges** with some early results showing 12-40% energy efficiency and 20% reduction of CO2 emissions in some pilots.

With an initial indicative budget from the Union of **534 M€** for the period 2016-2020, the BDV cPPP has mobilised **1,1 B€** of **private investments** since the launch of the cPPP (484,6 M€ in 2017).

The BDV cPPP covers **4 major sectors with close to the market large-scale implementations** (Bio Economy; Transport, Mobility and Logistics; Healthcare; Smart Manufacturing) and **over 10 different sectors** covered in total including Agriculture, Forestry and Fishing, Manufacturing, Wholesale, Retail and e-Commerce, Transport and Logistics, Information Service activities, Financial and Insurance activities, Public Administration, Health and Wellness, Safety and Security, Food, Tourism, Media and Energy. The BDV cPPP has developed **26 large Scale experiments** (19 involving closed data) and **over 150 use cases** and experiments and made available **85,4 Petabytes of data for experimentation**⁴.

The BDV cPPP has developed during 2017 **18 training programmes** involving around 1 700 participants in total and **over 100 events**. **Over 100 new job profiles** are expected to be generated in the upcoming 2-3 years, and running projects foresee a contribution to **job creation** with estimated numbers from 1.000 to +10.000 new jobs by 2023.

¹ BDV Contractual agreement and BDV PPP SRIA

² 2 projects of the 15 granted projects of the 2016 call started at the very end of 2016

³ 32 projects as one of them, KPLEX project sister project from ICT-35 is already finished.

⁴ Data for experimentation in the context of the project

Results of the Monitoring Report 2017 show that a wide range of SMEs in Europe benefit from the Big Data Value cPPP, considering **size, age and geographical distribution**. Participation of **SMEs in the BDV cPPP is over 20%** and the PPP has launched targeted data incubation activities for start-ups. SMEs play a variety of roles in the data value chain⁵ and SMEs participating in the BDV cPPP clearly show a trend of **increase in turnover** (69%⁶ average with respect to 2014, beginning of H2020, and a 10,6 % increase in the last year⁷) and **increase in number of employees** (52% compared to 2016).

During 2017 resources have been put in place by the **cPPP CSA BDVe project** to set up the necessary **coordination and collaboration structures and tools** for the projects to **unlock the innovaiothn potential** of the BDV cPPP as a programme. BDVA and BDVe project have worked closely together to implement a systematic and interactive collaboration approach between the projects, the Association and its members, and the European Commission.

The Big Data Value Association (BDVA)⁸, private counter part of the European Comission in the BDV cPPP, has **increased its membership for 25%** during 2017 reaching almost 200 members at the end of 2017, with representation in 28 countries of which 23 are EU Member States, 2 candidates and 3 countries associated to Horizon 2020. 18% of BDVA members are Large Industries, 33% are SMEs, 42% are Research and Academia and 7% represent non-profit or public/Governmental players.

During 2017 the Association has contributed to the data ecosystem development by organising **over 10 workshops** with members and external communities, **a large event** with over 800 participants (EBDVF 2017), and has implemented the second wave of **BDVA i-Spaces labelling**⁹, with 7 labelled i-Spaces selected and promoted during 2017. BDVA has developed **3 papers** providing **Big Data guidelines** in **Healthcare, Smart Manufacturing and Earth Observation**, several **position papers**, a consolidated **BDV cPPP Reference model** and it has updated its Strategic Research and Innovation Agenda (**SRIA**) to the version **v4.0.** BDVA has built **strategic collaborations with other PPPs** (EIT Digital¹⁰, ETP4HPC, EFFRA, ECSO, euRobotics), with other initiatives and communities (AIOTI, EOSC, RDA), with Standardisation bodies, and has become a member of the **Digital Skills and Jobs coalition**.

Year 2018 is a transition period for the PPP implementation moving from phase I to phase II with many new projects starting in early 2019, and expected increasing impact and value created by the ongoing projects. Additionally, to support future funding programmes the BDVA community has also produced throughout 2017 a **Future Vision paper** for the Big Data Value Ecosystem for the post H2020 period¹¹. Finally, recently launched initiatives such as the AI communication¹² and the data communication “Towards a European Data Space”¹³, and the EuroHPC¹⁴ Joint Undertaking will strongly influence shaping the future of the European Big Data Value cPPP.

Disclaimer: *This document has been prepared by the Big Data Value Association (BDVA) and it reflects the views only of its authors.*

⁵ This information has not been specifically gathered through a questionnaire but it is known because of the role of the companies in the projects. In future exercise it could be useful to request this information also.

⁶ 7,5% of the sample is not considered to assess the evolution of turnover, because they did not provide input for all the years (e.g. they provided only input for 2017, or for the rest of the years and not 2017, etc)

⁷ In alignment with the macro-economic figures provided in KPI II.3

⁸ www.bdva.eu

⁹ All information about the i-Spaces labelling can be found on the the BDVA website. General information: <http://bdva.eu/I-Spaces>. Labelling process: <http://bdva.eu/node/789> Information about labelled i-Spaces: http://bdva.eu/BDVA_labelled_i-spaces

¹⁰ In 2016

¹¹ http://bdva.eu/sites/default/files/BDVA%20position%20to%20Fp9_v1.pdf

¹² <https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe>

¹³ <https://ec.europa.eu/digital-single-market/en/news/communication-towards-common-european-data-space>

¹⁴ <https://ec.europa.eu/digital-single-market/en/eurohpc-joint-undertaking>

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1. INTRODUCTION: THE BIG DATA VALUE CPPP

The BDV cPPP started in 2015 and was operationalised with the launch of the Leadership in Enabling and Industrial Technologies (LEIT) work programme 2016/2017 of Horizon 2020 (H2020) **with the first cPPP projects (Call 1) starting on January 2017**¹⁵.

The Big Data Value PPP plays a central role in the **implementation of the revised DSM strategy**¹⁶, contributing to multiple pillars including “Digitizing European Industry”, “Digital Skills”, “Building the European Data Economy” and “Developing a European Data Infrastructure”.

The vision, overall goals, main technical and non-technical priorities, and a research and innovation roadmap for the European Public Private Partnership (PPP) on Big Data Value are defined in the **Big Data Value Strategic Research and Innovation Agenda (BDV SRIA)**¹⁷.

The BDV SRIA defines an implementation strategy involving four main mechanisms:

- **I-Spaces** are cross-organisations cross-sector interdisciplinary Innovation Spaces to anchor targeted research and innovation projects. They offer secure accelerator-style environments for experiments for private data and open data, bringing technology and application development together. I-Spaces act as incubators for new businesses and the development of skills, competence and best practices.
- **Lighthouse projects** are large-scale data-driven innovation and demonstration projects that aim to create superior visibility, awareness and impact.
- **Technical projects** tackle specific Big Data technical priorities.
- **Cooperation & coordination projects** foster cooperation for efficient information exchange and coordination of activities, and address non-technical challenges such as skills, ethical issues, etc.

The BDV cPPP SRIA defines the roadmap and methodology describing 3 different phases:

- **Phase I:** Establish Innovation Ecosystem (H2020 WP 2016–2017 calls)
- **Phase II:** Disruptive Big Data Value (H2020 WP 2018-2019 calls)
- **Phase III:** Long-term Ecosystem Enablers (H2020 WP 2019–2020 calls)

The BDV SRIA has been updated annually incorporating the multi-annual roadmap of the BDV cPPP. BDV SRIA v4 provides direct input to the LEIT WP 2018-2020 as defined in its updated phase II and III.

BDVA¹⁸ is an industry-driven and fully self-financed international non-for-profit organisation under Belgian law. BDVA has almost 200 members all over Europe with a well-balanced composition of large and small and medium-sized industries (over 30% of SMEs), as well as research and user organisations. BDVA members come together to collaborate in a common mission: developing the **European Big Data Value Ecosystem** that will **enable the data-driven digital transformation** in Europe delivering maximum **economic and societal benefit**, and **achieving and sustaining Europe’s leadership on Big Data Value creation and Artificial Intelligence**.

¹⁵ 2 projects of the 15 granted projects of the 2016 call started at the very end of 2016

¹⁶ <https://ec.europa.eu/digital-single-market/en/news/digital-single-market-mid-term-review>

¹⁷ BDVA SRIA v4.0: http://bdva.eu/sites/default/files/BDVA_SRIA_v4_Ed1.1.pdf

¹⁸ www.bdva.eu

To achieve this mission BDVA members develop the following activities also included as part of this Monitoring Report 2017:

- **Develop Data Innovation Recommendations:** Providing guidelines and recommendations on data innovation to the industry, researchers, markets and policy makers.
- **Develop Ecosystem:** Developing and strengthening the European Big Data Value Ecosystem.
- **Guiding Standards:** Driving Big Data standardisation and interoperability priorities, and influencing standardisation bodies and industrial alliances.
- **Know-How and Skills:** Improving the adoption of Big Data through the exchange of knowledge, skills and best practices.

The cross-technological nature of the data value chains, flowing across different technologies (IoT, Cloud, 5G, Cybersecurity, infrastructures, HPC, ...) has triggered and accelerated during 2017 the **development of stronger collaborations** between the BDV cPPP/BDVA and other technological (cross-sectorial) sectorial communities and in particular **with other PPPs**. This has resulted in the identification of common challenges, alignment of roadmaps, and development of activities of common value. This work has been reflected in the latest multi-annual version of the BDV Roadmap as part of the SRIA v4.0 and materialised in the LEIT WP 2018-2020 with some calls of common interest focused on **technology integration**¹⁹ and the signature of official declarations of collaboration with other PPPs during 2018.

During 2017 the Public-Private collaboration consolidated its foundations, not only through contractual and governance structures but joining efforts in major dissemination and engagement activities. During 2017 the European Commission and the Association merged their main European Data Community events in a single new branded European large event: The **European Big Data Value Forum (EBDVF)** which first edition took place in November 2017 in Versailles.

2. MAIN ACTIVITIES AND ACHIEVEMENTS DURING 2017

The main achievements of the Big Data Value cPPP during 2017 can be summarised as follows:

- **Mobilised private investments** since the launch of the cPPP of **1,1 B€** (484,6 M€ in 2017).
- **33 projects running at the beginning of January 2018**, with **16 projects active during 2017** (contributing to many of the KPIs) and 17 additional projects selected in 2017 and starting in 2018. Tangible outcomes from 2017 (1st year of operations):
 - **45 innovations** of exploitable value delivered during 2017.
 - **Over 100 new job profiles** expected to be generated in the upcoming 2-3 years. **70% of the projects contribute to job creation** with estimated numbers from 1.000 to +10.000 new jobs by 2023.
 - **3 patents**, over **25 publications** and **7 products or software components** in the field of **advanced privacy and security respecting solutions** for data access, processing and analysis.
 - **1 economically viable service of high societal value** developed and 22 planned for +2018 from the 16 projects running in 2017.
 - Participation of **SMEs over 20%** and targeted data incubation activities for start-ups.

¹⁹ E.g. ICT-11 a) and b)

- **18 training programmes** involving around 1700 participants in total and **over 100 events**.
 - **67%** coverage of research priorities defined in SRIA, with **32** systems and technologies developed in the relevant sector beyond the state-of-the-art.
 - **26 Large Scale experiments (19 involving closed data)** and over **150 use cases** and experiments.
 - **4 major sectors** (Bio Economy; Transport, Mobility and Logistics; Healthcare; Smart Manufacturing) covered with close to the market large-scale implementations, and over 10 different sectors covered in total.
 - **85,4** Petabytes of data for experimentation.
 - Evidence of **contribution to the environmental KPIs**, with early results showing 12-40% energy efficiency and 20% reduction of CO₂ emissions in some pilots.
- Organisation of the **European Big Data Value Forum (EBDVF)** 2017 event.
 - **Three papers developed by the association providing Big Data guidelines to Industry**, users, research and Policy makers in strategic application areas and in collaboration with external communities.
 - Big Data Technologies in Healthcare (whitepaper)²⁰.
 - Big Data Challenges in Smart Manufacturing (discussion paper)²¹.
 - Big Data in Earth Observation (whitepaper)²².
 - **SRIA update** to the version **v4.0** provides direct input to the LEIT WP 2018-2020 as defined in its updated phase II and III.
 - European Big Data Value **post H2020 vision paper**.
 - Second wave of **BDVA i-Spaces labelling**²³, with 7 labelled i-Spaces selected during 2017.
 - Consolidation of **BDV cPPP Reference model**.
 - Developed **collaborations** with an impact on technology integration and the digitisation of industry challenges, and in particular into **collaborations with the ETP4HPC** (European Technology Platform for HPC) (for HPC), ECSCO (for cybersecurity), **AIOTI** (for IoT), 5G (through 5G PPP), the **European Open Science Cloud** (EOSC) (for the Cloud), and the **European Factories of the Future Research Association** (EFFRA) (for factories of the future).
 - Official **liaison with the ISO/JTC1/WG9** with the main objective of channelling European input (cPPP) into global standards and organisation of 3 specific workshops (June, August and November) to engage with standardisation bodies such as ETSI, CEN / CENELEC, W3C, OneM2M, and RAMI 4.0.
 - BDVA/BDV cPPP has become a member of the **Digital Skills and Jobs coalition**.
 - BDVe project is supporting the collaboration of the Network of Centres of Excellence in Big Data and the establishment of a new Centre of Excellence in Bulgaria, the first such centre in Eastern Europe.

²⁰ <http://bdva.eu/sites/default/files/Big%20Data%20Technologies%20in%20Healthcare.pdf>

²¹ http://bdva.eu/sites/default/files/BDVA_SMI_Discussion_Paper_Web_Version.pdf

²² http://bdva.eu/sites/default/files/TF7%20SG5%20Working%20Group%20-%20White%20Paper%20EO_final_Nov%202017.pdf

²³ All information about the i-Spaces labelling can be found on the the BDVA website. General information: <http://bdva.eu/i-Spaces>. Labelling process: <http://bdva.eu/node/789> Information about labelled i-Spaces: http://bdva.eu/BDVA_labelled_i-spaces

- Data skills activities including the launch of the BDV PPP Educational Hub for European MSc programmes in Data Science and Data Analytics, and a stakeholder workshop on data skills in Brussels.
- Knowledge Exchange Sessions with the US Big Data Hubs.

2.1 Implementation of the calls for proposals evaluated in 2017

The calls evaluated in 2017 included 4 topics (ICT-14, ICT-15, ICT-16, ICT-17.b) with the deadline for submission of proposals on 25th April 2017. **17 proposals** were selected for funding (success rate of 12,05%) with a total EC contribution of 88,9 Million € (and an estimated private contribution of 10,4 Million €).

From the total **contribution of the EC** to the calls 2017 (88,9 Million €), 44,2% goes to private for-profit organisations, 19,1% to High Education Institutions, 25,5% to research institutions, 2,7% to Public bodies, and 8,6% to others. 17,1% of the original EU allocated budget total goes to SMEs (15,2 Million €). **22,5%** of the total EC contribution for the calls 2017 goes to SMEs²⁴.

In terms of participant types, 57,2% are private for-profit organisations, 18,1% Research organisations, 18,1% Higher or secondary education, 3,3% public bodies, and 3,3% others. **SMEs represent the 21%** of all participants.

The ratio of **BDVA member participation** for the calls 2017 was about 29,6% (70,4% of non-BDVA members in the participation) with an allocation of 35,3% of the budget. Annex 3 (Results from calls for proposals) provides further details and explanations on these results.

Portfolio analysis:

[Table 1](#) shows the mapping of the BDV SRIA mechanisms to the funded projects by the H2020 LEIT WP 2016-17²⁵ and introduces for the first time in this report the name of all the selected projects as they will be referenced throughout next sections.

In terms of **SRIA technical priorities coverage** the major focus of technical contributions lies in the “Data Management” priority, closely followed by “Data Analytics” and “Data Processing Architectures”. We can see a clear trend that focuses on the technical contributions in the areas of “Data Analytics” and “Data Processing Architectures”, which will see a strong increase in the years 2018 and beyond, which is in line with expectations given a solid base of “Data Management” solutions that in turn enable analytics and processing. Section 3.2 of this report and Annex 2²⁶ to this report provide detailed visualisation and analysis of results differentiating contributions delivered in 2017, ongoing in 2018 or planned for future years.

SRIA Mechanism	WP Topics	Projects calls 2016	Projects calls 2017
i-Spaces	ICT-14	EW-Shopp: Supporting Event and Weather-based Data Analytics and Marketing along the Shopper Journey	BODYPASS: API-ecosystem for cross-sectorial exchange of 3D personal data
		AEGIS: Advanced Big Data Value Chain for Public Safety and Personal Security	Fandango: FAke News discovery and propagation from big Data ANalysis and artificial intelligence Operations
		QROWD: Because Big Data Integration is Humanly Possible	ICARUS: Aviation-driven Data Value Chain for Diversified Global and Local Operations

²⁴ Considering one of the projects (ICT-14.b EDI) has 4,8 Million € allocated in the budget of the coordinator²⁴ to open calls for SMEs and start-ups

²⁵ Table 1 does not include the sister project from ICT-35-2016 (Enabling responsible ICT-related research and innovation - KPLEX project) was added to the cPPP portfolio

²⁶ Section 7 of Annex 2. KPI II.10

SRIA Mechanism	WP Topics	Projects calls 2016	Projects calls 2017	
		FashionBrain: Understanding Europe's Fashion Data Universe	TheyBuyForYou: Enabling procurement data value chains for economic development, demand management, competitive markets and vendor intelligence	
		euBusinessGraph: Enabling the European Business Graph for Innovative Data Products and Services	Lynx: Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe	
		SLIPO: Enabling the European Business Graph for Innovative Data Products and Services	Cross-CPP: Ecosystem for Services based on integrated Cross-sectorial Data Streams from multiple Cyber Physical Products and Open Data Sources	
		BigDataOcean: Exploiting Ocean's of Data for Maritime Applications		
		Data Pitch: Accelerating data to market (INCUBATOR)	EDI: European Data Incubator (INCUBATOR)	
Lighthouse Projects	ICT-15	DataBio: Datan-Driven Bioeconomy	BOOST 4.0: Big Data Value Spaces for Competitiveness of European Connected Smart FacTories 4.0	
		TT: Transforming Transport	BigMedilytics: Big Data for Medical Analytics	
Cooperation and Coordination Projects	ICT-17.a	BDVe: Big Data Value ecosystem	N/A	
	ICT-18.b	e-Sides: Ethical and Societal Implications of Data Sciences	N/A	
Technical Projects	ICT-16	N/A	BigDataGrapes: Big Data to Enable Global Disruption of the Grapevine-powered Industries	
			BigDataStack: High-performance data-centric stack for big data applications and operations	
			CLASS: Edge and CCloud Computation: A Highly Distributed Software Architecture for Big Data AnalyticS	
			E2Data: European Extreme Performing Big Data Stacks	
			I-BiDaaS: Industrial-Driven Big Data as a Self-Service Solution	
			Track and Know: Big Data for Mobility Tracking Knowledge Extraction in Urban Areas	
	ICT-18		SODA: Scalable Oblivious Data Analytics	
			MH-MD: My Health - My Data	
ICT-17.b		SPECIAL: Scalable Policy-awarE linked data arChitecture for prlvacy, trAnsparency and compliance		
		N/A		DataBench: Evidence Based Big Data Benchmarking to Improve Business Performance

Table 1: Portfolio analysis: mapping with the BDV SRIA implementation mechanisms

2.2 Mobilisation of stakeholders, outreach, success stories

Although 2017 has been the launching of the first wave of PPP projects, the cPPP implementation (projects) can already point to initial **success stories**, such as **development of new technologies/systems**, first successful **experiments and outcomes**, **strong project foundations in place** from most of the projects, **publications** and **engagement activities**. BDVA members have also reported individual success stories directly linked to their participation in the Big Data Value PPP including **new business opportunities and partnerships**, broaden scope of R&D capabilities and **enrichment of company innovation portfolio**, and

success in commercial services within the scope of the BDV PPP SRIA, which input back into the community as knowledge (important for ecosystem development).

A summary and examples of success stories from the projects and the BDVA members can be found in Annex 4.

BDVA has established **official collaboration agreements** with EIT Digital, AIOTI, and EFFRA, and it is working to formalise an agreement with ETP4HPC after 2 years of intense cooperation. BDVA has been invited to join the EuroHPC Joint Undertaking and it is strengthening collaboration with euRobotics in line with the European AI initiative and also with ECSO for CyberSecurity. BDVA has contributed to the 3 Working Groups of Digitising European Industry initiative, and it has developed official liaisons with International Standardisation Bodies²⁷. Finally, BDVA is developing collaborations with other European Data Initiatives such as RDA, IDSA and initiating collaboration with the MyData community.

DataPitch, the first **data accelerator** to bring together organisations from all over Europe that own data and would like to see it used to solve some of their most interesting business problems, with start-ups with fresh ideas for data products and services, launched its **1st open call** in 2017. The competition aimed at selecting the best business ideas by start-ups and SMEs from all over the EU. The selected companies received funding of up to 100K€ equity free and a place at our data accelerator that started in February 2018. Data Pitch received 142 applications with the first call concluding on October 1st, including applications for all the chosen challenges. 18 companies were accepted into the accelerator to start in February 2018.

To mobilise stakeholders the projects have developed intensive communication and dissemination campaigns, with a result of **100 events in total organised by the projects during 2017** (including project-specific events, seminars, conferences, etc.) with the objective of raising awareness about their different activities, to engage new stakeholders, and to keep up the expectations about future upcoming results²⁸.

In addition to this, the Association (**BDVA**) has also contributed with the organisation of 2-day events with 7 Activity Groups (with an average attendance of 50-70 participants, BDVA members and external guests), the organisation of 6 standalone workshops (2 for Big Data Standards, 2 for Big Data-HPC cooperation, 1 for skills and 1 for Data Future scenarios in collaboration with IDC), and it has participated in multiple events, with speakers, and by organising of workshops.

All these activities deployed during the year have culminated in the **European Big Data Value Forum 2017** (Versailles on November 21-23, 2017), a large event with over 800 participants **organized by the BDVA, INRIA (local host, BDVA member) and the European Commission** and where all projects, BDVA members and many external actors in the European Big Data and AI landscapes had the opportunity to meet, share experiences, present their achievements, and discuss about the future²⁹.

2.3 Governance

The main governance structure of the Big Data PPP (

[Figure 1](#)), was prepared and delivered at the beginning of the PPP to provide the framework for collaboration and alignment among all members of the PPP (EC, funded projects, and the BDVA).

²⁷ Formally with ISO/EIC JTC1 WG9

²⁸ A full list of events organised and participated reported by the projects can be found in Annex 4.

²⁹ Full report of EBDVF 2017 in Annex 5

The **Cooperation Charter** was created by the Association as one of the key governance mechanism to facilitate cooperation among the BDV PPP actions and the BDVA³⁰. The BDVe project³¹ (CSA of the BDV cPPP) has supported the implementation of the PPP projects Governance structure by establishing the BDV PPP **Steering Committee** (SC) and the **Technical Committee** (TC) in 2017; these two bodies, where all the BDV PPP actions are represented, ensure awareness and foster exchange about the achievements and outcomes produced by the BDV PPP actions. The Steering Committee (SC) provides executive-level steering and advice to ensure effective and efficient coordination and communication between the BDV cPPP actions. The Technical Committee (TC) facilitates knowledge exchange and cooperation on the technical aspects, methodology and implementation of the BDV cPPP programme. Both the SC and TC were kicked off during Spring 2017. 2 SC meetings and 1 TC meeting were organised during 2017, coordinated by the BDVe project:

- SC01 meeting, 13th March 2017, Brussels
- SC02 meeting, 20th November 2017, Versailles
- TC01 meeting, 10th May 2017, Brussels

A non-formal Communication Committee was also established to support cooperation in Marketing and Communications.

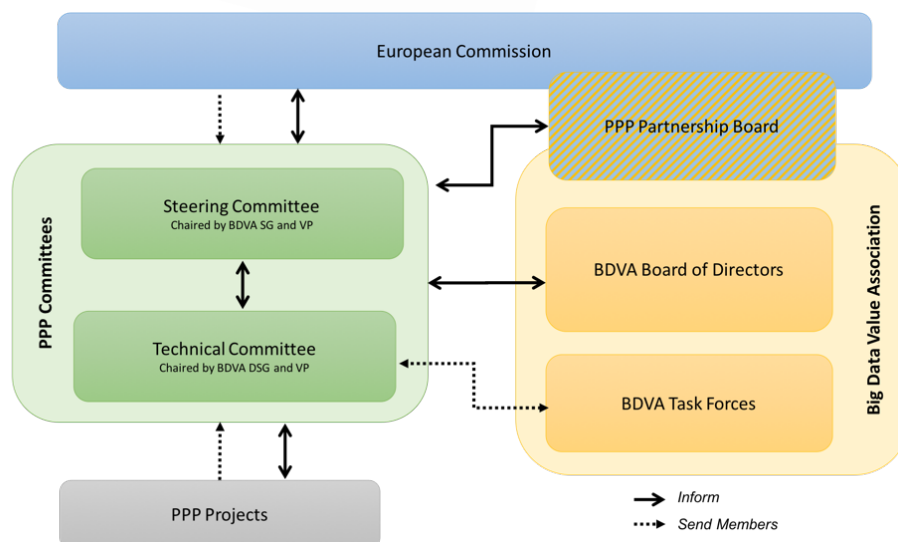


Figure 1: BDV cPPP Governance structure

The **Board of Directors**³² (BoD) of BDVA is selected by the General Assembly (2-year mandate) and is in charge to achieve the Objectives of the Association. It follows the resolutions, instructions and recommendations adopted by the General Assembly. The BDVA **General Assembly** (GA), conformed by all the BDVA members, approves the general policy of the Association. The **BDVA Task Forces**³³ (TFs) are the main centres of BDVA activities and are regulated by its bylaws and established or dismissed by the BoD.

³⁰ The Cooperation Charter was produced by the BDVA during 2016 and it has been integrated in the CAs or GAs of the Call 1 and 2 actions, thereby formalizing the actions' commitment to supporting the cooperation among the BDV ecosystem.

³¹ Reported as part of BDVe project D3.17

³² List of BoD members: <http://www.bdva.eu/board-members>

³³ <http://www.bdva.eu/task-force-overview>

The **Partnership Board** (PB) is the monitoring body of the cPPP formed by selected directors of the Board of the BDVA, and representatives of the European Commission. The PB meets approximately 2 times per year. The European Commission is represented by DG Connect Directorate G (Unit G1 in particular). Following the elections of the BoD on November 2016, 10 Association directors were appointed during 2017 to renew the PB PSM. Appointment is based on expression of interest and assessment on the balance in composition.

During 2017 **two official Partnership Board** meetings were held:

- **PB07**³⁴: June 28th, 2017 (Brussels, standalone meeting)
- **PB08**: November 20th, 2017 (Versailles, co-located with European Big Data Value Forum 2017)

Discussion topics include vision and strategy for the BDV PPP, engagement with other PPPs and other initiatives, contribution to different application domains, SRIA and input to Work Programmes, review of overall progress in commitments and achievements from the private and public side, cPPP mid-term review (cPPP KPIs), PPP implementation topics, governance, common events (EBDVF) and overall progress.

3 MONITORING OF THE OVERALL PROGRESS SINCE THE LAUNCH OF THE CPPP

3.1 Achievement of the goals of the cPPP

According to the Big Data Value PPP SRIA v4³⁵ the programme will develop the European data ecosystem in distinct phases of development, each with a primary theme. The three phases are:

- Phase I: Establish the ecosystem (governance, i-Space, education, enablers) and demonstrate the value of existing technology in high-impact sectors (Lighthouses, technical projects) (Work Programme WP 16–17).
- Phase II: Pioneer disruptive new forms of Big Data Value solutions (Lighthouses, technical projects) in high-impact domains of importance for EU industry, addressing emerging challenges of the data economy (WP 18–19).
- Phase III: Develop long-term ecosystem enablers to maximise sustainability for economic and societal benefit (WP 19–20).

The cPPP goals achieved are analysed based on the defined roadmap and in particular in the progress on its **Phase I: Establish Innovation Ecosystem (2016–2017)**, focused on laying the foundations needed to establish a sustainable European data innovation ecosystem. In particular:

³⁴ MR2016 reported PB meetings 5,6 and 7 taking place in 2016. This was an error in the numbering as 2016 hosted PB04, PB05 and PB06.

³⁵ And Multi-Annual roadmap version 2017

Expected cPPP activities and outcomes for 2016-2017 according to BDV cPPP SRIA / Multi-Annual roadmap	Achievements
Establish a European network of i-Spaces for cross-sectorial and cross-lingual data integration, experimentation and incubation (ICT14 – 2016–17)	<ul style="list-style-type: none"> • 15 projects (8 running in 2017, 7 selected in 2017 and starting in 2018) including 2 European Data Incubators. • 7 labelled BDVA i-Spaces providing data experimentation and data incubation capabilities for SMEs
Demonstrate Big Data Value solutions via large-scale pilot projects in domains of strategic importance for EU industry, using existing technologies or very near-to-market technologies (ICT15 – 2016–17)	<ul style="list-style-type: none"> • 4 lighthouse projects: 2 running in 2017, and 2 selected in 2017 and started in 2018. • 4 major domains of strategic importance covered: Bio Economy; Transport, Logistics and mobility; Healthcare; and Manufacturing.
Tackle the main technology challenges of the data economy by improving the technology, methods, standards and processes for Big Data Value (ICT16 – 2017).	<ul style="list-style-type: none"> • 67% of SRIA technical priorities covered in 2017. • 7 technical projects selected in 2017 (started in 2018) • Strong foundations in place to define Big Data Standardisation priorities in collaboration with ESBs and Global standardisation bodies (ISO, ITU) in between TF6.SG6 and the running projects. • BDV PPP reference model
Advance the state of the art in privacy-preserving Big Data technologies and explore the societal and ethical implications of this (ICT18 – 2016).	<ul style="list-style-type: none"> • 4 projects running in 2017 (1 focused on societal and ethical implications) • BDVA TF5 (Societal and Ethical aspects of Data, among other things)
Establish key ecosystem enablers including programme support and coordination structures for industry skills and benchmarking (ICT17 – 2016-17).	<ul style="list-style-type: none"> • BDVe project progress on skills, Business and SME support, impact and ecosystem development. • Governance structure in place • Benchmarking project selected in 2017 and starting in 2018 (DataBench) • Progress in BDVA Task Forces • New Skills Profiles and skills recognition • Centres of Excellence in Big Data • BDV PPP Educational Hub

Table 2: Summary achievements of the goals of the BDVA cPPP

3.2 Progress achieved on KPIs³⁶

3.2.1 Mobilised Private Investments (I.1)

Through this KPI we attempt to understand and capture/show the level of industrial engagement within the BDV cPPP. This KPI includes information at two levels:

- Total amount of actual private expenditure mobilised in cPPP projects
- Estimation of private investment mobilised in other R&D activities related to the cPPP, including investments after the end of the projects.

³⁶ Details in methodology, response rates, and detailed outcomes and analysis can be found in annex 2.

To calculate both the private investment mobilised in R&D activities and the private expenditure mobilised in projects **a questionnaire was sent out to 189 companies** representing all **for-profit organisations** participating in Big Data Value cPPP projects active during 2017 (including not only projects partners but also third parties engaged through cascade funding) and all for-profit organisations members of BDVA. The questionnaire requested the following relevant information³⁷:

- Turnover, employment and overall R&D Expenses (regional coverage Europe)
- Estimation of the total amount of R&D expenses that are related to Big Data (BDV SRIA). 4 sub questions complement this one:
 - Estimation of the amount of R&D expenses that are related to the Big Data PPP but are not related to EU-funded projects.
 - Estimation of the amount of R&D expenses resulting from follow-up investments of projects funded by the EC that are topic-wise related to the Big Data PPP, however initiated outside the Big Data PPP (in FP7 or in H2020) (excluding any expenses that have been funded by the EC)
 - Estimation the amount of R&D expenses resulting from follow-up investments of Big Data PPP projects (Excluding expenses that are funded by the EC) (only for participants in cPPP projects)
 - Calculation of actual overhead costs and BDV PPP project-related expenditure mobilised (in BDV PPP projects). (only for BDV PPP project partners)

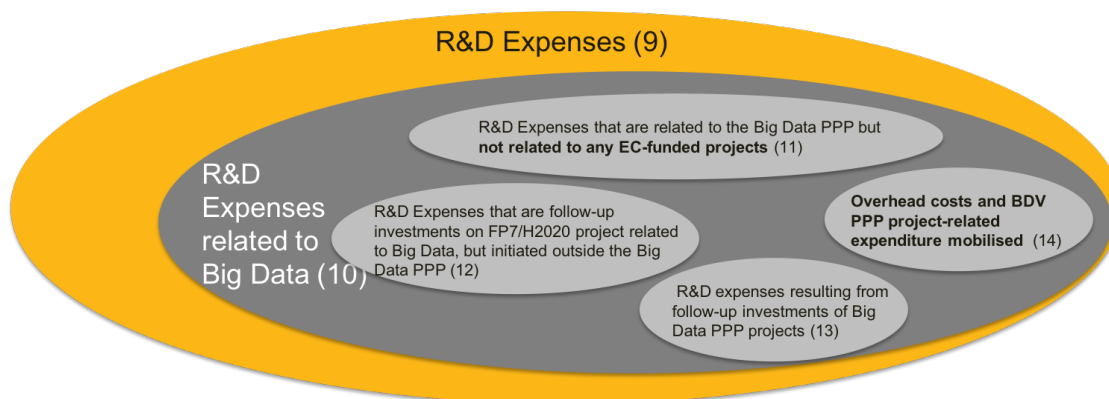


Figure 2: Illustration of the subset relationship of the expenses requested in (9) to (14)

The estimation of **private investment mobilised in other R&D activities related to the Big Data cPPP**, including investments after end of the projects, is calculated aggregating input from the respondents to questions (11) and (12). 44 companies provided input to the specific questions linked to this KPI (11) and (12), which is a 34,4% response rate considering all the for-profit organisation in project, and a 23,3% if we consider all the for-profit organisations in projects and in the Association.

The total based on aggregated numbers from those 44 companies is **472,2 M€**³⁸:

- 85,55 M€ relate to as follow-up investments for EC-funded projects topic-wise related to Big Data
- 388,67 M€ as investments related to the Big Data PPP, but not related to EC-funded projects

³⁷ Same questionnaire was used to gather information related to private investments (KPI I.1) so those fields are explained under I.1

The **total amount of actual private expenditure mobilised in cPPP projects** (i.e. beneficiary contributions to eligible project costs plus possible additional private expenditures directly linked to project execution), is calculated based on the input provided by the companies to question (13). The aggregated result is 4,55 M€³⁹ with a response rate of 36,7% for this particular sub-KPI. Based on annual estimated private contribution⁴⁰ the estimated figures for 2017 would be **12,4 M€, 2,26 times higher** than the known figure by the EC. Details of the methodology used to calculate these numbers can be found in Annex 2 to this report.

Table 3 shows the evolution of reported numbers in private investments from 2015 to 2017 (figures gathered through similar questionnaires in the BDV cPPP Monitoring Report 2015 and 2016).

Description	Unit	2015	2016	2017
Estimate of the total amount of R&D expenses that are related to Big Data	MEUR	948,20	1.020,60	1.079,01
Estimate the amount of R&D expenses that are related to the Big Data PPP but are not related to EC funded projects. (This excludes any expenses that are funded by the EC by definition!)	MEUR	245,80	289,10	388,67
Estimate the amount of R&D expenses resulting from follow-up investments of projects funded by the EC that are topic-wise related to the Big Data PPP however initiated outside the Big Data PPP (in FP7 or in H2020). Exclude any expenses that have been funded by the EC!	MEUR	35,10	49,40	83,55
Estimate the amount of R&D expenses resulting from follow-up investments of Big Data PPP projects. Exclude any expenses that are funded by the EC!	MEUR	N/A	N/A	1,09
Calculate actual overhead costs and BDV PPP project-related expenditure mobilised (in BDV PPP projects). (only for BDV PPP project partners).	MEUR	N/A	N/A	3,46

Table 3: Evolution of private investments on BDV cPPP over time⁴¹

Aggregated to the numbers reported in 2015 (280,9 M€) and 2016 (338,5 M€) the amount of mobilised private investments since the launch of the cPPP is **1096,1 M€**. With the additional **12,4M€** estimated actual private expenditure mobilised in cPPP projects during 2017, the accumulated total private investment since the launch of the PPP is **1 104 M€ (1,1 B€)**. Considering the amount of EU funding allocated to the cPPP so far (158,8 M€) the BDV cPPP ends 2017 with a **leverage factor of 6,95** much higher than the leverage factor of 4 committed contractually.

³⁹ Companies provided input to this KPI with different approaches (some provided only amount invested on top of reported, some the total, some just the reported figures, some specified reported and additional on top). As the Association does not have access to the 2017 reported figures by each of the companies it is difficult to extrapolate results. The figure provided is based on totals, even when some companies only reported the difference. Extrapolating current figures the total amount would be around 12,4 Meuros, 2,26 times bigger than the amount reported.

⁴⁰ Estimated to reporting period 2018.

⁴¹ Input to PPP project investment was 0 before 2017 as project had not started. Number 12,4 MEuros is calculated based on real input extrapolated based on percentage of responses and expected annual private investment explained earlier.

³¹ Considering the response rate we can assume this number is much higher, but as in previous years we only report on aggregated numbers based on real individual inputs with no extrapolation. As the methodology used this year to calculate this KPIs is the same that the one used in previous

Data incubator

Companies (start-ups) selected in the 1st call for projects of the DataPitch data incubator (cascade funding) were selected in 2017, but funding was not granted until 2018. While the amount of private expenses reported linked to the projects for 2017 is low (around 95K€ in total), the reported expected follow-up investment value for 2018-2022 is of 8,67 M€ (with a response rate to this question of 44%). This will be definitely an aspect to analyse in the future years, as current estimations point out to leverage effects above 600.

3.2.2 New skills and job profiles (I.2, II.8)

40% of the projects running in 2017 reported contribution to the creation of new job profiles. Although there is no evidence of job profiles created during 2017, **over 100 new job profiles** are reported as expected to be created from 2018 onwards and by the end of the project⁴² linked to the project activities.

Over 50% of the projects running in 2017 reported **contributions to the generation of new skills** by end of the project. In addition to the skills linked to the new job profiles reported above new skills are expected to be developed in cross sectorial domains and in specific sectors. Not enough quantitative data has been gathered to provide discrete numbers in relation to the skills creation.

Among the **BDVA members**, 43% of organisations have reported contribution to the creation of new Job Profiles and almost 70% contribute to the creation of new skills linked to the Big Data Value.

70% of the BDV cPPP projects active in 2017 indicated their project will contribute to job creation by 2023, with an estimation in accumulated numbers of thousands. Projects indicated in a qualitative way the causality in between the project activities and the job creation, and some provided an estimation in numbers. Job creation in discrete numbers is not possible to calculate precisely at this stage but **estimated numbers go from 1 000 to +10 000 new jobs by 2023**.

BDV cPPP projects have reported **18 training programmes during 2017** involving around **1700 participants** in total. 49 PhD and Master students are contributing directly to BDV cPPP projects, and over 100 events have been organised by the BDV cPPP during 2017.

3.2.3 Impact of the BDV cPPP on SMEs (I.3, II.18)

Results of the Monitoring Report 2017 show that a wide range of SMEs in Europe benefit from the Big Data Value cPPP, considering **size** (11% medium-size companies, 47% are small companies and 42% are micro companies⁴³), **age** (32% of the SMEs are 0 to 4 years old, 25% of the SMEs are 5 to 10 years old and 43% of the SMEs are 10 years old or older) and wide **geographical distribution**. The SMEs play a variety of roles in the data value chain⁴⁴. SMEs participating in cPPP projects clearly show a trend of increase in turnover and increase in number of employees.

Total turnover reported for SMEs in 2017 is **175,8 M€⁴⁵**. In terms of **turnover evolution** there is an **increase in aggregated data of 69%⁴⁶ with respect to 2014** (beginning of H2020) and a **10,6 %** increase in the last year⁴⁷ (2017 compared with 2016). This number is in full alignment with the macro-economic numbers of

⁴² End of 2019 considering the length of the 16 active projects in 2017

⁴³ Criteria for classification following EC rules: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

⁴⁴ This information has not been specifically gathered through a questionnaire, but it is known because of the role of the companies in the projects. In future exercise it could be useful to request this information also.

⁴⁵ Aggregated total of the companies

⁴⁶ 7,5% of the sample is not considered to assess the evolution of turnover, because they did not provide input for all the years (e.g, they provided only input for 2017, or for the rest of the years and not 2017, etc)

⁴⁷ In alignment with the macro-economic figures provided in KPI II.3

Data companies in Europe, and higher for some specific categories, in particular for young and micro companies. For example, very young companies reach over 54% annual increase. Detailed results based on age and size of the company are provided in Annex 2.

Special emphasis should be made on the cPPP instruments focused on supporting SMEs, and in particular the Data Incubators (DataPitch project in 2017) and i-Spaces. SMEs and Start-ups part of the data incubator DataPitch (cascade funding), were selected during 2017 but did not receive any funding until 2018. The average age of the companies engaged is 3,5 years, with 82% of SMEs younger than 5 years, and around 50-60% one year old or less (new companies). These companies reported a 36,4% increase in turnover in 2017 with respect to 2016, and the estimated turnover increase in 2022 with respect to 2017 is of 407%.

In terms of **employment evolution**, SMEs involved in the BDV cPPP have reported an increase of employees of **52%** compared to 2016 (and over 180% since the launch of H2020).

Results of the call for proposals 2017 show **22,5%** of the total EC contribution for the calls 2017 goes to SMEs.

3.2.4 Innovations emerging from projects (I.4, II.7, II.17)

Innovations arising from the BDV cPPP are expected to include:

- **Specific project developments that have a marketable value**, including Big Data **products, processes, instruments, methods, systems and technologies** offering value to a wide variety of economical and industrial sectors (I.4).
- **Services of high societal value** developed by projects (II.7) (including solutions contributing to the environmental challenges II.6, II.19, II.20, II.21)
- **Spin-offs** arising from projects and **start-ups** incubated by the programme activities (I.2 and I.3).
- **Patents and solutions** enabling **advanced privacy and security respecting solutions** for data access, processing and analysis (II.4)
- **Contribution to Standards** (III.3) (Individually as projects and coordinated activities at a programme level).
- **Innovations result of cooperations in between projects** or programme-coordinated activities (e.g. advances in data sharing, innovative skill programmes, re-use of technical solutions across different sectors, etc).
- Transformation of sectors of high economical value (led by the cPPP lighthouse projects, but also triggered by project cooperation): **New business models** and **scaling innovations** (advances in TRLs, cross-border solutions and bringing technology closer to the market accelerating adoption).

It is therefore necessary to have a full overview of the contribution to many different KPIs to understand the innovation value of the PPP. After its first year of operations this report concentrates in providing aggregated results of innovations arising from the projects, quantifying and describing those innovations (including the TRL and expected exploitable value), but it does not focus on the significance of those innovations, nor provides an overall innovation impact and assessment, which is expected to be assessed in future monitoring reports.

In their first year of operation, BDV cPPP 16 running projects reported **45 innovations** of exploitable value under including technologies, services, software, products, tools platforms, models and systems⁴⁸.

During 2017 there is an evidence of **one** service of high societal value⁴⁹ and a total estimation for 2018+ is of **22 services**⁵⁰.

32 new systems and technologies have been reported by cPPP projects as produced during 2017 and many of them are not limited to one sector and in fact the majority of the new systems and technologies can be utilised in different sectors/markets and by that stimulating the use of Big Data technologies in many areas.

Finally, all the solutions and innovations arising from the Big Data PPP will be promoted in the BDV PPP Marketplace developed by the BDVe CSA project to spread the knowledge about the outcomes of the cPPP.

Details can be found in Annex 1 and 2 to this report.

3.2.5 Support major sectors and major domains by Big Data technologies and applications (II.13)

The BDV cPPP lighthouse projects⁵¹ active in 2017 focused on the Bio-economy (Agriculture, Fisheries, and Forestry) (DataBio project) and Transport, mobility and logistics (Transforming Transport project). The 2 new lighthouse projects starting in 2018 cover the domains of Healthcare and Manufacturing, with a total of **4 major sectors supported by Lighthouse projects** and therefore widely supported with multiple use cases, scenarios and solutions.

Innovations reported above (section 3.2.4) include sectorial and cross-sectorial (horizontal) solutions supporting sectors such as Agriculture, Forestry and Fishing, Manufacturing, Wholesale, Retail and e-Commerce, Transport and Logistics, Information Service activities, Financial and Insurance activities, Public Administration, Health and Wellness, Safety and Security, Food, Tourism, Media and Energy.

Considering the whole project portfolio, the amount of sectors supported is bigger than **10**, although for sectors not addressed by lighthouse projects the amount of use cases and scenarios is more limited.

3.2.6 Experimentation (II.11, II.12, II.14)

Projects reported **26 large scale experiments** (aggregated number of experiments conducted by all projects in 2017), **19 involving closed (private) data** (73,1% of the total).

In addition, projects reported **151 use cases or/and experiments conducted during 2017** with a contribution from 8 different projects. BDVA members, including those running BDVA labelled i-Spaces, reported independently and **additionally** (to the BDV PPP projects) **130 data experiments during 2107** most of which have been developed in BDVA i-Spaces.

In relation to the amount of data made available for experimentation, projects have reported a total of **0,0854 Exabytes** (85,4 Petabytes) for 2017⁵².

⁴⁸ All these innovations are listed and described in annex 2

⁴⁹ Developed by euBusinessGraph project: "Open Corporates Event service" application that supports the transparency of company information

⁵⁰ This figure does not include the DataPitch incubated solutions, as start-ups will be developing further viable services within the DataPitch accelerator.

⁵¹ Large-scale data-driven innovation and demonstration projects that aim at creating superior visibility, awareness and impact in specific relevant economic sectors

⁵² 3 projects reported data for this KPI (TT, DataBio and EW-Shopp)

3.2.7 SRIA update and implementation (II.9, II.10)

For what concerns SRIA coverage (KPI II.10), measured as “% of research priorities covered compared to overall scope of research priorities defined in SRIA” projects have delivered contributions during 2017 covering **67%** of all the SRIA technical priorities, have reported ongoing activities during 2018 covering 92% of the priorities, and 100% coverage is planned for to be covered in 2018+. Section 5 of Annex 2 to this report provides a detailed analysis of the SRIA implementation.

In relation to the BDV SRIA update process, BDVA released at the very beginning of 2017 the SRIA v3.0 and worked through 2017 a new version (SRIA v4) counting **1 592** participants/contributions through 7 events and multiple online interactions.

SRIA v4 incorporates important strategic directions within the BDV PPP that are reflected in the Work Programme 2018-2019 and provides guidance for the way forward to 2020 and beyond. SRIA v4 includes a new chapter explaining the BDV Reference Model, adds an additional chapter to the Platforms for Data Sharing (Industrial and Personal), and puts more emphasis in the European Data Value Ecosystem Development and in particular goes more deeply into developed collaborations with an impact on technology integration and the digitisation of industry challenges, and in particular into collaborations with the ETP4HPC, ECSO, AIOTI, 5G, the European Open Science Cloud (EOSC), and the European Factories of the Future Research Association (EFFRA).

3.2.8 Technical Projects (II.4, II.15, II.16)

The BDV PPP contributes in **enabling advanced privacy and security respecting solutions for data access, processing and analysis** (II.4). For 2017, **15 contributions** were reported, with a planned number of contributions of 39 in 2018+. [Table 4](#) shows the consolidated and aggregated results for the three specific sub-KPIs. This is in line with what has been reported for KPI coverage, where we see an increase in the number of contributions/technologies on the technical priority “Data Protection”.

Number of patents filed by cPPP projects that enable advanced privacy and security respecting solutions for data access, processing and analysis		Number of publications by cPPP projects that describe advanced privacy and security respecting solutions for data access, processing and analysis		Number of OSS contributions/ products/ SW components resulting from cPPP projects that enable advanced privacy and security respecting solutions for data access, processing and analysis	
Year 2017	2018+	Year 2017	2018+	Year 2017	2018+
3	24	23	44	7	17

Table 4: Sub-KPIs for KPI II.4 “Enable advanced privacy and security respecting solutions for data access, processing and analysis”

In relation to the assessment of quality, diversity and value of data assets (KPI II.15) **54% of the projects** confirmed they are **assessing quality, diversity and value of data assets**. While these results show the intense usage of metrics to measure quality, diversity and value of data assets in projects, we cannot talk yet (2017) about “cPPP” developed metric expected for 2018+⁵³.

⁵³ In 2018, as part of the second call for projects, a new project called DataBench started with the objective of defining these metrics in collaboration with the projects. We expect therefore more concrete results from 2018 onwards. Additionally, a new subgroup under BDVA Task Force 6 (Data Benchmarking) has been created at the beginning of 2018 with the objective to widening the outreach in amount of research projects and actors.

In relation to the speed of **data throughput** compared with 2016 (II.16), over 30% of the projects reported they expect the project to improve data throughput. In terms of quantitative value the SLIPO project has already reported an improvement in data throughput on the project of 150-200%.

3.2.9 Macro-Economic KPIs (II.1, II.2, II.3, II.5)

The monitoring of the macro-economic KPIs is based on input from the European Data Market Monitoring Tool⁵⁴ as they are presented in the most recent report⁵⁵ by IDC.

According to the most recent report⁵⁶ **the number of Data Companies (KPI II.2)** increased to 276 450 by 2017, compared to 261 450 in 2016, with a growth rate of 5,7%. I-Spaces and Data Incubators (ICT 14-b projects) are designed to contribute to the KPI as they support start-ups and entrepreneurs from early ideas to technical and business development till go-to-market⁵⁷. Over 75% of the cPPP projects active in 2017⁵⁸ reported contribution from their project to increase the number of European Companies offering data technology, applications. In addition, 22,5% of the BDVA members reported their organisation run or support a programme that is specifically targeted at supporting start-ups or entrepreneurs in the Big Data area.

The **revenues of Data Companies in the European Union (KPI II.3)**, according to the IDC report⁵⁹, reached 69 B€ in 2017 compared to 62 B€ in the year before, with a growth of 11%. The revenue share of SMEs in 2017 amounts to 49,5 B€ (72% of the total revenues), an absolute growth of 4,5 B€ on the year before. The growth rate of revenues increases in proportion to company size, with the revenues of large companies over 500 employees growing at 15% in 2017 over 2016. **Over 70% of the cPPP projects** active in 2017⁶⁰ reported contribution (or plan to contribute) to the revenue generated by European Data Companies.

The baseline for **Data Professionals** in the European Union in 2013 (**KPI II.5**) amounts to 5,77 million. The number of Data Professionals increased to a total number of 6 million in 6.7 million by 2017, resulting in a total absolute growth of 913 000 since 2013 with a compound annual growth rate of 3,7%. Approximately half of this increase occurred in 2017, when the European economy gained 498 000 new data professionals jobs with an annual growth rate of 8%.⁶¹ Over 75% of the cPPP projects active in 2017⁶² reported contribution from their project to increase the number of Data Workers in Europe.

KPI II.1 assesses development of the **market share of the European Union in the global Big Data Market**. As an indicator, we compare the total revenues of EU Data Companies with other economies, i.e. the US, Japan, and Brazil, as they are used as a benchmark in the IDC report⁶³. The EU share of the total revenues in these economies the 2013 baseline was 27,7%. This share increased slightly to 28,1% in 2017, which is remarkable because the international indicators grew very fast in this period, but the EU kept pace with them. In absolute terms, the total revenues of US Data Companies in 2017 amount represent approximately double the revenue of EU Data Companies in 2017 (115,5 B€ vs. 56 B€). **Over 84% of the cPPP projects** active in 2017⁶⁴ reported contribution to increase revenue share of EU companies against total of revenue of EU, US, Japan, Brazil.

⁵⁴ SMART 2016/0063 – Study “Update of the European data marketMonitoring Tool”, IDC and Lisbon Councils

⁵⁵ Gabriella Cattaneo, Giorgio Micheletti et al. “Update of the European Data Market Tool - First report on Facts and Figures” February 2018

⁵⁶ Gabriella Cattaneo et al. “ibidem

⁵⁷ Further information can be found in section 2.1 of this report.

⁵⁸ Based on number of respondents.

⁵⁹ Gabriella Cattaneo et al. “Ibidem pages 89-97

⁶⁰ Based on number of respondents.

⁶¹ Gabriella Cattaneo et al. “European Data Market – SMART 2013/0063 D6 – Second Interim Report” p.71

⁶² Based on number of respondents.

⁶³ Gabriella Cattaneo et al. ibidem pp.130-140

⁶⁴ Based on number of respondents.

Details of contribution from the different projects to the macro-economic can be found in Annex 2.

3.2.10 Contributions to environmental challenges (II.6, II.19, II.20, II.21)

The 2 lighthouse projects running in 2017 (DataBio and Transforming Transport) have reported contributions to the reduction of energy use and the reduction of CO₂ (II.19). Some early results in the Transforming Transport project show that for the specific monitored items improvements in **efficiency range between 12% and 40%**.

Similarly, the 2 lighthouse projects, TT and DataBio, have reported contribution to the reduction of waste (II.20). For example, in DataBio and in particular in forestry, although still with early data and experiments, the experience from customer cases shows **up to 10% reduction in waste**.

And finally, the 2 lighthouse projects have reported contribution to the reduction in the use of material resources through improved maintenance and operations, savings in fuel consumption and specific plans e.g removal of all paper-based forest management plans in DataBio project. There is no particular input from projects running in 2017 about energy reduction in big data analytics using a specified benchmark through solutions provided by specific cPPP projects compared to baseline at beginning of H2020 (II.6)⁶⁵.

3.2.11 Standardization activities with European Standardization Bodies (III.3)

On March 2017, BDVA TF6-SG6 (Big Data Standards) presented to the European Multi Stakeholder Platform (MSP) on Standardisation results of the work developed during 2016 and Q1 2017, including some initial results in the definition of Big Data Standardisation priorities, a roadmap of activities and objectives. The European MSP on Standardisation provided some recommendations to fine-tune the main priorities for the BDVA Standardisation group as follows:

- Establish an official liaison in between the BDVA Standards Group and the AIOTI WG3. This activity was developed through different workshops during 2017 and implemented in 2018 with the signature of a MoU.
- Further develop the BDVA Reference Model pursuing alignment with others such as oneM2M, BDE Platform, AIOTI, RAMI 4.0, etc, This was implemented through different workshops organised during 2017.
- Open an official dialogue with CEN, CENELEC and ETSI on standards harmonisation, implemented through different workshops during 2017 (work in progress).
- Establish a dialog with CEN to discuss extending the CEN Workshop on Big Data beyond Aquaculture sector to include other sectors e.g. manufacturing.
- Create BDVA Roadmap for Big Data Standards harmonisation and industry engagement in Global Big Data standards development.

During 2017 **BDVA established an official liaison with the ISO/JTC1/WG9⁶⁶** with the main objective of channelling European input (cPPP) into global standards. Further actions are being developed during 2018 in this direction. Also, during 2017 BDVA has organised 3 specific workshops (June, August and November) to engage with other standardisation communities as an important step to create the Roadmap for Big Data Standards harmonisation, and in particular ISO/JTC1/WG9, ETSI, CEN / CENELEC, W3C, OneM2M, and RAMI 4.0.

46% of the projects running in 2017 reported they perform **activities leading to data/Big data Standardisation**. Only 1 project has reported contribution to European Standardization Bodies (ESBs)

⁶⁵ The recently started DataBench project will work on this with all the PPP projects

⁶⁶ At the time of submitting this report merged with the recently launched SC42 for Artificial Intelligence

activities and in particular DataBio, reporting 4 working items in ESBs (same reported as Pre-Normative Research Files under consultation in ESBs). **26% of BDVA members reported its organisations perform activities leading to data/Big data Standardisation.** In particular BDVA members have reported contributions to IEC, DIN DKE and other consensus-base standardisation bodies, OPC foundation and other consortia-based standardisation bodies, OASIS, W3C committees and community group discussions, open data harmonization national activities, ISO/EIC JTC1, contribution to define standards in georeferenced data for geoscience (OGC and IUGS/CGI) and ETSI. 18% of BDVA members reported contribution to ESBs. Members reported 17 working Items in European Standardization Bodies. Details can be found in Annex 2.

3.3 Evolution over the years

2017 is the 3rd year of activity of the BDV cPPP and the 1st period with running projects.

- **Leverage investments:** There is a clear indication of annual increase in **private R&D investments in the context of the PPP** along the 3 years (280,9 M€ in 2017, 338,5 M€ reported in 2016 and 472,2 M€ reported in 2017) with percentages of growth of almost 40% in the last year and with a total the amount of reported **mobilised private investments** since the launch of the cPPP of 1,1 B€. Considering the amount of EU funds allocated to the cPPP so far (158,8 M€) the BDV cPPP ends 2017 with a leverage factor of 6,95 higher than the leverage factor of 4 committed contractually.
- **Participation of SMEs in the programme has increased and kept over 20% of SME** participation in projects (as reported in 2016) and over 30% in the Association. But the important aspect to analyse is the evolution over the years of the SMEs involved in this PPP, showing growth in revenues and employees (job creation) in alignment with the macro-economic KPIs of the European Data Market and higher for specific SME profiles. SMEs linked to the association have also reported success stories linked to their participation in the PPP.
- **Achievements in implementing the BDV cPPP roadmap and the coverage of the SRIA technical priorities implementation** are described in Section 3.1 and Section 2.2 of this report. Results show the cPPP is in track with no major gaps identified considering not only the delivered activities during 2017 but also those ones planned for the already funded projects in the upcoming years.
- This year we can see an increase of the awareness on the importance of skills and job profile definition. However, still more alignment between industry and academia is required. The definition of a schema for skills recognition in agreement with industry and academy can help.
- BDVA, the **Association**, was created at the end of 2014 with 24 founding members, and has grown over the years outreaching a solid based of almost 200 members at present, with a well-balanced composition of large industries, SMEs and research organisations and geographical distribution. Task Forces and Subgroups were already set up back in 2015 and have evolved along the 3 years to adapt to the multi-annual roadmap needs and members focus. Since the launch of the PPP until the end of 2017 the Association organised 23 Activity group meetings/workshops (for task force and cross-task force collaboration), 4 international open large events, 21 Board meetings, 12 General Assembly meetings, and 9 PB meetings, delivered 4 versions of the BDV SRIA, 3 whitepapers, multiple position papers, a post H2020 paper, and has built strong collaborations with other PPPs, International and national organisations as reported in Section 2 and Annex 4.
- **Governance structures** for the PPP were set up during 2015 and operationalised since then. In 2016 the **Cooperation Charter** was created to facilitate cooperation among the BDV PPP actions and the BDVA, and during 2017 the project-oriented committees were integrated in the overall PPP Governance structure as reported in Section 2.3.

- The analysis of the evolution over years for most of the quantitative KPIs does not provide further information of what is already reported in Section 3.2, as most of the KPIs are for the first time presented in this report. Results from 2017 show **positive outcomes in terms of impact**, but a longer period of assessment will be needed to assess their evolution.
- The Macro-economic KPIs show evidence of growth in the sector and most of the projects provided qualitative statements and examples that give evidence of contribution of the PPP to those KPIs.

4. OUTLOOK AND LESSONS LEARNT

Year 2018 is a **transition year** and an important inflection point in between the so-called phase I (establishment of the ecosystem) to the second phase of the BDV cPPP (pioneer disruptive new forms of Big Data Value solutions). New calls for proposals are in place during 2018 and 2019 as part of the H2020 WP 2018-2019 (calls closing in April 2018, November 2018 and April 2019) that will bring many new projects to the portfolio increasing challenges of coordination and cooperation. At the same time and during 2018-2019, many new innovations are expected to be delivered and adopted demonstrating impact in different sectors. The increase of the quality and quantity of the data available for experimentation, and the launch of the cross-border Industrial Data Platforms and Personal Data Platforms at the beginning of the year 2020, supported by other ecosystem enablers will probably define final transition period towards phase 3 as defined in the SRIA v4.

Also during 2019 most projects from phase I will head towards an end with expectations of follow-up private investments from the PPP ramping up. We expect impact in job creation materialised mainly through the new job profiles and skills development.

The community is already working in identifying challenges and defining an extended roadmap for the future data economy⁶⁷ in strong collaboration with the running PPP projects, other communities, engaging national initiatives, the European Commission and Member States in the discussion. The objective is supporting the definition of public-private interventions needed for the future. In particular, BDVA is working in the following areas:

- **Next Generation Data and AI Platforms** building on the foundation of the early data platforms to be established in 2018-2020: to secure (industrial) prosperity of Europe in the context of the global data-driven economy Europe needs Industrial leadership in Big Data and AI platforms and technologies (develop, operate, promote its own Data / AI platforms) securing autonomy in Big Data and AI technology.
- **Trust in Data-Driven Critical Decision Making** with a focus on trusted co-evolution between humans and AI-based systems, legal issues with data decisions, and trust in algorithms and data. EBDVF 2017 already focused on this topic (“Trusted AI in Smart Industry”), and BDVA TF5 (policy and Societal) together with the BDVA BoD have already launched activities in this domain.
- **Extract Value from Next Generation Digital Infrastructure** (5G, HPC, Cloud, IoT, Big Data, Edge Computing and AI): In 2018 we are at the beginning of a great wave of enabling technologies from IoT, 5G, HPC, Edge Computing to Big Data and AI across all domains. The focus beyond 2020 will need to be on the knowledge and fusion technologies with many of these decisions taken in near to real time and the scalability of value chains involving key enabling technologies. In line with this BDVA and the

⁶⁷ http://bdva.eu/sites/default/files/BDVA%20position%20to%20Fp9_v1.pdf

BDV cPPP are developing strong collaboration with other PPPs, aligning roadmaps, and some projects starting in 2019 will provide relevant insights.

- **Scaling Industrial Cooperation Models in the Data Economy:** Addressing the lack of data interoperability, data sharing and exchange, and with a focus on new data-driven business models and data-driven industrial cooperation across value chains.
- **Data Skills and Know-how:** Develop the European workforce to have the necessary data skills for both technical and business tasks. Ensure Europe retains its best people in both Industry and Academia to compete in the global competition for talent. There is a need to promote skills in cross domain sectors and in particular in those sectors more novel to the application of analytics such as transport or health.

EBDVF 2018⁶⁸ will be held in Vienna on Nov 12 – 14 organised with the Austrian Ministry for Transport, Innovation and Technology as an official event under Austrian Presidency and with a theme on “Data-driven AI for the Future”.

Finally the recently launched initiatives such as the AI communication⁶⁹, the data communication “Towards a European Data Space”⁷⁰, the EuroHPC⁷¹ Joint Undertaking, and, the recommendations from the mid-term to rationalise the PPP landscape and improve the collaboration instruments brings a lot challenges and opportunities to the future of the European Big Data Value ecosystem and the BDV cPPP.

5. ANNEXES TO THIS REPORT:

Annexes Included in this public report:

- **Annex 1:** Results on all common and specific KPIs (embedded in this document)

Annexes available on request to the Association (email to info@core.bdva.eu):

- **Annex 2:** Details about all common and specific KPIs (methodology, response rates, assessment and detailed input)
- **Annex 3:** Results call for proposals 2017
- **Annex 4:** Details about collaborations, outreach and success stories
- **Annex 5:** Report on EBDVF 2017
- **Annex 6:** Relevant sectors and applications domain.

⁶⁸ www.ebdvf.eu

⁶⁹ <https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe>

⁷⁰ <https://ec.europa.eu/digital-single-market/en/news/communication-towards-common-european-data-space>

⁷¹ <https://ec.europa.eu/digital-single-market/en/eurohpc-joint-undertaking>

Annex I Part 1: Common Priority Key Performance Indicators

Key Performance Indicator (KPI)		Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments
I.1	Mobilised Private Investments	<p>Total amount of the private investment mobilised in cPPP projects (2017): 12,4 M€</p> <p>Private investment mobilised in other R&D activities related to the cPPP (2017): 472,2 M</p> <p>Accumulated (2017): 1 104 M€ (1,1 B€)</p>	N/A	2 Billion € (total accumulated of private investments)	<p>Total private investment mobilised in other R&D activities related to the cPPP since the launch of the cPPP (2015) 1 104 M€ (1,1 B€)</p> <p>2015: 280.9 M€ 2016: 338.5 M€ 2017: 472,2 M€ + 12,4 M€</p> <p>Total investment from EU (2016+2017): 158,8 M€</p> <p>Leverage factor: 6,95</p>
I.2	New skills and/or job profiles	<p>2017: 0</p> <p>Planned +2018: 116 (from projects running on 2017 only)</p>	0 (no projects running / no cPPP running)	>0 (not defined yet)	<p>40% of the projects running in 2017 reported contribution to the creation of new Job profiles. Although no job profiles were created in 2017, 116 new job profiles are reported as expected to be created from 2018 onwards and by the end of the project⁷² linked to the project activities.</p> <p>Over 50% of the projects running in 2017 reported contribution to the generation of new skills by end of the project. In addition to the skills linked to the new job profiles reported above new skills are expected to be developed in cross sectorial domains and in specific sectors. Not enough quantitative data has been provided to provide discrete numbers in relation to the skills creation.</p>

⁷² End of 2019 considering the length of the 16 active projects in 2017

					<p>Among the BDVA members, 43% of organisations have reported contribution to the creation of new Job Profiles and almost 70% contribute to the creation of new skills linked to the Big Data Value. The quantitative input from the members is not included.</p> <p>Finally 40% of the projects have reported contributions to the to the Skills Agenda for Europe⁷³.</p> <p>Details to support this KPI are provided on Annex 2.</p>
I.3	Impact of a cPPP on SMEs	<p>Total turnover (reported for cPPP SMEs for 2017): 175,8 M€ .</p> <p>Increase of turnover: 69% (baseline 2014)</p> <p>Last year increase of turnover (baseline 2016): 10,6 %</p> <p>FTE evolution: 52% respect to 2016 (and over 180% since the launch of H2020).</p>	N/A	N/A	<p>Profile participating SMEs:</p> <ul style="list-style-type: none"> • 11% are medium-size companies, • 47% are small companies, and, • 42% are micro companies (22)⁷⁴. <p>Average age of the SMEs is 9,6 years, and in particular:</p> <ul style="list-style-type: none"> • 32% of the SMEs (0 to 4 years old) • 25% of the SMEs (5 to 10 years old) • 43% of the SMEs (> 10 years old) <p>Geographical distribution of the SMEs providing input to this KPI is large covering the following European Countries: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Romania, Slovenia, Spain, Switzerland and UK.</p> <p>Details to support this KPI and mapping of SMEs are provided on Annex 2.</p>
I.4	Significant Innovations	45 innovations of exploitable value	N/A	>0	<p>In total, 45 innovations of exploitable value were reported and can be categorized as follows per project:</p> <ul style="list-style-type: none"> • Transforming Transport: 1 technology, 4 services, 1 Software, 5 Software and service (11 in total)

⁷³ <http://ec.europa.eu/social/main.jsp?catId=1223>

⁷⁴ Criteria for classification following EC rules: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

					<ul style="list-style-type: none"> • EW Shopp: 1 product, 1 tool, 1 method/service, 3 tool/services (6 in total) • SODA: 1 software, 1 technology (2 in total) • euBusiness Graph: 3 tools, 2 prototypes, 2 products, 1 platform, 1 Models, 1 component, 1 API, 1 discovery service, 1 Service (13 in total) • SLIPO: 5 systems and 1 software (6 in total) • Big Data Ocean: 1 model, 1 service (2 in total) • FashionBrain: 2 methods + system, 1 technology + system (3 in total) • Data Bio: 1 method and service • Kplex: 1 method <p>Following projects are still in the development phase and will have exploitable or marketable innovation starting from 2018/2019:</p> <ul style="list-style-type: none"> • AEGIS: in 2017 focus on collecting requirements and design activities • SPECIAL” first versions of Policy language and representation to store data processing and sharing events available • DataBio: still in the development phase of the new solution for easy data sharing and networking; solution will be ready in 2018 • Data Pitch: the first batch of SMEs/startups was selected in the second half of 2017 and did not finish their acceleration program in 2017; results can be provided in 2018 <p>Details to support this KPI are provided on Annex 2.</p> <p>Innovations arising from the BDV cPPP are expected to include outcomes reported in other KPIs (specific KPIs mainly):</p> <ul style="list-style-type: none"> • Services of high societal value developed by projects (II.7) (including solutions contributing to the environmental challenges II.6, II.19, II.20, II.21 • Spin-offs arising from projects and start-ups incubated by the programme activities (I.2 and I.3). • Patents and solutions enabling advanced privacy and security respecting solutions for data access, processing and analysis (II.4) • Contribution to Standards (III.3) (Individually as projects and coordinated activities at a programme level).
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Annex I Part 2: Specific Key Performance Indicators

KPIs listed in the PPP Contractual Agreement or/and the Multi-annual Roadmap of the PPP and not covered in Part 1.

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments
II.1 (CA1)	Market Share of the European suppliers of the global Big Data Market	Increased revenue share of EU companies against total of revenue of EU, US, Japan, Brazil 2017 [M€]: EU: 68 575 US: 145 546 BR: 6 310 JP: 27 723 Total: 244 444 EU-Share: 68 575/244 444 = 28.1%	2013 [M€]: EU: 56 029 US: 115 519 BR: 5 272 JP: 24 013 Total: 200 813 EU-Share: 56 029/200 813 = 27.9%	>27.6%	Source: Update of the European Data Market Study (SMART2016/0063) D2.1 First Report on Facts and Figures (Note: Baseline updated) Details and contributions from projects in Annex 2.
II.2 (CA5)	Number of Data Companies	Increased number of European Companies offering data technology, applications 2017: 276 450 2016: 261 450 Delta (2017-2016): 15 000 Delta (2017-2013): 36 604	2013: 239 846 Delta: 0	>0	Baseline: IDC report "European Data Market – SMART 2013/0063" D6 – First Interim Report 2016 value: IDC report European Data Market – SMART2013/0063" D8 – Second Interim Report Updated 2016 value and 2017 value: Update of the European Data Market Study (SMART2016/0063) D2.1 First Report on Facts and Figures Details in Annex 2.
II.3 (CA6)	Revenue generated by European Data Companies	Increased revenue generated by European data companies compared to baseline in terms of: Absolute growth Revenue: 2017: 68 575 M€ 2016: 61 781 M€	2013 [M€]: 47 801 M€	>0 >0%	Baseline: IDC report "European Data Market – SMART 2013/0063" D6 – First Interim Report 2016 value: IDC report European Data Market –

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments	
	Relative growth.	Growth (2017/16): absolute: 6 794 M€ relative: 11 % Growth (2017/13): absolute: 20 774 M€ relative: 43 %			SMART2013/0063" D8 – Second Interim Report Updated 2016 value and 2017 value: Update of the European Data Market Study (SMART2016/0063) D2.1 First Report on Facts and Figures Details in Annex 2.	
II.4 (CA7)	Enable advanced privacy and security respecting solutions for data access, processing and analysis	Number of patents filed by cPPP projects that enable ... Number of publications by cPPP projects that describe ... Number of OSS contributions/ products/ SW components resulting from cPPP projects that enable ...	2017: 3 patents 2018+ (planned): 24 patents 2017: 23 publications 2018+ (planned): 44 publications 2017: 7 2018+ (planned): 17	0 0 0	>0 >0 >0	As it can be seen on a high-level of analysis, in each of the sub-KPIs projects have delivered outcomes, with a steep increase from 2018+ onwards. This is in line with what has been reported for KPI coverage, where we see an increase in the number of contributions/technologies on the technical priority "Data Protection". For 2017, and as part of the SRIA technical coverage 15 contributions were reported, with a planned number of contributions of 39 in 2018+. Details in Annex 2.
	... advanced privacy and security respecting solutions for data access, processing and analysis					
II.5 (CA8)	Employment	Increased Number of European Data Workers	2017: 6 685 182 2016: 6 187 466 Delta (2017/16): 497 717 Delta (2017/16): 913 182	2013: 5 772 000 Delta: 0	>200 000	Baseline: IDC report "European Data Market – SMART 2013/0063" D6 – First Interim Report 2016 value: IDC report European Data Market – SMART2013/0063" D8 – Second Interim Report

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments	
					Updated 2016 value and 2017 value: Update of the European Data Market Study (SMART2016/0063) D2.1 First Report on Facts and Figures Details in Annex 2.	
II.6 (CA9) (D9)	Contribution to the reduction of energy use	Energy saved in big data analytics using a specified benchmark through solutions provided by specific cPPP projects compared to baseline at beginning of H2020	2017: N/A	1	<0.9	The recently started DataBench project will work out during 2018+ this with all the PPP projects. Details in Annex 2.
II.7 (CA10)	New economic viable services of high societal value	New economically viable services of high societal value developed or resulting from cPPP projects	2017: 1 2018+ (planned): 22	0	>0	As the cPPP projects started only in 2017, currently only a small number of all innovation developed within the projects is related to high societal value. During 2017 one service of high societal value has been developed by euBusinessGraph project: "Open Corporates Event service" application that supports the transparency of company information. Total estimation is of 22 services for 2018+. This figure does not include the DataPitch incubated solutions, as startups will be developing this viable services within Data Pitch acceleration. Details in Annex 2.
II.8 (CA11) (D3, D4)	Higher establishment availability of big data value creation skills development	Number of training programs established arising from cPPP. Number of European training programs involving 3 different disciplines arising from cPPP Number of Master and Phd students involved in PPP projects	Projects: 18 training programme involving around 1700 participants in total 0 49 (19 Master and 30 PHD)	0 0 0	>49 >9 N/A	Details in Annex 2 and Annex 4

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments	
	Number of dissemination events, seminars, conferences organised in cPPP projects (including number of participants)	100 events	0	N/A		
	Number of other actions that contribute to (e.g updated curricula, etc)	N/A	0			
II.9 (CA12)	Ensure efficiency, transparency and openness of the cPPP's consultation process	Number of overall contributors in the SRIA consultation process 2017 update: 1592 Total: 4227	0		Details provided in Annex 2.	
	Number of events to collect feedback from the community	2017 update: 7 Total: 23	0			
II.10 (CA13)	Ensure that technology progress is in line with multi-annual roadmap of SRIA	% of research priorities covered compared to overall scope of research priorities defined in SRIA (differentiate running, upcoming and not covered yet)	Delivered in 2017: 67% Ongoing: 82% Planned for 2018+: 100%	N/A	The major focus of technical contributions lies in the "Data Management" priority, closely followed by "Data Analytics" and "Data Processing Architectures". An important observation can be made, when considering the time dimension: clear trend that focuses on technical contributions in the areas of "Data Analytics" and "Data Processing Architectures" will see a strong increase in the years 2018 and beyond, which is in line with expectations given a solid base of "Data Management" solutions that in turn enables analytics and processing. An important priority, even though with less intensity, is "Data Protection". The analysis of the coverage of the challenges in this priority reveals an interesting insight. Details reported in Annex 2	
II.11 (D1)	Large Scale experiments conducted in cPPP projects and I-Spaces involving closed data	Number of large scale experiments conducted in cPPP projects and BDV I-Spaces involving closed data	19	0	>49	Projects reported 26 large scale experiments (aggregated number of experiments conducted by all projects in 2017), 19 involving closed(private) data (73,1% of the total). Projects also provided a criteria to for experiments to qualify as "large-scale" with following criteria being mentioned: <ul style="list-style-type: none"> • A combination of data volume, data complexity and velocity. • Investment • High data value flowing cross-border

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments	
					<ul style="list-style-type: none"> • Number of data sources • Complex datasets integrating data from different countries • Large geographical coverage; • Large number of involved actors and users • Significant impact for society and/ or business 3 projects have contributed to this KPI, and in particular the 2 lighthouse projects active in 2017, Transforming Transport and DataBio that have reported 13 and 12 (5 with close data) large scale experiments respectively. Details in Annex 2.	
II.12 (D2)	Uptake of BDV use cases and experiments	Year over Year increase of the number of Big Data Value use cases supported in I-Spaces and cPPP projects	2017 from projects: 151 2017 from members (mainly I-Spaces): 130	Baseline for projects is 2017	30% (p.a.)	Projects reported 151 use cases or/and experiments conducted during 2017 with a contribution from 8 different projects. Details in Annex 2: <ul style="list-style-type: none"> • TT project: 47 • FashionBrain project: 5 • EW-Shopp: 7 • DataPitch: 20 • Special project: 3 • DataBio Project: 13 • euBusinessGraph project: 6 • Sliop project: 50
II.13 (D3)	Support major sectors and major domains by Big Data technologies and applications	Number of sectors and major domains supported by Big Data technology and applications developed in cPPP projects	Lighthouse projects: 4 Total: 10 (or > 10)	0	>9	Sectors supported in lighthouse projects: 4 <ul style="list-style-type: none"> • Transport, logistics and mobility; • Bio Economy; • Healthcare; • Manufacturing Other sectors supported by Big Data technology and applications developed in cPPP projects: Retailing and e-commerce Fashion Safety and Security Maritime environment Tourism Media (Fake news) Details in Annex 2.

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments	
II.14 (D6)	Amount of data that has been made available to I-Spaces (including in particular closed data)	Number of Exabytes of data made available in cPPP projects and I-Spaces (including closed data) (access to data for experimentation) This include data made available for experimentation (e.g. Data incubators and I-Spaces) and data made available internally in the projects for experimentation purposes (e.g. Lighthouses and other projects)	0,0854 Exabytes (85,4 Petabytes)	0	>10	Details in Annex 2.
15 (D7)	Availability of metrics for measuring the quality, diversity and value of data assets	Number of metrics developed by cPPP that allow for assessing quality, diversity and value of data assets	2017: 7 projects using metrics. 0 new metrics developed by cPPP	0	>0	54% of the projects running in 2017 confirmed they are assessing quality, diversity and value of data assets. Details in Annex 2.
16 (D8)	Increase the speed of data throughput compared to 2014	Data throughput of specified benchmarks increases by contributions of cPPP projects and other technology advancements by a factor of 100 compared to 2014.	2017: 150-200% reported in 1 project. +30% projects expect to improve data throughput	1	100	Over 30% of the projects reported they expect the project to improve data throughput. In particular EW-Shopp, DataPitch, euBusinessGraph and SLIPO reported expected outcomes in this area. In terms of metric used EWShopp reported using Gb/h, DataPitch reports "number of data driven product funded", euBusinessGraph "Number of datasets and number of data providers" and SLIPO talks about "triples per second". In terms of quantitative value SLIPO project has already reported an improvement in data throughput on the project of 150-200%.
II.17 (CA 4)	New systems and technologies	Number of systems and technologies developed in the relevant sector in cPPP projects (beyond state of the art)	32	N/A	>0	32 new systems and technologies have been reported by cPPP projects as produced during 2017 and many of them are not only related to one sector. Assessing the results coming from the cPPP projects it can be determined that in fact the majority of the new systems and technologies can be utilized in different sectors/markets and by that stimulating the use of Big Data technologies in many areas. The multl.applicability of the innovative systems and technologies coming from the projects is shown in

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments
					<p>the list below increasing by that virtually the potential number of innovations showing the impact they have on different sectors:</p> <ul style="list-style-type: none"> • Agriculture, forestry and fishing: 2 (BigDataOcean) • Wholesale, retail and e-commerce: 7 (EW-SHOPP), 5 (SLIPO) • Transport, storage and logistics: 4 (TT), 5 (SLIPO) • Information Service activities: 14 (euBusinessGraph) • Financial and insurance activities: 3 (SODA) • Public administration (eGovernment): 5 (SLIPO) • Health and Wellness: 3 (SODA) • Tourism: 5 (SLIPO) • Fashion: 2 (FashionBrain)
II.18 (CA3)	Participation and benefits for SMEs	<p>Number of SMEs participating in cPPP projects</p> <p>2017: 51 2016: 70 (52 +18 funded through open calls) Total: 121</p> <p>Share of participation of SMEs in cPPP projects</p> <p>%Organisations 2017: 21% Total: 23% [review]</p> <p>%Budget 2017: 22,5% Total: 23,7%[review]</p> <p>Estimation of the increase in turnover in SMEs participating in the cPPP projects (Reported in I.3)</p> <p>Increase of turnover: 69% (baseline 2014) Last year increase of turnover (baseline 2016): 10,6 %</p> <p>Estimation of the increase in number of employees for SMEs participating in the cPPP projects</p> <p>%annual increase: 51,9%</p>	<p>2014: 581,7 FTEs 2015: 957,5 FTEs 2016: 1083 FTEs 2017: 1645, 2 FTEs</p>	20%	<p>Details provided in Annex 3 and comments provided to KPI I.3 (and Annex 2)</p>

KPI domain	Key Performance Indicator (KPI)	Value in {2017}	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments
			%increase on baseline: 182,8%		
II.19	Contribution to the reduction of energy use and CO2 emissions	<p>Contribution of the cPPP projects to the reduction of energy use in the area of the cPPP</p> <p>Contribution of the cPPP projects to the reduction of CO2 emission in the area of the cPPP</p>	<p>2017: 2 projects contributing in 2 major application domains Early results show 12-40% energy efficiency in some pilots</p> <p>2017: 3 projects contributing. Early results show 20% reduction in some pilots</p>		Contribution from Lighthouse projects in the areas of Transport, Logistics, Mobility and Bio Economy (agriculture, fisheries, forestry) Details can be found in Annex 2.
II.20	Contribution to the reduction of waste	Contribution of the cPPP projects to the reduction of waste in the area of the cPPP	2017: 2 projects. Up to 10% reduction*		2 projects contributing in 2 major application domains. DataBio: In forestry, the biomass Manager module of Wuudis solution tracks and provides the material balance of bio-material supply chains. This is a versatile solution and can handle any type of bio-material at any scale. Any material wastage can be easily identified through this solution. In addition, it also offers corrective suggestions to reduce material waste. Up to 10% reduction in waste is the experience from our customer cases. Further details in Annex 2.
II.21	Contribution to the reduction in the use of material resources	Contribution of the cPPP projects to the reduction of material resources in the area of the cPPP	2017: 2 projects contributing		The 2 lighthouse projects running in 2017 (DataBio and Transforming Transport) have reported contribution to the reduction in the use of material resources. Further details in Annex 2

Annex I Part 3: Contribution to Programme-Level KPI's

	Key Performance Indicator (KPI)	Definition/Responding to question	Type of data required	Data [Commission/Association]	Baseline at the start of H2020 (latest available)	Target (for the cPPP at the end of H2020)	Comments
1	Patents		Number of patent applications. Number of patents awarded		n.a. [new cPPP under H2020]		
2	Standardisation activities (project level)		Number of activities leading to standardisation	[Data from Association] 3	n.a. [new cPPP under H2020]	No target	SPECIAL contributes/has contributed to W3C (Tracking Protection, EXI, Web of Things, RDF Data Shapes, POE). DataBio project contribution to OGC Testbed 13 – Exploitation Platform Thread Contribution to OGC DCAT Best Practice Paper OGC 18-00. euBusinessGraph reported a the development of a semantic model for companies information. In addition e-Sides and KPLEX monitor and publish findings in Standards. Further details in Annex 2
	Contributions to new standards (PPP level)		Number of working items in European Standardisation Bodies.	2017: 21 Total: 36		No target	2015: 12 2016: 3 (3 additional) 2017: 21 2017: 21 (4 from DataBio project; 17 from members)
			Number of pre-normative research files – prEN - under consultation in ESBs	2017: 4 Total: 6			2015: 2 (from members) 2016: 0 2017: 4 from DataBio project
3	Operational performance	Time-to-grant	from call closure to grant agreement signature (days)	196,41 days [Commission]		Max 8 months (243 days)	Average value

	Key Performance Indicator (KPI)	Definition/Responding to question	Type of data required	Data [Commission/Association]	Baseline at the start of H2020 (latest available)	Target (for the cPPP) at the end of H2020	Comments
4	H2020 - LEIT - Number of joint public-private publications	Number and share of joint public-private publications out of all LEIT publications.	Properly flagged publications data (DOI) from LEIT funded projects	35 publications [Commission]	n.a. [new cPPP under H2020]		The modest number of scientific project publications is due to the fact that all these projects only started in 2017. Many more publications are expected in the 2018 monitoring report.



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