3.1 Publishable summary

BYTE context and objectives

The **B**ig data roadmap and cross-disciplinar**Y** community for addressing socie**T**al **E**xternalities (BYTE) project will assist European science and industry in capturing the positive externalities and diminishing the negative externalities associated with big data in order to gain a greater share of the big data market by 2020. In order to do so, BYTE is developing a policy and research roadmap for big data in Europe and forming a big data community to implement the roadmap. The first year of the project conducted seven big data case studies in actual big data practices across a range of disciplinary and industrial sectors to gain an understanding of the economic, legal, social, ethical and political externalities that are in evidence. In this second year, we have consolidated and published the case study findings, undertaken a horizontal analysis of the case studies and used this information to develop a vision for big data for the year 2020. These activities form the basis for the research and policy roadmap, which is the cornerstone of the final year of the project. Finally, stakeholder engagement is key to the success of the BYTE project, and is crucial to all stages of the research process including the case studies, visioning exercise, roadmap and community building. Looking towards year three, BYTE will organize three workshops and a final conference, in collaboration with major, relevant European events, to encourage and enable a wide population of stakeholders from different disciplinary, industry and sectoral perspectives to give input into the research and policy roadmap and the formation of the big data community.

The BYTE project has the following **main objectives**:

- To **map the current context** in which big data is utilised
- To review **big data policies and initiatives** of the **public and private sector**
- To understand the **technological and infrastructural tools** relevant to **big data**
- To understand the **economic, legal, social, ethical and political issues** relevant to big data
- To gauge **public sentiment** around big data based on current information practices
- To understand the **relationship** between big data and **open access to data**
- To use **stakeholder participation** in **case studies** to identify the **positive and negative externalities** evident within these case studies
- To determine the extent to which **negative externalities can be diminished** and **positive externalities can be amplified**
- To develop **a series of sector-specific visions** for big data five years in the future
- To develop a **general vision for big data five** years in the future
- To design the **BYTE research** and **policy roadmap** for big data that accounts for the social impact, positive externalities, and negative externalities associated with big data and gain **stakeholder consensus** on the **BYTE roadmap**
- To **design** and **form** the **BYTE Big Data Community**

3.1.2 BYTE activities so far

In the first two years, the BYTE project has progressed well in meeting its objectives.

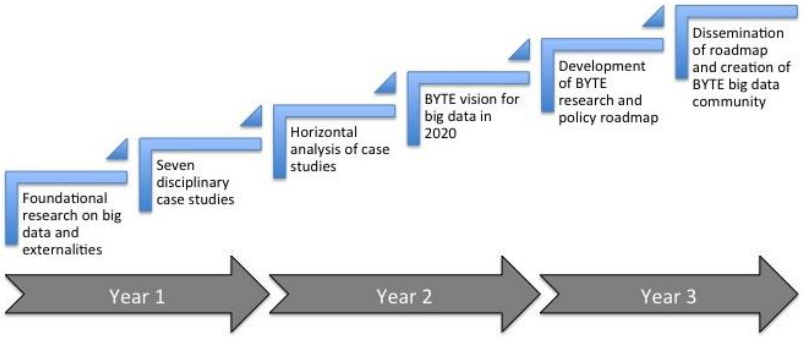
Work package 1, *Setting the stage on big data* and Work package 2, *Elements of societal impacts of big data* were completed in Year 1. All of the deliverables were submitted on time, or in accordance

with an extended deadline, and all are publicly available on the project website. These work packages represented the foundational research on big data and the positive and negative externalities associated with big data, and they produced the following comprehensive reports:

D1.1 Understanding and mapping big data
D1.2 Big data policies
D1.3 Big data initiatives
D1.4 Big data technologies and infrastructures
D2.1 Report on legal, economic, social, ethical and political issues
D2.2 Report on public perceptions and social impacts relevant to big data
D2.3 Report on the relationship between open access and big data

These work packages also provided inputs and variables to be considered within the case studies conducted in WP3 and a list of externalities to attend to through the course of the project.

Year two focused on work packages 3, 4 and 5, which undertook a series of case studies, performed a horizontal analysis of the case studies and developed a vision for big data. Each of these represented an incremental step. The case studies informed the horizontal analysis, where the horizontal analysis sought to identify common impacts of big data and good practice in addressing them. The output of the horizontal analysis was a series of recommendations for amplifying the opportunities associated with positive externalities and diminishing or mitigating the roadblocks associated with negative externalities. This information was used to create a vision for big data in 2020, where the opportunities have been captured and the negative impacts have been adequately addressed.



Work package 3, *Case studies in positive and negative externalities* used this information and examined a series of variables associated with the definition of big data and the externalities associated with actual big data practice across seven different industrial and disciplinary sectors:

Energy
Crisis Informatics
Health
Utilities/ Smart Cities
Transport/ Shipping
Environment
Culture

These case studies provided evidence-based information about what externalities were in evidence and how practitioners were addressing them. The output of WP3 was a methodology for conducting the case studies (D3.1, produced in Y1) and a comprehensive case study report *D3.2: Case study reports on positive and negative externalities* that provides first-hand information about the positive and negative impacts identified in each of the case study organisations and the associated sector.

This information fed into the *Horizontal analysis* produced in work package 4 that consolidated the case study findings and identified good practice in amplifying positive externalities and addressing negative externalities. The outputs of this work package were two comprehensive deliverables:

D4.1 Horizontal analysis and social impacts of positive and negative externalities
D4.2 Report on diminishing negative externalities and amplifying positive externalities

One of the highlights of D4.2, in particular, is the examination of legal gaps associated with the ability to realize opportunities associated with big data and potential avenues to address these gaps.

Work package 5 utilized the good practice identified in the case studies and horizontal analysis to undertake a series of foresight exercises and consolidate a vision for big data in Europe for 2020. The *BYTE Vision* (D5.2) developed a series of scenarios to help decision-makers plan for the changes associated with the data economy, as well as a series of sector-specific visions that considered how prepared different sectors were for the transition to the data economy. Deliverable 5.2, *Tackling the externalities of the vision*, describes an adaptive framework to aid policy decision-making to assist in addressing the externalities associated with the BYTE vision.

In addition to these research-intensive work packages, work packages 7, 8 and 9 were also active during year two of the project.

Work package 7, *The big data community*, began in year two and developed an interim strategy (D7.1.1) and sustainability plan (D7.2.1) for building the BYTE big data community. Both documents examine three potential strategies for the BYTE big data community: acting as an autonomous organization, acting as an umbrella organization or joining with an existing, multi-stakeholder organization. The project has been in conversation with the Big Data Value Association (BDVA) regarding the third option, and plans for the big data community will be finalized in consultation with the Advisory Board and other founding members of the community.

Work package 8, *Stakeholder engagement* commenced with the start of the BYTE project and will remain live throughout the duration of the project. To date, the project partners have created a Stakeholder Taxonomy (D8.1) that maps relevant stakeholders within the big data ecosystem. This deliverable was updated following the results of the case studies in WP3. In addition, partners continuously update a stakeholder contact list, which has been created as part of WP8. WP8 also manages the BYTE advisory board, and consultations with the AB have been accelerated in Y2.

Work package 9, *Dissemination* also remains live for the project's duration. Project partners continue to maintain a user-friendly website to keep stakeholders engaged, and we actively manage three different social media platforms: Twitter, SlideShare and LinkedIn. In addition to these web-based activities, we have also updated the project posters as well as continued to draft journal articles and participate in academic conferences and other events. Finally, the project has introduced a web-based blog, hosted on the BYTE website, that provides digestible information about the major deliverables, the events in which we participate and other notable happenings. We intend for this to be a more expansive forum that will host entries from other projects, advisory board members and other founding members of the big data community in Year 3 of the project.

3.1.3 BYTE expected results and impact

The key expected impact of the BYTE project is to support European stakeholders to achieve a 30% share of the big data market by 2020. The BYTE project aims to provide European industry and science with the tools to reach a proportionate share of the big data economy.

The roadmap and the big data community will assist industry in capturing current and potential efficiencies, new business models, etc. associated with the collection, analysis, linking and re-use of big data and proactively address current and potential negative externalities before beginning a project, initiative or programme. The result of the BYTE research roadmap will be a series of clear and precise questions for future research that are necessary to address in order for European companies to take further advantage of the possibilities of big data. Additionally, the policy roadmap will produce a series of policy questions that decision-makers must address in order to facilitate and support companies in addressing societal externalities.

The foresight analysis and visioning are specifically timed to ensure that the projection five years into the future of big data aligns with the 2020 benchmark discussed in the Digital Agenda for Europe and Horizon 2020. The research and policy roadmap will outline a series of incremental steps needed to support big data stakeholders in addressing current economic, legal, social, ethical and political barriers and challenges in meeting this goal. This will assist European industry and scientists to avoid costly mistakes associated with negative externalities, and thus achieve efficiencies and competitive advantages. Furthermore, the predictive element of BYTE will also enable European companies to anticipate emerging opportunities. BYTE's goal of diminishing negative externalities while amplifying positive externalities will result in a European big data economy that is predicated on responsible innovation practices.

3.1.4 BYTE contact details

Website: http://byte-project.eu/

Twitter: @BYTE_EU