3.1 Publishable summary

3.1.1 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 will develop a policy and research roadmap for big data in Europe and form a big data community to implement the roadmap. One of the main goals of the first year of the project and the first step in this process is to conduct 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. These case studies and a series of stakeholder engagement activities will be used to construct a vision for big data in Europe in 2020 that will provide a goal for which the roadmap will indicate steps to achieve.

Use of case studies

In order to provide an in-depth analysis of the externalities in evidence across a number of societal sectors and industries that utilise big data, BYTE will undertake case studies in the following sectors:

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

These case studies will provide a multi-disciplinary platform from which BYTE can examine the positive and negative externalities associated with big data within these sectors. The case studies draw on early BYTE research and context setting, including setting the stage on big data (WP1) and identifying elements of societal impact (WP2). As described above, they will provide evidence of actual positive and negative externalities associated with real big data use (WP3) in order to evaluate and consolidate them through a horizontal analysis (WP4) and to provide material for the foresight analysis and visioning exercise (WP5), roadmap (WP6) and big data community formation (WP7).

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. Stakeholder collaboration is crucial in terms of building an active and relevant Big Data Community. In particular, the early work packages focus heavily on stakeholder collaboration and participation that will set a baseline that will encourage and enable 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

The first year of the BYTE project has progressed well in meeting its objectives.

Work package 1, *Setting the stage on big data* is complete. All of the deliverables were submitted in accordance with an extended deadline and are publicly available on the project website. WP1 partners undertook a literature review of relevant materials to define big data and map current data flow internationally (D1.1), to review policies and initiatives relevant to big data in the public and private sector (D1.2 and D1.3), and to understand the technological and infrastructural tools relevant to big data (D1.4). This extensive research revealed a number of meaningful insights to assist big data stakeholders in better understanding the European big data ecosystem. Aspects of this research were validated in a workshop in Lyon, France in September 2014.

Work package 2, outlining *Elements of societal impacts of big data* was completed on time, and copies of the Deliverables are available on the project website. WP2 partners undertook a literature review of materials relevant to the economic, legal, social and ethical, and political issues that arise in relation to big data. WP2 partners also examined public sentiment towards big data information practices, including public aspirations for big data information practices, as well as reviewing the current status of big data and open access policies. WP2 partners identified practical examples of externalities impacting different stakeholders (industry, public sector, governments, citizens etc.) Analyses of this information confirmed that a number of economic, legal, social and ethical and political issues are present in the big data landscape in Europe and they impact a number of key sectors, and potentially the big data industry as a whole. These findings were validated at a workshop that was held in Lyon, France in September 2014.

Work package 3, *Case studies in positive and negative externalities* was almost complete at the close of the first reporting period. Partners are finalising case studies of big data use and practices in relation to: health; culture; crisis informatics; energy; shipping; utilities and smart cities; and environment. Preliminary results from the case studies were tested at a number of focus that were held in four different locations across Europe, including London, Munich, Vienna and Oslo.

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 that maps relevant stakeholders within the big data ecosystem and partners continuously update a stakeholder contact list, which has been created as part of WP8.

Work package 9, *Dissemination* has also commenced and will remain live for the project's duration. To date, project partners have established and continue to maintain a user-friendly website to keep stakeholders engaged. In addition to the project website, other dissemination activities have included: the design and production of promotional materials, including brochures, project logo and posters; a publicity campaign, which includes drafting journal articles and presentations; as well as mass media interaction via blogs, and social media channels.

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/

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