DELIVERABLE

Introducing BIGPROD

Summary

This deliverable reports on the objectives of the BIGPROD project. The Policy Brief is designed to introduce project objectives and spark discussions with stakeholders. The project covers the econometric model used, data collection and its implementation as well as the co-creative aspects of the project.

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Introduction

In addition, previous work on big data, data science and indicator design needs to be studied in order to understand the possibilities that big data offers and the problems with translating this data into metrics and indicators. Specific attention needs to be given to previous, and current, work done by the EC on this topic to establish synergies and prevent any doubling of efforts. Moreover, the work by the OECD is important to keep an eye on, since the OECD has working groups dedicated to the topic of big data, indicator design and measurement, and productivity analysis.

Econometric model

BIGPROD intends to use the econometric model developed by Crépon, Duguet, and Mairesse (1998), known as the CDM model, as the basis for testing the newly constructed metrics/indicators. The CDM model is composed out of three interacting equations:

1. An equation explaining the amount of R&D.
2. An innovation output equation, where R&D appears as an input.
3. A productivity equation, in which innovation output appears as an explanatory variable.

This model corrects for the endogeneity of R&D and innovation output as well as for the selectivity of R&D performing or innovating firms. It has been estimated with a common specification on various country data to compare their respective R&D and innovation performance in terms of productivity (Mairesse and Mohnen, 2010).

BIGPROD aims at extending the model to incorporate factors that “new” big data sources could help to measure, such as the role of open innovation/spillovers among firms, and the higher relevance of intangible goods, as well as servitization trends.

Data collection and testing

Although the econometric work will be the cornerstone of BIGPROD, one of the main priorities will be the collection, development and testing of the big data metrics that will inform the econometric work. Two work-packages are dedicated to this part of the work, with the first being primarily aimed at data collection and management. As we intend to use structured, semi-structured and unstructured data sources it is important to have an infrastructure, as well as collection and management methods, and a workflow compatible with all three of these types of data.

Figure 1 below shows an example of how a combination of unstructured and semi-structured data from company websites, job listing sites and social and news media can interact with structured data from several sources such as EPO, EUROSTAT and OECD to create an informative data-pool from which to construct the necessary metrics and indicators.

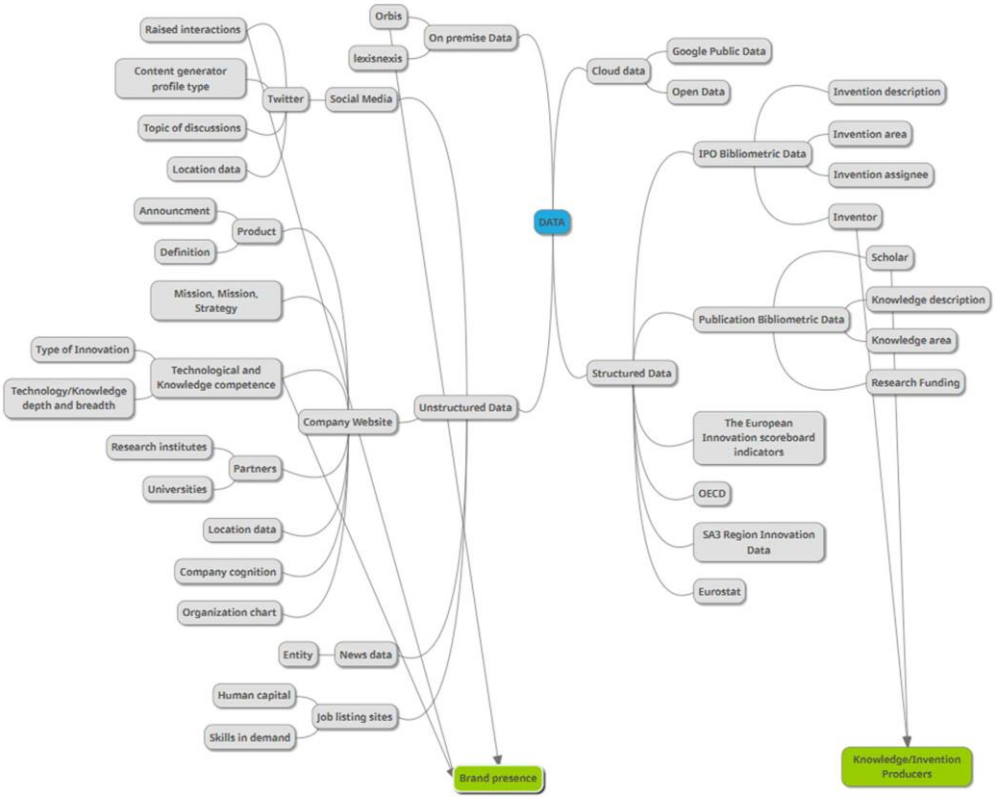

Figure 1 Mindmap of data sources.

The second work package under this heading deals with the testing of the resulting data in three policy relevant pilots which each focus on a specific industry:

1. High tech industry; focusing on the impact of digitalization on the pharmaceutical industry, we will explore whether it is indeed a question of mismeasurement of intangibles that impacts on the productivity analysis for this sector.
2. Low tech industry; here we will focus on product introductions to discover innovations in an industry that is not known for its R&D progress. We do however know that R&D is present, although not explicitly, and we believe that big data can contribute to creating more systematic and developed R&D metrics.
3. Service sector; the focus here will be on the reallocation of resources by looking at the entry and exit dynamics through the gathering of review data from social media and company websites. This will allow us to link the introduction of new services to the perceived quality and longevity of these services.

Co-creation and outreach

Dirk Pilat (2019) points to following possible policy interventions for alleviating, or even repairing, the effects of the productivity slowdown:

1. Strengthening innovation across the economy
2. Fostering investment in tangible and intangible capital
3. Strengthening the diffusion of technologies, organizational practices and business models

4. Improving skills of workers and improving management
5. Facilitating structural change; where certain sectors may require more policy attention
6. Strengthening entrepreneurship and the scaling of firms
7. Ensuring good regulation and sound competition.

These interventions are all macro-scale and would require a concerted effort by different national and supra-national institutions to make them work. It is therefore of the highest importance that a diverse set of decision- and policymakers are involved in the BIGPROD study.

To this end, the study has tasked a work-package with connecting all the technical work-packages by serving as an information gathering as well as dissemination tool using a co-creational approach. This approach seeks to interactively link stakeholder expectations and requirements/needs with the definition and construction of new variables and indicators through group interviews and discussion sessions. In Figure 2, on page 5, we show how we envisage the Stakeholder Involvement Cycle that is the core of the co-creational approach.

The satisfactory testing of these new variables and metrics will be followed-up by the instruction of the relevant stakeholders on the methods used in collecting and using the data through training workshops. Subsequently, the updated CDM model will be validated by experts and peers during (internal) working group sessions and (external) conference presentations, culminating in several peer-reviewed journal publications.

Furthermore, the wider academic world and the public will be updated on the progress of the study using outreach and dissemination activities, including a dedicated website, as well as a Facebook and ResearchGate project page, and a Twitter presence. As earlier mentioned, presentations at relevant conferences and publication of results in specific peer-reviewed journals are also planned as a way of receiving feedback on the methods and results of the study.

Finally, the BIGPROD website (https://www.bigprod.eu) will serve as a platform through which the main findings of the project are made available to the end-user. We also aim to present the main datasets produced during the project as interactive Jupyter notebooks, which will give the end-users the opportunity to explore and use the data generated during the project.

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About BIGPROD

BIFPROD is a research project focusing on Big Data based analysis of productivity using webscraped data. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 870822.

The project partners in the project are Quantitative Science and Technology Studies team, Foresight-driven Business Strategies, 1) VTT Technical Research Centre of Finland, Competence Center Innovation and Knowledge Economy (Coordinator), 2) Fraunhofer ISI, Economics of Knowledge and Innovation team, 3) UNU-MERIT, Maastricht University, 4) Public Policy and Management Institute, 5) Economics of Technology and Innovations, Faculty of Technology, Policy and Management, 6) Delft University of Technology, Economics of Technology and Innovations, 7) Faculty of Technology, Policy and Management, Delft University of Technology