Introduction:
Big data, economics and regulations

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Following on the inaugural issue of *Digital issues* devoted to artificial intelligence, this second publication concentrates on big data, *i.e.*, the massive accumulation of electronic data.[1] Besides its technological challenges, this large-scale trend is bringing about major changes in the usual organization of the economy. It is a game-changer for society. Big data are turning out to be a litmus test for the digital transition in our societies. The proliferation of data modifies our ways of producing and consuming, and questions our conceptions of individual freedom and of the principle of sovereignty.

Over the last decade, the diffusion of connected devices (smartphones, tablet computers) along with their applications has amplified the production of data. The invention of social networks and the explosion of the Internet of things (IoT) are now bolstering this process, which has combined with the advances being made in artificial intelligence.

We are living through a data "revolution" that we can describe as a new industrial revolution. Data now represent a major resource for the economy. The phrase "big data" refers not only to bigger sets of data but also to processing them so as to improve the quality of the information drawn from them and raise our level of knowledge. This linkage between big data and data analytics is important since the stock of knowledge is fundamental to innovation, economic growth and development.

An OECD report (2015) has provided a panorama of the potentially positive effects of big data on economic growth and well-being.[2] Empirical analyses of this trend have been limited, and more should be made. According to a study in the United Kingdom, intensive uses of data accounted for an average increment of growth per year by +0.02% between 2005 et 2012.[3] Although studies about the impact of big data on innovation in firms are limited to specific sectors,[4] their findings have confirmed a significant correlation between the intensive use of data and the productivity of American firms from 2005 to 2010; and underscored the complementarity between using big data and highly qualified jobs. According to a recent study of manufacturing and services in Germany, the use of big data is associated with a higher propensity for innovation in firms and improves the market performance of innovative firms.[5]

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[1] This article has been translated from French by Noal Mellott (Omaha Beach, France).

[2] OECD (2015) *Data-Driven Innovation: Big Data for Growth and Well-Being* (Paris: OECD Publishing), http://dx.doi.org/10.1787/9789264229358-en.

[3] GOODRIDGE, P. & HASKEL, J. (2015) "How does big data affect GDP? Theory and evidence for the UK", *Discussion Paper 2015/06*, Imperial College Business School.

[4] TAMBE P. (2014) "Big data investment, skills, and firm value", *Management Science* 60(6); and BRYNJOLFSSON E. & MCELHERAN K. (2016) "Data in action: Data-driven decision making in U.S. manufacturing", *Working Paper* 16-06, Center for Economic Studies, US Census Bureau.

[5] NIEBEL T., RASEL F. & VIETE S. (2017), "Big data – big gains? Understanding the link between big data analytics and innovation", paper submitted to the 28th European Regional Conference of the International Telecommunications Society (ITS). Available at: https://EconPapers.repec.org/RePEc:zbw:itse17:169489.

On 28 March 2018, Cédric Villani submitted a report to the government that, entitled *Giving a Meaning to Artificial Intelligence: For a National and European Strategy*,[6] places data at the center of a strategy based on an "*offensive policy in favor of the access to data, of circulating and sharing them*". Since data are not rivalrous goods, the fact that a person has them and uses them, the report has pointed out, does not keep other persons from having them. In this sense, we can admit that data are, in part, a public good and that the public should determine their uses.

However admitting that data are nonrivalrous goods does not necessarily imply for-free access to them. From this viewpoint, data can be seen as a basic resource (or infrastructure) that justifies a policy for opening them in order to stimulate initiatives and innovations. Data confer a competitive advantage on the firms that have them. At present, the position held by GAFAM (Google, Amazon, Facebook, Apple, Microsoft) enables these giants to collect, store and process data so as to draw value from them. This, in turn, reinforces their market position, and jeopardizes small operators owing to the quasi exponential relationship between the quantity of data collected and the value drawn from them. Therefore, the stakes are high for France and Europe, which are trying to establish conditions for their own digital champions to emerge.

To win public support, the trend toward opening data must coincide with a policy for protecting data (in particular personal data). The EU's recent General Data Protection Regulation (GDPR),[7] which legally sets the conditions for collecting and using personal data, should be conductive to the construction of a digital ecosystem on a European scale.

This issue of *Digital issues* contributes to the current debate surrounding big data. In the first part, several articles present a wide view of the issues related to big data, while also exploring the economic and regulatory aspects and paying attention to the implications for society. The second part presents use cases from various fields and branches of the economy — industry, insurance, predictive marketing and agriculture — the purpose being to illustrate the changes resulting from the upsurge of big data. Given the growing mass of data, questions arise about whether they are related, or complementary, to the classical methods of data collection and production used by national offices of statistics. How are big data related to public statistics? An interview with Yves Gassot, CEO of IDATE DigiWorld for more than twenty years, closes this issue. His view sheds a useful light on the breaks and breakthroughs introduced by big data.

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[6] VILLANI C., (2018) *Donner un sens à l'intelligence artificielle: pour une stratégie nationale et européenne* (Paris: Prime Minister's Office), 235p. Available via: https://fichiers.acteurspublics.com/redac/pdf/2018/2018-03-28_Rapport-Villani.pdf.
[7] The GDPR (General Data Protection Regulation): "Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data". Available via:
http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1478961410763&uri=CELEX:32016R0679.