Big Data, Services and Policy Making

Big data is changing the way many businesses and organizations are facing the market and societal challenges. "Big data" refers to the massive amounts of information that come from the web, social media, mobile phones, e-commerce, other financial transactions, machine-to-machine communication, sensors (including traffic loops, smart meters and satellite images), crowdsourcing, biometrics and other human- and machine-generated sources. Big data is rooted in the Internet revolutions after 2000, the emergence of the Internet of things, the universal use of mobile phones and the digitalization of ubiquitous processes and information. In the Internet of things, for example, sensors, software, Internet communications and other technologies connect large numbers of devices, generating enormous amounts of data.

The digital economy generates data that are available for all types of organizations to reshape their own ways of working and to generate a new range of services. Big data facilitates new ways of providing digital services and of creating new and improved digital services. For example, big data opens opportunities for management consultancy services, new markets and business analytics, computer services dealing with the storage and analysis of big data, services related to market research, legal services related to data protection laws and privacy and security services for guaranteeing fair data treatment and preventing viruses and piracy.

Big data affects virtually every sector of the economy. In the private sector, big data is affecting almost all services activities, including financial services, transport services and telecommunications and information services. In the public sector, big data services are growing in importance in many areas. The case of health services is outstanding because big data offers a huge opportunity for a historical leap in the diagnosis and treatment of many diseases through sharing recorded information. Big data has contributed to the creation of data science, a field that uses new machine learning and artificial intelligence techniques that complement traditional statistical and rule-based approaches. Big data currently provides a huge range of functionalities beyond mere prediction (Athey, 2017).

Public policies using big data are a particular improvement for policy making because they allow the use of new data sources and the improvement of existing ones, they enable analytical techniques that can lead to better diagnosis, they can provide insights more quickly or nearly in real time, new public services can be designed on a data-driven basis, and the target audience can be enlarged (if data providers are informed on data users activities) so policy co-creation may be easier.

Policies to promote and regulate big data services are related to six distinct areas of public service provision. Figure 1 depicts the spectrum of policies related to big data services.

1. The first category, innovation policies for enterprise digitalization, relates to the promotion of big data use in the private sector

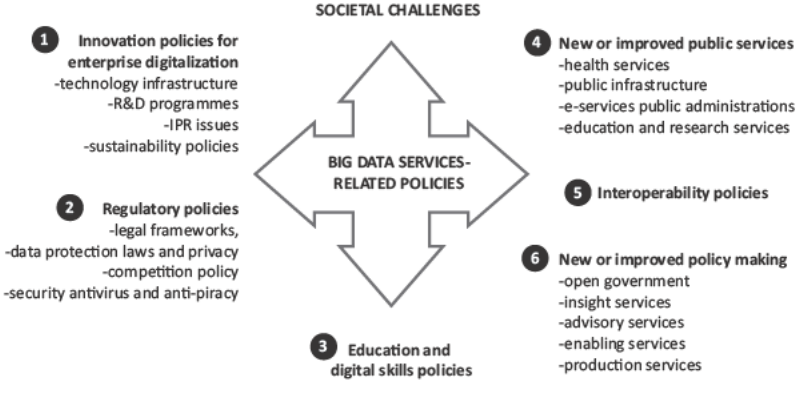

Figure 1 Policies related to big data services

and the third sector. In this regard, the first responsibility is the provision of technological infrastructure, so the digital economy can be ready to operate. Then, it includes all policies regarding digitalization and innovation policies including research and development (R&D) and intellectual property rights (IPR) issues. Some sustainability policies can also be included in this point.

2. A second area of policies is related to the regulatory environment, legal frameworks, privacy issues and data protection laws, competition policy and security (anti-virus and anti-piracy). In the area of competition laws, it is important to mention Europe's General Data Protection Regulation, which tries to optimally balance the dual objectives of maximizing the value of the use of data while minimizing privacy violations and other harms. In some sectors, such as health, this is a particularly critical policy topic because the dissemination of private data may have major implications for patients.
3. Education and skills is another policy area needed to promote both the supply and demand for big data–related services.

The other policy areas relate to the role of the public sector in its own functioning and service provision.

4. Public administrations can use big data to provide new or improved services in areas such as health, education, public infrastructure and e-services.
5. A particular function is also devoted to promoting and guaranteeing data interoperability. Legal, semantic, organizational and technical are the four key interoperability fields where public administrations need to have a dedicated policy (European Commission, 2016).
6. Finally, big data has a key role in making possible new or improved policy making. This can be useful in the context of open government and open data (Misuraca et al., 2014), but it can also produce a new service model based on the four types of services as proposed by the European Commission (2016): Insight services – the art of the possible (showing the benefits and possibilities of data analytics to other institutions and bodies); advisory services – we tell you how (providing guidance and fostering collaboration); enabling services – we provide you with the means (providing key tools and resources for data analytics); and production services – we do it for you (producing data analytics on behalf of other institutions and bodies).

These three areas related to the public sector have proven to be important (Suominen and Hajikhani, 2021) both in terms of impacts through data-informed policy making and data-based decision making and in terms of opportunities to improve the productivity of public administration, the quality of service to the public and the technical capability of public administrations in order to take maximum advantage of the potential benefits that big data offers. The two sides are interrelated insofar as improving "strategic capability" in the public sector through big data can enhance policy making and decision making.

Challenges for big data policies are numerous. There are many issues related to all the mentioned topics. In particular, there are issues related to statistical bias, privacy, equity and governance, among others (Schintler and Kulkarni, 2014). As a result, there is a need to formulate, evaluate and implement policies that not only mitigate the risks but also maximize the benefits of using big data for policy making.

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