

Briefing note prepared for participants attending the 4th Global Forum on the Knowledge Economy, Tokyo, October 2014 on Data-driven innovation for a resilient society

Data-driven innovation, growth and well-being

Data-driven innovation (DDI) harnesses the potential of large volumes of data, known as “big data”, to drive value creation and foster new products, processes, and markets. It can deliver significant competitive advantage and sustainable growth and development across OECD and Partner economies. But considerable challenges, with policy implications, need to be addressed.

Benefits

For the ICT sector, “big data” presents a sizeable business opportunity, with some estimates putting the global market for “big data technology and services” at USD 17 billion in 2015, from USD 3 billion in 2010.

Beyond the ICT sector, the exploitation of data has already created significant added value for many businesses, but more can be expected to follow. Empirical studies suggest the use of data and analytics can boost productivity growth by around 5% to 10%.

Low-tech industries and manufacturing also stand to benefit, as the use of data and analytics is further driving the ‘servicification’ of the economy. In agriculture, for example, data is used through geo-coded maps of fields and the real-time monitoring of farming activities, with some estimates putting improved yields at around USD 100 in increased profits, per acre.

The highest impact could be felt in public administration, research, health and education. These sectors heavily rely on the collection and analysis of information, but still have a relatively low level of computerisation. In public administration, Public Sector Information, including open government data, can increase efficiency, transparency and accountability, and help to rebuild public trust; in research, data analytics can enable a better understanding of highly complex phenomena, such as Alzheimer’s disease and dementia; in healthcare, data analytics could reveal unforeseen adverse effects of drugs; in education, data analytics promise personalised, adaptive learning environments.

Challenges

(1) **Supply-side challenges** relate to the provision of data and analytics:

- **Investments in mobile broadband:** Penetration rates of mobile broadband in 2013 still lag at 30% or less in countries such as Chile, Turkey, Hungary and Mexico.
- **Barriers to the free flow of data:** However legitimate the ambition, protecting privacy, security or confidential business information may limit data flow and be a barrier to DDI.
- **Incentive issues:** The incentives to share the fruits of investments in databases, meta-data and algorithms may be lacking, and intellectual property rights be miscalibrated.
- **Access to cloud computing and analytics:** The lack of interoperability and the risk of vendor lock-in may impede the adoption of cloud computing and analytics.

(2) **Demand-side challenges** relate to the capacity to take advantage of DDI:

- **Skills and competences in data analytics:** With data specialists accounting for only 0.5% of total employment in most OECD countries, the lack of skills is a barrier. Domain-specific competencies to interpret and make data-based decisions are also needed.

- **Organisational change:** Data analytics may point to organisational change, but this may be difficult to implement by businesses due to its disruptive nature.
- **Entrepreneurship:** Start-ups can satisfy specific customer demand for data-driven applications, but their creation and success require favourable economic conditions, such as regulatory frameworks on access to markets or to finance, and labour markets.

(3) **Societal challenges** have potential long-term negative impacts on the core values of democratic market economies and the well-being of citizens.

- **Loss of autonomy and freedom:** Data analytics make it possible to infer sensitive information. The misuse of these insights can affect individual and societal core values and principles, such as autonomy, equality and free speech.
- **Market concentration and dominance:** The economics of data favour market concentration and dominance. A number of DDI-specific factors challenge the traditional approach to ensuring competition. Defining the relevant market, and assessing the degree of market concentration and potential consumer detriments due to privacy violation is complex.
- **Power shifts that exacerbate existing inequalities:** Concentration and greater information asymmetry create shifts in power from individuals to organisations; from traditional to data-driven businesses, with risks of market concentration and dominance; from governments to data-driven businesses, when these gain more knowledge about citizens; and from lagging economies to data-driven economies.
- **Structural change in labour markets:** Decision automation through “smart” applications can affect (labour) productivity. Jobs of a “transactional” nature may be most affected leading to further structural change in labour markets with potential implications for inequality in earnings.
- **Limitation to the traditional security approach:** DDI requires an open, interconnected and flexible digital environment, which challenges the application of traditional approaches to digital security.

Policy considerations

Promoting a “big data” industry may mean focusing on the top stacks of the data ecosystem and considering the conditions that have favoured the development of a big data industry in the U.S.

Promoting the favourable conditions for a trustworthy environment will require protecting the privacy and freedom of individuals, promoting a culture of digital risk management across the data ecosystem, and leading by example in the use of analytics and the supply of data.

Leveraging DDI requires taking the full data value cycle into consideration, and developing frameworks that encourage the free flow of data across national and organisational borders, subject to legitimate restrictions. This will also require providing incentives for data sharing and the interoperability of data-driven services as well as empowering individuals and consumers to reuse their data across interoperable applications and services (data portability).

Enabling the full potential of data and analytics calls for the promotion of complementary investments in economic competencies across the economy, including data analytic skills and competencies, organisational change, as well as research and development (R&D) on data analytics and privacy-enhancing technologies.

Promoting DDI in the public sector, healthcare, science and education is a ‘low-hanging fruit’ that could boost efficiency and well-being in society. However, the mechanisms through which benefits are generated and policy issues raised deserve domain-specific considerations.

Achieving policy coherence will require furthering the dialogue between competition, privacy and consumer protection authorities, so that (i) potential consumer detriments due to DDI are taken into account, (ii) synergies in the enforcement of rules controlling privacy violations, anti-competitive practices, and mergers are unleashed, and (iii) firms’ incentives to compete on and invest in privacy-enhancing and enhanced technologies and services are boosted.