

# Towards a new data-driven service design and delivery model?

Ubaldi, Barbara-Chiara *OECD*, [barbara.ubaldi@oecd.org](mailto:barbara.ubaldi@oecd.org); Curina, Francesco and Welby, Benjamin, *OECD*

## Abstract

Data is a key enabler for designing services that respond to the needs of users and deliver a transformed experience. Transformation is hard to achieve without a strategic approach to establishing a sound data governance model for identifying clear responsibilities, overcoming silo based mentalities and other barriers to data access and sharing, and establishing the necessary leadership and broader capabilities to add value to users. Increasing access and sharing of data and putting it to greater use raise questions about how organisations can preserve the trust of users through the ethical use, collection, treatment and storage of data. Therefore, the strategic approaches of both the public and private sectors need to foresee potential risks and envisage measures to decrease or handle them.

This paper explores the comparative experience of the public and private sectors in their efforts to move towards becoming more data-driven. This article presents an analytical framework organised around four main components: data access (to internally held data concerning users and externally supplied data from users), sharing (within the organisation, or with those outside the organisation), context (resources, skills, leadership, governance, organisational culture) and the necessary business case to justify investment. It is then applied to frame an understanding for data-driven approaches towards improved services in the private and public sectors and concludes by drawing some conclusions reflecting on the common challenges and on what is unique.

**Keywords** –data; service design; service delivery; public sector; private sector.

## 1 Introduction

Data helps to understand, and foresee, the needs of users and is therefore one of the key enablers for “teams to be able to deliver high quality services that meet the needs of their users” (OECD, 2020). But without a strategic approach to the role of data in the public as well as private sectors, transformed services are hard to achieve.

Governments, as well as business, consist of several organisations or units that handle different data and treat data differently. In both sectors, it is often challenging to facilitate the access to and sharing of data needed to improve the design and delivery of services. Limited data availability is often the result of insufficient data interoperability, or accessibility, and is not always caused by technical reasons. In fact, it is organisational culture that usually represents the biggest barrier to data-driven approaches. Silo based

mentalities, associated with the idea that data is power and owned by the organisation that produces it, are difficult obstacles to overcome.

Securing the right type of leadership that understands, supports and embraces the changes required is an essential ingredient for success. This also demands a convincing business case to establish clear data governance, as a foundational condition to secure the availability and accessibility of quality data. Such governance models need to be built around identifying clear responsibilities for data management and increasing the visibility and controls over its use to support the broader service design and delivery strategy.

The public and private sectors are often compared when it comes to the speed and depth with which they experience the digital transformation. Yet, despite consensus among different audiences that data is important at a strategic level (OECD, 2019; Bonturi, Ubaldi, & Welby, 2020; van Ooijen, Ubaldi, & Welby, 2019), the extent to which the data and services agendas are connected in practice for large public and private institutions remains unclear. Furthermore, there is little analysis of how the public and private sectors compare, or differ, in terms of drivers for change, and the challenges they face in adopting data-driven service approaches. What compares? What is the difference? Are there lessons that can be shared?

This article first presents an analytical framework organised around four components, with the goal to identify the requirements for establishing a data-driven approach to service design and delivery. It then applies it to the public and private context and concludes by drawing some conclusions reflecting on the challenges that are common to both sectors, and on what is unique to one or the other.

## 2 Analytical framework

The analytical framework identifies four components for framing an understanding of the requirements for improving services with data-driven approaches, whether in the private or public sectors:

- access (to internally held data concerning users and externally supplied data from users)
- sharing (within the organisation, or with those outside the organisation)
- context (resources, skills, leadership, governance, organisational culture)
- business case

## 2.1 Enhancing data access and sharing

Emerging developments in the digital age related to data in the context of the Internet of Things (IoT) and artificial intelligence (AI) have increased the availability of data, making access to and sharing of data more crucial than ever before. The OECD (2020) Open, Useful and Re-Usable data (OURdata) Index shows how enhancing access to and sharing of data can help maximise the social and economic value of data re-use. The benefits to economies and societies of overcoming existing barriers can be significant leading to both an increased value of data for primary data holders and stimulating further value from its reuse by secondary data users. Business and public sector organisations can use data they hold, or reuse data from their users, to create internal benefits to the organisation as well as to their clients or citizens when accessing services. Individuals, businesses and governments often face barriers to data access, which may be explained by a reluctance to share. Facilitating, encouraging and enhancing data access and sharing for the benefit of all should remain a priority for both the private and public sectors, particularly when associated with the overarching goal of offering improved services that better respond to the needs of the users.

Overall, data access and sharing is estimated to generate social and economic benefits worth between 0.1% and 1.5% of GDP in the case of public sector data, and between 1% and 2.5% of GDP (in a few studies up to 4% of GDP) when also including private sector data (OECD, 2015). The estimated magnitude of the effects depends on the scope of the data and the degree of data openness. Beyond value creation in economic terms, enhancing access and sharing of data contributes towards societal objectives, such as the Sustainable Development Goals or furthering democracy through greater transparency of government.

Conversely, there are also risks associated with sharing data, since data can be used malevolently, harming

legitimate stakeholder interests, such as privacy, intellectual property, national security and other public interests. The increasing use of, availability and access to data – personal as well as nonpersonal – raise questions not only about their ethical use, collection, treatment and storage, but also about responsibility, accountability, fairness and the respect of human rights in relation to data. Any strategy aimed to foster the increased or improved use of data to deliver better services, either private or public, should foresee potential risks and envisage measures to decrease or handle them. This is essential to gain the trust of users.

## 2.2 Context

The availability of a supportive and engaged leadership that is ready and willing to prioritise new investment or reallocate resources of all sorts is needed to foster the changes required to enable data-driven service design and delivery. This is as essential as having the right capabilities, mindsets and profiles in place in the wider workforce. Supporting improved, data-driven service design and delivery calls for different technical skills and roles (e.g. data custodians, data architects, data scientist) at each stage of the data value cycle (Figure 1).

Securing the right capabilities to leverage data for improved services demands a strategy that combines new recruitment with capacity-building programmes for training and reskilling. Using data for improved services requires multi-disciplinary approaches that blend the technical skills of data scientists and data analysts with those of user researchers and service designers to develop shared knowledge of user needs and preferences as well as the final product or services being offered. In terms of addressing the broader organisational culture, having someone aware and informed about the implicit and explicit efforts needed to support the accessibility, sharing and integration of data is a necessary requirement.

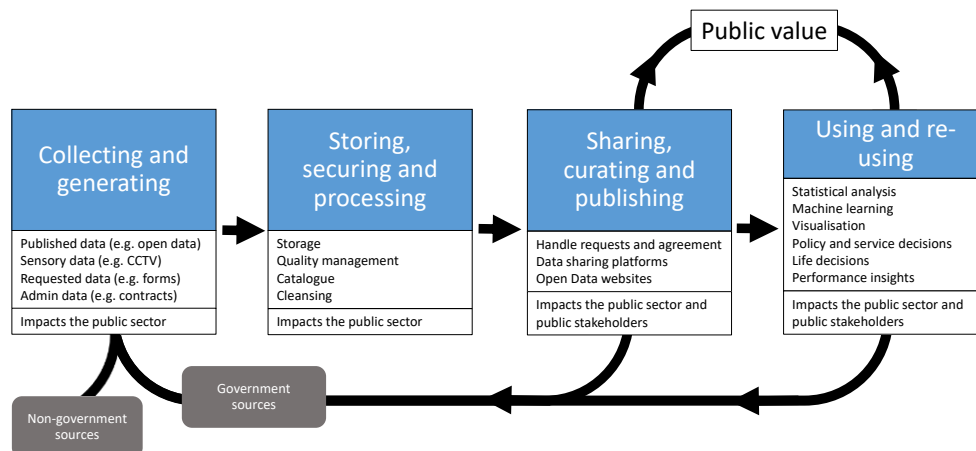


Figure 1. The government data value cycle ((van Ooijen, Ubaldi, & Welby, 2019)

## 2.3 Business Case and value proposition

Finally, shifting to a data-driven approach bears costs for businesses, as well as for public sector organisations. These costs can be for short-term, one-off activities or in providing the ongoing, long-term measures that will secure sustainable data-driven efforts. In both cases, it is essential to be able to communicate a compelling value proposition that can persuade decision makers to reallocate resources and invest in the changes needed to give momentum to data-driven approaches. Although the financial case should be able to draw on increases to efficiency, the value proposition should also consider the intangible benefits that come from inviting service users – whether customers or citizens – to become partners in service design, reinforcing the impact on overall levels of satisfaction and performance.

## 3 Real cases application of the analytical framework

### 3.1 Private sector

Data sharing is a predominant tendency within the private sector. Despite this, there are still entry barriers in particular in private manufacturing companies. In ‘b’ to ‘c’ data sharing is no longer a taboo, and customers are willing to give out part of their information in exchange of increasingly efficient services. But what happens in medium-sized companies and in the manufacturing sector? Can the private sector obtain from customers more information about their satisfaction with the final products? Within the manufacturing sector it is not so immediate, and this is due to two main factors: one internal to the companies and one related to the customers.

#### 3.1.1 An internal perspective: the manufacturing company as service provider

Large manufacturing companies, such as Caterpillar, Rolls-Royce, Alstom, have turned towards a push for the digitalization of products and services design. Evidently, their level of digitalisation is so high that they are not taken as an example for this work, except to say that they represent the most advanced level of existing digitisation of private services. The management of the data associated with the reliability of the product has led them to a shift from product to product-service systems in such an advanced way that some historical drivers of manufacturing companies are being questioned in their model, such as: ownership of assets, sharing of risk, centrality of the customer.

To the contrary, the main problem for medium-sized companies, particularly in contexts mainly characterized by SMEs (such as in Italy), is that they descend from a family management that have gradually increased in size

and turnover. Of these companies, some have been able to renew themselves quickly to embrace the cultural change towards digitalization, others have remained at stake trying to understand how and if to make the transition to the digital world.

More mature companies have undertaken a slow but continuous path, which has led them towards an internal cultural change, and the development of digital platforms, but they have also acted progressively on changing the culture of customers. The customer began to perceive the benefits of sharing data with the manufacturing companies and began to think about a common ground to discuss how to improve products and services. This is the fundamental question that companies should try to address : it is not simply about asking for data as it is about giving life to a new way of designing services based on the new data.

Other companies have not had this push for change and have not been able first to internally develop the preconditions that make the gears of digitalization begin to move. The primary internal reasons hindering change are innumerable and the literature there provides ample examples: Lack of strategy, lack of understanding of the starting point or simply the inability to articulate the reasons and advantages. These companies still have a historical furrow around them that prevents the establishment of a direct contact between manufacturer and customer. The logic of the “build and sell” accompanied by some basic services, such as spare parts and after sales is still strongly predominant. This obviously does not improve or evolve the points of contact with the customers who are not spontaneously motivated to share data. It is important to underline that complex and slow cultural shift within the company is essential to enact a transition to the use of customer data. An example we can focus on is that of the silo structure that we find widely in medium-sized Italian companies. Organizations are structured in “silos” so that each department has its own assets and information but these are not necessarily shared with the other strategic business branches. We are talking about invaluable information, for example concerning post sales that does not return to the engineering department. Each player focuses on his own perimeter, where he exerts a strategic control thanks to his assets, i.e. the data he/she owns.

In this type of structure, the problem is not the absence of the data or the fact that the data is not collected, but data collection is often disorganized and data is not shared. Knowledge has a purely character of information storage and is not exploited within the process of continuous improvement of services and products. In this logic of data protection within the company, the cultural change towards a digital model is the first step to be able to use the customers’ data to improve service design and delivery. This is where the transition starts, and not as is often believed from the outside to the inside. Customers’

perception of the digital maturity is a key element in building a new model.

With these premises, the model that leads to a sharing and use of customer data in medium-sized enterprises must go through a series of subsequent steps. The time horizon is very different and can change from the type of industry, the type of market, from the managerial will and strategic vision. In general, however, we can say that these are not quick steps and that we always talk about multi-year development plans. This can be stated based on the concept that the achievement of data sharing with customers goes through a series of mandatory checkpoints. The transition to digital and data sharing must go hand in hand with a mapping of the required skills. This is particularly important in mid-sized manufacturing companies where different generations meet. The challenge for companies will be to build a framework that allows the combination of different sensitivities and skills in a logic of integration. Finding the motivational levers, combining knowledge and innovation, will be the challenges to be addressed in the constantly evolving macroeconomic field.

In addition to data management skills, on which it is superfluous to dwell, one must focus on specific sets of skills that are consistent with a pervasive vision of the digital revolution. There are many but we should focus on the following:

- Brand ambassador: The improvement of services cannot be separated from a staff development policy as a generator of consent from the customer to the company. Personnel, in particular those working in the aftersales from the technicians to the help desk, must adopt a client centric side
- Project management: each actor must have the ability to see their work as a business unit, understanding its financial implications, the impact on business processes and above all the degree of involvement of the various departments. From the intern to the mid manager companies need to trigger awareness processes framed in a work structure with a hierarchical pyramid as flat as possible. Delegation, empowerment and team working are the elements that must be part of the training program and corporate values.
- Creativity: In the logic of project manager accountability lies a great potential for people's expressions of creativity. The responsibility associated with the autonomy of people can create fertile ground for developing ideas with a perspective that takes into account the financial logic of the company.

Finally, the implementation of digital systems aimed at sharing information, improving processes and services can only pass through the involvement of the entire organization and needs to count on the historical memory.

This is quite evident in medium-small business contexts where there is a particular diffusion of a phenomenon that is commonly referred to as "the islands of knowledge". There are people in the company who possess not only the historical memory but also a large part of specific knowledge that makes them indispensable from a context of development of the sharing of knowledge data. This type of structure is particularly harmful and will not be the subject of this article, but it should still be emphasized that it is an attitude, which raises barriers. In addition to this, it should be added that historical memory is very often associated with seniority and therefore on the one hand a more marked difficulty to change, on the other a difficulty in sharing data and learning through innovative tools. Obviously, this is not valid universally and in all sectors but it is still an aspect to be considered in companies and in particular in manufacturing ones. We must therefore provide digital inclusion paths to be sure we can reach the first step of sharing data within companies and then move on to the second phase of approaching the outside world. In manufacturing companies, sharing and especially the use of data has become a priority both internally and externally. The reasons that are pushing, even if it is difficult to move in this direction, are different but in general it can be said that it is one of the most important tools if not one of the few that allow companies to improve products and services to compete and fight the strategy of emerging markets pricing. The fact that companies cannot only compete with low price strategies is now widely recognized and competition must be based on product reliability and the efficiency and variety of services (especially in high-value energy and mining industries). Shifting from product to complex systems of product services can only be implemented with a clear roadmap that provides for the acquisition of information from customers. The continuous monitoring of the machines allows companies to have a continuous flow of data on the use and performance of their products. The construction of a database associated with the flow of data in real time allows, on the one hand, to understand where to invest resources to improve reliability and on the other, to build predictive maintenance models that decrease not productive times. Finally, the advantage of continuous improvement in products and services allows to raise the barriers of competition by creating relationships of dependence between the producer and the customer. This logic is demonstrated as it can induce repeated sales on the one hand and facilitate extended contracts. As mentioned, data sharing with customers starts from the internal company, from a growing digital maturity and from a new set of skills that must be present.

### 3.1.2 An external perspective: the view of the service user

As for companies, also on the customer side we have different degrees of digital maturity and predisposition to share information. Once we have all the digital tools and a culture that has pervaded the company's strategic areas from the company's point of view, one can begin to act on customers. There are various levers that can be used such as real-time machine monitoring systems and others that must be explained and absorbed in the organisational culture. Below we report a series of problems encountered with customers and at the same time how these can be approached to arrive at a data-driven approach and possible solutions.

- **Cyber security.** The issue of security is undoubtedly one of the barriers to entry into customers' field. This is especially true in strategic sectors such as energy and raw materials. Customers perceive data sharing as a potential factor that can compromise their businesses. The problem of security is certainly an issue that must be addressed in the approach with customers but at the same time one must operate in two ways to reassure. First, the data that the manufacturing companies want to obtain are machine data and therefore not sensitive and that they have no strategic value. The second is that the technologies available allow to work with a certain degree of security and that the main interactions are from the assets to the outside and not vice versa (excluding software repairs for which a specific authorization is required).
- **The use of data for the purpose of understanding the customer's satisfaction and know-how.** One of the biggest obstacles encountered in having access to digital data is the fear that these will be used to understand and grasp the know-how associated with the activities. This is particularly marked in the oil and gas sector where it is thought that the digital data are then used to derive the production and localization of hydrocarbons. In addition to oil and gas, this belief extends to all sectors related to mines. This more than a reality is a taboo and the data to which one can access does not allow access to sensitive information at any time. Obviously, communication and the approach to achieve this awareness on the part of customers is not easy and in particular it is difficult in sectors where the logic of the second mover is preferred to the logic of the fast mover, because it is more conservative.
- **Change of contracts (long term extended warranty).** One of the levers that can be used to increase the propensity of customers to share data

is to extend the warranty periods of the machines. It is necessary to highlight how this type of approach can only be implemented if you have products with high reliability. This aspect to be taken into consideration as a main driver in order to think about this type of solution. Extended warranty agreements related to new products on the market can lead to extremely negative consequences for companies. The extended warranty contracts represent on the one hand a plus for customers who feel more protected in their operations and on the other hand they allow the company to formulate packages, basic and premium, adding additional services such as Audit, training and spare part. This guarantees a better functioning of the assets and a decrease in the administrative logistic load of the customers who delegate part of the responsibility for operational continuity to the manufacturer.

- **Additional services at no cost (or at least perceived as such).** An undoubtedly valid approach is to provide customer services that can improve their working capacity. One of these is to provide free clients (web based) through which companies can on the one hand check the status of their assets in real time, check the maintenance status and take advantage of analytics for predictive maintenance. On the other hand, through constant communication with the manufacturer, take advantage of an after sales service that can intervene remotely or possibly on the field to correct malfunctions and breakdowns. This is one of the most important levers that can be used with customers, to make the sharing of data perceived as a tool for reducing not productive times, improve assets control and guarantee premium after-sales service. Being able to manage a fleet, especially for the most advanced customers, allows you to optimize operations.

## 3.1 Public sector

*The path to becoming a data-driven public sector* (OECD, 2019) builds on the instruction of the *Recommendation of the Council on Digital Government Strategies* (OECD, 2014) to "create a data-driven culture in the public sector". It presents a framework for public sector organisations to identify, prepare and respond to the challenges and opportunities of data-driven government to create a holistic, coherent and effective strategy for data. That strategy starts with data governance in order to facilitate the application of data to generate value through improved

design, delivery and evaluation of public services, as well as ensuring that the use of data builds trust in government.

The OECD model for data governance indicates a cross-cutting and holistic approach is needed covering strategic, tactical and operational considerations to unlock the potential for data-driven transformation of services. It is imperative that questions of organisational readiness to support implementation are addressed to ensure that data can be readily shared and integrated across the public sector, while preserving the needed safeguards in terms of privacy and security. Fixing the basics to solve the coordination, legal and practical challenges of data sharing is important to unlock data value for improved services that meet the needs of citizens. The institutional changes include prioritising the establishment of the data infrastructure and data architecture to simplify the means by which services can access available data and instil confidence that when they do the quality is assured (OECD, 2020; OECD, 2019). Data accessibility implies efforts to improve the quality of data as an essential condition for governments to secure public confidence when innovating through the use of emerging technologies like Artificial Intelligence.

The importance of thinking about data architecture is not solely a technical question but is increasingly important in 'Rules as Code' efforts to close the gap between policy development in written prose and its subsequent implementation in machine code. The OpenFisca project, initiated by France but now containing the tax and benefit systems of eight countries including Italy, New Zealand, Tunisia, and Uruguay provides access to the underlying rules of government as code that can be used, and re-used to build more effective services and understand the future permutations of a given policy.

Investing in the data infrastructure of base data registries and APIs that allow teams to find out what data are available and what attributes can be established without asking the user again is valuable. The Once Only Principle is increasingly evident amongst OECD countries with Estonia providing leadership in this area and making it a legal obligation in 1997 and following it up with the resources to subsequently develop national interoperability infrastructure (OECD, 2015). These opportunities for interoperability are not just about the use of internal data but can support and encourage external efforts in terms of Open Government Data. Continuing to promote the publication of high value datasets alongside the provision of openly accessible data infrastructure can stimulate social and economic value in encouraging the use, and re-use, of data.

Having these foundations in place simplifies the use of data to innovate throughout the government data value cycle (see Figure 1). Instead of replacing analogue processes, the more sophisticated use of data allows services to develop a

clearer understanding of user needs and reimagine solutions that respond to the challenges they are facing. At the most ambitious, data-driven government can be proactive in service delivery, responding to needs before they are requested and ensuring that citizens do not need to provide government with information that it already knows about them.

In addition to valuing and understanding data in designing and delivering services, data helps to monitor and evaluate performance over time. The ability for services to improve continuously in response to feedback and data about usage is essential in ensuring that the needs of users continue to be prioritised and met. In the United Kingdom, real-time service performance data is made available through public dashboards. These dashboards also act as a rudimentary catalogue of services. Greater sophistication to such a register of services may include contact details for those responsible for a given service, creating transparency and a reference point for any concerns, questions or feedback about the experience of using it, thus facilitating the sharing of experiences and scaling up of good practices. The real value of such an index is in mapping government and understanding the flow of data between services and organisations. This can pave the way for transforming, simplifying and rationalising services by building a cross-government view of the whole problem and understanding the end to end experience of a user.

Establishing good data governance and using data effectively will deliver better quality services that are more inclusive of, and responsive to, the needs of the public and consequently strengthen public trust in government. However, where data is applied throughout the delivery lifecycle it is imperative that questions of trust are considered within the design of the service. Therefore, the final practical consideration of data-driven service design and delivery is to mitigate these risks in several ways. First, in defining, publishing and enshrining ethical frameworks that guide the behaviour of public servants and commercial suppliers. Second, maintaining a focus and understanding of data protection and privacy from the perspective of citizens, rather than the interests of government. Third, designing the user experience around the granting of consent for the use of data to ensure citizens understand the implications and have a means to see how their data are used and revoking that consent as necessary. Finally, adopting approaches to the security of government services that contain threats without becoming barriers to transformation (OECD, 2019).

Good data governance is a pre-requisite for data-driven service design and delivery. Successful implementation of public policies, or business programmes, intended to increase the use of data for improved services relies on the intersection of different factors. These range from ensuring co-ordination between institutions or actors, to capacity-

building initiatives, collaboration and knowledge-sharing (OECD, 2019). Additionally, the availability of the appropriate regulatory frameworks (e.g. for data sharing, openness and protection) helps to create the right environment for policy instrumentation (e.g. by reducing burdens and barriers to data sharing), and in setting the rules for better controlling data management practices. This is relevant for sustaining enhanced access and sharing of data in the public as well as in the private sector.

#### **4 Conclusions: are we ready or not?**

The sections above have highlighted to what extent the experience of private and public sectors in using data to improve service design and delivery is similar.

The business case providing the motivation, different in nature, revolves always around the need to secure users' satisfaction. While the cost opportunity is different – as it translates into lost revenues in the case of businesses and in decreased levels of public trust and possible negative turn outs in political elections – both public and private sectors want to retain the users.

Yet, both private and public service providers have the difficult task of convincing the service users to share their data. Building a convincing case to be granted consent to access customers' data is strictly linked to be able to show that this can lead to improved quality of final services. Real-time monitoring of delivery processes to data on use can enable rapid intervention and users' and higher reliability, security and guarantee of privacy protection can be a convincing argument for public services. Financial incentives for the users, not available for public authorities, are levers at the disposal of businesses that can also provide advantages in terms of post-sale guarantee.

The promise of improved quality of services can be strongly appealing for users, although issues with potential risks of breaches with personal data privacy and security are very strong, among users of both private and public

services. Both in the public and private sectors, organisational leadership and boards are becoming aware that is not a matter of if but when the digital transformation of service design and delivery driven by data needs to be fully enabled. Data management as a strategic asset is increasingly as indispensable for the future development and the key question both in the public and private sphere remains how to turn this awareness into operational reality. A supportive leadership, a digitally capable and skilled workforce, a clear strategic vision supported by an implementation roadmap and a solid data governance can help improve the institutional readiness for data-driven approached to service design and delivery.

#### **References**

- OECD. (2020). Digital Government in Chile – Improving Public Service Design and Delivery. OECD Publishing, Paris.
- OECD. (2019). The Path to Becoming a Data-Driven Public Sector. OECD Publishing, Paris.
- Bonturi, M., Ubaldi, B., & Welby, B. (2020). What Will It Take to Make Government Data-Driven? *PUBLIC - ESADEgov e-bulletin*.
- van Ooijen, C., Ubaldi, B.-C., & Welby, B. (2019). A data-driven public sector: Enabling the strategic use of data for productive, inclusive and trustworthy governance. OECD Publishing, Paris.
- OECD. (2020). Open, Useful and Re-usable data (OURdata) Index: 2019. OECD Publishing, Paris.
- OECD. (2015). *Data-Driven Innovation: Big Data for Growth and Well-Being*. OECD Publishing, Paris.
- OECD. (2014). *Recommendation of the Council on Digital Government Strategies, OECD/LEGAL/0406*. OECD, Paris.
- OECD. (2015). OECD Public Governance Reviews: Estonia and Finland: Fostering Strategic Capacity across Governments and Digital Services across Borders. In *OECD Public Governance Reviews*. OECD Publishing, Paris.