



Economic potential of open data for Ukraine

2018

Transparency and Accountability in Public Administration and Services / TAPAS



ДЕРЖАВНЕ АГЕНТСТВО
З ПИТАНЬ ЕЛЕКТРОННОГО
УРЯДУВАННЯ УКРАЇНИ



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Economic potential of open data for Ukraine

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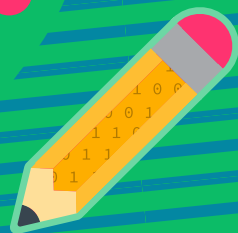
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Executive summary



As part of a reform programme across the government, Ukraine is rapidly increasing the amount of open data that it publishes. Open data is information that anyone can access, use and share. Open data is being used by individuals, businesses, journalists and civil society to learn more about government activities, and to create new tools and insights. Open data is a valuable resource that helps to strengthen the digital and 'real' economies, and it is contributing to economic growth in Ukraine. This study is the first estimate of the impact of open data on the Ukrainian economy and finds that **open data has already contributed over USD 700 million** in 2017. If the open data movement continues to gather momentum in Ukraine, we estimate that it could contribute up to **USD 1.4 billion to the Ukrainian economy by 2025**, representing 0.92% of Ukrainian GDP, through a combination of direct and indirect benefits.

Our research found that the number of workers in Ukraine working directly with open data is fairly small, at between 3000 and 4000 people. We do not expect that open data will increase unemployment in Ukraine, but there will be a need for greater skills in data capture, use and analysis in order to achieve the economic growth potential of open data.



How does open data create economic growth?

Open data helps the economy to grow by increasing the efficiency of individual companies, helping consumers to make better decisions, and enabling the development of new products and enterprises:

- Open data **supports better decision-making** by consumers by giving them access to more, and better, information about a market. For example, [tabletki.ua](#) allows consumers to compare medicine prices across pharmacies.
- **New products, services and business models** can be built using open data, such as EasyWay, which gives information about public transport routes in Ukrainian cities.
- **Businesses and government can find new efficiencies** through access to open data, such as access to the public procurement system Prozorro.

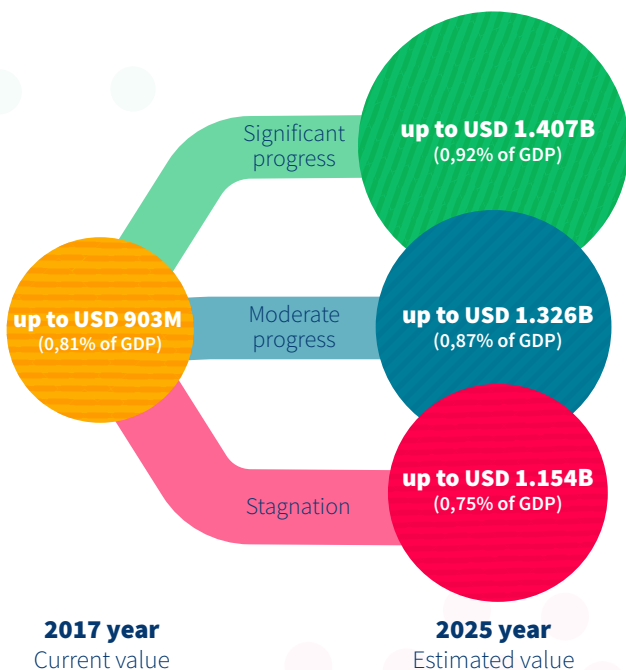


How can Ukraine maximise the economic benefits of open data?

The size of the open data market in Ukraine depends directly on how much progress the government open data programme achieves over the next 5-10 years. In 2016, Ukraine signed up to the principles of the Open Data Charter, with the headline commitment that government information should be made open by default. The government has since opened several hundred new datasets and has worked with the USAID/Uk Aid TAPAS¹ programme to organise events to stimulate open data use by civil society and startup companies.

To maintain momentum in its open data programme and continue to strengthen economic growth in Ukraine, we recommend that the government:

¹ [Transparency and Accountability in Public Administration and Services](#)



 **Figure 1. Our estimates of the potential impact of open data on economic growth**

- ⊙ **Ensures that open data can be used as widely as possible**, by publishing a higher proportion of its open data in a machine-readable format and ensuring all data is published under an open license;
- ⊙ **Tailors its policies to the needs of its users**, by creating formal feedback mechanisms for open data users in the private sector and in civil society to give advice on data quality and on which data is most useful for them;
- ⊙ **Learns from best practice internationally**, and continues to increase its position in international rankings such as the Open Data Barometer and the Global Open Data Index.

Introduction

McKinsey & Company (2013) estimate the world market for open data could be USD 3.2 trillion². A more recent study by [Capgemini for the European Commission \(2015\)](#)³, estimates the direct size of public sector open data across EU28+ countries⁴ at EUR 55.3 billion, forecasting an increase of 36.9% by 2020⁵.

Although similar trends are observed in Ukraine, there are no studies aimed at assessing the economic impact of open data in the country. This report is the first attempt to fill this gap by estimating the current and potential future market size of open data in Ukraine. It also provides recommendations for government on how to support the open data economy.

Ukraine is in the early, but promising, stages of its open data development. Progress has been made since the passing of the [Law on Access to Public Information](#) in 2011 and its amendments focused on open data adopted in 2015, the launch of the [open data portal](#) in 2014, and the adoption of the [Open Data Charter](#) in 2016. The publication of key open datasets, including for example on public procurements and asset declarations by civil servants, along with nurturing an active open data community of startups, civic tech organisations and journalists, resulted in Ukraine making substantial improvements in international open data rankings⁶.

² ["Open data: Unlocking innovation and performance with liquid information", McKinsey \(2013\)](#)

³ ["Creating Value through open data", Capgemini Consulting for European Commission \(2015\)](#)

⁴ EU28+ refers to the 28 European Union Member States and the four EFTA countries Iceland, Liechtenstein, Norway, and Switzerland. These are the countries that publish public sector open data on the [European Data Portal](#)

⁵ ["Creating Value through open data", Capgemini Consulting for European Commission \(2015\)](#)

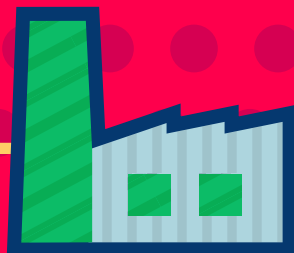
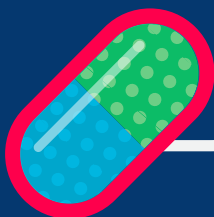
⁶ In 2016, Ukraine jumped 18 positions up in the Open Data Barometer, to the 44th place out of 115 countries, and by 23 positions up to 31st place out of 94 countries in the Global Open Data Index. See ["Country detail Ukraine", Open Data Barometer \(2017\)](#) та ["Place overview", Global Open Data Index \(2016\)](#).

The structure of the report is as follows: we introduce open data and its economic potential, describe the current state of open data in Ukraine, and present findings on the current and potential future impact of open data on the Ukrainian economy and employment. Finally, we provide recommendations aimed at improving the open data ecosystem in Ukraine.

The methodology for estimation builds on that of Capgemini for the European Commission (2015)⁷, making adjustments which are specific to the Ukrainian context. The analysis is limited to open data provided by the public sector, and results are likely to underestimate the overall impact of open data on the economy. To illustrate the importance of open data published by the private sector, case studies are provided throughout the report.

⁷ ["Creating Value through open data", Capgemini Consulting for European Commission \(2015\)](#)

How open data can grow the Ukrainian economy



Data is becoming increasingly important to global economies, as more and better data is collected than ever before, and new technologies enable us to draw quicker and more sophisticated analysis from it. Data is open when anyone can access, use and share it,⁸ which is specified in the open data licence.

Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike.

Open Data Handbook⁹

As open data is a relatively new resource, we draw on more widely understood resources to illustrate its economic potential. Open data can be understood as a form of infrastructure, enabling societies and economies to operate. Much as roads help us to reach a destination, open data helps us to navigate to a decision or action. It informs our behaviour and if we have more and better data available we can make better informed decisions. Roads are only useful when people drive on them and data is only useful when its analysis informs decisions. The more it is used and the more connections are made, the more productive the infrastructure becomes. This is encouraged through openness.

★ The open data value chain

Open data becomes productive when it is operating within an ecosystem of data publishers, intermediaries, product and service providers, and beneficiaries¹⁰. Below we introduce the main groups of actors, who add value at different stages of the open data value chain.

Data publishers collect and publish data openly.

Intermediaries add value by aggregating, reorganising and formatting data.

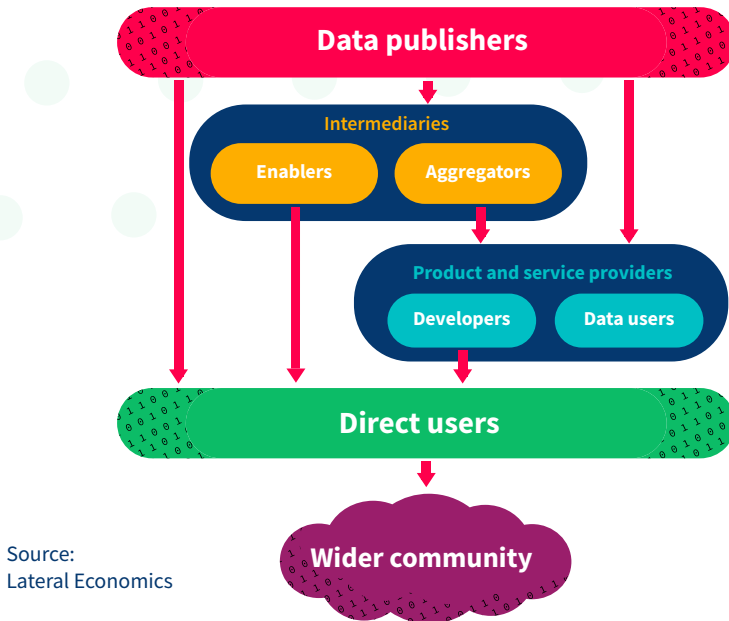
⁸ [“What is open data?”, Open Data Institute \(n.d.\)](#)

⁹ [“What is Open Data?”, Open Data Handbook \(n.d.\)](#)

¹⁰ [“Permission granted: The economic value of data assets under alternative policy regimes”, Lateral Economics \(2016\)](#)

Product and service providers create applications, enhance existing products and services, or create new ones.

Direct users of the open data enabled end-products and the **wider community** benefit indirectly from open data enabled products and services.



 **Figure 2. Value chain for core data assets re-use**

Channels for economic impact of open data

Open data affects economic activity broadly through three channels:

Open data supports better decision-making

Open data supports better and more informed decision-making by consumers and organisations, by giving them access to more and better information about a market. Better decisions have a positive impact on the operational and strategic level.

More efficient public procurement through open contracting

*The public procurement system **Prozorro** launched in 2015. Publishing open procurement data and implementing open contracting procurement reforms has reduced corruption and generated savings for the public sector. Since the programme's inception, open contracting and procurement has resulted in an increase in competition, more suppliers who hadn't bid before and more savings. Procurement entities are able to attract more participants for tender, resulting in greater competition and lower prices. For companies offering services, it becomes easier to identify potential new buyers. Procurement becomes more transparent to the public, allowing NGOs and journalists to better monitor it.*



New products, services and business models

Open data informs the design of products and services, and supports the anticipation of future demands. Open data can improve access to existing products and services, and allow more targeted or customised services to be offered. New business models are emerging, focused on building value from data, instead of generating revenue from selling data. As a result of new services being developed, new jobs are created and opportunities for trade and investment arise. The largest share of the benefits goes to consumers, who receive better and more efficient services¹¹.

Better public transport through open routing data

*The Ukrainian company **EasyWay**, created in Lviv in 2011, is a free service that provides information on all routes and public transport stops for around 60 cities of Ukraine as well as cities in Moldova, Bulgaria, Serbia,*

¹¹ "Permission granted: The economic value of data assets under alternative policy regimes", Lateral Economics (2016)

Croatia, and Kazakhstan. In 2012, the site provided information for guests of the 'Euro 2012' championship, demonstrating the potential benefits to tourism when foreign visitors are able to easily navigate a city's public infrastructure. In 2013, EasyWay became a technical partner of Google, Yandex and Here, which has meant further support for public transport in Ukraine through the exchange of information for the mutual improvement of each service. EasyWay also provides information on public transport through an API that can be used by other businesses.



Transport for London (TfL), who are responsible for the majority of public transport in London, have demonstrated that open transport data can have a significant impact on the economy. **Research by Deloitte (2017)**¹² shows that TfL's approach to open data is improving journeys, saving people time, supporting innovation and creating jobs. It estimates that open transport data generates annual economic benefits and savings of up to GBP 130 million for travellers, London and TfL itself.



Businesses and government can find new efficiencies

Open data can increase efficiency and cost savings by enabling smoother and more integrated operational processes, and by increasing market access and fair competition. Open data reduces frictions and information asymmetry in the market and helps to better match supply and demand, increasing productivity overall.

Cost savings for medicine through open price information

tabletki.ua — is a Ukrainian web portal that collects data on components, prices and availability of medicines from more than 2,700 drug-

¹² "Assessing the value of TfL's open data and digital partnerships", Deloitte (2017)

stores and the open state registry, and provides this information to more than 6 million site visitors per month.

Through this portal, a person can compare the costs of doctor-prescribed medicines with those of other medicines containing the same ingredients (i.e., generic), find the closest drugstore with this medicine, or get home delivery. It also helps patients to verify prices, demonstrating how transparency can contribute to general efficiencies in the healthcare sector.

To ensure the relevance of the information, all data updated more than three days ago is removed. The main source for revenues are fees paid by drug stores for the right to provide the information on the portal.



TABLETKI.UA



Mitigating risks associated with the use of open data

While there are risks associated with open data that need to be taken into account, a prudent open data policy can minimise those risks, allowing the benefits to be distributed among a broad range of citizens, companies and public entities. We show the main risks and strategies for mitigation below¹³.

Privacy concerns

Where open data may contain personal or commercially sensitive information it is necessary to ensure the use of anonymisation techniques to protect sensitive data, and to develop policies to help people understand what data should be opened up and what should be kept closed.

Poor decision-making due to poor data

Data that contains mistakes, is outdated or incomplete can lead to incorrect information being produced (“garbage in, garbage out”). The risk can be minimized by improving collection, cleaning, storing and sharing

¹² [“Open Data in developing economies”, GovLab \(2017\)](#)

of data, as well as by establishing efficient feedback mechanisms. Good quality data is essential for an open data ecosystem and productive use cases.

Entrenching power asymmetries

There is a risk that only a limited number of people can effectively use open data because of the specific skills or technologies needed to read and process it. Supporting the development of an open data ecosystem, ensuring the availability of data in a wide range of formats, and developing programmes to increase citizens' skills and understanding can protect against this risk.

‘Open washing’

Open data could become the substitute for other necessary reforms related to transparency and accountability. To minimize the risk, civil society organizations should monitor the public bodies' activities in other areas related to open data.

State of open data in Ukraine



Ukraine is in the early, but promising, stages of its open data development. Progress has been made:

- In 2011, Parliament passed the law on [‘Access to public information’](#) which allows any person to access public information by sending a request to the relevant public entity, with no fees required. In turn, the public entity has to provide an answer within five days.
- In 2014, the national [open data portal](#) was launched by [PO Social-Boost](#) in cooperation with the Ukrainian government. Since then it has continued to grow from a relatively small collection of public datasets into a widely used and extensive source of public information.
- In 2015, parliament passed amendments to the law aimed at simplifying access to public data with a focus on open data. To support the amendments, the Cabinet of Ministers of Ukraine adopted [decree #835](#) that required a list of datasets to be opened, specifying the means of opening and a list of responsible bodies.
- In order to implement open data policy in line with international open data principles, in 2016 Ukraine joined the [Open Data Charter](#) – a set of principles and best practices for the release of open data provided by government.

Open Data Charter principles ¹⁴

-  Open by Default
-  Timely and Comprehensive
-  Accessible and Usable
-  Comparable and Interoperable
-  For Improved Governance and Citizen Engagement
-  For Inclusive Development and Innovation

¹⁴ [“Principles”, Open Data Charter \(n.d.\)](#)

- The [Open Data Challenge](#) was the first national competition for open data projects. 170 applications were received, 15 teams participated in a hackathon, 10 teams went through two months of incubation period at [1991 Open Data Incubator](#) and three winners were selected at the first national [Open Data Forum](#). The next cycle of the open data Challenge started in February 2018.
- The [E-Governance for Accountability Participation \(EGAP\) Challenge](#) was the first national competition for e-democracy projects, including open data projects.
- The [Apps4 Cities](#) competition that was held in 2016 to support projects on the basis of the open data.

New startups using open data

*The **Open Data Challenge Series** is a national competition for open data projects. It was launched in 2017. The challenge provides an opportunity for developers, entrepreneurs, designers, researchers and civil activists to develop products and services.*

In 2017, over USD 50,000 was distributed across the three finalists:

Open Coal Market is an online coal auction platform that provides open access to the market, reduces corruption risks through transparent pricing and disclosure of sales information, and provides open data.

Court on the Palm is an analytical tool for finding, researching and challenging court decisions. The main users of the service are lawyers, journalists conducting investigations based on data from the Unified Register of Court Decisions, and non-governmental organisations that carry out activities in the field of law and reform of the judiciary.

Fines UA - Safe Driving project is a mobile tracking technology that allows users to determine the quality of driving a car using the telemetry features of a smartphone. It also provides tips for improving driving skills, makes managing fines easier and sends reminders for insurance policy updates.



Open data at the national level

Open data decree and implementation

The Cabinet of Ministers' [decree No. 835 'On Approval of the Provision on Data Sets to be Released'](#), (2015) specifies more than 300 datasets, and for the most part the responsible data publisher, to be released openly by government. As of December 2017, 93% of these datasets have been published.

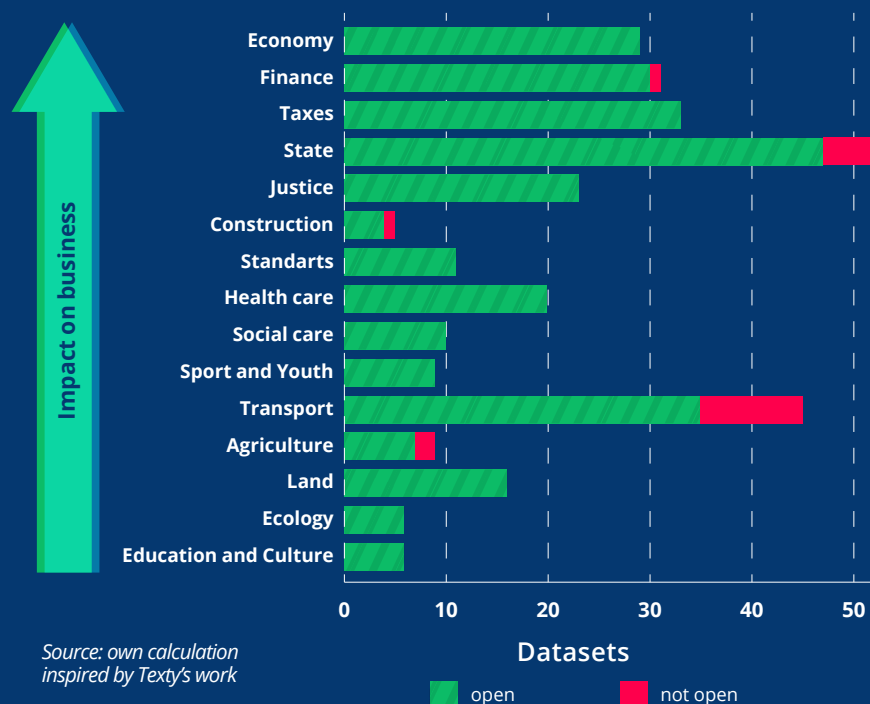


Figure 3. Implementation of the open data decree by domain

The figure above illustrates the distribution of the available datasets from the decree by domain. Not all the datasets are yet machine-readable and there is room for improvement in terms of data quality.

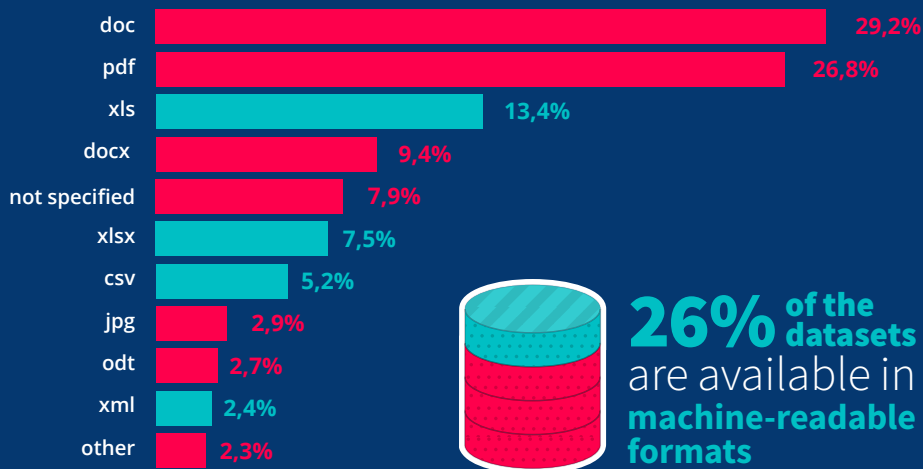
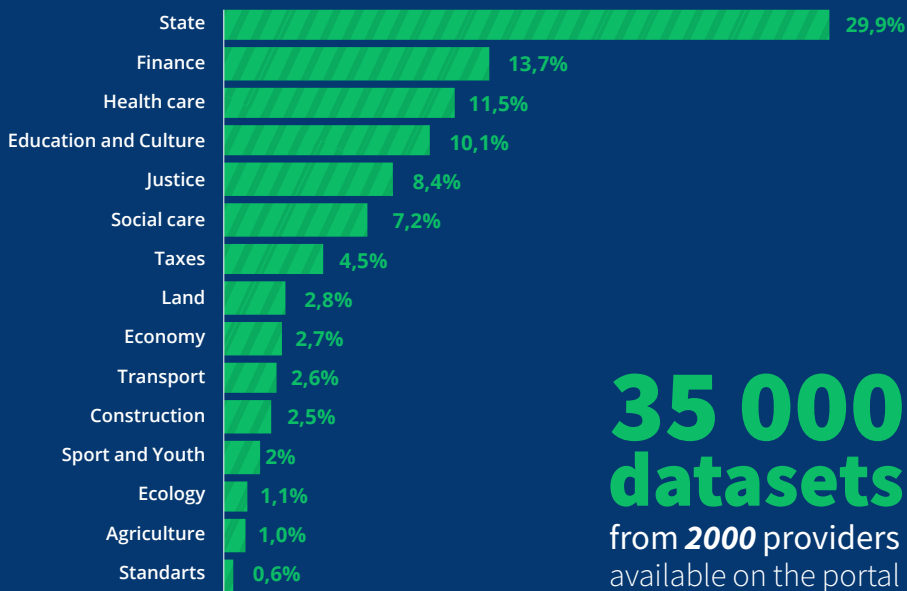
The National Bank of Ukraine and Ministry of Justice are leaders in the publication of open data and have opened additional datasets to those required by law, including for example the **beneficial ownership registry**.

93% all the datasets
from the open data decree
have been published openly

The State Agency for E-Governance drafted amendments to the decree in 2017 to double the list of datasets to be opened over the next few years, starting in 2018.

National open data portal

In 2015 The State Agency for E-Governance created the national open data portal. Over several years it was transformed from a relatively small collection of public datasets into the primary source of public sector information. As of April 2018, the portal consists of more than 35,000 datasets from almost 2,000 data providers. The distribution of the portal's datasets by their file formats and domains is presented in the figure below.



Note: the sum of shares is larger than 100% due to multiple file formats for some datasets.

Source: data.gov.ua (as of April 1, 2018)

 **Figure 4. Distribution of datasets on the national open data portal**

Despite the fact that a large number of datasets are available, only around a quarter of them are available in machine-readable formats¹⁵. An additional 37% can be processed automatically (semi-machine-readable formats, i.e. txt, rtf). Even though data in non-machine readable formats can be processed automatically using sophisticated algorithms or programmes, this creates additional cost of processing the data. It would be good practice to provide datasets in machine-readable formats (csv, json) and also human-readable formats (excel) to make data as useful as possible.

The most viewed datasets on the portal are shown below. The total number of views is almost 2.2 million. The unified registry of legal entities and the registry of value added tax payers accounted for about 13% of all views. Identifying frequently accessed data sets can help prioritise resources for improvements.

The State Agency for E-Governance (with external support) is planning to improve the portal's functionality in 2018, which will make it easier to use.

Most viewed datasets on the national open data portal

- 1. Unified register of legal entities (241,000 views)*
- 2. Register of VAT-payers (40,000 views)*
- 3. Information on business entities that have a tax debt (9,000 views)*
- 4. Register of land surveyors (8,000 views)*
- 5. Reference indicators for monetary valuation of land settlements (6,000 views)*
- 6. Register of pesticides and agro-chemicals allowed in Ukraine (6,000 views)*
- 7. List of postal codes and post offices (5,000 views)*
- 8. Intellectual property register (5,000 views)*

¹⁵ For our study, we separated all the datasets from the portal into three groups: machine-readable (csv, html, json, rdf, xls, xlsx, xml), semi-machine-readable (doc, docx, ods, odt, rtf, txt) and non-machine-readable (gif, jpeg, jpg, tiff, png, rar, pdf). Note, that we added pdf formats into the latter group, though under some circumstances it can be semi-machine-readable.



Open data at the local and regional level

In 2017, five cities joined the [Open Data Charter](#): Lviv, Vinnytsia, Chervivtsi, Dnipro and Drohobych¹⁶. As a part of their open data strategies, some cities have developed or are developing local open data portals, including Lviv, Dnipro and Drohobych. Portal creation is part of a broader process aimed at creating an open data ecosystem. Regionally, Kharkiv and Odessa have also launched their own open data portals.

Local open data portals are particularly important because they provide access to data that relates directly to citizens, and the tools they inspire can be used in everyday life: where to buy a specific product, how to get from A to B more efficiently (see example of EasyWay), and where to park.

Transparency in cities through local open data portal

The current version of [Lviv's open data portal](#), the first local portal in Ukraine, was launched in January 2017. As of October 2017, the portal contains more than 300 datasets (from 12 domains) published by almost 100 data providers.

All of the datasets are available in machine-readable formats. The IT Centre provides consultations and conducts trainings for civil servants to improve data quality. Detailed manuals on data processing for public entities are being prepared. It is expected that in the future, the IT Center will be responsible for data quality control, while the public entities will be entirely responsible for collection and cleaning of the data.

In its short history, the portal has already proved popular: the number of unique visitors exceeds 1,000 per month. Most frequently, the visitors are looking at information on unlawful buildings, urban planning, lease agreements for communal property and results of the council's plenary

¹⁶ "Adopted by", [Open Data Charter](#) (2015)

meetings. Moreover, Civil Network **OPORA** developed a public web-service based on data from plenary meetings.

*These developments have led to the Lviv city council winning the **Open Data City Award**¹⁷ as part of the **Open Data Forum** held in September 2017.*

Significant improvements can be seen at the regional level. Most of the regional authorities publish at least some of their data on the [national open data portal](#) and currently provide the majority of the portal's datasets. Data on regional budgets and spending have been made available on [spending.gov.ua](#), and data on procurement on [prozorro.gov.ua](#).

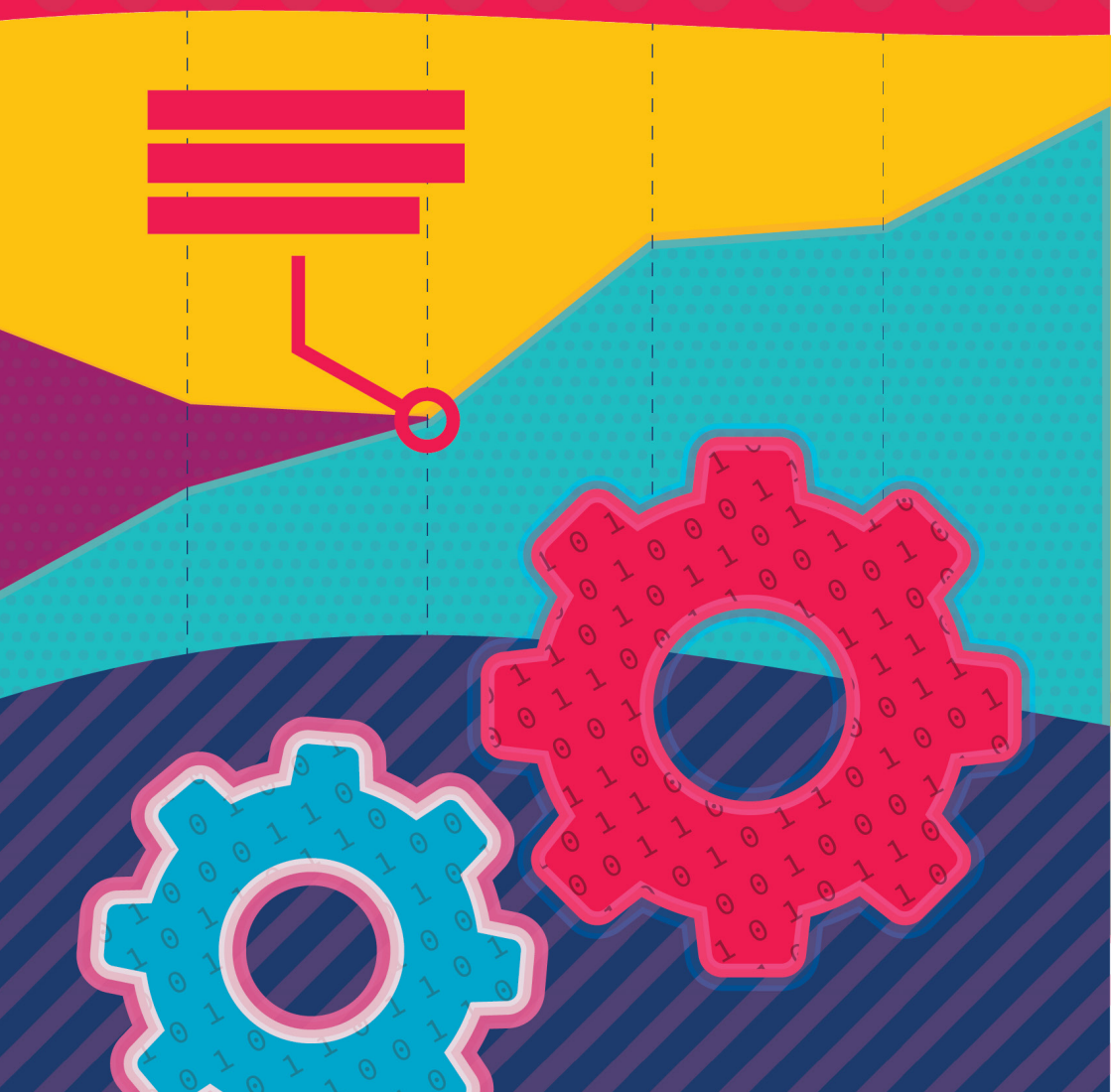
More efficient transport through smart parking

Smart Parking Systems is an Italian smartphone app which was developed in 2004 to guide users to the nearest available parking space, and provides a direct payment channel. This saves a driver the time spent looking for a place and having to stop at a payment terminal.

The application combines multiple data sources to provide the information and services to its users. By combining open data with new data from underground sensors, the efficiency of management of street parking places is improved. This results in higher revenues for local government and lower costs for citizens. In order to get information on parking availability, the company has developed its own wireless underground sensor. The app is available in 13 cities.

¹⁷ [“Results open data forum: there are three winners of the open data challenge”, 1991 \(2017\)](#)

Findings on the economic impact of open data



In this section, we present an estimation of the current impact of open data on the Ukrainian economy and forecast the potential impact by 2025. To determine the economic impact of open data, we assess Ukraine's open data maturity and derive the size and growth rates of the open data market. We suggest three scenarios for the future of open data and present a forecast of the economic impact for each. Note that all monetary values are in real 2017 prices.

Open data maturity

Open data maturity describes how well a country publishes and consumes open data, and is assessed through open data policy, licensing, availability, use, impact, and an open data portal's usability and content. Based on its maturity level, the size and growth potential of the open data market will be estimated.

We conducted a survey of open data experts and open data portal representatives, based on a questionnaire developed by the European Commission¹⁸. Ukraine scored 645/1090 on open data readiness (EU average: 597) and 160/250 on portal maturity (EU average: 161)¹⁹.

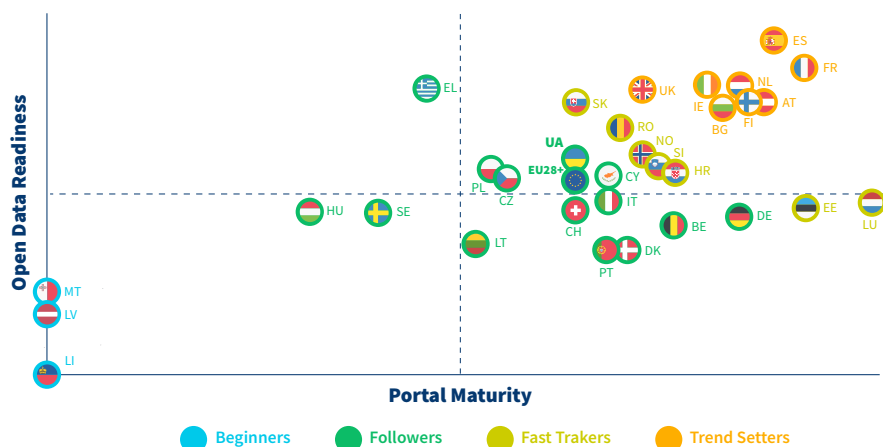
The [European Commission \(2016\)](#)²⁰ groups countries, according to their open data maturity, into Beginners, Followers, Fast Trackers and Trend Setters. Based on the scores, Ukraine belongs to the group of Followers, along with Poland, Germany, Italy and Lithuania. Followers are characterised as a group of countries that have “successfully developed a basic open data policy” but still have limitations in open data availability and use²¹.

¹⁸ [“Open Data Maturity in Europe 2016”, European Data Portal \(2016\)](#)

¹⁹ [“Open Data in Europe”, European Data Portal \(n.d.\)](#)

²⁰ [“Open Data Maturity in Europe 2016”, European Data Portal \(2016\)](#)

²¹ [“Open Data Maturity in Europe 2016”, European Data Portal \(2016\)](#)



Source: "Open Data Maturity in Europe 2016" and own calculations

Figure 5. Open data maturity clusters

Current economic impact of open data

The economic impact of open data can be broken down into direct and indirect benefits. The direct impact refers to benefits that accrue to businesses providing open data enabled services, including revenues and jobs created. The much larger impact is indirect, meaning benefits accrue to the users of open data enabled services. Indirect impact includes better and more efficient services, but also revenue and jobs created as a result of using the open data enabled services, as well as knowledge economy growth and increased market efficiency and productivity²².

We estimate the direct and indirect impact in turn. The estimation of the direct open data market size in Ukraine is based on the methodology of Capgemini (2015)²³, who suggest a direct open data market size to have been 0.23% of total gross domestic product (GDP) in the EU28+ in 2005. Given that Ukraine is in the early stages of developing an open data ecosystem, similar to that of EU28+ in 2005, we take this number as a starting point²⁴. Ukraine has a smaller IT sector than the EU average

²² "Open data for economic growth", World Bank (2014)

²³ "Creating Value through open data", Capgemini Consulting for European Commission (2015); "Measuring European Public Sector Information Resources", European Commission (2006)

²⁴ "Creating Value through open data", Capgemini Consulting for European Commission (2015) projected the economic impact of open data to be 0.35% of GDP in EU28+ by 2015. Given the short history of open data in Ukraine, we refer to the 2005 share of 0.23% of GDP as a starting point.

(4.5% of GVA, compared to 5% for EU28+), and given this smaller market, the potential to scale is likely smaller. We therefore estimate the 2017 market size of open data to be between 0.19% and 0.23% of GDP, or between USD 213 and 258 million (in constant 2017 prices)²⁵.

To estimate the indirect impact, we assume a multiplier effect that captures the wider impact of open data on the economy. Vickery (2011) estimates the multiplier to be 2.5.²⁶ This suggests an indirect impact between USD 533 and 635 million,²⁷ or between 0.48% and 0.58% of GDP.

The total economic impact of open data in 2017 is thus estimated at between USD 746-903 million or 0.67% and 0.81% of GDP.

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Future scenarios for the economic impact of open data

The open data maturity level defines the expected future growth rate. We forecasted the growth rates for *Beginners*, *Followers*, *Fast Trackers* and *Trend Setters* based on estimations by [Capgemini \(2015\)](#)²⁸ for comparable groups, which we then adjusted for economic growth projections for the Ukrainian economy overall. The forecasted growth rates for each group are shown below²⁹.

²⁵ UAH 5.7 bn and UAH 6.9 bn (average exchange rate in 2017: USD 1 = UAH 26.6; source: [National Bank of Ukraine](#))

²⁶ [“Review of recent studies on PSI reuse and related market developments”, European Commission \(2011\)](#)

²⁷ UAH 14.2 bn - UAH 17.2 bn (average exchange rate in 2017: USD 1 = UAH 26.6; source: [National Bank of Ukraine](#))

²⁸ “Creating Value through open data”, Capgemini Consulting for European Commission (2015) assumes the groups to be Beginners, Advanced Beginners, Followers and Trend Setters and estimates the growth rate for the highest group to be 7%, with each lower group growing at 2 percentage points slower. In “Open Data Maturity in Europe 2016”, European Data Portal (2016), the groups we use in this paper are introduced but no new growth rates are provided. We apply the previous growth rates to the updated groups.

²⁹ [“Gross Domestic Product \(GDP\)”, International Monetary Fund \(n.d.\)](#)

Any policy change causing a country to move between groups has an impact on the growth rate one year after. For example, if Ukraine moved from *Follower* to *Fast Tracker* in 2018, the open data market growth rate would stay at 3.1% in 2018 and increase to 5.2% in 2019³⁰.

Table 1. Open data maturity levels and open data market growth rates
(Source: own calculations)

Maturity	Growth rate
Beginner	1%
Follower	3,1%
Fast Tracker	5,2%
Trend Setter	7,3%

To forecast the economic potential of open data by 2025, we considered three scenarios in terms of the level of investment and uptake of open data: stagnation, moderate progress and significant progress. We describe each scenario below.

Stagnation

The state of open data in Ukraine will not develop further. No additional open data will be released, no new data users will be added and existing data users will not develop new products and services. Ukraine will remain a *Follower* and the open data market growth rate will stay at the current level of 3.1% until 2025.

Moderate progress

The majority of the datasets defined by the open data decree will be published openly, the data quality and usability will improve moderately and the number of data users will increase somewhat. Ukraine will move to a higher data maturity group every three years, joining the *Fast Trackers* in 2020 and the *Trend Setters* in 2023. The open data market growth

³⁰ The open data growth rates (based on the maturity level) are adjusted on the GDP growth rates: if the economy is growing at the higher rates, than the demand for open data tools is also increasing with the higher rates. The IMF expects real growth of the Ukrainian economy to be 2%-3.5% annually between 2017 and 2019, and 4% annually afterwards. See [“Gross Domestic Product \(GDP\)”, International Monetary Fund \(n.d.\)](#)

rate will remain at 3.1% until 2020, then increase to 5.2% until in 2024 it becomes 7.3%

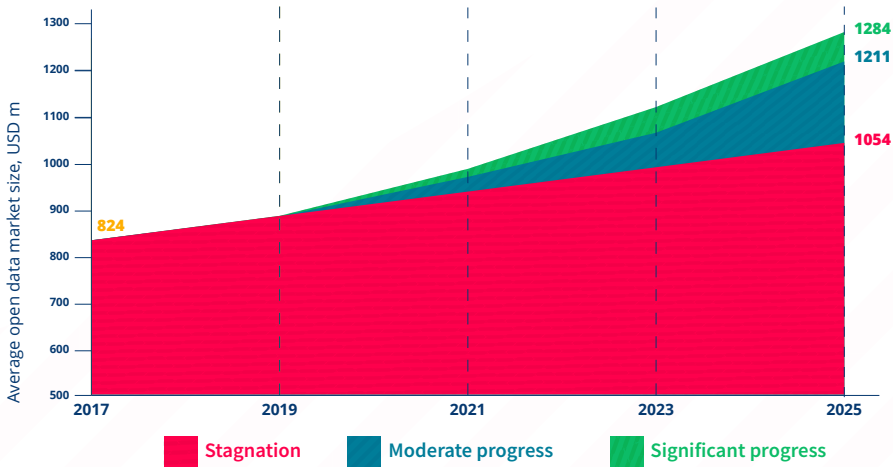
Significant progress

All datasets from the open data decree as well as additional ones will be published openly, the quality and usability of open data will improve significantly as will the number of users. As a result, the country will use the full potential of open data. In this scenario, Ukraine will move to a higher data maturity group every two years. In 2019, Ukraine will join the Fast Trackers and in 2021 it will join the Trend Setters, leading to open data market growth rates of 3.1% until 2019, 5.2% until 2021, and 7.3% from 2022 onwards.

Based on the estimated growth rates, the open data market size for each scenario is shown in the figure and table below

Table 2. Open data market growth rates for three future scenarios

	2018	2019	2020	2021	2022	2023	2024	2025	Open data maturity
Stagnation	3,1%	3,1%	3,1%	3,1%	3,1%	3,1%	3,1%	3,1%	Follower
Moderate progress	3,1%	3,1%	3,1%	5,2%	5,2%	5,2%	7,3%	7,3%	Fast Tracker
Significant progress	3,1%	3,1%	5,2%	5,2%	7,3%	7,3%	7,3%	7,3%	Trend Setter



Source: own calculations

Figure 6. Average total open data market size, USD m

The table below summarises the results of our estimation.

Table 3. Open data market size 2017 and 2025 for each scenario³¹
(Source: own calculations)

	2017		2025	
	Open data market size, USD, m	Share of GDP	Open data market size, USD, m	Share of GDP
Stagnation	746-903	0,67-0,81%	953-1,154	0,62-0,75%
Moderate progress			1,095-1,326	0,72-0,87%
Significant progress			1,162-1,407	0,76-0,92%

If significant progress is achieved, the open data market will be between USD 1.2 and 1.4 billion by 2025, with an average contribution to the Ukrainian GDP of 0.84%. This is a significant increase from the current share of 0.74%. Notably, the difference between stagnation and significant progress is close to USD 200 million, or 0.15% of GDP.

Economic impact of open data across sectors

The impact open data has on a sector depends on the size of the sector, the availability of relevant open data and the ability to use open data productively. While it would be possible to estimate the direct impact of open data on a sector, measuring or forecasting the indirect impact is more difficult as it is characterised by intersectoral relationships – opening the data (or creating the data-based tools) in one sector can have large impact on others.

We are therefore not hoping to provide an estimation of the sectoral distribution of the open data market, but want to highlight some sector-specific developments that can, and already do, play significant roles in economic development.

³¹ in 2016 prices

Better schools and school choices through open educational data

Open School is a Ukrainian project that helps parents to find the best school for their children.

The service was established in 2016 and now contains information on almost 17,000 schools across Ukraine. The information covers the distribution of pupils by class, number of teachers, school's facilities, and statistics on External Independent Evaluation (school leaving qualification).

There are almost 4 million pupils in Ukraine. Service users can be parents, school administrators that now can compare their school's performance with that of other schools, and people that either work in education or are interested in education developments. Open School contributes to building competition between schools, better allocation of public resources and better matching of pupils with schools that are suitable for them.

Ukraine has a large agricultural sector, which contributes almost 14% to GVA³². Unsurprisingly, one of the most frequently viewed datasets on the national open data portal is the registry of pesticides and agro-chemicals allowed in Ukraine³³. The potential for open data supported services is illustrated by the Smart Farming example below.

Towards precision agriculture through open geospatial data

SmartFarming, a Ukrainian company that promotes 'precision agriculture', uses geospatial data from different sources, including open data from State Land Cadastre, which helps farmers to increase their yield. It provides a range of services, including crop condition monitoring, measuring land plots and soil analysis, creating comprehensive analytics about their landholdings, and helping them better allocate resources.

³² Source: Ukrstat

³³ See section **Open data at the national level**

A number of interesting examples of open data enabled services have developed to reduce corruption, including [YouControl](#), [OpenDataBot](#), [007](#), and [Kontrahent](#). They provide information based on open data that helps users to find trustworthy business partners, reducing the risk involved in transactions and leading to more efficient allocation of resources.

Increase business integrity through open background checks

OpenDataBot is a service that provides business intelligence and lets users monitor companies, court decisions related to the companies, raider attacks etc. The service was launched in 2016 using the platform Telegram and later expanded the list of platforms on Facebook, Skype and Viber.

The service uses information from 10 open data sources. It also has the API that can be used by other companies in their business models.

Findings on the impact of open data on employment



Open data can have an impact on employment in three ways: job creation, job destruction and change of tasks.

New businesses using open data as an input require data analysts and data scientists, who in turn produce outputs that others will be able to process further. We therefore start by estimating the number of jobs, which are considered to be high-tech and knowledge intensive activities (KIA).

Based on the definition of KIA provided by Eurostat³⁴ and the distribution of employed workers in Ukraine by 2-digits NACE classification in 2013,³⁵ we estimate the total number of workers in KIA to be equal to approximately 5.2 million or 25.6% of all employed in Ukraine.

The annexation of the Crimea and war in the Donbass reduced the total number of employed people in Ukraine. We estimate that the impact was proportionally larger for lower-skilled workers. The average share of KIA in EU28+ is equal to 35.3%³⁶. Thus, we estimate the share of KIA jobs in 2017 to be between 25.6% and 35.3%, which equals 4.2 - 5.7 million people³⁷.

³⁴ [“Aggregation of Knowledge Intensive Activities based on NACE Rev.2”, Eurostat \(n.d.\)](#)

³⁵ This is the latest available data.

³⁶ [Annual data on employment in knowledge-intensive activities at the national level, by sex \(from 2008 onwards, NACE Rev. 2\)”, Eurostat \(2017\); “Employment in technology and knowledge-intensive sectors at the national level, by sex \(from 2008 onwards, NACE Rev. 2\) \[htec_emp_nat2\]”, Eurostat \(2017\)](#)

³⁷ According to State Statistical Service of Ukraine, the total number of workers in 2017 was 16.2 million, see [“Employed population by economic activities in 2012-2016 NASE \(rev-2\)”, Ukrstat \(2017\)](#)

Based on findings by [Capgemini \(2015\)](#)³⁸ and the low open data maturity of Ukraine, we estimate the share of workers in KIA directly involved in open data related activities to be between 0.066% and 0.074% or 3,000 to 4,000 workers. Taking into account the forecasted open data market developments, in 2025 their number will be 1,400 - 1,900 higher. Based on these numbers we can estimate the number of indirect employees in open data related activities using the multiplier from the previous section. Our findings are summarised in the table below.

Table 4. Number of employees in the open data market
(Source: own calculations)

		2017	2025	Change
Direct jobs	upper bound	4	5.9	1.9
	lower bound	2.9	4.2	1.5
Indirect jobs	upper bound	10	14.7	4.7
	lower bound	7.2	10.6	3.4

In our research, we did not find evidence that open data causes reduction of the number of workers. However, we do not exclude the possibility that this outcome will have some effect in the medium- or long-term.

In the short- and medium-term, open data may result in workers having to perform new tasks, including the need to retrain. For example, the availability of open data may change the nature of public requests for information from data requests to questions about the data.

³⁸ [“Creating Value through open data”, Capgemini Consulting for European Commission \(2015\)](#)

Conclusions and recommendations



Ukraine has made significant progress in publishing open data and building an ecosystem around that data to encourage its productive use. Much of this development is a result of close cooperation between government and civil society. During recent years, an unprecedented amount of public data has become open, including business and court registers and public transactions. This has resulted in efficiency gains and cost savings, new and better services, new business models and more efficient markets.

We estimate the economic impact of open data in 2017 to be between USD 746 and 903 million. If significant progress is made, this will increase by 57% by 2025 to be between USD 1.2 and 1.4 billion, or 0.84% of GDP. Below we suggest a number of recommendations to support significant progress.

≡ Recommendations

1. *Civil society and businesses play an important role in the open data ecosystem. When prioritising the types of datasets, formats and places to publish, we encourage data publishers to engage users in order to better understand their needs. An efficient feedback system for the national open data portal and for external data sources would support this dialogue.*
2. *Open data only generates economic impact when it is used. To make data most useful, it should be provided under an open license, referencing, for example, the Law on access to Public Information (art. 10.1 and art 10.2). This will allow anyone to use the data in any way, including for commercial purposes.*
3. *Examples and case studies are a great source of inspiration. Learning from others what worked or did not work can save time and support open innovation. We encourage the collection and sharing of examples, including on the national open data portal.*
4. *To improve data availability, data collection processes need to be improved and standardised and a focus on internal data management would make it easier to publish more and better data openly. To improve usability, more data should be available in machine-readable formats and be updated regularly. This will help reduce data processing cost for businesses.*
5. *In order to track the effectiveness of the implemented measures, international open data rankings are useful. Improvement in the indicators relevant for the Open Data Barometer and the Global Open Data Index should be actively pursued. While these ratings are focused mostly on open data supply side, there is also a need in developing additional indicators focused on how the data is used.*

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Appendix



Links to collections of case studies and examples

- **The OD500 Global Network.**

Large number of case studies from Australia, the US, Mexico, Italy, Korea and Canada:

<http://www.opendata500.com/>

- **Open Data Institute.**

Comprehensive description of the case studies from different countries:

<https://theodi.org/case-studies>

- **European Data Portal.**

Hundreds of the open data case studies from European countries:

<https://www.europeandataportal.eu/en/using-data/use-cases>

- **Follow the Money.**

Case studies mostly focused on fiscal issues:

https://docs.google.com/spreadsheets/d/1Rj47jIzF-lBoaF1_cvY4rM9DIQ3Bw2b6dy-BEQuDno/edit#gid=1240396981

- **Sunlight Foundation Case Studies.**

Case studies focused on open data's social impact:

<https://docs.google.com/spreadsheets/d/1jP6WIkEPczb8MBn6DNOU2PhKp9Prwe4HokqhUQVsxEO/edit#gid=0>

- **The Open Data Impact Map.**

Public database of organisations using open government data from around the world:

<http://opendataimpactmap.org/>

- **Collection of databases on Medium:**

<https://medium.com/@opendatacharter/examples-of-how-open-data-can-improve-public-sector-performance-1b80a1522dbe>



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