

Shaping the Future of Open Data

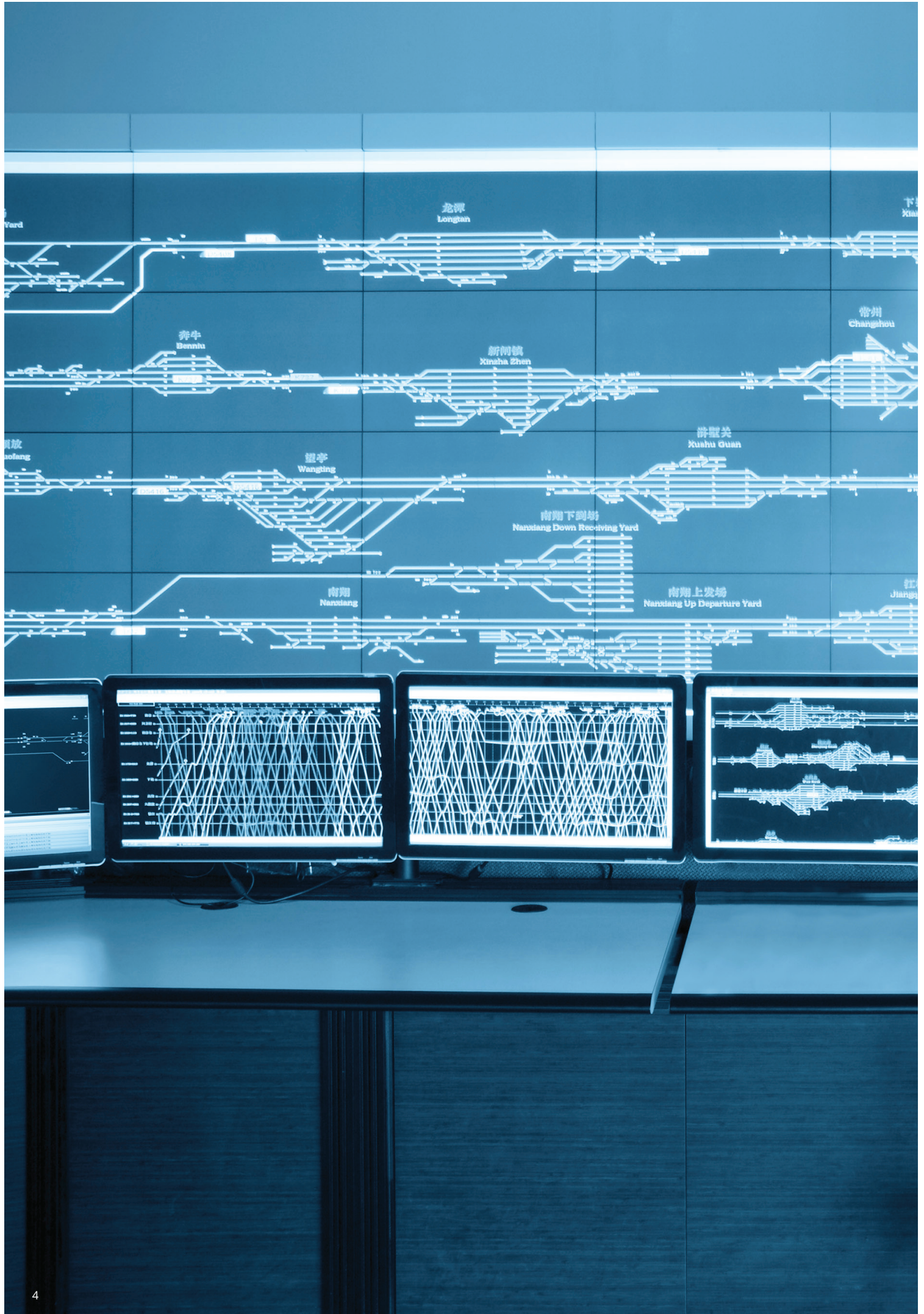
An assessment of the open data
landscape in Cyprus

A report by the Innovation
and Entrepreneurship Centre

“Data has become a key asset for the economy and our societies similar to the classic categories of human and financial resources. Whether it is geographical information, statistics, weather data, research data, transport data, energy consumption data, or health data, the need to make sense of data is leading to innovations in technology, development of new tools and new skills.”

Digital Single Market: Digital Economy & Society
European Commission

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“It is the unexpected re-use of information which is the value added by the web.”

Sir Tim Berners-Lee
Founder of World Wide Web, 2006

This information, which is generated by public administrations and public sector bodies (PSBs), is a key resource for the knowledge society, given its quality and variety. When this information is provided in the form of open data, i.e. data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike, it constitutes a valuable raw material on an economic and societal level. So much so in fact, that open data has been coined as “the new raw material of the 21st century”², with benefits such as greater government transparency and accountability, greater civic engagement and participation, increased public and private sector efficiency and stimulation of business innovation and entrepreneurship, as well as the economy in general.

This report will explore the recent developments in the OD landscape with particular attention to Cyprus. Our aim is to join the growing movement of advocates who call for more open data both on a Cypriot and on an international level. In doing so, we hope that in the near future, we will see an exponential increase in the supply of good quality data and a growing demand by the private sector, i.e. the potential re-users, thus leading to the creation of new products and services, new businesses and new jobs.

Preface

Open Data: the new raw material of the 21st century

The public sector, as part of its public task, collects, creates, produces and disseminates a wide range of information from legal and administrative information, business and economic data, to geographic and meteorological information. Public sector information (PSI), is “information, including information products and services, generated, created, collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution”¹.



Introduction

The benefits associated with the diffusion of PSI evolve around the development of an information industry and society, which enables businesses and citizens to participate in the reinforcement of their local economies and the improvement of their daily lives. Due to the untapped economic potential of PSI, open data initiatives are gaining momentum across the globe.

As pointed out, knowledge and information flows underpin creativity and innovation and as a result, the relative scope and scale of PSI, particularly in small economies, makes PSI an important source of raw material for innovation³. To further explain, PSI which is openly available to the public for re-use purposes, not only encourages the design of innovative applications creating thus value for open data initiatives, but also assists in

cultivating the entrepreneurial spirit of citizens. As a result, OD initiatives can assist in generating economic growth and in creating more employment positions.

In addition to the creation of wealth and jobs, open data initiatives have been associated with improved democratic governance, as previous research has established that one of the main benefits of PSI reuse is, in fact, increased transparency⁴. When decision-making processes become more transparent, citizens feel more motivated to engage with government policies and services, which consequently results in an increased sense of ownership and trust for PSBs. Furthermore, with the use of open data portals, rules, budgets and decision-making processes (such as public procurement) become more transparent⁵ and, as a result, accountability is also increased.

In 2011, Deloitte in Cyprus became involved in project HOMER (Harmonizing Open Data in the Mediterranean Region). Within that context, in 2013, a report of the socioeconomic impact of open data in the region of the Mediterranean⁶ was published⁷. The report was a thorough assessment resulting from secondary/ desk research and primary research, including an analysis of open data stakeholders in various sectors of the economy. The report highlighted social benefits from open data re-use such as the enhancement of democratic engagement, transparency, accountability and public trust, as well as the direct and indirect economic impact from the commercial exploitation of open data.

Since the completion of the report in 2013, there have been important developments in the field of open data in Cyprus, the first being the launch of a National Open Data Portal (www.data.gov.cy) and the second being the involvement of Deloitte in a project of great importance in this field – the assistance to public sector bodies (PSBs) in Cyprus to open up their data. This “open data project” was assigned to Deloitte in September 2015 by the European Commission’s Structural Reform Support Service (SRSS), in order to assist the public sector bodies in Cyprus in implementing the revised directive 2013/37/EU and promote public sector information reuse to the public and private/ business sector in Cyprus. The project was a 12-month long engagement and it involved a large number of activities including the training of civil servants on

open data, supporting them in the stock-taking activities of the information that they produce and uploading them on the National Open Data Portal, as well as a vast array of awareness raising activities including the organization of the 1st Open Data Forum in Cyprus and the 1st Open Data Hackathon.

With such major developments, a follow up to the 2013 report, therefore, was deemed necessary, in order to capture these changes, give an updated outline of the current situation with regards to open data in Cyprus, evaluate the status quo using primary and secondary sources, in order to make suggestions as to the prospects of open data in the country. Thus, the current report, attempts to map the current open data landscape internationally and give an update of this landscape in Cyprus, followed by an assessment of the open data ecosystem in Cyprus and recommendations for the next steps.

By compiling this report, we hope to give a valuable tool to policy makers in Cyprus, which will be used for the purposes of shaping the future of open data in the country.

“There’s now a clear understanding that we need robust data to drive democracy and development- and a lot of it.”

Open Data Barometer 2016

The open data landscape

Since the beginning of the millennium, a number of studies have been published, outlining the social and economic value of PSI and open data. The consensus of these is that PSI and open data has a true potential to create a positive impact on social and economic levels. A few of these reports have attempted to quantify this value, with varying results.

In 2000, a report by PIRA International⁸ calculated the commercial value of the PSI market to be at 68.5 billion euro per annum with an upper estimate of 134 billion euro and a lower estimate of 27.7 billion euro. Fast forward to 2006, a study performed on behalf of the European Commission DG for Information Technology⁹ estimated that the overall EU market for PSI ranges between 10 to 48 billion euro per annum, with a mean value around 27 billion euro. In 2011, a study by Vickery¹⁰ argued that, if infrastructure is improved and other barriers from OD re-use are removed, the aggregate direct and indirect economic benefits for the (then) EU27 economy could have been around 200 billion euro (1.7% of GDP) in 2008.

In 2013, Deloitte¹¹ published a socioeconomic impact study on the value of open data in the MED region¹², as

part of the work undertaken for project HOMER. The overall value of open data in the Mediterranean regions covered by the study, was estimated at 3.6 billion euro for 2013 while the annual value for Cyprus was estimated at 50 million euro for that specific year. During the same year (2013) a report by McKinsey estimated the global annual value of open data at 3 trillion US dollars¹³. Deloitte's report constitutes, up to this day, the only in-depth study on the socio-economic impact of open data in the Mediterranean. It demonstrated that, amidst the volatile financial and social landscape across Europe, with most countries of the Mediterranean area then being officially in recession and struggling to find ways to cope with worsening economic conditions and growing unemployment, open data initiatives could play a catalytic role in driving innovation, promoting entrepreneurship and accelerating scientific progress.

The outlook for the future in relation to the value of open data is positive: in a recent report by the European Commission it is estimated that the economic growth projection of PSI will increase by 36.9% from 2016 to 2020, which translates to 75.7 billion euro.

“The digital economy revolves around data. It is the driving force behind those three main elements of productivity, innovation and digitalization. Let's not lose time being afraid - let's build an open and vibrant data economy.”

Andrus Ansip, Vice-President Digital Single Market

Europe's open data decade

The promotion of open data reuse in Europe began in 2003, when Directive 2003/98/EC on the Reuse of Public Sector Information¹⁵ was adopted. The Directive, which applied to all EU MS as well as to the European Free Trade Association (EFTA) countries (Norway, Iceland and Liechtenstein), had four main objectives:

- Stimulate the further development of a European market for PSI-based services;
- Enhance the cross border use and application of PSI in business processes;
- Encourage competition in the internal market; and
- Address divergence as to reuse rules between MS.

A revision of the PSI Directive was introduced in 2013. Directive 2013/37/EU¹⁶ introduced the general principle that all information accessible under MS legislation is in principle re-usable. The main differences between the two Directives are listed below:

- Administrative charges should not exceed the margin-oriented fee of making data available for reuse.
- Cultural institutions have been included as PSBs with an obligation to release data, however, they are allowed to continue charging re-users in a way that they can recover the costs of producing the information.
- Increased transparency relating to the calculations of fees.
- Provision of support regarding machine-readable and open formats.

Although the revised PSI Directive has been criticized for its lack of robustness as a

weak tentative when compared to the US Freedom of Information Act, MS were obliged to transpose the Directive by July 18th of 2015. Currently, all European countries are in the process of completing the transposition of the revised PSI Directive¹⁷ into national legislation. Information retrieved by the European Commission suggests that thirteen Member States have adopted specific PSI reuse measures (Belgium, Cyprus, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Ireland, Italy, Luxembourg, Malta, Romania, Spain, Sweden, UK), whereas three MS have used a combination of new measures as a means of specifically addressing reuse and legislation predating the Directive (Austria, Denmark, Slovenia) and nine MS have adapted their legislative framework for accessing documents to include re-use of PSI (Bulgaria, Croatia, Czech Republic, Estonia, Finland, France, Latvia, Lithuania, Netherlands, Poland, Portugal, Slovak Republic)¹⁸.

A number of initiatives related to the promotion of PSI and open data re-use has so far been supported directly or indirectly by the EU. One of these initiatives was the project HOMER, a three year project funded by the Programme MED, which aimed to promote open data re-use in eight Mediterranean EU-countries (Spain, Italy, France, Malta, Greece, Slovenia, Cyprus and Montenegro)¹⁹. The objective of the project was to address the challenges (i.e. Technical, Cultural, Legal), which hinder the reuse of OD, and facilitate the use of PSIs as a means of promoting transparency, inclusion of citizens in the decision-making process, and stimulating economic growth through the development of digital markets. At the end of the project, in 2013, the partners released a study, prepared by Deloitte, which outlined the status of open

"If I had to express my views about the digital future – that of Europe or indeed, of the whole world - I could do it with one word: data."

Andrus Ansip,
Vice-President Digital Single Market

data in the regions of the eight participating countries, estimating the annual value of their OD to be 3.3 billion euro²⁰.

In the spring of 2015, an Open Data Incubator (ODInE) was launched with financing from the EU's Horizon 2020 programme. ODINE constitutes a 6-month incubator offering up to 100.000 euro to startups across Europe to enable them grow their open data idea into a successful business. ODINE has, to date, accepted over 30 companies from 24 countries, generating more than 1 million euro in additional investment, sales, and jobs.

Perhaps one of the most important developments in relation to the transposition of the Directive in the field of open data in EU was the launch of the European Data Portal (<https://www.europeandataportal.eu/>), in November 2015. The objective of the portal is to harvest all available metadata available in all of the national EU portals.

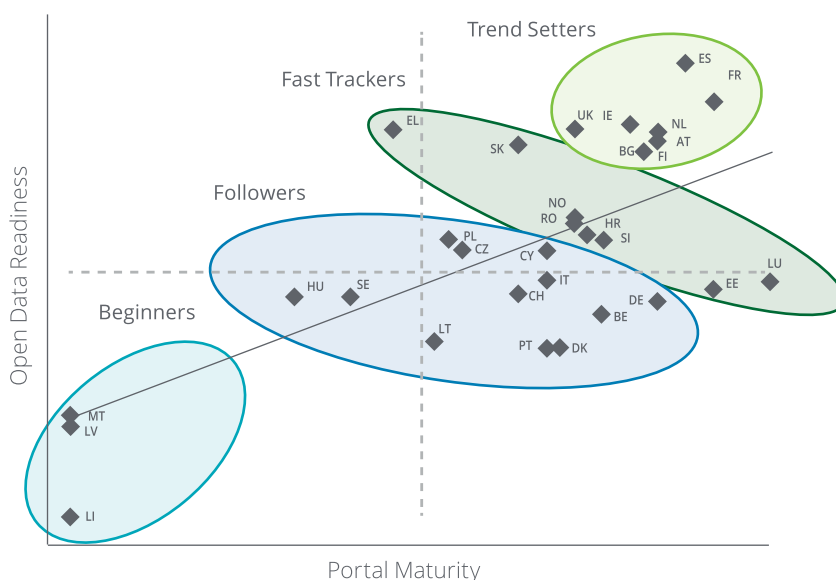
In an effort to complement the launch of the European Data Portal, and raise awareness on the capabilities and possibilities of open data reuse, the EU proceeded to invest 14.4 million euro in order to boost the uptake of open data skills, build capabilities and assist open data start-ups²¹. Part of this investment will be available through Horizon 2020 and the remaining amount (around half) will be used to fund ODInE for open data startups, modelled on the ODI's UK open data startup incubator that has been running since 2012.

Overall, it seems that over the last decade, the European open data landscape has changed dramatically, if one considers that only a few years ago, in 2005, more than half of Member States (MS) were classified to be only at the very early stages in terms of the development of their open data policies (about 63%), while at the time when this report was written, only one fifth of

them remain at embryonic stages. As a matter of fact, by 2020 it is expected that not only all EU MS will have a fully operating open data portal, but that the EU will become a leader in the field.

A recent report by the European Data Portal²² demonstrates that the structures have been set in most EU countries: 68% of EU MS have an open data policy and the portal maturity level is at 64.3% due to the development of more advanced features on country data portals. Having mentioned that, the report indicates that improvements are needed in order to deal with the limited awareness levels and impact of open data throughout Europe. The figure below taken from the specific report, illustrates the current (2016) situation in the EU 28²³ with regard to open data, clustering them into four categories: beginners, followers, fast trackers and trendsetters.

Figure 1. Results from the open data Maturity Assessment 2016



Source: European Data Portal (2016). "Open Data Maturity in Europe 2016". European Commission.



The open data landscape in Cyprus

The Cyprus National Action plan for PSI re-use, which covers the period from 2014-2018, envisions “to create an environment that promotes the re-use of public sector information and thus fosters the emergence of new economic activity, enhances transparency and creates new jobs”²⁴. In order to promote this vision, the Action Plan is structured on four main pillars:

- Establish the necessary implementation mechanisms that will enable the generation of economic activity around open data;
- Create a stronger legal framework for the provision of PSI by transposing Directive 2013/37/EC into a new national legislation;
- Develop a National PSI Portal that will host public datasets; and
- Implement a communication strategy for the promotion of PSI reuse in both public and private sectors.

With regard to the legal framework for the re-use of PSI in Cyprus, the Cyprus Law consists of the transposition of EU Directive 2003/98/EC and its subsequent revision, Directive 2013/37/EC. In Cyprus,

the first application of the Directive was with the Reuse of Public Sector Information Act of 2006 and the decrees that followed in 2007, 2010 and 2015, which led to the transposition of the revised directive into national law titled The Reuse of Public Sector Information Act 2015.

With the 2015 Act, the amended EU Directive of 2013 was transferred to the Cypriot legal framework, obliging thus PSBs to publicly disclose documents/information/data on the national data portal. Along with the amendment came the establishment of the necessary mechanisms which would assist in the practical implementation of the Directive. These were:

- Overviewing / Coordination Mechanism
- Dispute and Complaints Resolution Mechanism
- Costing Mechanism and the Dissemination Mechanism

In essence, the Act aims to promote the reuse of PSI with as fewer exceptions as possible that have to go a priori through the Treasury of the Republic. With the 2015 Act, the 2006 Act was abolished, along with the Ministry of Finance decrees. The Act specifies that in case data owners have the intellectual property rights, PSBs must ensure that in the case of re-use, the data must be further usable either for commercial or non-commercial purposes. The Act highlights that documents, information and data will be available through the national portal as data-sets. The data released must be in a machine-readable format, in order to conform to open standards.

The Act foresees that in the occasion that datasets required are not online, then re-users must submit an application to formally request for the specific data-set. According to the 2015 Law, a five-member Review Committee (RC) is appointed for a period of 3 years, which will be tasked

with examining such requests. These requests can be submitted in writing or electronically, by any natural or legal entity. PSBs are required to provide the applicant with the data requested within 20 working days. In case of rejection, PSBs must provide solid reasoning for their rejection, and must inform the applicant of the right to reapply within 20 working days. The announcement of the decision of RC shall be made within 40 working days after the application request was submitted.

The Act maintains that data should be published in their pre-existing format or language and in an open and machine readable format if possible, along with their metadata on the national portal data.gov.cy

Datasets should be accessible through programming applications and interfaces that facilitate automatic processing. As recommended by the European Directive, fees shall be limited to the marginal costs incurred for the reproduction, provision and dissemination of the data. Exceptions apply for libraries, museums and archives, as these entities generate their revenues from specific documents, information and data.

With regard to the monitoring progress, a PSI team has been formed, consisting of civil servants of the Public Administration and Personnel Department of the Ministry of Finance.

The National Open Data Portal (www.data.gov.cy) was launched in 2014, but it wasn't until September 2015 that a significant effort was made in order to locate the information available in each department and publish it on the national portal, within the scope of work contracted to Deloitte by the EC Structural Reform Service, in order to assist the public sector of Cyprus to open up its data ("the open data project"). At the time of writing this report the open data portal contained more than 1200 datasets.

An assessment of the open data ecosystem

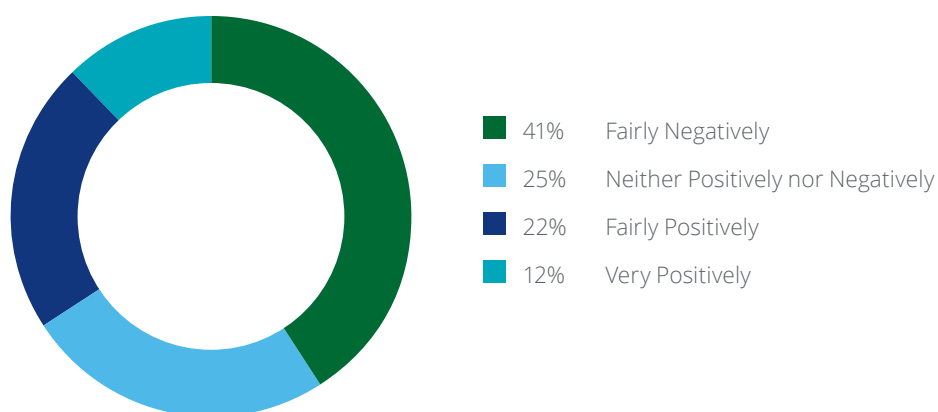
In this section, we attempt to make an assessment of the current environment with regard to open data in Cyprus. A combination of primary and secondary research methods was utilized for the compilation of the assessment of the open data ecosystem in Cyprus. The objective was to complement information found in existing studies, with information gathered by utilizing primary data collection tools. The sources, among others, included the socio-economic impact study prepared by Deloitte in 2013, the results of an online survey with the utilization of a structured questionnaire (hereinafter referred to as the “Open Data Survey”), which was widely disseminated to all open data stakeholders in the private and public sectors of Cyprus²⁵, as well as an evaluation of the results of the open data project undertaken by Deloitte between September 2015 and September 2016.

In order for the open data value to be unlocked and for open data to maximize its impact on societal and economic levels, a number of factors need to be in place. For the case of Cyprus, the main barriers which at the moment prohibit further open data re-use and the main recommendations to overcome these barriers revolve around the National Open Data Portal user experience and the quality of the datasets currently published.

The open data portal

As mentioned in the previous chapter, the National Open Data Portal was launched in 2014. As any new tool, and as it is evident by the responses in the Open Data Survey (four in ten respondents have a fairly negative opinion about the user interface of the open data portal), there is room for improvement with regard to the user experience and functionalities. Having said that, a significant percentage of 34% of the respondents has a positive (very positive or fairly positive) opinion about the national portal's user experience, as illustrated in Figure 2.

Figure 2. How would you rate the user experience on the National Open Data Portal?



Source: Deloitte Open Data Survey, 2016

Format of datasets

One of the biggest concerns that have been repeatedly expressed, is the format of the datasets on the open data portal. The “perfect” open data are available in an open and non-proprietary format, ruling out the formats frequently used for the creation of documents and spreadsheets, PDF (not machine readable), EXCEL (proprietary) and WORD (proprietary and not machine readable). Nonetheless, the Cypriot PSI re-use legislation, as transposed from the respective European Directive, does not exclude such formats. As a result, even though PSBs are advised to publish their data in machine-readable non-proprietary formats, this is not imposed on them. Thus, it comes as no surprise that a total of 72% of the respondents would evaluate the datasets currently on the national portal either very negatively or fairly negatively. Only 22% of the respondents would actually give a positive evaluation (fairly positive or very positive) to the datasets currently on the national portal.

Dataset utilization

For the purpose of looking into the negative evaluation in more depth, the respondents were asked to state the obstacles/reasons which deter them from re-using the datasets on the national portal.

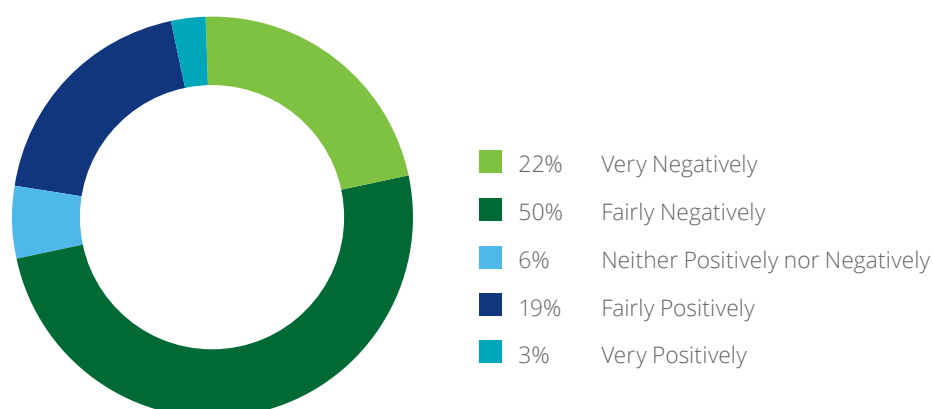
The vast majority (69%) stated that a major deterring factor is the inconvenient format of the data, while 52% of them argued that datasets that they would like to have access to, are either unavailable or inaccurate. Other important elements that deter open data re-use are the difficulty in locating data in the portal due to the limited search functions, with 50% of the respondents listing this as a major deterring factor and the lack of detailed metadata, with 36% of the respondents listing this as a major obstacle in open data re-use.

Unlocking the value of open data – the road ahead

The value of open data both at a social and economic levels has been extensively covered in numerous studies in the past, one of them being the Deloitte 2013 report on the socioeconomic impact of open data in the MED region²⁶. The main benefits are greater transparency and accountability, civic engagement and participation, and increased efficiency within public sector bodies, which own and publish open data in the social sphere and the stimulation of business innovation and entrepreneurship. Additionally the reduction of transaction costs in accessing and using PSI and the economic stimulus and large direct economic benefits, are mentioned as important benefits

Overall, a direct market size of open data of 55.3 billion euro for 2016 for the EU 28+, with an increase of 37% between 2016 and 2020 has been reported²⁷. In 2013, Deloitte calculated the size of PSI market in Cyprus to be 57 million euro for that specific year²⁸. Using that exact methodology, it is estimated that for 2017 this value will reach 64 million euro.

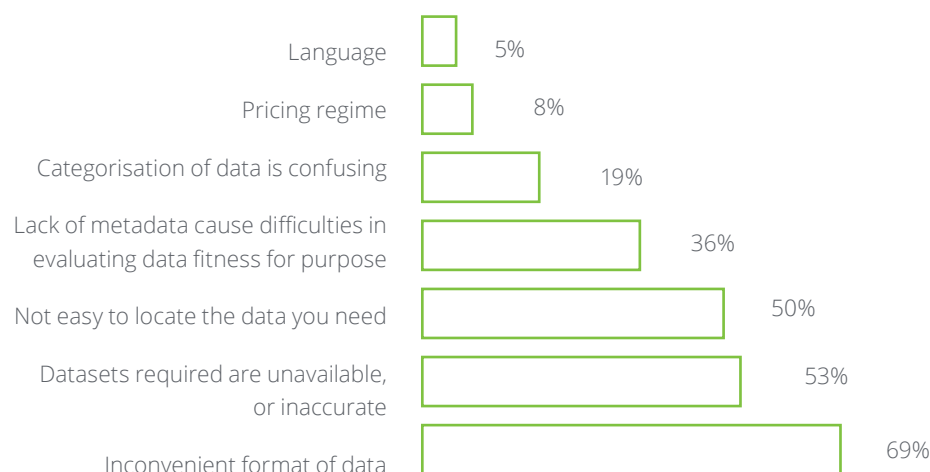
Figure 3. How would you evaluate the datasets currently on the National Open Data Portal?



Source: Deloitte Open Data Survey, 2016

Recognizing the scale of the opportunity offered by open data, Cyprus should act proactively so as to be in a position to fully unlock these benefits eventually. In the following paragraphs, the main conditions to achieve this are outlined.

Figure 4. What are the obstacles/factors that deter you from re-using open data further? (multiple responses allowed)



Source: Deloitte Open Data Survey, 2016

Improvement of the open data portal

The potential for higher portal usability is directly affected by how easily the users can locate the data they are looking for. An improved search function for the datasets, which will enable users to browse datasets by format, tag, license or date would allow stakeholders to search easily and re-use data. The government could potentially consider shifting from the current portal software, to one that is more specialized. A good example is the Comprehensive Knowledge Archive Network (CKAN), which is a web-based open source management system for the storage and distribution of open data. CKAN actually allows re-users to filter by license, format, and tag, simplifying thus, the whole process.

The introduction of APIs can also support open data initiatives as the automation

they offer in data collection makes it easier for developers to use open data.. Essentially APIs enable the direct use of data by mobile apps and interfaces, thus making the process of creating apps easier and faster. However, given the fact that API functionalities require access to entire sets through bulk downloads, resources and tools should be devoted towards building them. As suggested by the survey's respondents, PSBs should be allocated with sufficient technical and financial means (i.e. hardware and software) not only to enable them to offer APIs, but also to assist them in improving the usability, interface and friendliness of the open data portal.

As suggested by the Study on the Impact of reuse of Public Data Resources²⁹, the portal can maintain side analytics functions, which will assist in obtaining information

regarding the users of the website, identify the datasets which are being downloaded the most figure out how many downloads take place. Interaction between governance and stakeholders through feedback mechanisms can also assist in ensuring people have the motivation and ability to make the most out of the OD available on the portal, leading thus, to higher reuse possibilities³⁰.

Provision of datasets of high quality, high value and high interest

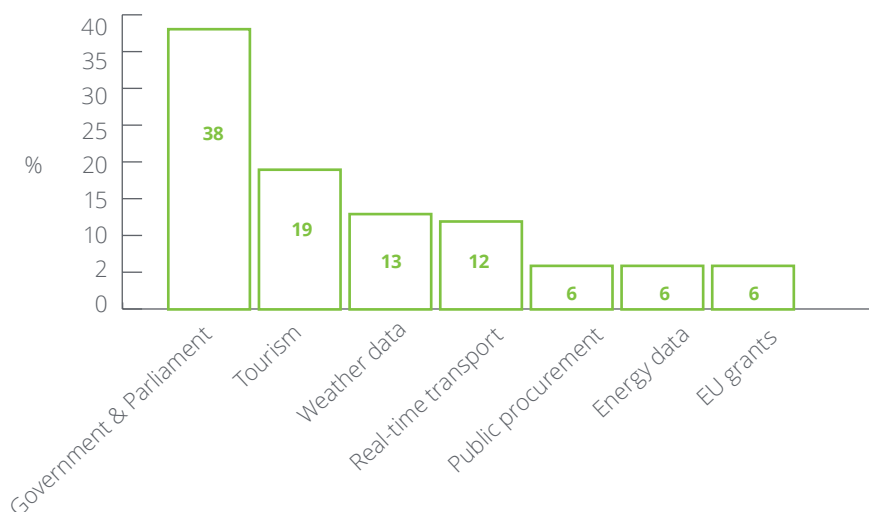
The production of disparate, un-exploitable formats of PSI, is making the data difficult to re-use and analyze. Open data re-users struggle with closed or unexploitable formats under which public data is unfortunately so often released. Every effort should be made for open data to be provided in non-proprietary and machine-readable formats.

In addition, open data investments should be focusing on high value datasets. As per the European Commission's "Report on high-value datasets from EU institutions value of a dataset"³¹, the value for the re-user's perspective depends primarily on its use and re-use potential, which can effectively lead to the generation of (new) business models. The respondents of the open data survey, who were primarily existing or potential re-users of open data, identified governmental and parliamentary decisions (38%), tourism (19%), weather (13%) and real time transport (12%) data as the ones of the highest interest. Therefore, effort should be made to ensure that datasets under these categories are provided in the highest quality possible to ensure their re-use.

Supporting data owners

Supporting data owners in order to allow them to perform their open data tasks is imperative for the success of any open data initiative. Support should be in the

Figure 5. What kinds of public sector information or specific datasets would you be interested in or you think should be made openly available to citizens?



form of technical and financial means (e.g. hardware and software) as well as training.

Offering training programmes to civil servants to increase their understanding about open data reuse can increase their engagement, as well as the quality of the datasets provided. Such trainings can be offered offline or even online following the example of the eLearning modules developed by the European Data Portal³² and can enhance civil servants skills on collecting, cleaning and standardizing data, improving thus the quality of the data to be released. In addition, training could also eliminate the risk of uploading incomplete datasets, increasing thus the user friendliness of the open data portal and stimulating reuse. As a result, providing continuous support and assistance to civil servants can be useful in tackling and overcoming barriers associated with poor data management infrastructure and scarce skills in data organization that limits reuse.

In addition it is crucial to secure the engagement of these data owners. It is often the case that PSBs are reluctant to open their datasets to a wider audience

out of a fear of loss of "interpretational sovereignty", the exclusive autonomy to control the PSI owned. At the same time, administrative burden and lack of resources were frequently cited as deterring factors for PSBs publishing their data.

Engaging with re-users

An important activity in the management of the open data ecosystem is the systematic retrieval of feedback from re-users about the data quality. Feedback mechanisms can also assist PSBs to understand what data is of higher value and, as a result, prioritize the release of future datasets. In fact, building an open data community, should be of primary importance to the PSI competent authorities. It is the open data community which will be the most engaged part of the population with regard to the provision of constructive feedback and technical support, in order to take open data initiatives to the next level.



Conclusion

A young open data ecosystem with a lot of prospect

It is rather indisputable that open data reuse yields a diverse range of benefits for the society, from increased government effectiveness relating to transparency and accountability, to the reinforcement of local economies and the improvement of social welfare. As a matter of fact, the reuse of open data has been associated with increased efficiency within the PSBs, which own and publish these data, while open data reuse has also been linked with the reduction of transaction costs incurred by reusers in accessing and using PSI. In addition, there is a general consensus that the reuse of open data stimulates business innovation and entrepreneurship through the creation of new products and services, which results in large direct economic benefits and stimulus for the society.

Indeed, evidence from the current report and also findings from previous studies suggest that the open data movement has nowadays reached its tipping point. Despite the fact that the open data ecosystem in Cyprus is rather young, it is growing at a fast pace. A proof of this is the score that Cyprus has achieved in the latest "Open Data Maturity in Europe 2016" of the European Data Portal³³. Even though the country is still categorized as a follower for the purposes of the report, Cyprus has achieved great progress since the 2015 report and in fact is very close to be categorized as a fast tracker.

Overall, despite the progress achieved within the last few years, the findings of the Deloitte survey strongly suggest that there is ample room for the improvement of the portal. Particularly, Deloitte's assessment has revealed a series of barriers pertaining to governance and technical issues which are currently hindering the possibility of OD reuse. Shortcomings in the publishing of OD relating to the format, the availability and accuracy of datasets, are indeed currently de-motivating prospective users from accessing and re-using the OD that are available through the national portal. These shortcomings relate partly to the PSB's lack of expertise in the uptake of technically interoperable solutions (e.g. architecture, metadata, data formats, etc.).

Deloitte's findings are also supported by the 2016 European Data Portal assessment, which revealed a particularly low score for Cyprus with regard to the extent of its coordination activities at a national level, pointing out that there was neither an integration of regional portals nor documentation for any regional data initiatives. As a result, the quantity of datasets published is still relatively limited as compared to those potentially available for publication. This can be largely

attributed to the relatively small market size, the PSBs' lack of technical capabilities and the fact that many local authorities are nowadays starting to use the National Open Data Portal for sharing their data.

Despite the great expectations and benefits associated with open data initiatives, the publishing of open data as a standalone practice does not necessarily result in successful open data initiatives. Efforts should not only be collective, consistent and continuous, but also need to be directed towards improving the overall user's experience on a technical and an organisational level. Policy makers in Cyprus should address the limitations that exist in terms of data release, which are currently hindering the possibility of the public to use and re-use datasets. A means for ensuring the re-usability of open data is the release of open data in an open, non-proprietary and machine-readable format. In addition, minimizing the publication of PDF and Excel files, data owners should be encouraged to upload datasets in CSV and RDF formats, while PSBs should also be encouraged to publish datasets in multiple formats when available.

As per the OD Maturity Assessment report³⁴, it is necessary for countries like Cyprus to accelerate further the publication of data sets as a means of ensuring interoperability, as that will consequentially increase the discoverability of the data. In addition, datasets must be updated and harvested more frequently, as that will assist in developing more user-friendly functionalities. The report has also demonstrated that in order to stimulate and foster the reuse of OD, it is

vital to leverage community engagement into making the most out of OD. However, awareness of OD policies and their potential benefits is still very limited in Cyprus. Communicating and raising awareness about the national portal and use of OD in general through examples of business models, will empower users into making the most of OD. Assisting the community to understand the value of OD, will essentially result in grasping the OD users' interest.

The systematic studying of the economic impact of OD reuse, will assist Cyprus to advance its OD initiatives and become a trend setter in the OD field. Boosting the development of ICT products and services based on OD reuse will not only result in economic growth, but it will also improve Cyprus' competitiveness within the European economy, supporting the development of a digital single market. Deloitte is therefore committed in continuing its research in the field of OD reuse, providing targeted recommendations that will assist shaping the Cypriot OD entrepreneurial ecosystem.

Acronyms

CKAN	Comprehensive Knowledge Archive Network
EU	European Union
OECD	Organization for Economic Co-operation and Development
PSB	Public Sector Body
PSI	Public Sector Information

Endnotes

- ¹ OECD Working Party on the Information Economy. (2008). Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information [C(2008)36], p.4.
- ² The Guardian. (18/4/2012). Francis Maude | data is 'the new raw material of the 21st century'. Available at: <https://www.theguardian.com/public-leaders-network/2012/apr/18/francis-maude-data-raw-material>
- ³ Vickery, G. (2011). "Review of recent Studies on PSI (re-)use and related market developments". Available at: http://ec.europa.eu/newsroom/document.cfm?doc_id=1093 [Accessed 22/7/2017]
- ⁴ European Data Portal. (28/9/2016). Open Data in a Nutshell. Available at: <https://www.europeandataportal.eu/en/providing-data/goldbook/open-data-nutshell> [Accessed 22/7/2017]
- ⁵ ePSIplatform (2012), PSI-Reuse: Enabling Innovation and Transparency. Available at: <http://www.w3c.es/Presentaciones/2014/0218-creativeCH-MA/0218-creativeCH-MA.pdf> [Accessed 10/08/2016]
- ⁶ The report covered all the regions which participated in project HOMER, namely Spain, Italy, France, Malta, Greece, Slovenia, Cyprus and Montenegro.
- ⁷ Deloitte Limited (2013a): The value of open data in the Mediterranean Region <http://www2.deloitte.com/cy/en/pages/about-deloitte/articles/the-value-of-open-data-in-the-mediterranean-region.html>
- ⁸ PIRA International (2000). "Commercial Exploitation of Europe's Public Sector Information". European Commission, DG for the Information Society.
- ⁹ HELM Group of Companies (2006). "Measuring European Public Sector Information Resources. Final Report of Study on Exploitation of public sector information – benchmarking of EU framework conditions". For the European Commission, DG for the Information Society. Available at: http://www.ec.europa.eu/newsroom/document.cfm?doc_id=1197
- ¹⁰ Vickery, G. (2011). "Review of recent Studies on PSI (re-)use and related market developments". Available at: http://ec.europa.eu/newsroom/document.cfm?doc_id=1093 [Accessed 22/7/2017]
- ¹¹ For the purposes of the present report, the term Deloitte is used to refer to Deloitte Limited, a Deloitte member firm registered in Cyprus.
- ¹² Deloitte, 2013a
- ¹³ McKinsey (2013). Open Data: unlocking innovation and performance with liquid information. Available at: <http://www.mckinsey.com/business-functions/business-technology/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information> [Accessed 8/8/2016]
- ¹⁴ European Commission (2015). "Creating Value through Open Data". Available at: http://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf
- ¹⁵ European Commission (2003), Directive 2003/98/EC, European Parliament and Council Directive of 17 November on the reuse of Public Sector Information.
- ¹⁶ Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the (re-)use of public sector information Text with EEA relevance. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0037> [Accessed 30/08/2016]
- ¹⁷ European Data Portal (2015). Open Data Maturity in Europe 2015 - Insights into the European state of play. Available at: https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n1_-_final.pdf [Accessed 30/08/2016]
- ¹⁸ European Commission. Implementation of the Public Sector Information Directive. Digital Single Market: Digital Economy and Society. Available at: <https://ec.europa.eu/digital-single-market/en/implementation-public-sector-information-directive-member-states#how-has-each-eu-member-state-implemented-the-rules> [Accessed 19/9/2016]
- ¹⁹ HOMER Project. Available at: <http://homerprojectresults.eu/> [Accessed 20/09/2016]
- ²⁰ Deloitte, 2013a
- ²¹ Gibbs, S. (4 November 2014). EU commits €14.4m to support open data across Europe. The Guardian. Available at: <https://www.theguardian.com/technology/2014/nov/04/eu-commits-144m-to-support-open-data-across-europe> [Accessed 30/08/2016]
- ²² Open Data Portal (2016). "Open Data Maturity in Europe 2016". European Commission Directorate General for Communications Networks, Content and Technology.
- ²³ The 28 EU MS plus Norway, Switzerland and Lichtenstein
- ²⁴ Deloitte (2013b). "Open Data Action Plan 2014-2018. Open Cyprus – The Open Data Strategy and Action Plan for Cyprus". As part of project HOMER
- ²⁵ The online questionnaire was available for completion between August-September 2016.
- ²⁶ Deloitte, 2013
- ²⁷ European Open Data Portal, 2016
- ²⁸ For details on the method of calculation of the PSI market refer to the Deloitte 2013 report.
- ²⁹ European Data Portal (2015). "Creating Value through Open Data: Study on the Impact of Reuse of Public Data Resources". European Commission. Available at: http://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf [Accessed 31/08/2016]
- ³⁰ Jetzek, T., Avital, M., Bjørn-Andersen, N. (2014). "Generating Sustainable Value from Open Data in a Sharing Society". International Federation for Information Processing
- ³¹ European Commission (2014). "Report on high-value datasets from EU institutions value of a dataset". Available at: http://ec.europa.eu/isa/documents/publications/report-on-high-value-datasets-from-eu-institutions_en.pdf [Accessed: 4 November 2016]
- ³² European Data Portal e-learning programme. Available at: <http://www.europeandataportal.eu/elearning/en/#/id/co-01>
- ³³ European Data Portal. (2016). Open Data Maturity in Europe 2016. Available at: https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n2_2016.pdf [Accessed 10/10/2016]
- ³⁴ European Data Portal. (2015). Open Data Maturity in Europe 2015 - Insights into the European state of play. Available at: https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n1_-_final.pdf [Accessed 30/08/2016]

Bibliography

- Data Management Association. (2010). DAMA International Guide to Data Management Body of Knowledge. Technical Publications. Available online: (<https://www.dama.org/content/body-knowledge>) [Accessed 11/08/2016]
- Deloitte Limited. (2013a): The value of open data in the Mediterranean Region. Available at: (<http://www2.deloitte.com/cy/en/pages/about-deloitte/articles/the-value-of-open-data-in-the-mediterranean-region.html>) [Accessed 30/8/2016]
- Deloitte Limited. (2013b). HOMER socioeconomic impact study. Available at: (https://www2.deloitte.com/content/dam/Deloitte/cy/Documents/innovation-and-entrepreneurship-%20centre/CY_IEC_SocioeconomicImpactStudy_Noexp.pdf) [Accessed 11/08/2016]
- ePSIplatform. (2012). PSI-Reuse: Enabling Innovation and Transparency. Available at: (<http://www.w3c.es/Presentaciones/2014/0218-creativeCH-MA/0218-creativeCH-MA.pdf>) [Accessed 10/08/2016]
- European Commission. (2003). Directive 2003/98/EC, European Parliament and Council Directive of 17 November on the reuse of Public Sector Information. Available at: (<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0098-20130717&from=EN>) [Accessed 30/08/2016]
- European Commission. (2013). Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the (re-)use of public sector information Text with EEA relevance. Available at: (<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0037>) [Accessed 30/08/2016]
- European Commission. (2015). "Creating Value through Open Data". Available at: (http://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf) [Accessed 30/08/2016]
- European Commission. (2015b). DG for Information Technology. Available online: (<https://ec.europa.eu/digital-single-market/en/dg-connect>) [Accessed 30/08/2016]
- European Commission. (2015c). Implementation of the Public Sector Information Directive. Digital Single Market: Digital Economy and Society. Available at: (<https://ec.europa.eu/digital-single-market/en/implementation-public-sector-information-directive-member-states#how-has-each-eu-member-state-implemented-the-rules>) [Accessed 19/9/2016]
- European Data Portal. (2015). Open Data Maturity in Europe 2015 - Insights into the European state of play. Available at: (https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n1_-_final.pdf) [Accessed 30/08/2016]
- European Data Portal. (2016). Open Data Maturity in Europe 2016. Available at: (https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n2_2016.pdf) [Accessed 10/10/2016]
- European Data Portal. (2016). Open Data in a Nutshell. Available at: (<https://www.europeandataportal.eu/en/providing-data/goldbook/open-data-nutshell>) [Accessed 22/7/2016]
- European Data Portal. Available at: (<http://www.europeandataportal.eu/>) [Accessed 31/08/2016]
- European Public Sector Information Platform. (2015). New Businesses Around Open Data Smart Cities and Fiware". Available at: (<http://www.investhorizon.eu/resources/documents/6/263232145-New-Businesses-Around-Open-Data-Smart-Cities-FIWARE.pdf>) [Accessed 31/08/2016]
- Gibbs, S. (4 November 2014). EU commits €14.4m to support open data across Europe. The Guardian. Available at: (<https://www.theguardian.com/technology/2014/nov/04/eu-commits-144m-to-support-open-data-across-europe>) [Accessed 30/08/2016]

HELM Group of Companies. (2006). "Measuring European Public Sector Information Resources. Final Report of Study on Exploitation of public sector information – benchmarking of EU framework conditions". For the European Commission, DG for the Information Society. Available at: (http://www.ec.europa.eu/newsroom/document.cfm?doc_id=1197)

HOMER Project. Available at: (<http://homerprojectresults.eu/>) [Accessed 20/09/2016]

HOMER. (2013). Harmonising Open Data in the Mediterranean through better access and (re-)use of Public Sector Information. Socio-economic Impact Study: Analysis of Socio-economic impact in the MED area. Final Report March 2013. Available at: (https://www2.deloitte.com/content/dam/Deloitte/cy/Documents/innovation-and-entrepreneurship-%20centre/CY_IEC_SocioeconomicImpactStudy_Noexp.pdf) [Accessed 31/08/2016]

McKinsey. (2013). Open Data: unlocking innovation and performance with liquid information. Available at: (<http://www.mckinsey.com/business-functions/business-technology/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information>) [Accessed 8/8/2016]

Measuring European Public Sector Information Resources. (2006). Final Report of Study on Exploitation of public sector information – benchmarking of EU framework conditions. Available at: (http://www.ec.europa.eu/newsroom/document.cfm?doc_id=1197) [Accessed 11/08/2016]

OECD Working Party on the Information Economy. (2008). Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information [C(2008)36], p.4.

Open Data Action Plan 2014-2018. Open Cyprus – The Open Data Strategy and Action Plan for Cyprus. Prepared by Deloitte Limited on behalf of the Sewerage Board of Limassol-Amathus. Available at: ([http://www.data.gov.cy/mof/papd/DataPortal/dataportal.nsf/5F6049B39DB52247C2257D970036ED3A/\\$file/PAPD%20Presentation%20-%20National%20PSI%20Strategy.ppt](http://www.data.gov.cy/mof/papd/DataPortal/dataportal.nsf/5F6049B39DB52247C2257D970036ED3A/$file/PAPD%20Presentation%20-%20National%20PSI%20Strategy.ppt)) [Accessed 31/08/2016]

PIRA International. (2000). Commercial Exploitation of Europe's Public Sector Information. For the European Commission, DG for the Information Society. Available at: (http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=1196) [Accessed 10/08/2016]

Power, D. (29 August 2016). Europe, Japan team boost smart cities with open data project. ReadWrite. Available at: (<http://readwrite.com/2016/08/29/europe-japan-team-boost-smart-cities-open-data-project/>) [Accessed 30/08/2016]

Speech by Vice-President Ansip at Bruegel annual meeting: "Productivity, innovation and digitalisation - which global policy challenges?". Available at: (https://ec.europa.eu/commission/2014-2019/ansip/announcements/speech-vice-president-ansip-bruegel-annual-meeting-productivity-innovation-and-digitalisation-which_en) [Accessed 30/08/2016]

The Guardian. (18/4/2012). Francis Maude | data is 'the new raw material of the 21st century'. Available at: (<https://www.theguardian.com/public-leaders-network/2012/apr/18/francis-maude-data-raw-material>) [Accessed 8/8/2016]

The National Open Data Portal. Available at: (http://www.data.gov.cy/mof/papd/dataportal/dataportal.nsf/index_en/index_en?OpenDocument)

The Open Data Incubator for Europe. Available at: (<https://opendataincubator.eu/>) [Accessed 31/08/2016]

Vickery, G. (2011). "Review of recent Studies on PSI (re-)use and related market developments". Available at: (http://ec.europa.eu/newsroom/document.cfm?doc_id=1093) [Accessed 22/7/2017]



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