# Use of open data as a tool for successful lean management in public services: evidence from Greece

Angelopoulos, Michail and Pollalis, Yannis

University of Piraeus, Department of Economics, Greece

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Michail K. Angelopoulos[1] , Yannis A. Pollalis[2]
[1,2] Department of Economics, University of Piraeus, Greece

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**Abstract**
Our modern society and economy is moving toward a knowledge-based and service-oriented global world. With the increase of mobile network, mobile devices, and internet of things, many industries, including government departments, private firms, and research communities, offer more transparency through releasing data. Data are considered a fundamental prerequisite to gain knowledge and produce services. Hence, there is the argument that data should not be captive but set free and while, there is a proliferation of data and IoT, there is still need for studies that examine open data, assess the current status of research, and propose future directions. Here, we conduct a review of literature to the current state of research on open data and how can we apply lean management for public industries in Greece.

**Key – Words:** open data, lean management, public industries, government

## Introduction

Governments from all over the world are looking for ways to reduce costs while at the same time to stimulate innovation without deteriorating service levels. They face a major challenge—to operate in a connected environment, engage stakeholders and solve societal problems by utilizing new methods, tools, practices and governance models. To accomplish this, fundamental changes are taking place and governments are embracing the concept of 'lean', which originates from the manufacturing industry creating the 'lean government' (l-Government).

Lean involves a variety of tools and technologies [1] and focuses on eliminating several types of waste in business processes [2]. The concepts of lean processes have been adapted to the industries over a decade [3] but for public sector, it is needs to get leaner to reduce cost, improve efficiency and at the same time improve quality and service levels.

The processes for the exchange of business-to-government information are changing under the pressure of new technologies, which enables new opportunities, as well as under the pressure of better compliance and cost savings. Pressured by the on-going economic crisis, policy makers urge for a 'compact' government with fewer personnel and reduced spending. Lean is a promising approach for helping government deal with the challenge of crushing demand and limited resources. A lean government does more tasks with fewer

resources by standardizing the processes, data and the collective IT-infrastructure. Understanding the implications of this statement requires to consider the modus operandi [4]. Usually, government agencies react to budget restrictions by enforcing traditional policies, such as freezing new personnel hiring, travel restrictions, delaying maintenance, and so on. While these actions may provide in short term a better balance sheet, the inefficiencies in processes remain the same.

Lean on the other hand is a process where it focuses on reducing time and resource waste in batching, bottlenecks, backlog, checking and re-checking processes, anything that does not add value from the customer's point of view. Its concepts such as a) increasing capacity, b) reducing manual processing, c) making processes flow more smoothly and d) understanding which customer's value can have a huge impact on government performance.

The future of lean is clear and it will be data-driven. Advanced analytics and artificial intelligence technologies, combined with the flexibility, processing and storage capabilities of cloud computing, will give manufacturers the ability to optimize IoT data and leverage it as part of their lean methodologies. Companies and governments must invest in the open/big-data infrastructure and processes that are needed to interpret the data as well as enable quick decisions.

Greece started participating in concept of open data in October 2014, where the law on open access and reuse of public sector documents, information and data was adopted. With the adoption of this legislation, Greece has timely aligned itself with the revised European policy framework for open data policy by institutionalizing the possibility for their free and unimpeded use.

In this paper we analyze what are open data, how did European Governments transformed from e- to I – government and how Greece has adopted the open data culture.

## 1. Open data analysis

### 1.1 Open Data

Governments have a large number of basic data which can add to society and that's why more and more European countries are developing policies to release this data as Open (Government) Data. Open data is data that can be freely used, accessible to everyone, re-used and redistributed by anyone - machine readable, offered online at zero cost [5]. Advances in collecting, processing, disseminating, and preserving information have resulted in the proliferation of data from a wide variety of sources.

European Commission aimed at creating a "data value chain friendly" policy environment which would effective for use and re-use of data through legal and

soft law measures. In 2003, the European Union (EU) adopted legislation to foster the re-use of Open Government Data in Member States via the Public Sector Information (PSI) Directive 2003/98/EC.II The PSI Directive was subsequently amended in 2013 by Directive 2013/37/EU.III With this amendment, the general principle was introduced that all in-formation accessible under Member State legislation is in principle re-usable [6] .

The expected impact of the Open Data policies and the development of data portals is to drive economic benefits and further transparency allowing citizens to access to valuable information. In our digital age, this information is crucial for innovation in business, to increase engagement with their community, and for government, it increases social participation in governance.

### 1.2. Open Data benefits

Open data increases transparency, and allows citizens access to valuable information which is crucial for prompting innovation and benefits in business and society [7]. Placing these benefits in four general categories open data can promote: **Transparency.** Open Data supports public oversight of governments and helps reduce corruption by enabling greater transparency. It also encourages greater citizen participation in government affairs and supports democratic societies by providing information about voting procedures, locations and ballot issues, **Public Service Improvement.** Citizens can use Open Data to contribute to public planning, or provide feedback to government ministries on service quality, **Innovation and Economic Value.** Open Data provides new opportunities for governments to collaborate with citizens and evaluate public services. Businesses and entrepreneurs are using Open Data to better understand potential markets and build new data-driven products, **Efficiency.** Open Data makes it easier and less costly for government ministries to discover and access their own data or data from other ministries, which reduces acquisition costs, redundancy and overhead. Open Data can also empower citizens with the ability to alert governments to gaps in public datasets and to provide more accurate information.


*Figure 1: Benefits of Open Data measured in EU [6]*

The direct market size of Open Data in 2016 was 55.3 bn EUR for the EU 28+. Between 2016 and 2020, the market size is expected to be increased by 36.9%, to a value of 75.7 bn EUR in 2020, including inflation corrections.

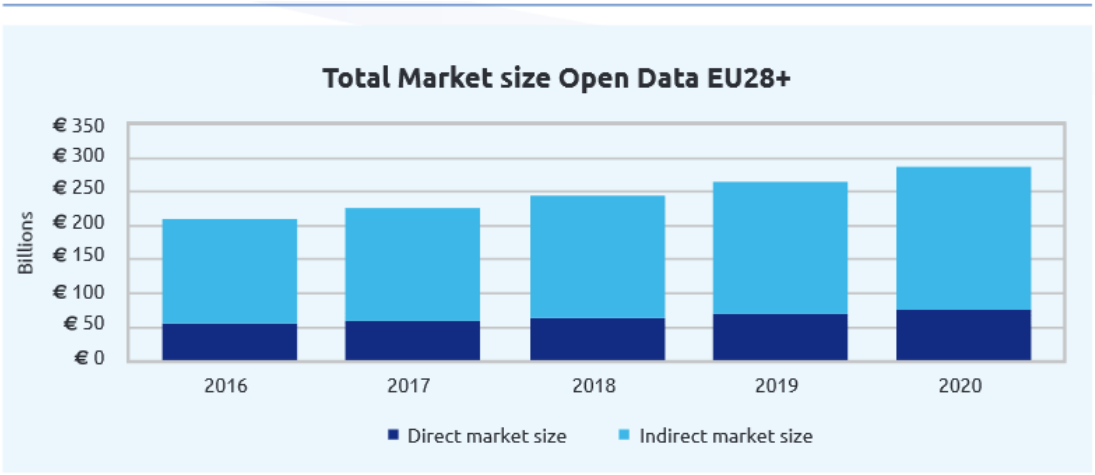


*Figure 2: Total market size (high bound), split in direct and indirect size for EU28+in billions, 2016-2020 [6]*

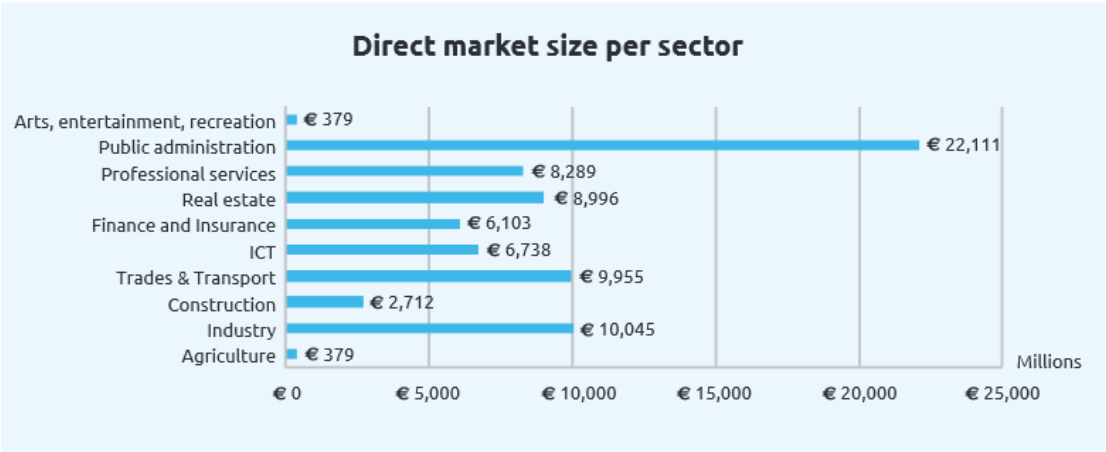


*Figure 3: Direct market size of Open Data per market sector for EU28+ in millions, 2020 [6]*

### 1.3 Strategies to leverage Open Data

The potential of Open Data is to create new solutions to social challenges and jobs, foster economic growth, and improve the lives of millions of people. The key is the partnership between data providers and data-users –which is called a "demand-driven" approach to open data. To do it effectively requires ongoing engagement between governments, the ICT sector, and data users. By engaging data users, governments can focus their resources on releasing data that will have immediate social and economic benefits.

Although there are potential and benefits, there is also a number of obstacles to using data in lower-income countries [8-10] that have identified such as: a) lack of clear legal and policy guidelines or clear open licensing, b) a 'digital divide' between rich and poor, affecting both the supply and use of data, c) organizational culture in government ministries that inhibits data sharing, d) a mismatch between the demand for Open Data and the supply of appropriate datasets and e) data released in a form that is too high-level –not granular enough to be fully useful

The best way to address to these issues is between government ministries providing data and the "customers" for their data. The strategies proposed to be used by the governments and develop an effective and sustainable Open Data programs are i) support open data use, through legal and license framework, ii) make data available for free online use, iii) publish data inventories for the government's data resources, iv) create feedback channels to government from current and potential users and v) prioritize the datasets that users want

## 2 Open data and lean management in governments and industries

### 2.1 Lean Implementation

In the last years, several studies have recognized the benefits of lean implementation in organizations and industries [11-13]. Lean production have proved the ability (LP) to: (i) remove inconsistency, wastes and non-value-adding activities from processes, (ii) reduce inventories, (iii) produce the required product, at the right time, in the right quantity, and (iv) improve quality [14].

On the other hand governments are in a situation where budgets are reduced and at the same time innovation is necessary to stimulate economic growth. The aim is to reduce the administrative burden and increase customer-centricity. Process standardization, providing services (only) online, open data, social media, participative innovation and reducing the size and complexity of the public sector are some of the developments contributing to this aim [15].

### 2.2 The transaction from e-Government and t-Government to l- Government

e-Government is the use of ICTs to improve the activities of public sector organizations. e-Government was initially focused on creating citizen-centric service, without looking beyond the boundaries of the public sector [16].

t-Government is focused on transformational government theme and on the operational aspects instead of on strategic changes. Transformational government has been a response to the need for radical changes of the public sector [17]. t-Government can be defined now as the "ICT-enabled and organization-led transformation of government operations, internal and external processes and structures to enable the realization of services that meet public-sector objectives such as efficiency, transparency, accountability and citizen centricity" [18].

l-Government is about 'doing more with less' and changing role of the government regarding complex political, managerial, and democratic challenges. An example of lean government is reporting in the Netherlands in which both companies and businesses benefit and do more with less [19]. Driven by the financial crisis government have to reduce their spending and reduce the size of their administration, whereas the web enables to engage with citizens and businesses, to build online relationships and involve them in the tackling of societal problems. Governments are getting smaller, but at the same time try to innovate and extend by creating ties within society.

Lean-government can be viewed as a set of tools, an approach to reduce costs and improve services, a system, and a philosophy based on a smaller government that makes use of existing capabilities in the society to reach public values including citizens, businesses, and NGOs.

## 3 Lean practice and Open Data in Greece

The use of open data as an important lean practice is confirmed by references from various authorities of Greece (regions, municipalities, public organizations and industries) where they highlight the importance of open data in fast and accurate decision-making, in upgrading the services they offer to citizens, saving on the use of resources (human resources, consumables) as well as reducing costs.

More specifically, the Region of Crete, the Municipality of Thessaloniki, the National Telecommunications and Post Commission, the Hellenic Statistical Authority, the Ministry of Development, the Decentralized Administration of the Epirus, Western Macedonia, all the Regions of the country, achieve better data management, faster decision-making and better customer service.

Thanks to the geospatial open data visualization and the development of corresponding applications, Greek municipalities and regions have been able to intervene better on road networks, on bus routes, on recycling bins, on geo-

processing geographical data services, on inventory data taking, in spatial and environmental studies. This has led to the increased use of open data as shown in the following tables in all public services in Greece after achieving economic savings in Resource Management (Lean Management).

In the implementation of the national strategy for open public administration and governance, Greece participates in the global initiative for Open Government Partnership [20].

## 3.1 Open data barometer

The Open Data Barometer [21], a World Wide Web Foundation initiative, aims to explore the open data initiatives that have been undertaken around the world. In the field of related research in more than 90 countries, it analyzes global slums, providing country and regional benchmarks, using a specific methodology for collecting, analyzing and evaluating data to identify multiple dimensional data (institutional framework, implementation evaluation).

In 2016, the 3rd version of Barometer covered 92 countries, evaluating three (3) dimensions: a) the degree of readiness for open data initiatives (Readiness), b) implementing open data policy at a practical level (Implementation) and c) outlining the effects of adopting open data policy on businesses and citizens (Impact).

Greece has expressed its views on the basis of the methodology followed and was placed in 33rd position, which is depicted as follows:

**Table1: Greece ranking at Open Data Barometer**

| | Research period | Readiness | Implementation | Impact | Total | Ranking |
|---|---|---|---|---|---|---|
| ODB (3rd Edition) | July 2014 - June 2015 | 60/100 | 38/100 | 18/100 | 34.38 | 33rd in total of 92 countries |

*Source: http://opendatabarometer.org/data-explorer/?_year=2015&indicator=ODB&lang=en&open=GRC*)

## 3.2 Digital Economy and Society Index

Following the previous report (2016) it is recalled that the Digital Economy and Society Index is compiled by the European Commission, following a weighting methodology of individual criteria, evaluating the national performance of countries based on six key dimensions:

a) connectivity

b) the human capital

c) the use of the internet

d) the integration of digital technology

e) digital public services and

f) research and development

The purpose of this tool is to summarize, by country, connectivity, skills in internet use, online activities, and the degree of development of some key digital technologies and digital public services.

For 2016, in terms of open data policy, in the "Digital Public Services" pillar, according to the open data sub-index (5a4 Open Data), Greece was ranked 520 out of a total of 700 points (note that average in the European Union is 351/700 points [22]). As it can be seen from the following diagrams a lot of entities are registered in the portal and open data sets have been posted publicly depending on the category to which they belong.

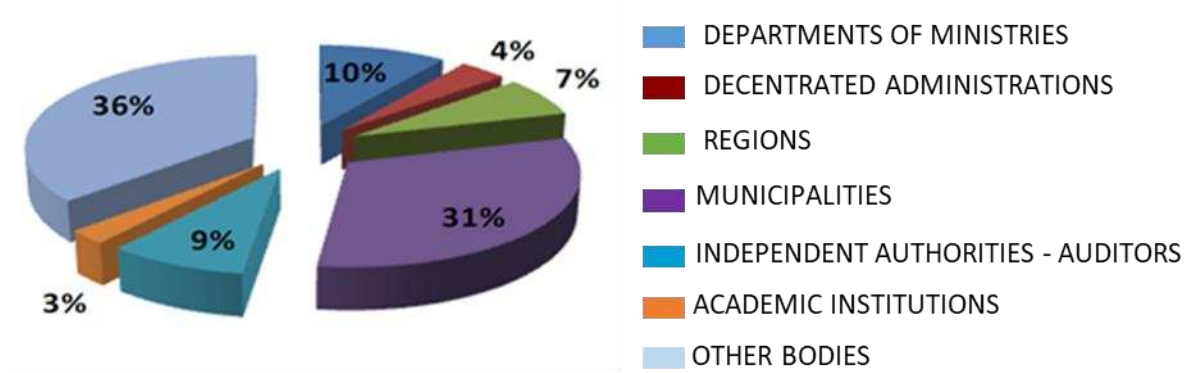


*Figure 4: Percentage Distribution of Registered Entities at data.gov.gr per category*

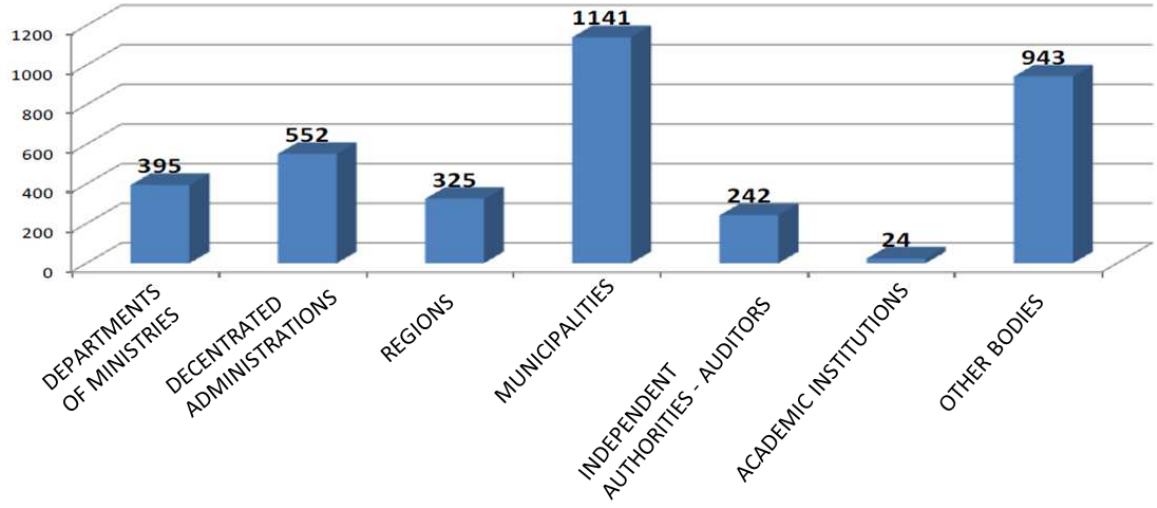


*Figure 5: Total open data per Entity at data.gov.gr per category*

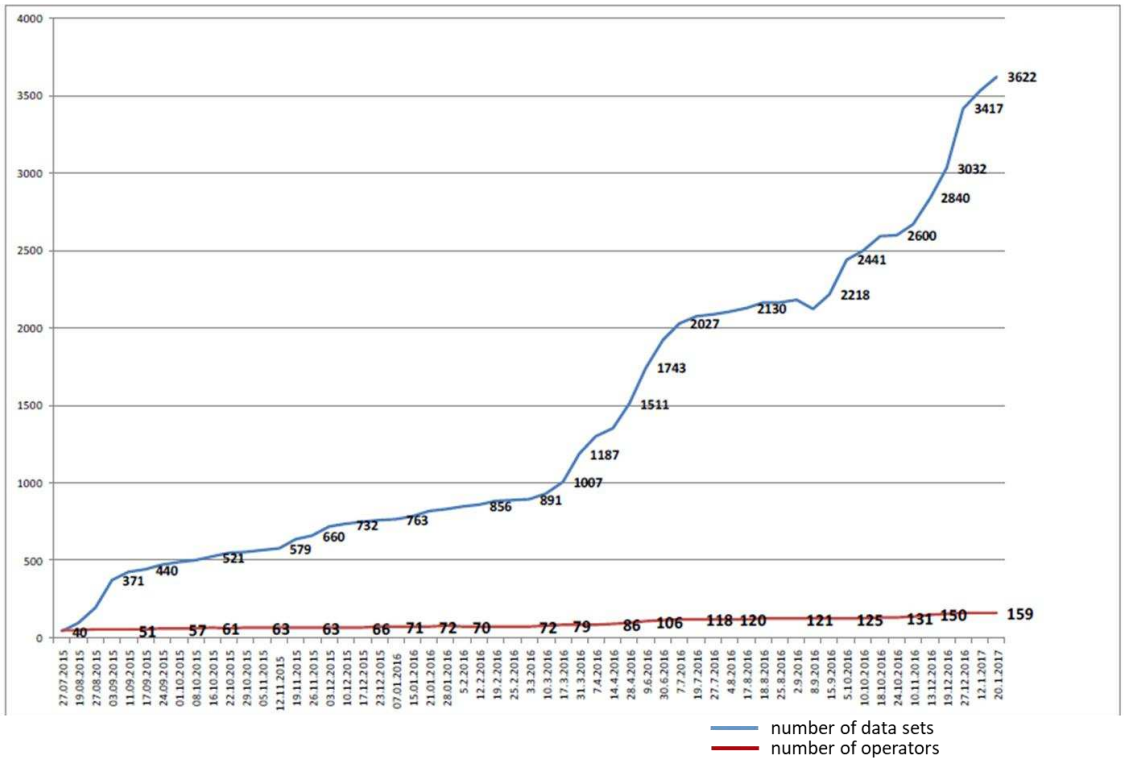


*Figure 6: Evolution overtime of number of operators and data sets (period 27/7/2015-20/1/2016)*

It is clear from the above that open data and its use can be considered as a Lean Tool (practice) since on one hand have proven to contribute to digital transformation and the development of public industries by delivering high quality services to citizens / customers and on the other hand they are time and cost saving tool.

## 4 Conclusions

Open Data are still a new field of business and governments, both growing rapidly. According to former EU's digital agenda, the number of "digital jobs" in the EU is growing rapidly every year. Technical e-skills are required and a lot of soft skills, like collaboration, problem solving and communication in order to start processing the data, and offer solutions to governments and industries.

The potential of Open Data is tremendous and its value for the EU28+ has been identified for the period 2016 – 2020. The total market size for Open Data is estimated at 325 bn EUR. To realize this potential, the EU28+ countries have to move forward with Open Data. Some countries do not even have a nation-al Open Data portal. Although all countries either implemented or are in the process of implementing the revised PSI Directive, other accelerations are needed as well: increased portal usability, machine readable data, increase in the release of public data, etc.

The lean results using Open Data shows that a) the **performance** of public services can be improved by contributing and enhancing Open Data which will provide great efficiency in processes and an overview of unnecessary spending, b) the **economy** can benefit by getting easier access to information and knowledge and by the

creation of new business models and c) societal benefits can improve the **social welfare** and since all information is transparent and accessible, enhancing collaboration, participation and social innovation by using Open Data.

All the above indicates that using Lean and Open Data by governments, industries and between countries will provide full potential and best practices creating E-government.

E-government has come into our lives in recent years and is constantly evolving. The use of open management as an open data tool is being implemented in several countries as the data society uses in its day-to-day life increases. This makes it necessary to post them in a central public repository. Greece tends to perform poorly in capturing the effects of implementing open data use. The indicator is broken down into the three components i) Political impact mapping, ii) Social impact mapping and iii) Impact on economic level

Although high scoring is achieved in the first sub-index, low scoring appears in the next two, as the effects and benefits of open data policy at social and economic level are not clearly visible. As it was found in the previous annual report (2016), despite the adequacy of the relevant institutional framework, this is due to the fact that the dissemination, use and exploitation of open data is still limited, not only to public bodies but also to the business world.

In order to improve the performance of Greece and derive tangible benefits from the use of open data, it is important to prioritize the use of public sector bodies and other stakeholders / businesses into i) Further increase in the number of datasets posted to the central public repository, ii) Improve the quality of the data sets posted in the central public repository, iii) Improve the functionality of the Greek open data portal and iv) Add information and publicity actions on the use and exploitation of open data in the private and public sectors.

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