

TECHNOLOGY
WATCH REPORT



Digitalisation and exploitation of data in the public sector

hubb**30.**

TECHNOLOGY WATCH REPORT

Digitalisation and exploitation of data in the public sector

Authors

Roser Salvat Jofresa, UAB Research Park

With the collaboration of Hafsa El Briyak Ereddam (UAB PUE - University Business Program)

Edition and design

Communication and Promotion Area

UAB Research Park



UAB Research Park

Av. de Can Domènech s/n - Eureka Building - UAB Campus
08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain

www.hubb30.cat/en

hubb30.

An initiative of:



A project co-financed by:



1

Overview of innovation and tendencies in the digitalisation and exploitation of data in the public sector

It is quite well-known that the Public Administration handles a lot of data, that they strive to have it all well identified and supervised, ensuring **compliance with public service functions** while respecting **current legislation** on data privacy, confidentiality, security, transparency, access and re-use.

In Europe, the public sector is the one holding the greatest amount of data. So-called Public Sector Information (PSI) may be of public access to make it available for query by citizens. The offer of information and data that has not been transformed or interpreted held by the public administration undoubtedly strengthens **transparency** and provides collaborative orientation.

In fact, **open data** is one of the bases of the **open government** philosophy. For some time now the European Commission has promoted open data practices in the public sector, partly due to the **legislative impulse** of other continents. In this regard, special relevance is placed

on:

- the Declaration by Obama in 2009 in favour of Open Government.
- the Freedom of Information Act (FOIA) in 2011, as well as the FOIA Directive to encourage the transparency and openness of public information.
- the publication by the W3C for the application of the international web accessibility initiative (WAI) that includes the promotion of open governments.
- the approval of European Commission Directive 2003/98/EC.
- Directive 2013/37/EU for transparency and free competition.
- the European Data Portal financed by the European Commission in 2015.

But the liberalisation of public data could also contribute another dimension in addition to **transparency and accountability** before citizens. When the purpose of the open data strategy is that of **re-use to generate new activity processes**, we get further into the field of

innovation. This means that application of the open data philosophy encourages the **innovative development of new applications and services**. In this way governments are no longer mere service providers, but also platforms and benefit managers. In fact there is a tendency for administrative bodies to work more and more towards adequately and sustainably managing this data with the purpose of **adding value and transforming it into real assets** for citizens and the corporations themselves.

Over the last few years public organisations have slowly accepted the view that information is an asset of common interest, as well as a strategic value that places it in a privileged position.

“Over the last few years public organisations have slowly accepted the view that information is an asset of common interest, as well as a strategic value that places them in a privileged position”

Data analysis can help diagnose problems in various sectors. Among municipal data, for example, we can distinguish, for conceptual effects, **various different large data repositories** or groups: (1) Management, administrative and technical data; (2) Open data and sets of raw data and open metadata; (3) Official statistics; (4) Open Content and (5) External data.

As data contingents are so important, it is quite understandable the public sector has been developing **big data** (BD) initiatives for many years. Big data analytics (BDA) undoubtedly allow taking advantage of unprecedented volumes of data in various formats, evolving towards higher and higher speeds, providing better responses to old matters, as well as tackling new questions. The challenges to taking advantage of BDA in the public sector are especially subject to data quality and the inherited infrastructure, as mentioned in the **Frost & Sullivan** 2016 report “Big Data Analytics in Europe’s Public Sector: Increasing real-world implementations - Showcase immense potential of BDA to public sector bodies”.

Although the volumes of data constantly increase, the **quality of the data** and its veracity are a frequent concern with the growing number of sources of the data being integrated. The data collected often originates in various sources, multiple traditional, relational databases or various types of sensors, and the on-line interaction generated by the user generally requires aggregation and integration using specialised tools. In the short term, this makes data cleaning an imperative to ensure its integrity, and in the mid-term really complex redesign processes will be required.

On the other hand, integration of data in most cases requires a new, integrated approach to **infrastructure**, thus requiring upgrades to storage, processing and data analytics systems, aspects that imply considerable investments in economic contexts as subject to close scrutiny as they are to economic justification. The **restrictions on resources** establish limits for investment in machinery, permits, integration tools and operative costs.

This challenge is in addition to the scarcity of **human resources with sufficient analytical skills**, an aspect that explains both the discourse and the operational practices of data public that often come, not so much from the administrative bodies themselves, as from infrastructure and technical **service providers**. These companies may have the tendency to consider technology as an objective, but it is necessary to understand that for open governments the technology is the tool that makes it possible to face challenges and public policies.

This leads us to confront the matter of the **organisational complexity** inherent to the public sector and its **regulatory environment**, because the BDA initiatives of any “vertical” or sector require strong leadership and exhaustive planning. Managing these data resources in a systematic and intelligent way, considering all their life cycle, to transform them into an asset and **construct tools and services** to have “just-in-time” access and make them available to the departments or individuals needing them while respecting the limits of right of access, is not always easy. This implies, among other technical tasks, defining procedures for data assessment and selection; planning transfers to analytical repositories; verifying safe repositories; applying controlled vocabularies and standards, as well as clear usage licences.

This means that perhaps the most complex aspects in this regard are those related to the

management of change and **organisational culture**. It is up to management to define the criteria to be used, and analytical experts to design the technical implementation and first line staff to ensure the quality of the processes and the data. But the complex structure of the administrative bodies and **legislative limits** could impose difficult to cross barriers whenever it is necessary to take new organisational measures, defining general and specific protocols that affect various political and technical levels.

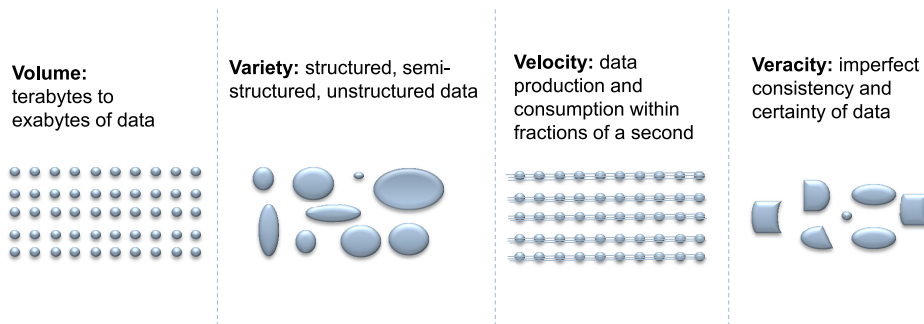
But the public sector will undoubtedly be faced with the growing **expectations of citizens** to improve services, **increasing demand**, and **improving efficiency** in the face of growing budgetary pressure. Improvement opportunities span along the whole value chain of service delivery, from citizen-facing front-office processes, on to interfaces with public sector systems, and back-office activities where workflow optimisation, records management, and analytics solutions drive efficiency of operations. In spite of all these difficulties, however, more and more investment effort is being made in digitalisation and data exploitation, because the **benefits associated** with these projects are extremely relevant: increased efficiency and responsibility; increased visibility of the institution; permanent learning curves, and improved transparency and accountability.

In this context, data exploitation plays an important role in the **aspirations to achieve political objectives** and to modernise social and economic strategies, contributing to territorial transformation. Culture of service to citizens and society could be the keystone upholding innovation in digitalisation and data exploitation in the public sector, because it explains that this is not only understood in terms of opportunity, but of responsibility associated with efficient and effective orientation of public action programmes. This being so, the real will to **evaluate and base public policies** (strictly defined using indicators), as well as the capacity to promote **specific uses associated with tangible benefits**, should mark the deployment of big data in the public sector.

2

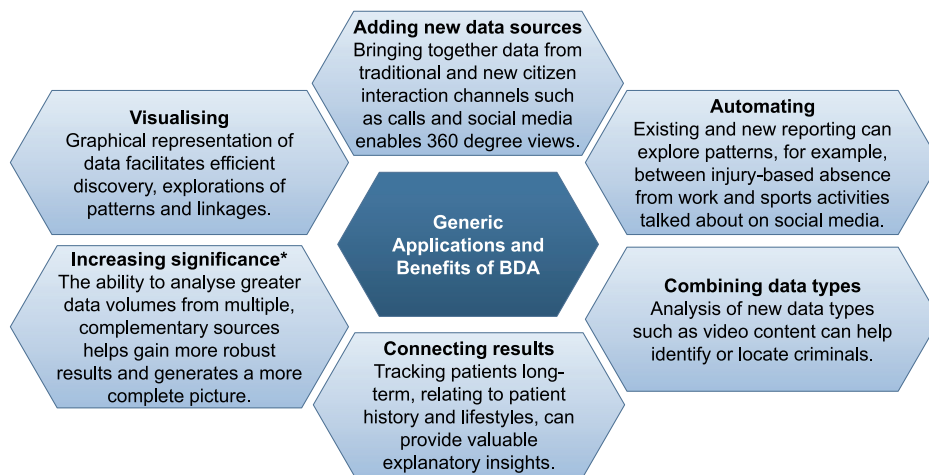
Open data and Big Data Analytics (BDA) in the public sector: Key infographics

2.1. Big Data Dimensions



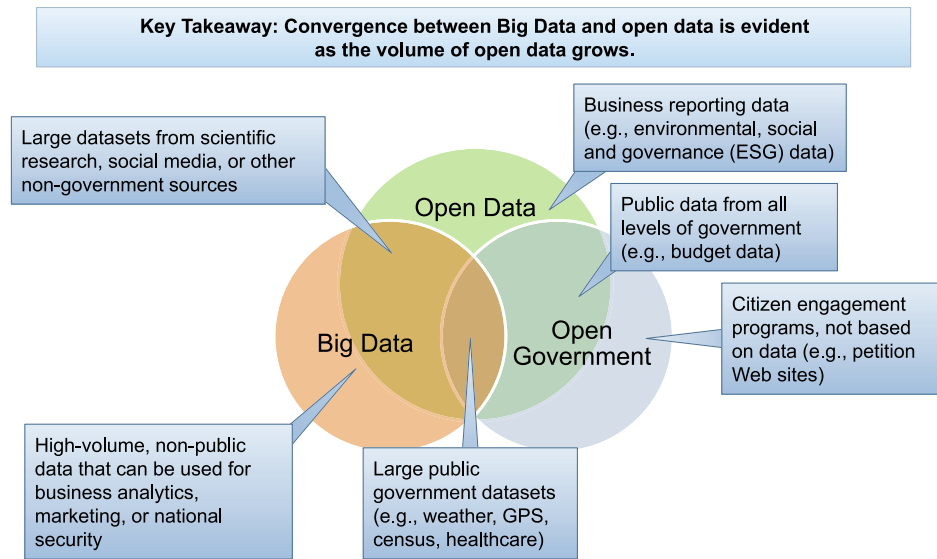
Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.2. Benefits of BDA



Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.3. Convergence between BD and Open Data



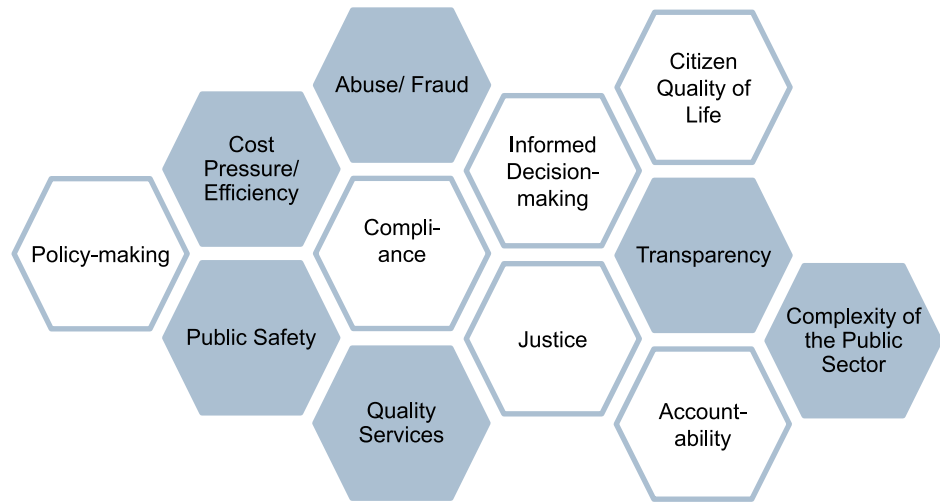
Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.4. BDA applications and classifications

Front-end (citizen facing)—back-end (back office)			
Customer Insight	Risk, Security, and Intell	Proc./Productivity Improvement	Resource Optimisation
<ul style="list-style-type: none"> Customer segmentation Behavioral analytics Affinity analysis Customer service improvement Campaign management Pricing analysis 	<ul style="list-style-type: none"> Fraud detection Cybersecurity Defense Insurance analytics Real estate finance Drug safety 	<ul style="list-style-type: none"> Inventory management System performance improvement Retail 	<ul style="list-style-type: none"> Sales productivity Operational efficiency Internal process improvement Supply chain analysis Human resource planning and management

Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.5. Priorities in the public sector



Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.6. BD applications in the public sector

Key Takeaway: HM Treasury's Public Expenditure Statistical Analyses offer a framework around budget areas for considering the myriad of public sector BDA opportunities.

Public Sector Domain	Public Sector Level			
	International*	Central	Regional	Local
1 General public services				
2 Defense				
3 Public order and safety				
4 Economic affairs				
5 Environment protection				
6 Housing and community amenities				
7 Health				
8 Recreation, culture, and religion				
9 Education				
10 Social protection				

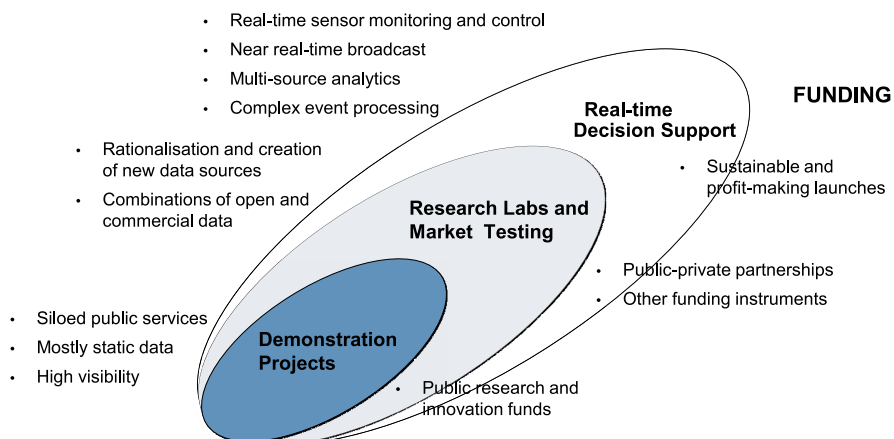
Red squares illustrate how the framework is used for indicative mapping of individual use case examples relevant to public sector budget areas.

*Supra-national governments such as European Union and non-governmental organisations such as the United Nations

Note: Public sector domains modeled on Public Expenditure Statistical Analyses by HM Treasury, Public sector current and capital expenditure on services by function
 Source: HM Treasury; Frost & Sullivan

Source: Frost & Sullivan (2016). Big Data Analytics in Europe's Public Sector. Increasing Real-world Implementations Showcase Immense Potential of BDA to Public Sector Bodies

2.7. Evolution of Data Flow to cities



Source: Frost & Sullivan (2014). Dynamic Open Data. The Tidal Flow of Europe's Real-time Cities

hubb30.

AN ALLIANCE TO PROMOTE
INNOVATION IN THE B30 AREA

www.hubb30.cat/en

An initiative of:



Project co-financed by:

