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SEMINAR PAPER

Open Data

Evolution, Concepts, OGD developments in Europe

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1.Introduction

The importance of Internet has increased rapidly over the last years and its usage is expected to even grow more in the future. Especially, after the popularization of Web 2.0 by Tim O'Reilly in late 2004, Internet has become a new way of communication and interacting between people, whom even don't know each other. Moreover, simple persons have the possibility to change and improve an existing article, such as by using Wikipedia. Not only this, but now anyone possesses also the chance to use, modify and share an existing software, which is called Open Source Software. All in all, the participation and collaboration of the public is becoming more and more significant and beneficial in many aspects of life. This is the reason why a lot of information is released for free, without any restrictions. The phenomenon is called Open Data and is becoming real from governments all over the world.

Data itself is raw, only a piece of information, but it has a big potential if it is used in the right way. Open Data initiatives aims exactly to promote this potential of data and to make possible the use, re-use and combining of diverse kind of data, by publishing them for free. Governments from all over the world have become consious of the benefits that come from the raw data and have already begun their projects to make the data available for the citizens and businesses. On one side leads an Open Government to more transparency, participation and collaboration between citizens, business and the government itself, but on the other side, several services and products that could be created with the data represent a big potential for the economic growth. Hence the value generated from Open Data could be divided into political and economic.

In the shape of the latest Open Data movements and initiatives in Europe, the paper aims to analyse the strategies that follow governments of different European countries and to find an answer for the research question: “ Which are the objectives and developments of Open Government Data initiatives in the European countries?”

The paper is divided as follows:

The second chapter gives an overview on the basic concepts of Open Data, including some interesting historic moments, the eleven conditions for a data to be called open, the Open Data licenses, and the Linked Open Data.

The following chapter explains in detail the term “Open Government Data” and especially the ten principles, set during a conference in October 2007 in California.

The third chapter deals with the research question, by analysing different aspects of Open Government Data

in diverse European countries and concentrates in detail on the situation in Austria and Germany.

At last, the paper identifies the benefits and challenges of Open Data, by ilustrating them through some examples and concludes in the chapter 6.

2.Open Data- Theoretical overview

2.1 Evolution

At first the author will give a brief history of information sharing, which has its origin in the early times before Christus, and will try to make a relation with the data sharing nowadays. The time that formal written language began in Mesopotamia and Egyptian hieroglyphics began to record all kinds of data from government taxes to schooling religious rites, around 35000BC, could be described as the beginning of data sharing. Even though it was a totally different period back then and the information didn`t have the same importance as now, the famous Pythagoras (572BC-495BC) was quoted as saying: “Friends share all things. Number is the ruler of forms and ideas.” His Theorem and ideas had a very big influence at a lot of philosophers that time, as he set out to show how mathematics can be used to understand and compute aspects of nature, music, and the world. If he didn’t share his thoughts and his theorems with the others, he wouldn`t surely have had this influence on the living that time. (the guardian, 2013) This is very similar with the opening of data now, because only by making the data public, exists the possibility to reuse them and to benefit from them.

A very interesting fact was around 1150 BC, when the Turin Papyrus in Egipt became one of the first topographical maps, useful to many persons, which could be considered as the first attempt to create a map for people. But, it was really the 1855, when one the first pioneers of shared open data, the oceanographer and metereologist Matthew Fontaine Maury, published his book “The physical geography of the sea” Through this book, where he mapped his analysis of ships’ logs, rain, wind and currents on charts, he sent his findings to others and encouraged their contributions, launching a worldwide project for safe navigation. This could be seen as the predecessor of the nowadays well-known Google Maps, although it is not so really open, as it is made up of large amounts of leased copyright material.(the guardian, 2013)

The 18th century can be considered as the really old beginning of Open Data, with the publishing of the First Freedom of Information Act of 1766 in Sweeden, which granted public access to government documents.

In the 19th century, Dr. Snow discovered the relationship between drinking water pollution and cholera in London, by combining data about cholera deaths with the locations of water wells, which led to the building

of London's sewage systems, and hugely improved the general health of the popualtion.(opendatahandbook, 2014) Even though times ago, this story shows how much unexpected knowledge could flow from the combination of different data sets and how could this influence many aspects of life.

Leaving behind the early past with all above mentioned meaningful examples, the real history began with the invention of computer and internet. With the spread of internet over the last years, the information increased too. At the time, in 2014 we are living in the "boom" of social networking sites, Web applications, hosted services etc. There isn't anymore only companies or businesses, who invent something or study something. Nowadays, normal people in everyday life can communicate and collaborate virtually with each other and improve so the existing technologies or invent themselves new ones or just study something on their own, which might be helpful for the whole society. But people need access on different informations, like older data or older studies or the actual ones, in order to be able to create new things. Subsequently the need for open data has increased rapidly.

Hence, for the first time the term Open Data appeared in 1995, in a document from an American scientific agency, which dealt about the disclosure of geophysical and environmental data. Through their quote "Our atmosphere, oceans and biosphere form an integrated whole that transcends national boundaries" , they promote a complete and open exchange of scientific information between different countries, a prerequisite for the analysis and understanding of this global phenomena. (wiki, 2014)

A big moment was on December 2007, when thirty open government advocates gathered in Sebastopol, California and wrote a set of eight principles of Open Government Data. These principles enclose the basic idea that public data are a common property, in the same way as scientific ideas. Whereas the means to achieve this idea concerned primarily with the sharing and use of this common good. Since most of the participants came from the free software movements, they were directly inspired by the approach and practice of open source, built on three concepts: openness, participation and collaboration. Therefore, their idea was to apply the concepts of open source and its working method to public affairs. (ParisTechReview, 2013)

It was the 21 January 2009, when the idea became really true from Barack Obama, who on his first full official day on his office issued two memos for the heads of executive departments and agencies: one on the Freedom of Information Act, and the other on Transparency and Open Government, which aim to ensure the public trust and to establish a system of transparency, public participation, and collaboration. The data.gov website launched in May 2009, set about the release of hundreds of thousands of datasets from 295 government APIs and 175 agencies, and made accessible multiple apps and tools. In the same way proceeded

that year also governments from many other countries and today, in 2014 all people have acces to different local, regional and national government sites from all over the world.(the guardian, 2013)

2.2 Terms and definitions

The importance of computers, internet and the increase in its usage over the last years caused a lot of evident changes in many aspects of life. For instance, the enormous collections, which decked out the shelves of the public administrations and governments, are now thanks to the digitalization simply saved in digital storage media. In addition, businesses, universities, schools, and even the normal people are replacing more and more the papers with digitalized forms of storing the information. As a result, exist an uncountable amount of data and information on the internet.

But what is a data itself? Does it have the same meaning as the information? Why are these two terms frequently confused and interchanged with each-other?

According to Russell Ackoff, an American organizational theorist, professor in the field of organizational research, system thinking and management science, there exists a Data-Information-Knowledge-Wisdom (DIKW) hierarchy in the content of human mind. Hence, data and information are two different components of hierarchy and should not replace each-other, especially when discussing open data. The definitions of each of the components shed light on the differences between the four types of understanding (Ackoff, 1989):

Data- Data is represented by symbols and is raw. It only exists and has no significance beyond its existence. It can exist in any form, usable or not and does not have meaning of itself. For example, a spreadsheet generally starts out by holding data.

Information- Information is data processed into a useful form, providing answers to “who”, “what”, “where” and “when” questions. Thus, in this level the data has been given meaning by way of relational connection. In computer terminology, for instance a relational database makes information from the data stored within it.

Knowledge- Knowledge is the application of data and information to answer the question “how”. It is the appropriate collection of information such that it's intent is to be useful. Applications, such as modeling, simulation etc. represent some types of stored knowledge in computer parlance.

Wisdom- Wisdom is the addition of judgment value to knowledge. It is essentially systemic and embodies more of an understanding of fundamental principles embodied within the knowledge that are essentially the basis for the knowledge being what it is (Bellinger, Castro, Mills, 2004). According to Ackoff, wisdom is the process by which people discern, or judge, between right and wrong, good and bad. It is a uniquely human

state, which the computers do not have, and will never have the ability to posses.

In accordance with these definitions, information is a step above the data, it has a real meaning and is obtained from raw data. In other words, data can become information when interpreted by an actor. Moreover, in the terms of computer science the digital data is seen as a kind of information suitable for processing, represented preferably and most often in quantitative format. The term "application" is often used in the place of "information", in a sense that data is used for storage and the application is used for different operations based on data. (Lindman, Kinnari; Rossi, 2014) All in all, the data itself, eventhough without meaning at first sight, is the essential component of the DIKW hierarchy, because only the processes of combining, modifying and using it for different purposes can improve the status of information, knowledge and wisdom.

Especially, in the 21st century, when developments in computer technology are experiencing their boom and the ability of people to leverage data to understand and solve complex problems is growing rapidly, the value of raw data as a resource for public and private use is quickly increasing. (Ayres, 2008). Due to this rapidly growth in the capacity of analysis, the need for access to large amount of data has become urgent. As a result, after the movements of Open Access, which means unrestricted online access to peer-reviewed scholarly search (wikipedia, 2014), and of Open source software, which is a software that can be freely used, changed, and shared (in modified or unmodified form) by anyone (OpenSourceInitiative, 2014), projects all over the world have already been adopted to take off also the restrictions and barriers of access to the different informations on the internet. The phenomenon is called Open Data and its intention is not just to see the data, but the possibility of the public to reuse, modify, and to benefit from it. In conformity with the definitions of the DIKW hierarchy, Open Data is always referred to the raw data without meaning, although in some discussions the term "information" is measlidingly used.

"A piece of data or content is open if anyone is free to use, reuse, and redistribute it- subject only, at most, to the requirement to attribute and/or share-alike." (OpenDefinition, 2014)

The open data should be made available for the public and organizations in an appropriate format, in order to have the possibility of reusing it. The term "open" means that no cost or any kind of restrictions should be required for using the data, even though the use and reuse of data is regulated through some proper conditions in accordance with different license models.

Below, the term "work" is used to denote an item or piece of knowledge which is being transferred through open data. Knowledge could be content such as music, films or books as well as scientific, historical, geographical data or otherwise, and government or other administrative information. Whereas, the term

“license” refers to the legal license under which the work is made available, or in the case where no license has been made it refers to the resulting default legal conditions, for example copyright.

According to (OpenDefinition1, 2014), a work is open if its manner of distribution satisfies the following conditions:

1. Access: The work shall be available as a whole in a convenient and modifiable form, at no more than a reasonable reproduction cost, preferably downloading via the Internet without charge.

2. Redistribution: The license shall not restrict any party from selling or giving away the work either on its own or as part of a package made from works from many different sources as well as it shall not require royalty or other fee for such sale or distribution.

3. Reuse: The license must allow for modifications and derivative works and must allow them to be distributed under the terms of the original work.

4. Absence of technological restriction: The work must be provided in such a form that there are no technological obstacles to the performance of the above activities. This can be achieved by the provision of the work in an open data format, i.e. one whose specification is publicly and freely available and which places no restrictions monetary or otherwise upon its use.

5. Attribution: The license may require as a condition for redistribution and re-use the attribution of the contributors and creators to the work, but not in an onerous way. For example if attribution is required a list of those requiring attribution should accompany the work.

6. Integrity: The license may require as a condition for the work being distributed in modified form that the resulting work carry a different name or version number from the original work.

7. No discriminations against persons or groups: The license must not discriminate against any person or group of persons because the maximum benefit from the process is achiavable only when the maximum diversity of persons and groups are equally eligible to contribute to open konwledge.

8. No discrimination against fields of endeavor: The license must not restrict anyone from making use of the work in a specific field of endeavor. For example, it may not restrict the work from being used in a business, or from being used for genetic research. The major intentions is to prohibit license traps that prevent open material from being used commercially.

9. Distribution of license: The rights attached to the work must apply to all to whom it is redistributed

without the need for execution of an additional license by those parties.

10. License must not be specific to a package: The rights attached to the work must not depend on the work being part of a particular package. If the work is extracted from that package and used or distributed within the terms of the work's license, all parties to whom the work is redistributed should have the same rights as those that are granted in concjuction with the original package.

11. License must not restrict the distribution of other works: The license must not place restrictions on other works that are distributed along with the licensed work. For example, the license must not insist that all other works distributed on the same medium are open. In conformity with this condition, distributors of open knowledge have the right to make their own choices.

    Content of the data could be cultural, scientific, financial, statistics, weather, environment, transport (OpenKnowledge, 2014). Furthermore, education material, geo-data, medical studies or radio and television programs represents as well proper informations to be reused, modified, combined and form therefore an important part of the Open Data project. Eventhough most of the data is collected and published from the public sector, Open Data includes also data from businesses, universities, broadcasting stations or non-profit organizations. (Geiger, Lucke, 2012)

2.2.1 Open Data Licenses

A license specifies how the owner of a work explicitly gives someone else permission to use that work. Generally the owner can transfer the ownership, so that someone else owns his work and has the rights associated with it, but he can also waive his rights, which places the work into the public domain and means anyone else can do whatever they want with it. In Europe there are two kinds of rights automatically given over things that someone created: (OpenDataInst, 2014)

- Copyright over works (content) that he/she create and which are original to him/her, such as text or photographs.
- Database right over collections of data that he/she has put a substantial effort into obtaining, verifying or presenting.

An open license is one that places very few restrictions on what anyone can do with the content or data that is being licensed. It allows others to do things like:

- republish the content or data on their own website
- derive new content or data from yours
- make money by selling products that use your content or data

- republish the content or data while charging a fee for access (OpenDataInst, 2014)

In accordance with (OpenDefinition, 2014), there are only two kinds of restrictions that an open license can place: attribution and/or share-alike. Hence, there exist three levels of license, which everyone can use when publishing open content or data:

- a public domain license has no restrictions at all (technically, this indicates the waiving of rights to the content or data)
- an attribution license says that reusers must give attribution to the source of the content or data
- an attribution and share-alike license means that reusers must give attribution and share any derived content or data under the same license

The two most important license models used by Open Data are: Creative Commons and Open Data Commons License, which was created specifically for databases. These licenses ensure for the creators, or the so called licensors copyright while allowing others to copy, distribute and make some uses of their work. Further they work around the world and last as long the applicable copyright lasts. They serve also as a baseline, on top of which creators can choose to grant additional permissions when deciding how they want their work to be used. (CreativeCommons, 2014)

The following table represents a list of the licenses that are conformant with the principles set forth in the Open Definition thus they provide the use, re-use and re-distribution of Open Data, under copyright terms.

- Domain = Domain of application, i.e. what type of material this license should/can be applied to.
- BY = requires attributiion.
- SA = require share-alike

License	Domain	By	SA	Comments
Creative Commons CCZero(CC0)	Content, Data	N	N	Dedicate to the Public Domain (all rights waived)
Open Data Commons Public Domain Dedication and Licence (PDDL)	Data	N	N	Dedicate to the Public Domain (all rights waived)
Creative Commons Attribution 4.0 (CC-BY-4.0)	Content, Data	Y	N	
Creative Commons Attribution (CC-BY)	Content	Y	N	All versions 1.0-3.0, including jurisdiction “ports”
Open Data Commons Attribution License (ODC-BY)	Data	Y	N	Attribution for data(bases)
Creative Commons Attribution Share-Alike 4.0(CC-BY-SA-4.0)	Content, Data	Y	Y	
Creative Commons Attribution Share-Alike(CC-BY-SA)	Content	Y	Y	All versions 2.0-3.0, including jurisdiction “ports”; version 1.0 is little used and not recommended because it is incompatible with future versions
Open Data Commons Open Database License(ODbL)	Data	Y	Y	Attribution-ShareAlike for data(bases)
Free Art License (FAL)	Content	Y	Y	

Illustration 1: Conformant recommended licenses (opendefinition2, 2014)

2.2.2 Linked Open Data

The Web has evolved from a global information space of linked documents to one where both documents and data are linked due to different new practices for publishing and connecting structured data on the web. These best practices led to the phenomenon of Linked Data, which means the use of the Web to create links between data from different sources, such as databases maintained by two organisations in different geographical locations, or simply heterogeneous systems within one organisation that, historically, have not easily interoperated at the data level. As a result, it was created a Web of Data from diverse domains, such as people, companies, books, scientific publications, films, music, television and radio programmes, genes,

proteins, drugs and clinical trials, online communities, statistical and scientific data, and reviews, which has increased thus the ability for new applications. Technically, Linked Data refers to data published on the Web in such a way that it is machine-readable, its meaning is explicitly defined, it is linked to other external datasets, and it can in turn be linked to from external datasets as well. (Bizer, Heath, Lee, 2014)

According to (Geiger, Lucke, 2012) :“ Linked Open Data are all stored data connected via the World Wide Web which could be made accesible in a public interest without any restrictions for usage and distribution. „

Linked Open Data is necessary to fully benefit from Open Data, since it facilitates innovation and knowledge creation from interlinked data and becomes thus an important mechanism for information management and integration.(Bauer, Kaltenböck, 2014) Further, on the basis of the possibility to combine with each-other enormous kinds of data, it increases the citizens willingness to concern themselves more with the study, use and re-use of the data, which leads to new knowledge or to powerful services and applications.

For the first time, the concept of Linked Open Data was proposed by Tim Berners-Lee in his 2006 Web architecture node. As basis it served the Semantic Web, since according to Lee the Semantic Web isn't just about putting data on the Web, but about making links, so that a person or machine can explore the Web of the data in order to find other related data when he/she/it has some of it.(w3.org, 2014) Hence, the Semantic Web is an initiative of W3C (World Wide Web Consortium) that represents its vision of the Web of linked data. It is not a separate Web, but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation. The intention of the Semantic Web is to extend the Web from a medium of documents for people to a one also for data and information that can be processed automatically, which means that computers must have access to structured collection of information and sets of inference rules that they can use to conduct automated reasoning. So, the idea is to enable machines to comprehend semantic documents and data, not human speech and writings.(Lee, Hendler, Lassila, 2001) The Semantic Web and linked data have become two concepts that are interchangable and have a close connection, since they share the same big objective: publishing and consuming machine-readable data is the center for both of these concepts. The Semantic Web can be viewed as created by the linked structured data on the Web.(Yu, 2011)

The publishing and linking of these machine-readable data has been made achiavable due to the two important technologies XML (eXtensible Markup Language) and RDF (Resource Description Framework). XML is a markup language that lets everyone create their own tags and allow the users to add arbitrary structure to their documents but says nothing about what the structures mean. The meaning is expressed by RDF, which encodes it in set of triples, each triple being rather like the subject, verb and object of an

elementary sentence and can be written using XML tags (Lee, Hendler, Lassila, 2001). RDF is a standard model for data interchange on the Web, which extends the linking structure to use URIs to name the relationship between things as well as the two ends of the link and allows thus structured and semistructured data to be mixed, exposed and shared across different applications (w3.org1, 2014).

For the Semantic Web and Linked Open Data to function, Tim Berners-Lee outlined, in 2006, a set of rules, which are also known as the „Linked Data Principles“ and provide a basic recipe for publishing and connecting data using the infrastructure of the Web while adhering to its architecture and standards :(Bizer, Heath, Lee, 2014)

1. Use URIs as names for things, in order to identify things.
2. Use HTTP URIs so that people can look up those names.
3. When someone looks up a URI, provide useful information, using the standards (RDF, SPARQL)
4. Include things to other URIs, so that they can discover more things. (w3.org, 2014)

Four years later, in 2010 Tim Berners-Lee developed a star rating system, in order to encourage people, especially government data owners along the road to good linked data and it serves as a guideline for them to define how open their published data really are: (w3.org, 2014)

★ Available on the Web (whatever format) but with an open license to be open data.

★★ Available as machine-readable structured data (e.g. excel instead of image scan of a table)

★★★ as (2) plus non-proprietary format (e.g csv instead of excel)

★★★★ All the above plus: Use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff.

★★★★★ All the above, plus: Link your data to other people's data to provide context.

Under this star rating system, to get one star is enough just to make the information public at all with an open license, even if it is a photo of a scan, of a fax, of a table. Then, the more stars a data gets, the easier it will be to be used and re-used from the people.

Another important benefit from the Linked Data is the new knowledge that can be created and visualized by an interlinking within a linked open data cloud. A popular illustration of this data cloud was designed in

October 2007 and refurbished for several time.(Geiger, Lucke, 2012) The term „cloud“ means that the data will not be saved in a local computing device (PC, tablet or Smartphone) anymore, but on a connected server or servers through a communication network such as Internet, an Intranet, a local area network (LAN) or wide area network (WAN). As a result, anyone can have access to the data from an Internetbrowser at anytime from anywhere in the world . (wiki3, 2014)

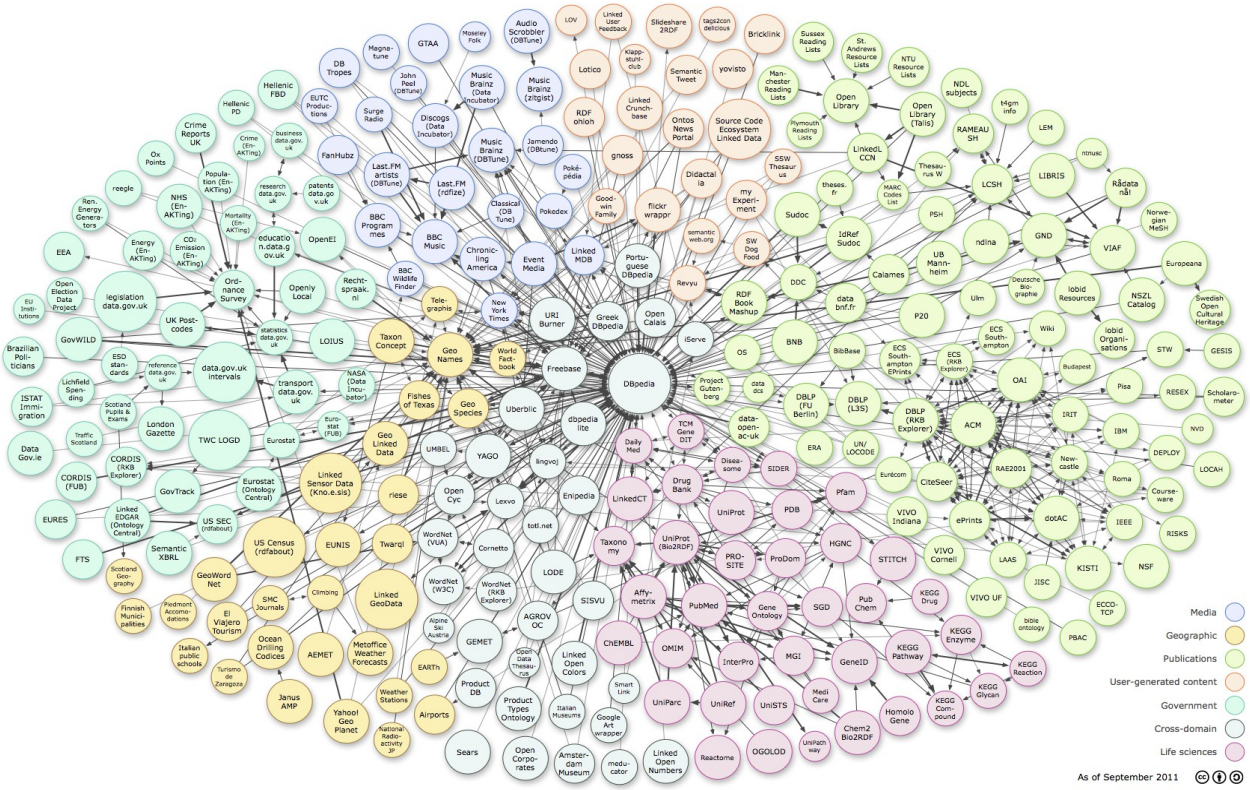

Illustration 2: Linking Open Data Cloud Diagram by Richard Cyganuak and Anja Jentzsch (lodCloud, 2014)

In the Figure 3 the arcs indicate that links exist between items in the two connected datasets. Heavier arcs roughly correspond to a greater number of links between two data sets, while bidirectional arcs indicate the outward links to the other exist in each data set. The cloud is splited into different categories of open data, comprising data about geographic locations (e.g. Linked Geo Data), people, companies, books (e.g. LIBRIS), scientific publications, films, music, television and radio programmes (e.g BBC programmes), genes, proteins, drugs and clinical trials (e.g Drug Bank), online communities, statistical data, census results (e.g. Wiki, Eurostat), and reviews. (Bizer, Heath, Lee, 2014)

3.Open Government Data

For governments the collection and dissemination of data is one of the key processes, which enables them to engage with the public. Since 1990, after the adoption of e-government, government ideology is moving toward a transparent and open one. This has come about as a result of the need for governments to connect with their electorate in order to provide legitimacy for their decision making process but also to entice citizenship participation in the political system. With growing apathy towards the political process in the West shown by declining participation in local, general and European elections, a transparent and open form of government that provides readily available information to the public greatly contributes towards the strengthening of the democratic process.(Chan, 2013) Furthermore, data made available by governments contributes towards economic development. Governments hold vast amounts of low no sensitive data that can be beneficial to business and individuals.(Chan, 2013) For example, macro-economic data, geographical and social data is used by business in order to create employment and services but also to plan ahead, thus providing a degree of security and enabling investment. Therefore, the availability of open data provided by government serves a numbers of purposes related to political, social and economic process and its primary aim is to foster collaboration and participation for the benefit of society. In addition, the more access the public has to the data, the more transparent is the government. As a result, Open Data serves as a basic requirement for the opening of governments, since it has a big influence in the three main objectives of Open Government: cooperation, participation, and transparency.

For labeling these freely-accessible stored data of the public sector, the item “Open Government Data” (OGD) seems better to be used, since this denomination refers explicitly to the public sector. A very clear definition of OGD is stated on the (Geiger, Lucke, 2012):

“Open Government Data are all stored data of the public sector which could be made accessible by government in a public interest without any restrictions of usage and distribution.”

Whereas David Eaves explains the term by means of “The three laws of Open Government Data” :

1. If it can't be spidered or indexed, it doesn't exist.
2. If it isn't available in open and machine-readable format, it can't engage.
3. If a legal framework doesn't allow it to be repurposed, it doesn't empower. (Davies, 2010)

However, OGD exludes the publication of all stored data of the public sector which should remain confidential, are private or contains industrial secrets and shouldn't therefore be published. Further, on the

basis of OGD-approach only selected data sets are procured in a structured and machine-readable form by responsible administrations, in order for them to be screened, searched through, filtered, formatted, monitored and edited. Those data could be statistics, geo data, maps, plans, environmental data, governmental information, accounting data, laws and directives, and other publications. For a common background, the government should open not only raw data, but also information and publications based on this data, because their combined usage would be desirable for the reuse of public sector information in general, especially refering to the EU Directive 2003/98/EG. (Lucke, 2011)

3.1 Principles of Open Government Data

One of the purposes of Open Data is its usage and reusage from everyone in order to modify and to combine different datasets with each other. The term “open” is related to the “interoperability”, which means that one piece of “open” material contained therein can be freely intermixed with other “open” material. In this way, diverse organizations and systems posses the ability to work together and to develop more and better products and services. In addition, also the citizens will have the possibility to use the data either for personal reasons or to create new knowledge and insights (opendatahandbook1, 2014).

But, to ensure that all this international data can be automatically evaluated via an API (interface), compared or combined with each other, it must be published in a standardized open format. For the first time, the principles of when a data is called open have been set in October 2007 in Sebastopol, California from thirty open government advocates, led by Carl Malamud and Tim O'Reilly. This important conference resulted in eight principles that would empower the public's use of government-held data. In 2010 the list of principles has been updated and expanded from the Sunlight Foundation and ever since have been applied the ten principles of open government data as an international standard, which provide a lens to evaluate the extent to which governemnt data is open and accessible to the public. As a result, a data should be considered open if it complies with: (SunlightFoundation, 2010)

1.Completeness- According to the first principle all public data, namely the data which is not subject to valid privacy, security or privilege limitations is made available. The principle emphasises the fact that data should be published as bulk data, in full, in order for the public to download all of the information stored in a database at once, which simplifies the reuse and analysis of data.

2.Primacy- The released datasets should include the original information collected by the government, details on how the data was collected and the original source documents recording the collection of the data. Hence, the data should be published with the highest possible level of granularity, not in aggregate or modified forms. The transcoded or aggregated open data should also be published, as long as the full-resolution

information is made available, thus, the primary data is always being referred to.

3.Timeliness- In order to raise the utility and value of the data for the public, it should be released as quickly as it is gathered and collected, whereas the priority should be given to the time sensitive information. This principle also includes the fact that not only the original data, but also the updates should be made available quickly and in an easy way for the public to find them. The currency of the data and a list of recent changes to the format and content is of a high importance for further reuse of tha data.

4.Accessibility- Since the purpose of open data, despite the transparency is its reusability, it should be made available in convenient, modifiable and open formats that can be retrieved, downloaded, indexed and, searched. Taking into account the fact that a software may change over time, the open data must be published with current formats and industry standard protocols, which tend to have lower barriers to use and especially to ensure the ability of the public to decode the data when the current software for that format is no longer available. Moreover, these formats should be open, non-proprietary and without technological restrictions upon their use, such as using forms or systems that require browser oriented technologies.

5.Machine readability- Data is reasonably structured to allow automated processing. In the reality any data can be read by a machine, but important for the open data is to be usefully proccessed by the machine. Therefore, information should be stored in widely used file formats that easily lend themselves to machine processing. For instance, PDF format is print ready (which is one of the requirements of the principle), but normally it is very difficult for a machine to parse. Hence, for spreadsheets it is recommended to use CSV, Open Office format, or XML; for documents XHTML/XML, whereas for Images JPEG, SVG or PNG.

The following table ilustrates all the potential data formats for OGD:

Text, Tables and Pictures	M	S	O	Geodata	M	S	O
Text (.txt)	+	+	+	Geography Markup Language (.gml)	+	+	+
Comma Separated Value (.csv)	+	+	+	GPS Exchange Format (.gpx)	+	+	+
Hypertext Markup Language (.html)	+	+	+	Keyhole Markup Language (.kml)	+	+	+
Extensible Markup Lanuage (.xml)	+	+	+	Drawing Interchange File Format (.dxf)	+	+	-
Resource Description Framework (.rdf)	+	+	+	Autodesk Drawing Format (.dwg)	+	-	-
Open Document Formats (.odt, .ods..)	+	+	+	ESRI Shapefile Format (.shp, .shx, .dbf)	+	+	-
Newsfeed / Webfeed Syndication (.rss)	+	+	+	Enhanced Compression Wavelet (.ecw)	+	-	-
Portable Document Format (.pdf)	-	+	+	MrSID Format (.sid)	+	-	-
Microsoft Word (.doc, .docx)	-	+	-	Normbas. Exchangeinterface (NAS)	+	+	-
Microsoft Excel (.xls, .xlsx)	+	+	-	Unified Database Interface (EDBS)	+	+	-
Microsoft Rich Text Format (.rtf)	+	+	-	BGRUND (Geospital agency BaWü)	+	+	-
Graphics Interchange Format (.gif)	-	+	-	WLDGE-Format (.wld)	+	+	-
JPEG Format (.jpg / .jpeg)	-	+	+				
Portable Networks Graphics (.png)	-	+	+				
Tagged Image File Format (.tiff, .tif)	-	+	-				
Geo-TIFF Format (.geotiff)	-	+	-				

M = machine-readable; S = specifications available; O = open format

Illustration 3: Potential data formats for OGD (Geiger, Lucke, 2012)

6.Non-discrimination- Data should be available to anyone, at any time, and with no requirement of registration. Barriers, like membership requirements or “walled garden” (when only some applications are allowed access to data) should not exist.

7.Non-proprietary- A non-proprietary format is a format over which no entity has exclusive control. It should

be used when making a data public, because only non-proprietary formats, like CSV or XHTML are often supported by a wider range of applications and support a wider range of uses and users. On the other hand, proprietary formats add unnecessary restrictions over who can use the data, how it can be used and shared, and wether it will be usable in the future, which means that information in these formats is not open at all. In the cases when non proprietary formats may not reach a wide audience, it may be necessary to make the data available in multiple formats.

8.License-free- Data is not subject to any copyright, patent, trademark, or trade secret regulation. Reasonable privacy, security and privilege restrictions may be allowed. License-free means that the barriers and technical restrictions should be eliminated, in order to fulfill the purpose of opennes, that anyone should be able to access information at any time without having to identify his/ herself.

But still some policies should exist, when publishing the data, in order to avoid the misuse of the information. These policies vary either from culture to culture or from the type of data. Different Creative Commons licenses are available on the official site of open data "opendefiniton.org" that may be extended hanging on the type of data, but always according to the principles.

9.Permanence- The public should have the possibility to find information over time either at a stable online location or through archives in perpetuity. The updates, changes or alterations to the data must also be documented to include appropriate archiving and version-tracking over time.

10.Usage costs- The data should be available on the internet at no charge, or at least no more than the marginal cost of reproduction. Since most government information is collected for governmental purposes, and the existence of users fees has little to no effect on wether the government gathers the data, the fees for acces would create a barrier for people who need the data. Therefore, also the benefits from the change or alteration of the data would be lower.

4.Open Government Data in Europe

4.1 The origin of Open Government Data

For the first time the ideas of transparency and accountability of government have been put into life from Obama, since his first day as President of America in January 21th, 2009. Through his two memorandums „Transparency and Open Government" and „Freedom of Information Act" he made it very clear that the way the government proceeded with their collected informations and data should change. Obama was the first, who highlighted the word „Open Government", which became very soon heard and used all over the world.

Hence, the aim of the memorandum „Transparency and Open Government“ addressed to the Heads of Executive Departments and Agencies, is represented by the main paragraph: (whitehouse, 2014)

“My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public participation, and collaboration. Opennes will strengthen our democracy and promote efficiency and effectiveness in Government”

In the same way, according to the other memorandum “Freedom of Information Act”, through the presumption “In the face of doubt, openness prevails”, Obama emphasises that all agencies should take affirmative steps to make information public, without waiting for specific requests from the public. Furthermore, they should use modern technology to inform citizens timely about what is known and done by their government (whitehouse2, 2014). As a result, on May 21, 2009 was launched the first open data portal „data.gov“, which initially contained only 76 datasets from 11 government agencies, but till April 2010, the number was increased to 1284 datasets from 170 government and related public agencies.(Hogge, 2010) Moreover, on December 8, 2009 the Office of Management and Budget published the OGD, which instructed agencies to publish at least three high-value datasets on the web. High-value datasets were defined as containing: information that can be used to increase agency accountability and responsiveness; improve public knowledge of the agency and its operations; further the core mission of the agency; create economic opportunity; or respond to need and demand as identified through public consultation,- and should be published in a downloadable and public format (Peled, 2011).

4.2 Objectives and Developments of Open Government Data in the European Countries

The developments in USA brought the so called „new era“ of Open Data and served as the first big step that helped in making several other countries conscious of the potential and the impact of Open Data and Open Government on the society, which began their own initiatives for more transparency. For instance, immediately in 2009 the political situation in UK regarding the open data also changed, and on September 30 the „data.gov.uk“ was launched in beta version, followed by an official, open launch in January 2010. (Hogge, 2010) Likewise the United States, the main objective of open initiatives from the government in United Kingdom is the transparency towards the citizens and also their involvement in the political processes. According to the program „Putting the Frontline First: Smarter Government“ launched on December 2009 from the British Chief Secretary to the Treasury, the key motivations of Open Government in UK are as follows:

„Action 1: strengthen the role of citizen and civic society, 1.3 Radically opening up data and promoting transparency: „Ultimately a more informed citizen is a more empowered citizen. In a modern democracy citizens rightly expect government to show where money has been spent and what results have been. [..] Data can also be used in innovative ways that bring economic benefits to citizens and businesses by releasing untapped enterprise and entrepreneurship.“ (Huijboom, Van den Broek, 2011)

This part of the programm is very similar to the open activities in US, that aim to increase public engagement and to foster collaboration, but seen more from a political perspective. Nevertheless, the programm of Open Data in UK considers also the actions, such as: releasing health data (e.g NHS Choices data), Ordnance Survey mapping and postcode datasets available for free reuse, increasing access to and reuse of public transport data including the National Public Transport Access Node database, opening Met Office Public Weather Service data for free download and reuse, more detailed departmental spending data, and attemptions to publish further user-friendly and accessible financial data. (HM Government, 2009) According to these actions, Open Data in UK doesn't aim only the political transparency, but even the publishing of different data services, like transport and space-oriented data for further purposes, especially the economic ones. Besides, the programm focuses a lot on the state budget- and household's data, which reenforces the economic orientation of OGD in UK.

The trend of making data public, in such a way to promote and encourage innovation and economic development is to be noticed in the most of other European countries, such as in Spain and Denmark,since the spirit of Open Data in Europe is related more with economic reasons as the political ones. For instance, in the „Open data Innovation Strategy“ in July 2010 from the authority „Danish Ministry of Science, Technology and Innovation“ is stated:

„Access to government data provides the basis for new services and different analyses, new information and better insights that are useful to citizens and businesses alike. ICT companies will be able to create new business in developing digital services and advanced content based on public data, and citizens can convert ideas and creativity into practical solutions to everyday problems.“ (Huijboom, Van den Broek, 2011)

Similarly, the key motivations of Open Data according to the program of Spain „Avanza2“, released by „Ministerio de Industria, Turismo y Comerco“ in July 2010 are summarized as follows:

„Data are crucial for the knowledge economy. By publishing Public Sector Data, more (economic value) can be generated. The data are a source for the development of new products and services. In addition, data are important to exercise one's democratic rights. Citizens are better informed about and engaged in government.“(Huijboom, Van den Broek, 2011)

The economic perspective plays a big role also in the plan of Open Data in Italy, where among different datasets already published or waiting to be published in accordance with Open Data Charta, a high-valuable dataset called OpenCoesione is released (www.opencoesione.gov.it), in order to publish information with details on assigned and spent resources, places, themes etc. and statistical indicators on local economic and social context. The objective of this initiative promoted by the National Department for Development and Economic Cohesion is to increase involvement of stakeholder in ensuring efficient and effective use of funds and encouraging the creation of new tools and services. In addition, by means of open access and ease of comparison on projects citizens will be able to evaluate if and how implemented projects meet their needs and wether financial resources are allocated effectively. Furthermore, the OpenCoesione initiative aims also to encourage greater public participation and collaboration by opening high value data and offering a large number of variables at the project level. (funzionerepubblica, 2014)

The Dutch government has been as well inspired from the Open Data initiatives in US and UK and has begun discussing and later also implementing ways of using open government to improve public administration and public services. Some of the intentions of the Dutch initiatives are clearly stated by the Groningen city council's new vision for ICT:

„The relationship between the council and local residents must change in response to new ICT applications (mobile apps, social media, open data)...The council must not only involve residents more in its policymaking, it must also engage them in the performance of its public duties. This includes making them more self-reliant, and also allowing residents to contribute to service provisions or encouraging them to propose solutions to public issues...This new relationship applies not only to residents, but also to business and institutions...If the council shares its data, companies will be able to combine it with other information, and use it to provide helpful new services...Our current policy on participation focuses on transparency...It is important that we integrate the new way of working into our operations and, in this new type of teamwork, concentrate on problems and issues on which we urgently need the public's help.“ (Ministry of the Interior and Kingdom Relations, 2013)

Whereas, in Finland and Sweden, the principle of transparency has not been used for the first time after the actions undertaken in US and UK. On the contrary, in these two nordic countries has been designed the world's first Freedom of Information Act in 1766, which intended the gaining of public acces to government documents. Ever since the principle of transparency remained central in the nordic countries. However, the first attemptions in opening the data in accordance with the OGD principles began in 2011 and in 2012 the Open Government Data has been defined as one of the main goals of the Public Sector ICT strategy. The targets of the Open Data Policy in Finland are correspondent with these in the other countries thus the

positive economic impact on the society is essential, since through the use and reuse of the data new businesses and innovative services, and more tax income could be promoted. Furthermore, it aims an increasing democracy and promoting transparency in the society as well as improving the data quality and the efficiency of the public sector. (MinistryOffinanceFinland, 2013)

Switzerland was also affected from the Open Government Data initiatives, thus since 2009 several players, such as Swiss Open Systems User Group and the parliamentary group „Digital Sustainability“ played a key role in promoting the OGD through different activities. For instance, from 2009 to 2011, four members of the parliamentary group launched eleven parliamentary actions related to OGD. In addition, in July 2010, a first meeting with guests from industry and academia took place on how to push OGD in Switzerland. These activities were followed by a series of other meetings which lead to the first Swiss Open Data Conference in June 2011 and finally to the first Open Data portal „opendata.ch“ in January 2011. According to the targets of OGD in Switzerland, a study taken to the executive authorities, by means of a quantitative survey of the Cantonal State Chancelleries (cantonal level) and a case study in eZürich resulted in the following conclusions: Regional and local authorities are aware of secondary use of open data, but the policies focus primarily on organizational and economic perspective, neglecting the political one. OGD is regarded as the enabler for cultural change and clearly understood to be handled as a management and leadership task. OGD can improve the execution quality of the core public business, build and strengthen collaboration within other public agencies and promote economic development and innovation.(Neuroni, Riedl, Brugger 2013)

In accordance with these programs and plans in the European countries, the economic development objectives are in the center of OGD initiatives. In comparison with the US, Open Data in Europe is seen more like a source for new services, products, applications and new businesses as one which increases the political transparency, strengthen democracy and promotes government effeciency and effectiveness. Nevertheless, the political transparency and democracy development remain still a part of the European strategies, even if in most of the cases they are not mentioned as essential targets.

But how is the situation in Austria and Germany? Which strategies do they use for opening up the data? The following chapter will answer to these questions, trying to make even a comparison between the two countries.

4.3 OGD Developments in Austria and Germany

Since 2009 began in Austria the first discussions about Open Government Data from different players including some Semantic Web academics, the Web 2.0 Community and diverse businesses. In addition, during a concrete talk in the Linked Data Camp from November 30 to December 1, 2009 in Vienna, was

discussed about the benefits of opening access to databases like geographic information, timetables, traffic or statistical data. One month later, on January 2010 another important meeting took place again in Vienna with the big intention to follow the Open Government Data vision also in Austria and to initiate this new initiative. In this meeting participated several Semantic Web advocates and representatives of organizations and businesses, who concluded to organize a kick-off event with representatives from different fields, such as politics, media, administration, economy and research. In April 8, 2010 was hosted the kick-off event in the context of Semantic Web Meetup Series as data.gv.at-Meetup, which resulted in the beginning of OGD initiative in Austria and the creation of the website " gov.opendata.at" (OpenGovDataAustria, 2014) The first Open Data portal of Austria "data.wien.gv.at" was launched in May, 2011 from the city of Vienna, which only one year later was complemented with data from some other states in the form of an Open Government Data portal.(Huber,Kurnikowski,...,2013) The first portal from Vienna served as an incentive for other portals either from the cities, such as Linz "data.linz.gv.at" in October 2011, Salzburg "stad-salzburg.at" in July 2012 and Graz "data.graz.gv.at" in June 2012, or from the states, like the state of Vorarlberg "data.vorarlberg.gv.at" in Mai 2012 , Tirol "tirol.gv.at/data" in April 2012 and Kärnten "data.ktn.gv.at" in October 2013. Furthermore, on the 13th July 2011 was founded the "Cooperation Open Government Data Austria" by the Federal Chancellery, the cities of Vienna, Linz, Salzburg and Graz, in order to set the basic agreements for the future of Open Government Data in Austria. Moreover, Federal Government, states, cities and towns in cooperation with the communities, science, culture and the economy aim to create an effective framework, by agreeing on open standards for the benefit of all stakeholders. The cooperation represents the interests of ministries, states, cities and communities to unite all actors who operate, plan or create an open government data platform.(data.gv.at, 2014) As a result, in 2012 the "Cooperation OGD Austria" launched the "data.gv.at", which operates as a central "Austria" catalog that receives the metadata from the decentralized data catalogs in Austria and keeps them automated available. Besides the data from states and cities, the catalog includes even data from different ministries, such as BKA, BMASK, Umweltbundesamt Gmbh etc. (data.gv.at2, 2014)

The targets of Open Data and Open Government Data in Austria are stated on the Austria IKT-Strategy for the years 2014-2018:

"The Open Data initiative aims to provide public, non-personal data, especially in machine-readable format for the population and the economy. The disclosure of administrative data is discussed as a means of increasing the participation in a common value creation process of politics, administration, citizens and business. By combining the data with existing content, for example, the research can gain new insights. Companies can combine these data with their internal data and improve, for example, their marketing

strategies. However, these data can also lead to a number of applications that are made available to the user. Thus, the citizens can already today, by visiting the Ministry of Finance Website get an idea where their tax money goes. Open Data should do in the future, also the state budget more transparent." (Kompetenzzentrum Internetgesellschaft, 2014)

"The Open Government Data is awarded to promote sustainable in many sectors the potential for social, cultural, scientific and economic progress. By the utilization of non-personal information from the public sector, the development of new products and services will be promoted as well the economic growth in Austria will be supported. Moreover, Open Government Data is seen as an adequate tool to increase the transparency of administrative action, to afford a better cooperation between politics, administration, economy and citizens, and to strengthen democracy." (Kompetenzzentrum Internetgesellschaft, 2014)

In Austria, Open Data has become a very important theme not only for the businesses and researchers, but also for the citizens. For instance, in the year 2013 the number of the developers-community in Vienna increased to 200-300 people, who show a big interest on the Open Data and use them to develop new applications. In addition, there exist some associations which aim to promote Open Data, not necessarily through financial support, but through other forms, such as information and formation of communities or organizing programmer's competitions or conferences. One of the well-known associations "Open Knowledge Forum Österreich (OKFO)" was founded in December 2010, based on the Open Knowledge Foundation, which is a non-profit network of people passionate about openness, using advocacy, technology and training to unlock information and enable people to work with it to create and share knowledge. An essential element of Open Knowledge's work is also the coordination of meetups, hackathons, conferences, festivals and workshops, both online and offline in order to connect open knowledge's enthusiasts of all background and interests. (okfn, 2014)In the same way, the challenge of OKFO in Austria is to promote Open Data by means of projects and events for communities. The already existing projects are: (opendata.at, 2014)

CKAN: It is a Metacatalog for data sets, where the registered data sources can be easy found, linked and combined.

Open Government Data Austria: Its goal is to make the public (non-personal) data (GIS data, micro-census, census data, environmental data, traffic data, information for various NPOs, NGOs etc.) freely available, in a human- and machine-readable form for the citizens and the economy.

Open Data Blog (futurezone.at): The Blog aims to report together with the OKFO on all current developments of Open Data.

Open 3 is another Austrian non-profit organization, founded in 2010, under the motto:

“Open Society, Open Government and Open Data- the three dimensions that lead to a modern country, to high transparency, participation and participation ability and possibilities of collaboration between different stakeholders.” (open3.at, 2014)

The network tries to operate as an intermediary between the policy-administration-population-economy groups and to enable the knowledge-transfer in all directions. It has already implemented several application-oriented projects, conducts often surveys about the potentials of Open Data, gives regularly informations on the topic and promotes the Community.(open3.at, 2014)

The above mentioned activities and progresses show that the government, economists, programmers, NGOs and citizens in Austria are all involved in the Open Data initiatives and projects and try even more to give their contribution for further developments. In 2014, not only the big cities, like Vienna, Linz and Graz update every day their portals with new data sets and applications, but also the municipalities, for example, Engerwitzdorf have become part of the projects and already implemented some interesting applications. (futurezone, 2013) As a result, the number of data sets in the data.gv.at is increased and therefore also the possibility for collaboration between states, cities and municipalities, what brings only benefits and economic profits for the country.

Whereas in Austria the Open Data movements and discussions began since 2009, the situation was not the same in Germany. Till the end of 2010 the new approaches of Open Government and Open Government Data could hardly prevail in Germany. This has come as a result of the administration's culture, which has no tradition on the Freedom of Infomation Act. On the government program “Vernetzte und transparente Verwaltung” (2010-2013) the Open Government was named as one of the most important projects, but still the government needed to be better informed and to create clear ideas of what was it about and how would it change the way government and administration proceeded.(Lucke, 2011) According to the program, a strategy for Open Government should be published and the Open Government pilot project should start at the same year, but this didn't happen. On the contrary, the date of the strategy formulation has been delayed to the year 2012 because of resource absence.(Kloiber, 2012)

Even though the German government was really skeptic regarding the Open movements, associations, such as the Open Data Network, the Open Knowledge Foundation Germany and the Government 2.0 Network Germany gave since 2010 their influence to the topic and helped in creating the first data portals in some cities and states. The first portal in Germany was launched from the state of Berlin “data.berlin.de” in September 2011, followed from other portals in Bremen, Baden Württemberg and Bayern.(Kloiber, 2012)

Whereas from the government side, problems continued till 2013, when the Open Government data portal "govdata.de" was eventually launched, although only as a pilot project. In fact, the portal was not as open as experts had hoped, and the amount of data was lackluster, tools for comparison and other accountability-encouraging functionality was missing.(OpenGovGerm, 2013) At the time, in 2014, a vast majority of the data is freely accessible in the "govdata.de" , but there is some data that government charges. In addition, for certain data one has to make a formal request before he/she can gain access to the data.(Chimeblu, 2013) These restrictions show that problems still exist and not all data is as open as it really should be. Compared to the Austrian portal, the German one makes use of many licenses, which reinforces the fact that it is not enough open according to the principles of ease of access.

The above events are evidence that this long lasting strategy development in Germany, is nontypical within an international comparison, which lets Germany a step back in the developments of Open Data. However, the "govdata.de" is still being considered under development and numerous developers and activists are working on to make further improvements and to refine the portal.

4.Benefits and Challenges

Even though a data itself has no meaning, it represents a very important resource from which new knowledge and different applications can be created. This is one of the reasons, why a lot of data is being more and more released for free. Especially the data collected from the government is of a big interest based on its quantity and centrality, but also on the fact that most of that data is public data by law.(opendatahandbook, 2014) Firstly, when the citizens will be given the opportunity to use open data and to get involved in the public sector, the government becomes more transparent to them, which helps them to create an opinion and to take better and qualified decisions. On the other side, the transparency leads to greater accountability and sense of duty of the government, but also to more trust and acceptance of the population in the government action. Therefore, a well-informed citizen will strengthen the democracy, since it enforces the relationship between the two parts.(opendatahandbook, 2014) In economic terms, more transparency means less information asymmetry, that can lead to adverse selection and moral hazard resulting in corruption, defined as misuse of public power for private benefits. For instance, the Open Budget Index found in 2008 that nearly 50 percent of 85 countries provided minimal information for the public enabling government to hide unpopular, wasteful, and corrupt spending.(Jetzek, Avital, Andersen, 2012) Thankful to Open Data different projects already exist, such as the Finnish "tax free" and British "where does my money go" , which show how the citizen's tax money is being spent by the government.(opendatahandbook, 2014)

Secondly, by means of Open Data citizens and organizations can work together on tasks that are too

extensive for the government and administration. Hence, Open Data and the use of information technology enables citizen participation and collaboration, leading to improved citizenship and collaborative behavior through crowdsourcing activities. OGD not only transforms how the services are delivered, but opens the opportunity for citizens to take an active role in the provision of those services, increasing thus the efficiency and effectiveness of government. A good example of citizen collaboration are the crowdsourcing activities that have been really helpful in natural disaster incidents, such as hurricane Katrina and the earthquake in Haiti, when the government agencies and formal organizations failed to respond quickly.(Jetzek, Avital, Andersen, 2012) Another good example of collaboration is the Dutch department for cultural heritage, which is actively releasing their data and collaborating with amateur historical societies and groups, such as Wikimedia Foundation in order to execute their own tasks more effectively. This initiative makes the government more effective and reduces costs, because besides improving the quality of the data, it also makes the department smaller.(opendatahandbook, 2014)

Despite the positive effects in the Politics, the total potential behind Open Data forms the basis for new products, services and innovation. Different organizations outside the public sector may use OGD to create new services and to develop new products, extending in this way their business models or creating new ones (Jetzek, Avital, Andersen, 2012). As a result, the promotion of the economic development and growth is an essential potential of the raw public data. For instance, the European Commission has launched in December, 2011 an Open Data Strategy for Europe, which is expected to deliver a €40 billion boost to the economy each year.(Eurocities, 2013) The economic innovation from Open Data is already to be noticed in different countries. In Denmark, for example the husetweb.dk helps the citizens to find ways of improving the energy efficiency of their homes, including financial planning and finding builders who can do the work. It is based on re-using cadastral information and information about government subsidies, as well as the local trade register.(opendatahandbook, 2014) The interoperability of the data increases the possibility of combining different kinds of data sets with each-other, which leads to very exciting and useful applications and services either for personal decisions or for the society. So, in America, in 2012 more than two hundred applications were submitted to the US Health Data Initiative Forum. One of them, from the startup “Asthmapolis” was very helpful for patients with asthma, since it combined usage data from sensors on asthma medicine inhalers with open environmental data (e.g. pollen counts) to develop personalized treatment plans for them.(Chui, Farrel, Van Kuiken, 2014) Another interesting service, already implemented in Netherlands is the “vervuilingsalarm.nl”, which warns the citizens if the air-quality in their vicinity is going to reach a self-defined threshold tomorrow.(opendatahandbook, 2014)

Open Data doesn't only promote new business models through new applications and services, but it also increases the possibility of other business models, in which companies are involved in the preparation and

processing of open government data. Therefore, companies could help in the collection and administration of public data or could provide IT-infrastructure for portals. For instance, the company datamarket.com offers a portal, on which data from the World Bank, the U.S government, Eurostat and the Economist Intelligence Unit can be searched, compared, visualized and downloaded.(Kloiber, 2012)

At last, is to be mentioned the fact that Open Data contributes also in the fields of science and research, because by combining open data with research data, the scientists and researchers could gain new knowledge and insights and refine the existing data sets, which could lead to whole new fields of application.

But like other phenomenons in the world, the Open Data initiative, despite all these benefits has to face several problems in order to achieve its objectives. The question is not just to make the data available, but to define the right type and quality of data, and to help the citizens make use from these data. One of the biggest related risks could be considered the potential thread to privacy, since the linking, combining and comparison of several anonymous data sets could help to yield information about individuals, what is prohibited by law. In addition, from the availability of diverse source of data, discrimination problems could arise, like false conclusions about residential districts or classes of population. A real example to illustrate such problems represents the creation of online crime maps in UK, which show the police where resources should be concentrated and help them to improve their tactic, while the public can identify risky areas to avoid and demand more police action if necessary. Despite of these public benefits, the maps led to some problems, such as reporting more crimes that happened in reality, which made the correspondent districts undesirable to live and increased the panic within them. In addition, a survey found that 11% of respondents in a certain district claimed to have seen but not reported an incident because they feared it would make it more difficult to rent or sell their house.(Hand, 2012) Hence, in order to deal with such wrong interpretations, irresponsible published mistakes and explosive data content, a fair handling of information by all users must be sought. (Geiger, Lucke, 2012) Public awareness and training programs should take place, in order to inform the citizens about the consequences of the misuse of data and to enable them to apply data to solve local problems in the right way.

Data quality represents also a big challenge for the government, because to really make profit from the data all the OGD principles should be applied. Flood and preparation of information requires time, thus agencies and regional authorities face a big challenge when deciding when and which data can be published in machine-readable formats and how to deal with approved publishing formats.(Geiger, Lucke, 2012) A big number of data available in the existing data portals are still not understandable to a considerable mass of the public, but only to a small elite of technical specialists who know how to interpret and to use it, as well as to those who can afford to employ them. Therefore it is important for the government to publish data in

actionable formats conforming to open data standards. Furthermore, community awareness must be raised, in order to create capacity within communities to interpret and apply open data themselves, without creating technical dependencies. To maximize the benefits derived from Open Data the government should inform even more the citizens about the potentials of Open Data and develop the practical skills and capacities so that those potentials are realized in practice.(Roberts, 2014) Projects and campaigns in different countries, such as in US, UK or Denmark are already a reality, but still much more is to be done, especially in the developing countries, where Open Data initiatives are only in their first steps.

Financial problems could sometimes be a barrier for Open Data, especially for the local authorities. When planning which data to publish, the government should consider also the budget that they need to allocate. Costs associated with re-use may be marginal in most cases, and with the potential gain in efficiency it could prove to be a zero-cost operation. But for some processes, such as building open data platforms than enable API data release, linked data or server extensions, additional costs exist, which would prohibit or hinder their release by budget deficit situations.(Eurocities, 2013)

Even though several problems are defined and a lot of work should be done from government , organizations and the society in order to achieve the maximal benefits from open data, the already implemented services and applications, the several conferences held by NGOs and the involvement of government and administration in different countries are facts that Open Data project is possible and will improve and spread in the future all over the world.

5.Conclusion

Since the first day of Barack Obama as President of America, the new initiatives “Open Data” and “Open Government Data” began in several countries. Making different kinds of data available for free, help the government to increase transparency, participation and collaboration, which leads to more democracy. In addition, the availability of the data and the possibility of their use and re-use gives a large contribute to the economic development. Already implemented applicatons and services by combining different sources of data, are evidences of the potential of the data.

The paper analysed the objectives of Open Government Data in some countries in Europe and concluded that the spirit of Open Data in Europe differs from that in US. While the main target of the US government is to promote transparency and to foster public engagement in the political process, in Europe Open Data is seen more as a source for new services, products, applications and businesses. Even though the transparency and democracy are mentioned in the European programs, not a lot is done to reduce the distance between the

administration and citizens, since their attention is focused to the economic development. Further, the paper gave a view on the progress of Open Data in Austria and Germany and found differences between. It is to be mentioned that the Austrian government, programmers, economists, NGOs and citizens are all pro the Open Data and give their contribution regularly for further developments. Whereas in Germany, the government is more sceptic related to making the data public, which lets the country a step back in the comparison with other countries in Europe. As a result, the Open Government Data portal of Germany is, in the year 2014, still in its development phase, although progress with the help of developers and activists is to be noticed every day.

As a conclusion, the paper made a confrontation between the potentials and problems of Open Data and stated that a lot of work should be done from the government, businesses, citizens and all related stakeholders in order to achieve the maximal benefits. Despite the challenge of releasing the data in appropriate formats, a duty of the government should be also the community awareness. All in all, the government should inform regularly the citizens about the potentials of Open Data and develop practical skills and capacities so that those potentials are realised in practice.

Despite the latest developments, there is also enough space to improve, taking in accordance the fact that Open Data was created only in 2009 and still remains a new project with a big scope of action.

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