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„Opportunities and Risks of Open Data for Companies
Should Companies release their Data? "

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“Some of the best theorizing comes after collecting data because then you become aware of another reality.”

– Robert J. Shiller*, Winner of the Nobel Prize in Economics*

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V. List of Abbreviations

AHP	Analytical Hierarchy Process
API	Application Programming Interface
CI	Consistency Index
CR	Consistency Ratio
CSR	Corporate Social Responsibility
DM	Decision-Maker
IP	Intellectual Property
KS	Knowledge Sharing
MCDM	Multi Criteria Decision-Making
NGO	Non-Governmental Organizations
OD	Open Data
ODfB	Open Data for Business
ODfC	Open Data for Companies
OGD	Open Government Data
OI	Open Innovation
PR	Public Relations
PSI	Public Sector Information

1. Introduction

Open Data, and particularly Open Government Data, are issues of immense interest because of their high impact on society and economy. By providing government-mined data to the public, the government enlarges its level of transparency concerning its processes, competences and decisions and increases its level of service. Furthermore, this e-government strategy also allows for the possibility of participation and even collaboration with governmental institutions and projects (Kaltenböck & Thurner, 2011). Based on this success in the public sector, studies have been undertaken to examine the potential for the private sector. For example, Gurin (2014) conducted a review on the current state of research in Open Data, particularly Open Government Data, and concluded that it has a "clear potential to be a major force in politics, culture and economic growth throughout the world". Vickery (2011) found that direct and indirect effects from improving access to data by the government could result in an economic value of €200 billion (1.7% of GDP EU27). Although these papers address the private sector, they do not highlight the potential and the risks Open Data could bear for companies.

To show the use of Open Data for companies, a recent example shall be presented, the food scandals "fipronil-eggs" and "ehec-sprouts", 2017 and 2011 (Szent-Ivanyi, 2017). Briefly summarized, the common problem was that food was contaminated and the public was very worried. During the sprout scandal, nobody knew where the source of the problem was, while in the fipronil case, the problem was that it was not clear where the ingredients went and which other foods were contaminated. In both cases, not only the companies but the whole food-producing industry suffered. One can imagine if, in both cases, data concerning where the raw materials came from and went were present in a machine-readable format or even available to the public, the scandal could have been solved more quickly and the industry would not have suffered as much from the scandal because they would be recognized as transparent and helpful.

This is just a small example for which an Open Data strategy could have consequences for a company. Very little research has been conducted within the field of Open Data for companies. The goal of the present thesis is to develop a model that helps to decide whether it is reasonable for companies to make their data public.

1.1. Objective of the thesis

The overall target of the present thesis is to provide insights and explore corporate motives for addressing the complex topic of Open Data from a business point of view. In addition, a decision model shall be given that incorporates the motives and helps companies to make the decision whether or not to invest in an Open Data project.

The field of Open Government Data is a current field of research in which publications are frequently released. However, few papers have connected Open Data to private companies.

One goal of this paper is to explore this topic from a business-oriented point of view. As shown in the introductory example, Open Data could immensely benefit companies. Therefore, it is important to draw attention towards this topic.

A sub-aim of the present thesis is to shed light on the argument for and against Open Data for companies. Risks and benefits will be examined in particular. Nevertheless, the primary aim of the present thesis is to present a decision-making model that supports companies in making the decision whether or not to invest in an Open Data strategy. This model and its evaluation is the aim of the present paper.

1.2. Method and approach

The thesis is structured in a three-phase approach. First, a theoretical overview about Open Data, the relation to Open Government Data and a connection to the business context is given. Although this thesis focuses on Austria, the theoretical part will provide a global overview of the subject. This is important to understand the evolution of the topic. Nevertheless, Austria is used as a focal point concerning the legal restrictions and the current situation in that country. A literature overview about topics related to Open Data, but from a business point of view, is also given.

The second part (Chapter 3) concentrates on the risks and opportunities arising from Open Data and explores why it is possible to project it to a business context.

In the following section (Chapter 4), a model will be found to explain how to place the described risks and opportunities in relation to each other and to form a decision model to support a company in making the decision whether or not to invest in an Open Data project. As a consequence, there will be a survey to control the former findings (Chapter

5). The sample will include companies that have already released datasets and companies that refused do to so.

The thesis concludes with a summary of the results (Chapter 6) and their critical discussion, followed by a forecast of future steps and research (Chapter 7).

2. Open Data: Background and Context

2.1. Definitions and delineations of data and Open Data

The pivotal aspect of the current paper is Open Data in a business context. For this reason, the following sequence covers the term "data" in general and business data in particular. It will then treat Open Data, concluding with a definition of Open Data operative for the present thesis.

The origin of the term "data" lies in a Latin expression which means "a given thing". Nowadays, the term is used to connote a piece of information, with the consequence that many such pieces are needed to provide information. According to Banse et. al. (2000), we have undergone a third revolution of industry, which is to say that we live in an "information century". This means that information is the most valuable resource of our time. With this background in mind, it is important to find new sources from which data can be generated.

Data can have various sources and can be produced by different institutions. In this thesis, data produced by the private sector will be put in focus.

From a business-oriented view, data have several dimensions. The first of these is accessibility. On the one hand, there are data that are easily accessible for a person who is outside the organization, data that are hardly accessible for an outsider, data that are only accessible to people within the organization and data that are only accessible to a minority of people within an organization. Most of the time, the information already exists, but not in a structured way. This makes access complicated.

Another classification of data from the company perspective can be drawn from importance and sensitivity. There are company data that are highly sensitive, for example personal data or customer data. On the one hand, this is the result of legal regulations, especially data protection laws. On the other hand, companies need to uphold their business interests. For example, companies need to avoid giving away crucial information concerning their core competencies. Therefore, when in doubt, company information is classified as closed. That paradigm stands against one of the key pillars of Open Data, which requires such data to be "open by default". It demands that all data shall be released to public, unless there is need to keep them private, e.g., private information.

Although the idea of Open Data is not new, its current popularity and the scientific interest in it is. For the reason that every researcher gives his or her study a specific target, there are numerous definitions of Open Data with different focuses. To clarify this circumstance, some definitions are given, and a comparative table (see Table 1) shows the different focus points. As a conclusion, a definition of Open Data for the present paper will be given.

"For data to be considered "open" it has to be free, downloadable, machine-readable, and structured without prior processing" (Lakomaa & Kallberg, 2013).

"[Open Data] can be defined as accessible, public data, that people, companies and organizations can use to launch new ventures analyse patterns and trends, make data-driven decisions, and solve complex problems" (Gurin, 2014).

"[…] define Open Data as non-privacy restricted and non-confidential data which is produced with public money and is made available without any restrictions on its usage or distribution" (Janssen, Charalabidis, & Zuiderwijk, 2015).

"Open Data are data that 'can be freely used, modified, and shared by anyone for any purpose'" (Vetró, et al., 2016).

"Data that can be freely used, shared and built on by anyone, anywhere, for any purpose" (Pantano, Priporas, & Stylos, 2017).

"Open Data is data made freely available by governments, organizations, researchers, among others, for use by anyone without copyright restrictions" (Sadiqa & Indulska, 2017).

"Open Data is data that anyone can access, use or share" (Open Data Instutite, nn.).

"Open Data and content can be freely used, modified, and shared by anyone for any purpose" (Open Knowledge Foundation, nn).

Comparing the given definitions of Open Data leads to the results shown in Table 1. It can be deduced from the findings that all definitions agree on the point that data should be free of cost for the user, followed by the point that they should be free of any other restrictions. This requirement can be seen as a caption of the next two most pertinent aspects: defined license and unlimited reuse of data. Both points not only enable but also facilitate the usage of data. In a different comparison of definitions Zuiderwijk, Helbig et. a. (2014) concluded that most definitions of Open Data differ in the following

aspects: the provider, the access to data, the definition of data and the format and the type of data.

	Defined license	Boundless addressees	Unlimited reuse	Free of cost for users	Free of restrictions	Origin by government / produced with public money	Problem-solving aspect	Machine-readable
Gurin, 2014	-	x	-	x	-	x	x	-
Janssen, Charalabidis, & Zuiderwijk, 2015	x	-	x	x	x	x	-	-
Lakomaa & Kallberg, 2013	-	-	x	x	x	-	-	x
Open Data Institute, nn.	-	-	x	x	x	-	-	-
Open Knowledge Foundation, nn.	x	-	x	x	x	-	-	-
Pantano, Priporas & Stylos, 2017	x	x	x	x	x	-	-	-
Sadiq & Indulska, 2017	x	-	-	x	x	x	-	-
Vétro, et al. 2016	-	x	x	x	x	-	-	-

X… included in the given definition -… not included in the given definition

Table 1: Comparison of definitions of Open Data.

Before Pantano et. al. (2017) came to their definition of Open Data, he detected three principles that are of upmost importance. The first is availability and access, the second is reuse and redistribution and the third is universal participation. These findings can be supported by the small excerpt of definitions in this thesis. In addition, Houghton (2011) states that data will not be used if they do not meet the criteria that they are able to be indexed, are in machine-readable format, and there is a legal framework that enables them to be repurposed.

For this thesis, a definition is needed that is based on the former findings concerning Open Data but which also features a business perspective. For the reason that business data are confidential by nature, it should be clear without any doubt that no confidential

or private data are meant when opening content is discussed. This particular idea is supported by Janssen et. al. (2015) and the Open Data Institute (nn.).

Taking into account these thoughts regarding business data, the above definitions and the findings from Pantano et al. and Houghton, Open Data should be defined as follows for the present thesis:

Open Data can be defined as non-privacy restricted and non-confidential data that can be freely used, modified, and shared by anyone for any purpose under defined license.

2.2. Open Data: General conditions

Another widely discussed aspect of Open Data is data quality (Attard, Orlandi, Scerri, & Auer, 2015). While many authors argue that a certain level of quality is needed to enable the use of data at all, others point out that the quality of data is and will remain a target that is not easy to define.

Several movements have tried to conquer that obstacle. As a result, different guidelines were released with regard to Open Data.

This section will focus on the principles, guidelines, metadata and quality of Open Data. It will first explain the problem and then show the source of differences or provide deeper specifications to overcome the quality issue.

2.2.1. Open Data: Principles and guidelines

Guidelines concerning Open Data that are widely agreed upon and referred to are released by the Sunlight Foundation[1] and the G8. The guidelines of the G8 Charter will be explained in detail in Chapter 2.6.1 (Open Data globally). The following sequence will deal with the principles of the Sunlight Foundation and give a comparison and conclusion about both approaches.

In 2007, the Sunlight Foundation published eight principles of Open Government Data that met worldwide interest. These were extended to 10 principles three years later. The

[1] The Sunlight Foundation is a NGO that describes itself as an organization that aims to "make our government and politics more accountable and transparent to all" (http://sunlightfoundation.com/about/).

list helps to describe data and to assess "to which extent data is open and accessible to public" (Sunlight Foundation, Ten Principles for Opening up Government Information, 2010):

- Completeness. This point not only refers to the dataset itself but also to the metadata, which describes the actual dataset. The dataset needs to be as complete as possible. The only exceptions whereby datasets are released in an incomplete state are federal laws and personality issues that would be hurt by them.
- Primacy. Data need to be of the first source to make sure that the data are not changed in any way and is reliable.
- Timeliness. There are data that are time-sensitive. This kind of information should be made available as fast as possible. The maximization of the criteria could be reached by real-time updates.
- Ease of physical and electronic access. Some data were only given to people who were in a government's office and who asked for them. That would be one end of the scale; the other end contains an API (Application Programming Interface) by which people could access the data at any time from any point all over the world.
- Machine readability. Some information is only found in a handwritten format; even if it is scanned and put online, it is hard to process it electronically. The best way to ensure the data can be of use for a large audience is to apply a widely used format and accompany the data with an explanation how to use them.
- Non-discrimination. This point refers to access barriers, like membership or registration issues. The ideal scenario is one in which a person does not need to be identified in order to access the data.
- Use of open or commonly owned standards. This criterion refers to the format of the data files and the programs needed to use them. There are closed formats, which require special software to be used, and open formats, which can be used by everyone. To ensure that the most people possible can use the data, a format is preferred for which no extra costs occur.
- Licensing. Data are licensed in different manners according to ownership. Thus, it is possible that reuse for business uses is permitted or allowed only if the

source is mentioned. The most openness can be reached if there are no restrictions set on the data.

- Permanence. Data must be found over time. Therefore, any kind of storage is needed to make data available over a long period of time.
- Usage costs. The access costs of data are a widely discussed topic. The Sunlight Foundation included costs on its list because costs can be a big barrier but are sometimes not avoidable. Thus, this point only measures the extent to which data are openly accessible and does not give advice how to handle restrictions.

As mentioned earlier, the G8 agreed on the G8 Open Data Charter. The main points can be summarized as follows. The first point is called "open by default", which means that data are open to public unless there is a need to make them not available in this manner. The second principle refers to the completeness, timely publication and accuracy of the data, summarized as "quality and quantity". The next issue, under the umbrella concept "usable by all", discussed the topics of licenses, non-discrimination and costs. Up to this point, several parallels could be drawn between the G8 Charter and the principles of the Sunlight Foundation. The fourth point concerns "releasing data for improved governance", addressing the country's citizens on the one hand, but also every participating country and organization, on the other hand. Openness and transparency ensures better policy-making. In addition, technical expertise should be shared to support each other in the process of opening data. The last point clearly focuses on the active participation of the citizens and on supporting creativity and the economy. It is called "releasing data for innovation".

However, although both approaches target the same topic, major differences remain. Where the Sunlight Foundation clearly states that Open Data should be free of charge, the G8 were not able to agree on this point. Another big difference is that the Sunlight Foundation has an utmost concern about format issues. People will only use the data if they are able to be processed by machines (Sunlight Foundation, G8 Open Data Charter Action Plan: Open data by default, but you may have to pay, 2014).

However, even if both guidelines have a government-oriented background, they both target more than government-produced data. Most points are universally applicable and should be seen as such.

For this thesis, in line with the established definition of Open Data, the Sunlight Foundation's guidelines should especially be taken into consideration when Open Data is mentioned.

2.2.2. Open Data: Metadata

To make the datasets more comprehensible and easier to use, metadata were established. The use of metadata is not a requirement specific only to Open Data. It belongs to every dataset produced, but for Open Data it is of particularly high importance.

Metadata are used to describe the actual dataset, to set it in a context and to be able to read, understand and classify the information in it. According to Martin et. al. (2013) metadata are "very important for the retrieval and reuse of datasets". Open Data datasets can be published on a portal that does not give a context for the data. The only way to find out whether or not the dataset contains the sought information is via its metadata.

For the Austrian Open Government Data initiative, a list of metadata is defined such that it contains compulsory and optional parts. The compulsory fields are Eibl et. al (2017) :

- Identifier. This refers to a specific and unique identifier that describes a dataset.
- Modification date. This describes the last date of creation or update of the dataset. As most datasets are published automatically, the modification date needs to be filled in or updated automatically, as well.
- Title. This should describe the dataset.
- Description. This point should give an idea as to what the dataset contains.
- Categorization. In Austria, there is a list of categories published which should be assigned to the dataset. It is possible to choose more than one.
- Keywords. In contrast to the predefined categories, each dataset should receive some freely-chosen keywords, without predefinition.
- Resource URL. The resource URL should lead directly to the single dataset that it is assigned to. If there are two datasets, such that there is doubt whether the URL refers to the one or the other, two datasets with distinct URLs should be requested.
- Resource format. Information pertaining to the format used in the dataset should be provided. Only open and machine-readable formats can be used.
- Maintainer. This field provides the name of the party responsible for the dataset.

- Publisher. The publishing party of the dataset can also be the maintainer.
- License. A license is the legal information about the dataset's license type.
- Start date and time. This element specifies the date and time when the dataset was released.

The optional metadata ask for concern topics like data structure and the description of attributes. For all Open Data sets released to public in Austria, the same regulations apply. They need to follow the 10 criteria of the Sunlight Foundation and the agreed-on metadata.

2.2.3. Quality of Open Data

The quality of data is an important topic, because low-quality data hinder the reuse of datasets (Vetró, et al., 2016). In addition, they require more effort to be used, because people have to validate the given data before they can be processed. In this argumentation, Vetró et al. goes even one step further and argues that high-quality data are a crucial success factor.

The importance of data quality within the topic of Open Data was also examined by Zuiderwijk et. a. (2012). They undertook a study concerning the biggest impediments of Open Data. One of these 10 examined points was data quality. The point was stressed that bad quality hinders people from using datasets, but they also argue that it is hard to measure the quality of data.

The most common dimensions used to evaluate data quality are accuracy, completeness and consistency (Sadiqa & Indulska, 2017). Any one component from that list, e.g., completeness, is hard to describe. Vetró et. al. (2016) have even more criteria on their list to evaluate datasets. In addition to the mentioned points, they also require traceability, correctness, expiration, compliance and understandability. Sadiqa and Indulska (2017) argue that the quality of a certain dataset is strongly dependent on the requirements the user has. They concluded, further, that there is still no final approach in the literature that solves the issue of how to handle the quality of data.

Another idea concerning data quality is that even if a dataset works perfectly for the publisher, it may not be useful in another use case. The underlying concept is called "fitness for use", which was discussed byVetró et.al. (2016) and Sadiqa and Indulska (2017). It focuses on the reason why the dataset was produced and not for undefined future questions. This way of looking at the dataset allows it to reach a high level of

quality because it fulfils all the mentioned criteria above, but could still be useless for the other use case.

To conclude, data quality is an essential but not uncomplicated topic within the field of Open Data. Although a dataset is complete, accurate and consistent, some information might be missing if a third party wants to use it for another purpose.

2.3. Acting parties in Open Data

Vetró et. al. (2016) found that there is a broad list of actors within the field of Open Data from all kinds of organizations, ranging from citizens to developers. Four groups of stakeholders were identified by Höchtl et. a, (2011): civil society, the economy and the government, divided into public administration and politics. Another list of stakeholders was released by Gonzalez- Zapata and Heeks (2015). They mention the identified actors mentioned above, but according to them, companies are not a relevant group when it comes to Open Data, because they do not contribute enough. The explanation for why companies are not a significant group can be described as a chicken-and-egg problem.

Stakeholders of Open Data can be further distinguished as publishers and consumers of Open Data. Most Open Data business models focus on the different types of consumers and how they use the data to enhance and repurpose them (Vickery, 2011). They can be divided into the following categories (Gurin, 2014):

- Aggregators: Their business model is the collection and analysis of data, followed by the selling of their findings.
- Developers: They use Open Data as a resource for applications, which they sell.
- Enrichers: Open Data is used in these companies to find new ways to enhance existing products and ways to get in contact with potential customers.
- Enablers: These companies put a fee on easier access to Open Data.

The interest of these groups lies in the use of the published data and the generation of profit.

A complementary role is that of the data publishers, also called “suppliers”. Their motivation does not lie in direct revenue, but in indirect benefits like increased customer loyalty, better reputations or other targets (Gurin, 2014).

As the list of data consumers and their business cases show, they all rely on the quality of the published data. Therefore, a great responsibility lies on the data supplier. This is why high standards are required for Open Data (see the sections on Open Data principles and guidelines and Open Data metadata).

2.4. Open Data and the law

It is said that data are only used if the legal situation is specified. There are two possibilities to make this happen; either there are clearly chosen licenses under which the dataset is published, or the dataset is published without a license, placing it in the public domain. It is important that the dataset is free for use, reuse and repurposing, as this is where the benefit of Open Data lies (Houghton, 2011). For this reason, the legal situation Open Data is confronted with will be explained in detail.

While the historical evolutions of Open Data in the different parts of the world influenced each other, the legal situation is different for Europe and the USA. Because the present paper will focus on companies in Austria, the legal situation in Europe and in Austria will be the focus. To give more insight into the kinds of legal circumstances that are relevant for this topic, different licensing models will be explained further.

2.4.1. The legal situation in Europe and Austria

The origins of the legal situation for Open Data in Europe lie in Open Government Data. Before the term "Open Government Data" was established in Europe, the expression "public sector information" (PSI) was used (Vickery, 2011) (European Parliament and Council, 2003).

In Europe, the interest in Open Data officially started in 2003 with a directive of the European Commission. It targeted the opening of governmentally produced data for a broader public, with the aim to foster economic growth in the European Union. In addition to the targets and general scope, the directive deals with the conditions for the reuse of data, which provides the determining factors for future proceedings on the topic (European Parliament and Council, 2003):

- Available formats. Institutions have to release their datasets in all available formats; it is not possible to force them to produce the dataset in another, not yet existing format.
- Principles governing charging. Institutions are allowed to charge marginal costs for the datasets published, but they do not have to.

- Transparency. This point refers to calculating the costs of the corresponding dataset and the requirement that all elements of the calculation have to be made public.
- Licenses. The publishing institutions have to state whether the dataset can be reused and repurposed without any restrictions or if the set requires a license. If a license is applied, the specific license has to be clear and comprehensibly documented.
- Practical arrangements. The member countries are liable to ensure that the published data are traceable online and can be found easily.

The directive had to be implemented in the member states by July 1st 2005 (European Parliament and Council, 2003). This was a big step for the development of Open Data in Europe. By harmonizing the different national approaches and forcing the hand of countries that had not yet started, Open Data gained a different interest in political and public lives (Janssen K. , 2011).

As a result of that PSI directive, Austria created the "Informationsweitergabegesetz" IWG. In this law, the minimum standards released by the European Commission were implemented to integrate them with national law in Austria.

Currently, Austria is working on another law concerning the opening of governmental data (Bundeskanzleramt Österreich, 2015), the "Informationsfreiheitsgesetz" IFG. It was sent in November 2015 to the national assembly (Nationalrat) and is in appraisal[2].

Going back to the beginning, PSI is defined as "the wide range of information that public-sector bodies collect, produce, reproduce and disseminate in many areas of activity while accomplishing their public task" (data.gov.uk, nn.). If this definition is compared to that of Open Data ("Open Data is data that anyone can access, use or share") (Open Data Instutite, nn.) several differences are apparent. While PSI is any data that is produced by governmental intuitions, Open Data needs to fulfil particular requests. As a result, it can be said that there is an intersecting set of data that satisfies both PSI and Open Data. However, PSI does not have to be necessarily Open Data and

[2] It is still in appraisal (05/2018) (Bundeskanzleramt Österreich, 2015).

vice versa. PSI always has a governmental origin; therefore, the intersection can be called Open Government Data.

To sum up the legal framework for Europe, with special regard to Austria, it is possible to say that Open Data is positioned for the first time in legislation, although it has by itself a higher standard than the law requires.

2.4.2. Open Data: Licensing models

The success factor "license" has already been mentioned a few times within this paper. In this section, special interest will be paid to the most common types of licenses and their advantages and disadvantages.

In general, the term license is defined as "a legal document giving permission to use information" (data.gov.uk, nn.). When it comes to Open Data, using information is a key issue for its success. Out of this circumstance, different licenses evolved. There are a few licenses pertaining to Open Data that can be compared. These include the PDDL license, as the first license ever created for Open Data (Open Data Commons, nn.), the creative commons license, as one of the most often used licenses in the world, and the open government licencence from the UK (The National Archives, 2018).

The PDDL (Public Domain Dedication and License) was created by the open knowledge foundation with the direct purpose of finding a license for Open Data that facilitates the use and reuse of it. The system abandons all copyrights, which gives the user and re-user the greatest possible freedom (Open Data Commons, nn.).

The creative commons license is based on the idea of sharing, and on the idea that the autochthonic copyright claims have to be modified to fit in the new idea of a culture of sharing. This license is built up like a modular construction system. It adds a supplement that says clearly if the data are allowed to be repurposed, reused or are usable for certain purposes. It was created for all kinds of data from various sources. In the case of Open Data, the creative commons licenses that are suitable for it are:

- CC-0: This license appendix can be seen as an "opt-out" of all license restrictions. By applying "CC0", the publisher declares that he has no rights reserved on his dataset, which is considered to be part of the public domain
- CC-BY: This license allows for the use, reuse, commercial use and editing of datasets under the prerequisite of naming the publisher.

- CC-BY-SA: This license also allows the use, reuse, commercial use and editing of the published dataset. The prerequisite in this case is that all resulting datasets from the first have to be published under the same license (CC-BY-SA).

Every other license that can be created with the modular system restricts reuse to commercial purposes. As a general limitation, it is mentioned that if data with personal or restricted background are used in the dataset, the limitations have to be passed on (Creative Commons, nn.).

To return to Europe, in the UK, a whole framework for Government licenses has been established (National Archives, Open Government Licensing Framework, nn.). A closer look into the license for Open Government Data demonstrates that it was designed to fit the creative commons license. The purpose of this license is to "facilitate the reuse of public sector information free of charge" (National Archives, Open Government Licence, nn.).

To conclude, even if there exist a multitude of different licenses applicable for Open Data, most of them contain similar or even congruent components. The most important are that the published data are able to be reused, repurposed and accessed free of charge (Creative Commons, nn.).

2.5. The effect of Open Data

The general intention of Open Data can be summarized in three keywords that will be explained in the following section: transparency, participation and collaboration.

The first idea of Open Data was derived from a governmental background. In former times, all governmental activities stayed unknown to the citizens and citizens only saw a few results. There was no active dialogue. This contradicts the intentions a democracy represents. Democracy derives from the Greek "power to the people", which goes hand in hand with the idea of Open Data. Open Data opens the way back to these roots by encouraging citizens to take part in governmental actions and to look into the produced data, not only once in a while if there is a press release but any time people wish to.

By making data available to the public, suddenly the walls fell and governmental actions became observable. With this new kind of transparency, there was more control transferred from the government back to the people. New incentives were given to the government employees to do things right and on time.

As a consequence, with this new insight, citizens started to participate more in governmental activities. This kind of participation led to more interactive exchanges of information and to a collaborative means of governing a country.

These three effects of Open Data are still its main goals. They are hard to achieve; in other words, they will never be achieved fully because there will be always room for improvement. That is why it is even more important to start a process of getting there.

As a fourth effect, economic growth comes to a nation as a result of having data to build on (Vickery, 2011). This is also supported by the work of Lakomaa and Kallberg (2013). They found that Open Data is a great enabler of entrepreneurial activity. By using Open Data, market and potential analysis are made easier and in some cases possible at all. Open Data is also able to enhance already existing online services.

Open Data can be seen as a powerful tool that unleashes potential in different areas.

2.6. A brief history of Open Data

The evolution of Open Data as a topic of its own is closely related to the history of Open Government Data. In the following section, the evolution of Open Government Data will be described, with the emergence of Open Data as a consequence. Although the internet was the strongest enabler of the Open Data movement, the topic of Open Government Data and several fundamental ideas concerning it can be found throughout history. For example, in the 18th century, Sweden introduced in its "freedom of information act" the principle of transparency, the first nation worldwide to do so (Zuiderwijk, Helbig, Gil-García, & Janssen, 2014).

However, the loose pieces of a puzzle could not be connected to a whole picture until the beginning of the 21st century, when the topic developed quickly around the world.

In the following subsections of this chapter, the evolution of Open Data in the USA, Europe and from an international perspective is shown. In addition, the evolution of Open Data in Austria is described briefly, as the companies of that particular country are this paper's focus. Although Austria is the focus, it is necessary to look at developments in Europe, the USA and on a global level. Because of the internet, national borders hardly exist.

2.6.1. Open Data globally

A milestone of worldwide interest was the signing of the G8 Open Data Charter in 2013. That declaration of intent contains the handling and use of Open Government Data and also includes five guidelines for implementation Open Government Data Strategies (Dapp, Balta, Palmetshofer, & Krcmar, 2016) (Verhulst & Young, GOVLAB, 2016) (for details, please see Chapter 2.2.1). Although the Open Data Charter released by the G8 has undoubtedly had the biggest impact on a global level, even more international institutions have placed focus on Open Data.

An example is the World Bank, which applies Open Data in developing countries to support them in many ways, e.g., through international aid (Lal Das & Morrison, 2014). Another international organization that is interested in Open Data is the United Nations. They founded a global government partnership in 2011. It targeted transparency in governmental issues and citizen engagement. In 2011, they started with eight participating countries (Brazil, Indonesia, Mexico, Norway, Philippines, South Africa, the United Kingdom and the United States) (Dawes, Vidiasova, & Parkhimovich, 2016). In July 2017, the partnership reached the outstanding number of 75 associates (Open Government Partnership, nn).

Even this short summary reveals that Open Data is an issue of immense global interest that attracts many stakeholders from various fields following different aims.

2.6.2. Open Data in the USA

From 2007 onwards, the topic developed quickly in the US. In that particular year, a meeting of internet activists was held with the goal to specify the term "Open Government Data". Only one year later, the term could be found in the election campaign of a candidate for the US presidency. Just after his election, Obama turned his promises into reality and released a memorandum about transparency and open government. In 2010, the first portal for Open Government Data was launched in the USA. In the very same year, the Sunlight Foundation, a NGO focused on transparency, published the 10 principles of Open Government Data (see Open Data: Principles and guidelines).

2.6.3. Open Data in Europe

In Europe, the topic had a different start. It became public as "Public Sector Information" (PSI). It started in 2003 with a "Directive of the European Parliament and the Council on the reuse of public sector information (2003/98/EC)". After that, several

years went by until 2011, when a "Communication from the Commission" was published titled "Open Data – An engine for innovation, growth and transparent governance COM (2011) 882 final". In the next year, the portal http://open-data.europe.eu/ was launched and after another year the term "Open Government Data" was used in an official directive of the European Parliament about the "reuse of public sector information (2013/37/EU)". In 2014, the European Commission released not only "Guidelines on recommended standard licenses, datasets and charging for the reuse of documents (2014/C 240/01)" but also a "Communication on data-driven economy COM (2014) 442 final". Last but not least, a communication was released, titled "A digital single market strategy for Europe COM/2015/0192 final". In the very same year, the pan-European platform https://open-data.europe.eu was launched (Dapp, Balta, Palmetshofer, & Krcmar, 2016).

To conclude, the European Union follows a uniting strategy to combine the efforts from the associated countries by supporting them and giving directives as to which course the movement should take.

2.6.4. Open Data in Austria

In Austria, the development of Open Government Data began comparatively late, in 2011. Nevertheless, the issue emerged even faster. In July of that year, the "Cooperation Open Government Data Österreich" was founded. The first datasets were made public. Municipalities, cities and ministries applied the given standards and joined the movement. As mentioned, Austria put effort into the subject and forced the development so that a nation-wide portal was launched for government data. The initiative promoted the next step by launching a portal for data from other sources than the government. This portal was recognized by the United Nations, which awarded Austria's approach with a first prize in 2014. Since then, Austria has been recognized as one of the trendsetters in Open Data (Carrara, Radu, & Vollers, 2017). More information about the current situation in Austria concerning Open Data can be found in the following section, "The Open Data landscape in Austria".

2.7. The Open Data landscape in Austria

In Austria, Open Data is a widespread topic concerning different levels in society. In the following chapter, three influencing initiatives will be presented.

By means of the national portal data.gv.at, all government-mined data can be assessed. This includes not only national data, but also data from municipalities and federal states. This portal is designed as the single point of contact for Open Government Data in Austria. It has to be mentioned that the portal does not own the data, but enables the access to them. The portal saves only the metadata for the presented datasets. The actual datasets remain in their origin location. The advantage is that the raw data are still located and archived by the owner (e.g., a municipality), so the owner has still full control over its data.

The second initiative addresses non-governmental data. It is called opendataprtal.at. It was initiated and fostered by a community consisting of Wikimedia Austria, Open Knowledge Foundation Austria, the Federal Chancellery of Austria, the City of Vienna and the Cooperation OGD Austria. This portal addresses data from the areas of science, business, culture, art and NGOs/NPOs. This portal is designed the same way as that for government data. It is only a portal, which enables a single point of contact for the user and saves only the metadata of each dataset.

To ensure the continuing growth and use of this platform, a pilot project, the "Data Pioneers", was founded. Its aim is to promote the topic of Open Data in the private sector and spread awareness of the topic. To do this, they have introduced several events, like "hackathons" and the "school of data", which is a series of seminars.

A different direction follows the project "Data Market Austria" [3]. The platform's goal is to create a marketplace in which economic structures work around the raw material data. This platform functions as one meeting point for the following stakeholders (Research Studios Austria Forschungsgesellschaft mbH, 2018) :

- Service providers
- Research, education and development practitioners
- Infrastructure providers
- Brokers
- Data providers

[3] In former publications, this group was mentioned under the title *"Daten Ökosystem Österreich"* (Tschabuschnig, 2014).

- Data market customers
- End users

From the list, it can be seen that this platform is a marketplace for all sorts of data-related services. Data are both offered and processed in this ecosystem. Services that enable these operations are also offered. The origin of the offered data is not restricted. It is possible to refer to governmental data or data from sources like NGOs, NPOs or companies. It is a platform that fosters business concerning Open Data. As an incentive, it is possible to charge for data and services offered on this platform. The idea was to create a data economy; therefore, money is needed to create these conditions (Tschabuschnig, 2014).

All in all, it can be said that Austria is a vibrant place for Open Data that tries as much as possible to foster this development.

3. Opportunities and Risks of Open Data in a Business Context

Open Data has its origin in Open Government Data. This context has already been discussed at length. This chapter's goal is to give a comprehensive overview of the opportunities and risks for Open Data in a business context. To reach this goal, first, the opportunities and risks of Open Government Data will be described. Second, the opportunities and risks of Open Data in a business context will be clarified. To get deeper into the topic, more insights from a business perspective will be given. The third section deals with the opportunities and risks of information sharing, especially with respect to the topics of knowledge sharing and open innovation. The following chapter sets a different focus. It supports the approach that Open Data has more than direct effects on a company by being part of its corporate social responsibility (CSR) strategy. At the end, a comprehensive conclusion about the opportunities and risks for data publishing companies shall be presented.

3.1. Opportunities and risks of Open Government Data

As discussed previously, Open Government Data is produced by the public administration and underlies different specifications, e.g., defined licenses for use, reuse and repurposing (for further explanations, see Chapter 2). In this chapter, the opportunities and risks that arise from applying an Open Government Data strategy will be clarified. Several theoretical papers from different sources form the basis for the present analysis.

3.1.1. Opportunities of Open Government Data

The opportunities of Open Government Data can be distinguished into four main issues. The first one is transparency (Zuiderwijk, Helbig, Gil-García, & Janssen, 2014), (von Lucke, 2010), (Attard, Orlandi, Scerri, & Auer, 2015), (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011), (Kaltenböck & Thurner, 2011), (Gonzalez-Zapata & Heeks, 2015), (Yannoukakou & Araka , 2014). Transparency is not a goal by itself; it is a result that could be achieved through Open Data initiatives. The real target is more trust in the establishment. To achieve this, many smaller goals, that are building the fundament for that, can be reached by applying an Open Data strategy. One such aim is the confinement of corruption by increased transparency (Zuiderwijk, Helbig, Gil-García, & Janssen, 2014), (Attard, Orlandi, Scerri, & Auer, 2015). More transparency

also leads to a more well-informed civil society. With more information, it is easier for citizens to understand the government's decisions. Following the current developments and being able to understand them leads to more trust in the government, as well. By enhancing the transparency of governmental processes and work in general, accountability increases (Martin, Foulonneau, Turki, & Ihadjadene, 2013). By making everything more transparent, a public administration that is sometimes viewed as a "black box" can remove barriers and become comprehensible to everyone.

The second area within the public administration that profits from Open Government Data is of an organizational nature. By releasing data that might be incomplete, citizens could be asked to complete and confirm them (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011), (von Lucke, 2010). Through the outsourcing of data quality management, the government can save resources. These resources can be used in turn to publish other datasets. After having started the vivid dialogue between the citizens and the government, it is easier for the government to detect new service gaps and determine which services the citizens need and shut others down that are less necessary. (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014). To sum up, by applying an Open Data strategy, the government is able to realize several efficiency gains in the public sector (Vickery, 2011).

After changing organizational patterns, a change in cultural aspects follows as a consequence. Cultural aspects are the third point of the positive effects of Open Government Data. The cultural aspects can be further distinguished into inwardly and outwardly oriented issues concerning the organization. The points affecting the organization and leading to a change in the culture correspond to the new way of approaching a task (Attard, Orlandi, Scerri, & Auer, 2015). This movement leads to a sharing culture (Martin, Foulonneau, Turki, & Ihadjadene, 2013).

The outwardly oriented side of organizational issues addresses civil society. In the section about transparency, it was already discussed that more transparency and more traceability of governmental actions leads to more trust in the government. There are even more consequences affecting civil society caused by an Open Government Data strategy. With increased awareness of national topics and the actions of the government, society can grow. A move towards a knowledge-based society is thus supported (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011). Another result that can

be assigned to Open Government Data is a loss or at least a reduction of class differences. By providing greater access to governmental information, more people gain insights than before and are able to communicate on a different level about the same topics (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011). A prerequisite to this point is that people not only have access, but use it, as well. As a consequence of having well-informed citizens, the democracy of a nation is strengthened (Attard, Orlandi, Scerri, & Auer, 2015), (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014).

The last section about the opportunities of Open Government Data refers to economic aspects. Several studies have found that the opening of governmental data has a significant effect on a nation's economic growth (Vickery, 2011), (Attard, Orlandi, Scerri, & Auer, 2015), (Deloitte LLP, Deloitte, 2012), (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011), (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014). By providing new resources in the form of data, new services can evolve and new businesses can be created. This is not only an opportunity for the companies directly but for the government through indirect profitability and, indirectly, taxes. These effects are not only interesting on an economic level. Social innovation is also fostered by an Open Government Data strategy (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014).

To conclude, the opportunities of Open Government Data have extensive consequences for different aspects of society. One recipient is the government, which profits in several ways. The general trust in its work is increased through increased transparency, their organization can reach the next level by enhancing their processes and increasing efficiency and their culture undergoes a radical change. There are also economic consequences in the form of increased tax income. Opportunities arise also for the civil society. In the realm of financial aspects, companies are able to build new business models and services from the newly won resources. Open Government Data enables people to be responsible members of society, are able to understand the government's actions and participate fully in democracy. Through these actions, a country is able to reach the next level as a society of knowledge.

3.1.2. Risks of Open Government Data

The risks arising from an Open Government Data strategy can be divided into four groups: finance, liability, reputation, and organizational issues.

The first risks to mention are the financial aspects. If an Open Government Data strategy is applied, resources are needed to implement it. Because of the general scarcity of resources, new ones are needed to implement the strategy, which leads to increased costs (Kaltenböck & Thurner, 2011), (Janssen K. , 2011). For the reason that more resources are needed to cover more tasks (e.g., publishing and maintaining data), government employees could stick to their known tasks and not give full attention to the new ones (Verma & Gupta, 2013), (Attard, Orlandi, Scerri, & Auer, 2015). A different aspect concerning the financial arguments is that Open Government Data is meant to be costless, which leads to the consequence that the government has to fund it (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014). An additional consequence of this fact is that governmental services for providing data has to be thought through. If the government had previously generated revenue by selling their data, the future looks different because the data must be given away for free. These losses have to be compensated (Janssen K. , 2011), (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011).

Further points that have to be taken under consideration are liability and legal issues (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014). One theory says that if there is enough anonymized information, it is possible to reconstruct it and to de-anonymize people. If that is done, data protection has failed and people's privacy is disturbed badly (Verma & Gupta, 2013), (Kaltenböck & Thurner, 2011), (Attard, Orlandi, Scerri, & Auer, 2015). The resulting question is whether the government is liable in this case, because they released the data for reuse and repurpose.

Following the same stream of thought, another risk is the loss of control that happens if data are given away to be interpreted freely (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011). While the free interpretation of data still assumes the data are interpreted objectively and correctly, it is also possible that data are misinterpreted in an unscientific way (von Lucke, 2010). Negative results (independent of a correct or false interpretation) could result in a bad reputation for the data-publishing institution

(Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014). A bad reputation in public can also result from releasing data of poor quality, which means that they are not easy to process as a result of missing license information, metadata, etc. (Kaltenböck & Thurner, 2011).

Applying an Open Government Data strategy has organizational consequences, as well. This leads to the next sequence of risks of Open Government Data. The people within the organization are confronted with a completely new topic, one which entails a different way of working and which requires new skills. Thus, the barriers for the employees could be high with respect to technical issues (Verma & Gupta, 2013), or just with respect to the awareness of which data to publish and which formats and licenses to apply (Attard, Orlandi, Scerri, & Auer, 2015). If these barriers are too high, data are not used. One consequence of unused data could be that people become frustrated and resign without putting any further effort into the task (von Lucke, 2010).

The way to work in public administration has already been touched upon. (Attard, Orlandi, Scerri, & Auer, 2015) stress the point that cultural barriers also have to be overcome. A more open approach in the way to think about public administration is needed. A radical change is necessary (Höchtl, Kaltenböck, Parycek, Schossböck, & Thurner, 2011), (Bertot, Jaeger, & Grimes, 2010). The cultural risks not only refer to people within the public administration, but also to those in the civil society. There is the risk of a digital divide or a digital gap within the citizens. This means that people who are technology-conversant and who are used to finding and processing information can profit from the Open Government Data initiative, while people without the knowledge to use it fall behind and do not have the chance to participate in the public debate (von Lucke, 2010). That problem influences not only the level of responsibility of the citizens but also the Internet penetration rate of a country. If people have no access to information, they are not even aware that they are missing something (Bertot, Jaeger, & Grimes, 2010). Giving away information could lead to another negative outcome. If excessive data are released, people could experience an information overload that leads to less trust in government because it is no longer possible to filter important from unimportant information (Zuiderwijk & Janssen, Open data policies, their implementation and impact: A framework for comparison, 2014).

As a conclusion to this overview of the risks of Open Government Data, it can be said that the risks have internal and external sources. On the one hand, there is the risk that

an Open Government Data approach just does not work out because people are not able to overcome their cultural barriers, or because there is a lack of resources that hinders the public administration from releasing data. The missing resources can lead to financial issues. The government has to invest in the setup of an Open Government Data approach, such that revenues could be lost. External risks lie in the reputational effects caused by misinterpretation or liability issues, e.g., if the privacy of people is breached. This can be a problem for the people whose privacy is impacted as well as for the government liable for the damage.

Opportunities of Open Government Data		Risks of Open Government Data	
Reputation	- Increased transparency - Confinement of corruption - Better informed civil society able to comprehend government actions better - More trust in government	Reputation	- Misinterpretation of released data - Enforcement of digital divide in society - Information overload leads to no distinction between important and unimportant information
Finance	- New resources to support economic growth - Depressed profitability through taxes - Savings through efficiency gains: - Outsourcing of data quality management - Use of free resources - Easier identification of unneeded services	Finance	- Implementation costs, both internal (resources, employees) and external (system setup) - Maintenance costs, both internal (resources, employees) and external (license fees) - Revenue losses: Formerly generated profits can no longer be realized
Employees	- More open culture	Employees	High cultural barriers, no support from employees - Active counteraction
Societal effects	- More educated and informed society	Legal	- Liability issues for usage of released data (mosaic effect)

Table 2: Opportunities and risks of Open Government Data

For an overview of the identified categories of risks and opportunities of Open Data for the government, refer to Table 2. It can be seen that there are categories that appear both as risks and opportunities.

3.2. Opportunities and risks of Open Data for business

In the introductory section, it was mentioned that very little research has been conducted on the topic of Open Data for business (ODfB). This is why the approaches of looking at the topic differ significantly. Nevertheless, risks and opportunities could be identified and will be presented in the following sections.

3.2.1. Opportunities of Open Data for business

The opportunities of Open Data for business can also be divided into four categories: reputation, finance, industry and core tasks.

One category consists of reputational issues. By applying an Open Data strategy, the company could present itself as transparent and trustworthy to the public. Furthermore, it can show that it has imposed anti-corruption measures and has a moral standing. Furthermore, the company can stress the point that it engages in social responsibility actions and has an altruistic facet. By these measures, the company's image in the public eye could be rebuilt completely. As a consequence, the company is more interesting to talented employees who pay attention to the company for which they work (Deloitte LLP, Deloitte, 2012).

The second category of risk is the financial aspect, although it is directed in a different direction. Financial opportunities through Open Data cannot be realized directly. By applying an Open Data strategy, a company is able to improve its processes and increase its efficiency (Manyika, Chui, Groves, Van Kuiken, & Almasi Doshi, 2013), (Zeleti, Ojo, & Curry, 2016). This is not done by just releasing data to public, but through detour effects, like learning from the new processes that influence other areas of the company. Furthermore, the company can improve existing services and can increase the customer value and customer satisfaction from them (Lakomaa & Kallberg, 2013). In combination, all of these factors lead to an increase in sales and in revenue.

Using Open Data can have multiple benefits for a company. Pantano et.a. (2017) examined the effects of analyzing Open Data within the tourism industry. They took a closer look into provided data of the website TripAdvisor, which aggregates tourist ratings of hotels. They researched the case that hotels could analyze their ratings before and after an action, e.g., renovations. By these analyses, the hotel is able to gain a richer understanding of customer needs and is able to measure the performance of any specific action (Pantano, Priporas, & Stylos, 2017). When it comes to the creation of new services and products, a company could use Open Data to verify new business plans and market potentials. By using Open Data, use cases can be verified which ensure the viability of an idea or the functionality of an app and its basis for external funding (Lakomaa & Kallberg, 2013). To sum up, Open Data is an enabler for entrepreneurial activity (Manyika, Chui, Groves, Van Kuiken, & Almasi Doshi, 2013), (Rogawski, Verhulst,

& Young , Great Britain's Ordnance Survey - A Clash of Business Models, 2016), (Zeleti, Ojo, & Curry, 2016).

For a company, the surrounding industry is an important part of its environment. How present the current industry in public is an important factor, because it affects the amount of people that are aware of the products and their need for them. By releasing data, a company helps to enhance the value chain and increase the overall industry performance. The industry community is supported by these approaches and collaboration is fostered, as well. By supporting the industry, a company indirectly supports itself (Deloitte LLP, Deloitte, 2012), (Manyika, Chui, Groves, Van Kuiken, & Almasi Doshi, 2013).

A very important point from a recently published paper is that if all other actors from an industry apply an Open Data strategy and their products and services are found via several other platforms where the data are used, it might even harm a company not to release data. The present paper refers to an example from the tourism industry in which hotels and local attractions can record a decline in new customers if they are not present on different platforms (Pantano, Priporas, & Stylos, 2017).

To put it in very familiar words, “a company’s purpose is to make profits” (Friedman, 1970). Considering the shown risks and opportunities of Open Data for business, the financial aspect lies both in the risks, where the consequences can be traced directly to monetary effects, and in the opportunities, where only indirect revenues can be realized. The opportunities have to be counted by means of other measures than money. Nevertheless, in a second stage these efforts have to be notable in a monetary form.

3.2.2. Risks of Open Data for business

Five major categories of risks could be identified as relevant if companies apply an Open Data strategy.

The first step of opening data is to create a project and set up a team that cares about that subject, organizationally as well as a technically. Both aspects entail further implications. While the organizational part is followed by cultural aspects, the technical side includes the setup of a data management system and the maintenance of data (Rogawski, Verhulst, & Young , Great Britain's Ordnance Survey - A Clash of Business Models, 2016). Already, these two points show that costs and resources arise which need to be calculated and planned (Lal Das & Morrison, 2014).

Another factor concerning the financial part of the project is that an opening of data could lead to a loss of revenues. By opening company data, the risk arises of giving away information about the competitive advantage of a firm. The information could be used by competitors to create similar services and steal customers (Martin, Foulonneau, Turki, & Ihadjadene, 2013). Another risk of losing revenue rests in the definition of Open Data. One important point about Open Data that is should have the smallest barriers possible. For that reason, the data should be offered for free. If a company's business model is based on paid-for data, the revenues cannot be realized in the future (Manyika, Chui, Groves, Van Kuiken, & Almasi Doshi, 2013).

This point leads directly to the next category. If there are fees for using a dataset, they function as barriers so that the dataset is hardly used (Rogawski, Verhulst, & Young , Great Britain's Ordnance Survey - A Clash of Business Models, 2016). The risk of producing data that are not used is, on the one hand, an unsuccessful project, if the aim was to create datasets which are then reused. On the other hand, it affects the employees and motivational factors if the energy put into the project does not show results. This is frustrating and the employees might lose their motivation. This effect has negative consequences in two ways. People do not put as much energy as before into their task, which leads to lower quality results and attracts fewer users than before. This can become a downwards spiral.

Another barrier is the uncertainty as to which license model is the right one for which dataset. Resulting from the need for security, a license can be applied that hinders people from using and repurposing the data (Martin, Foulonneau, Turki, & Ihadjadene, 2013). If data are not used it could again lead to frustration within the organization so that effort to publish new datasets is suppressed. Another barrier to apply an Open Data strategy can be the company's culture, which needs a radical change to understand the needs and new paradigms (Martin, Foulonneau, Turki, & Ihadjadene, 2013).

Security issues have been briefly touched upon. They can also arise from liability questions. The theory says if there is sufficient anonymized data, it is possible to de-anonymize people. If a company gets into a situation like that, the public reputation could suffer a lot (Graft, Verhulst, & Young, 2016). Another possibility affecting the reputation of a company could be the quality of data released. As discussed earlier, quality can be defined to as the perceived quality by the user. This, if the user interprets the data in an incorrect or unscientific way, the perceived quality suffers as well. Moving

one step further, if the dataset is not described in a comprehensible and complete way, it might result in bad press, because it cannot be used (Manyika, Chui, Groves, Van Kuiken, & Almasi Doshi, 2013).

Another consequence of opening data could be that government increases its control, e.g., for the purposes of tax declarations (Deloitte LLP, Deloitte, 2012). This makes it even more important for companies to have correct and high-quality data to publish.

The above-mentioned risks and opportunities are summed up and compared in Table 3.

Opportunities of Open Data for business		Risks of Open Data for business	
Finance	- Savings through efficiency gains by increased processes - Improved services, products and customer fit leading to an increase in sales	Finance	- Implementation costs, both internal (resources, employees) and external (system setup) - Maintenance costs, both internal (resources, employees) and external (license fees) - Education costs of employees - No direct revenues from the efforts - Revenue losses: Formerly generated profits can no longer be realized - Indirect financial effects: potential loss of competitive advantage
Reputation	Increased transparency leads to an increase in -Trustworthiness -Social responsibility -Company value - Attracts more talented employees	Reputation	- Misinterpretation of data Liability issues (mosaic effect)
Industry	- Increased reputation of the industry leads to an increase in company reputation - Push/pull effects of industry standards effect the company's position	Employees	- Radical change in culture - Resistance to change (denial/refusal of projects) Frustration
Core tasks	- Improvement of services and products - Improvement of customer relationships Strengthening of customer-product fit	More control	- Increased scrutiny by the government

Table 3: Opportunities and risks of Open Data for business

In the following sections, the opportunities and risks of Open Data with more focus towards a business perspective will be examined.

3.3. Opportunities and risks of information sharing from a business perspective

In this chapter, a theoretical background for sharing information in a business context shall be found. Therefore, a theoretical background of economic topics is approached so that it can be incorporated into a business point of view for sharing knowledge.

As discussed in the introductory section, only a limited literature and few empirical studies on Open Data for companies are available. Thus, related streams of literature on knowledge sharing (KS) as well as open innovation (OI) will be discussed before the topic of Open Data for companies is addressed. The second part of each section consists of benefits and risks arising from each theoretical background.

KS and OI differ such that KS can be seen as inwardly directed into a company, while OI addresses recipients outside an organization. This is not a sharp classification but helps to clarify the arguments.

3.3.1. Knowledge sharing

KS is a part of a company's knowledge management, which addresses the employees and their supervisors. In the following sections, the opportunities and risks of KS will be examined to create a comprehensive picture of the influencing factors for Open Data initiatives in companies.[4]

3.3.1.1. Opportunities of knowledge sharing

The main impetus to implement a KS strategy is to improve processes. There are different methods as to how this goal can be achieved. The simple archiving of knowledge is not enough to reach the goal of improved processes. Employees have to be able to access specific knowledge and to use it. Only by doing so are they able to transfer the gained knowledge of one project to a similar task. Unless the people with that specific knowledge move on, the knowledge stays within the company (Almeida & Soares, 2014). KS is all about how to share knowledge within one company over the boundaries of the team. If it becomes more transparent to the whole company which kind of work is done by which team or which employee, tasks are not done twice (Almeida & Soares, 2014). Thus, resources can be saved and put into other tasks. Returning to the processes,

[4] (Chumg, Cooke, Fry, & Hung, 2015), (Ghobadi, 2015), (D'Ambra & Ghobadi, 2011), (Hashim & Tan, 2015), (He & Wei, 2009), (Hsu, 2008), (Hung, Durcikova, Lai, & Lin, 2011), (Jadin, Gnambs, & Batinic, 2013), (Licorish & MacDonell, 56), (Ma & Chan, 2014), (Yuen & Ma, 2011), (Sun, Ju, Chumg, Wu, & Chao, 2009)

the most important point of KS is to support organizational learning (Almeida & Soares, 2014). If an organization is able to keep up with the fast-developing environment, it has a competitive advantage within itself.

As a result, it is not the organization itself that learns, but the people within it. By implementing a KS strategy, the company's human capital is developed (Hsu, 2008). This makes the organization faster and capable of undertaking more tasks.

If there is a change within a company and its employees, the culture within the company changes. From the new interactions that are generated from a knowledge-sharing environment, new social interactions are generated (Almeida & Soares, 2014).

The result of more transparency and more communication, another outcome of KS is an increase in ideas that arise by connecting different, new and existing inputs with each other (Hung, Durcikova, Lai, & Lin, 2011).

3.3.1.2. Risks of knowledge sharing

From the literature about knowledge management, five groups of risks could be identified.

The most frequently discussed topic is why people share knowledge, and how to inspire them to do so. Reasons for employees not to share their knowledge are that they do not like their team members or do not want them to have their knowledge. By applying a KS strategy, employees try to prevent themselves from losing their unique position and make others rely on them (Wang & Noe, 2010). Another point is that KS is time-consuming (Hung, Durcikova, Lai, & Lin, 2011). As mentioned, documentation is also time-consuming (Hung, Durcikova, Lai, & Lin, 2011). Thus, more resources are needed, resulting in more costs. Another element that causes increased expenses is the software system that is needed to support the KS strategy. For these reasons, it is highly important to implement an integrated strategy that covers motivations (intrinsic and extrinsic) as well as technological issues. To conclude, the biggest risk of a KS strategy is that people are resistant to it and do not follow the new guidelines.

The second category concerns the technological aspect. A system is needed that enables and eases the sharing of information (Almeida & Soares, 2014). Finding such a system is time-consuming and could be costly in the end. Thus, there is need for an investment at this point. Another technological factor is the information's format. Different formats might prevent others from using them (Sayogo & Pardo, 2013).

An infrequently touched risk of KS is that of losing competitive advantage (Andreoli-Versbach & Mueller-Langer, 2014). Others might have different ideas using the same data and come up with new products and create a new business model with it (Sayogo & Pardo, 2013). Possible consequences are the loss of the competitive advantage and the loss of customers.

The last category of risks consists of data-related issues. A dataset could be easily misunderstood, if it is not described in detail and in a comprehensive way (Sayogo & Pardo, 2013). If this happens to data, it is likely that they are perceived to be of bad quality. This could lead to a bad reputation of the publisher. This risk also includes the potential that data might be scooped, poached or misused (Sayogo & Pardo, 2013).

Opportunities of Knowledge Sharing		Risks of Knowledge Sharing	
Finance	Savings through efficiency gains in processes and avoidance of work done twice	Finance	- Implementation costs, both internal (resources, employees) and external (system setup) - Maintenance costs, both internal (resources, employees) and external (license fees) - Education costs of employees - Loss of competitive advantage, decrease in sales and revenue
Employees	- Employees develop more skills - New culture is established New knowledge is generated	Employees	- No sharing culture (radical change in culture) - Fear of losing unique knowledge and advantage - Resistance to change - Documentation is time-consuming might lead to frustration and even more resistance
		Data	- Different formats might hinder collaboration - Misinterpretation

Table 4: Opportunities and risks of knowledge sharing

The analyzed risks and opportunities are compared in Table 4. While the opportunities focus mainly on cultural and human resource issues, the risks are spread wider. However, they deal with personnel issues in addition to costs issues and data issues. The biggest difference can be seen in the fact that the risks cause direct costs, while the opportunities target the development of the organization and its processes and human resources.

3.3.2. Open Innovation

The second stream of literature that transports the same idea as Open Data is Open Innovation (OI).[5] It is based on the two-sided exchange of ideas; usually, one of these sides has an industry background.

OI was defined by Chesbrough (2012), known as the father of OI, as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation" (Chesbrough, 2012). He divides the subject in two parts. The first and most often used and examined is called "outside-in". This method integrates external information and inputs into the innovation process of a company. The second kind of OI is called "inside-out". It relates to the opening of company-owned but unused ideas to public (Chesbrough, 2012).

3.3.2.1. Opportunities of Open Innovation

The opportunities arising from OI can be separated into three groups.

The first and most often mentioned group concerns the improvement of customer relations and the customer involvement in the products. By asking customers about their needs and soliciting ideas on how to improve the product, customers not only get involved but also customer satisfaction increases as their needs are met (Euchner, 2013). As a consequence, the customer relations improve. (Melese, Lin, Chang, & Cohen, 2009) A frequently applied strategy is the lead-user method. This includes the identification of a user that is not only interested in the product but also has some very specific knowledge about it. They could give very valuable feedback concerning product innovations or improvements (Euchner, 2013).

OI influences the whole company, but this could also be seen as an advantage. OI can accelerate the processes of a firm (Melese, Lin, Chang, & Cohen, 2009) as well as improve them (Euchner, 2013). It could also lead to incremental product innovation or a completely new product design (Herskovits, Mercedes, & Javier, 2013). Special regard should be paid to the speed factor. By applying an OI strategy, faster innovation circles

[5] (Chesbrough, 2012), (Euchner, 2013), (Herskovits, Mercedes, & Javier, 2013), (Lee, Hwang, & Choi, 2012), (Melese, Lin, Chang, & Cohen, 2009), (Spithoven, Vanhaverbeke, & Roijakkers, 2013)

can be realized (Melese, Lin, Chang, & Cohen, 2009), (Herskovits, Mercedes, & Javier, 2013). With this increased speed, it is also possible to outrun a bigger competitor (Euchner, 2013).

The next opportunity covers possible cost savings. If the development of innovations is given to another party that is not paid by the company, there are lower costs for the product innovation because fewer people need to be employed (Euchner, 2013). Another source of savings is a whole field of commercially unavailable technology[6] that can be used (Melese, Lin, Chang, & Cohen, 2009). By doing so, the company is also able to address subjects that do not lead directly to a competitive advantage but are still important to develop the product (Melese, Lin, Chang, & Cohen, 2009).

The last point mentioned about finance issues is how to make money. Some companies own IP on inventions that they never realized, or never brought to market. If other firms could use this IP, they could create value by licensing it (Herskovits, Mercedes, & Javier, 2013).[7]

3.3.2.2. Risks of Open Innovation

The risks extracted from the present papers can be grouped into four categories.

The first aspect deals with contributor risks. As OI integrates input from outside the boundaries of the organization, this input lies beyond the control of the organization. The connected risks could be that there are no or not enough contributors, so that there is no vivid discussion about the topic or insufficient answers (Euchner, 2013). Tightly connected to this point, there could be one contributor overruling all the others so that there is neither a discussion nor a variety of opinions or ideas (Melese, Lin, Chang, & Cohen, 2009). In such a case, a means needs to be established to keep the discussion fair and interesting to all participants.

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[6] That point refers to open source software, for example.

[7] This argument is mentioned to give a comprehensive overview of opportunities arising from open innovation. However, this argument does not support the intention of the present thesis. For that reason, the argument is not followed further.

The next point is that there is no clear motivation for the contributors to participate in the discussion. They might see themselves just as a "hired help" and not as partners trying to reach the same goal (Melese, Lin, Chang, & Cohen, 2009).

The next group of risks rest in the company's area of responsibility. If a company applies an OI strategy, the people within the company react to that change. In fact, there will be a change in the culture, and people need to be prepared and willing to follow the new way of thinking and working. This can be influenced by the turnover in people within one company. If there is a very low turnover rate, new ideas hardly get accepted (Chesbrough, 2012). The new way in which the company works of course influences the whole company, but it particularly influences the research and development department that directly works with the new processes. If it is not taken care of, the impression could arise that there are outsourcing attempts at the cost of that department. In fact, OI works best if it is worked on from both sides—by the outside contributor and the employee (Chesbrough, 2012).

When working closely with a contributor that does not belong to the organization, there might be some dependency risks. This could be the outside party ceasing to deliver new ideas (Spithoven, Vanhaverbeke, & Roijakkers, 2013), or perhaps starting communication with one party could prevent others from communicating with the company (Melese, Lin, Chang, & Cohen, 2009).

Another risk that should not be forgotten concerns intellectual property rights (IP). The contributing party is not employed by the company and therefore the company does not have any right to force the party to transfer rights to the company or deny the party the ability to use the invention itself. This is particularly a problem in open source innovation. If the ownership of data is questionable, there is a significant risk for margins and revenues. (Euchner, 2013) Therefore, it is important to establish some IP rules, especially before any kind of capital-intense investment is made. Otherwise, the risk would be hardly bearable (Chesbrough, 2012).

Last, but not least, it is a technologically driven way of approaching a topic. Thus, consequently, technological issues must be considered. The risks lie in insufficient tools that may prevent potential contributors from posting ideas (Euchner, 2013). The tools might be expensive to implement. It is also not clear whether the desired effect is met

only by introducing a new means of communication. It needs to be ensured that there are processes and strategies behind the tools so that they are used efficiently.

Risks of Open Innovation		Opportunities of Open Innovation	
Finance	- Improvement of customer relationship leads to better product-customer fit, leading to an increase in sales and revenue - Savings in innovation through incorporating free resources from outside the company - Savings through improved processes	Employees	- Change in culture - Active resistance to project - Frustration High turnover rate
Employees	New skills evolve through new modes of working	Finance	- Implementation costs, both internal (resources, employees) and external (system setup) - Maintenance costs, both internal (resources, employees) and external (license fees)
Technological	- Faster innovation circles Shorter time to market	Contributor Risks	- Out of control of organization - Too little input - Biased discussion - Dependency from few contributors - IP of inputs has to be clear
Core task	Improvement of product-customer fit	Technological	Insufficient tools might hinder participation

Table 5: Opportunities and risks of open innovation

The examined risks and opportunities of OI differ significantly (see Table 5). Regarding the risks, there is a range from technological risks to company culture to IP-related risks, while the opportunities consist of the improvement of processes as well as the relationship to customers.

3.4. Opportunities and risks of Open Data as part of a company's CSR strategy

Another perspective on how to address Open Data from a business point of view is the influence of Open Data as part of a company's CSR strategy. This is also supported by the United Nations, who see Open Data as part of a company's CSR strategy (Verhulst, Mapping The Next Frontier of Open Data: Corporate Data Sharing, 2014). As discussed earlier, Open Data has inwardly as well as outwardly oriented effects. A company's CSR strategy has recipients inside and outside a company, as well. For this reason, Open Data is seen in the literature as part of the CSR strategy of a company (Watan-

atada, 2010; Yeşil, Koska, & Büyükbeşe, 2013), (Verhulst, Corporate Social Responsibility for a Data Age, 2017), (del Olmo Crenier, 2013). Nevertheless, the field of Open Data as part of a company's CSR strategy is rarely investigated in literature. Therefore, some papers addressing the topic from a general point of view are also included to give a comprehensive overview of the topic.

The effects (and in particular the risks and opportunities) arising from a CSR strategy in combination with Open Data will be discussed in the following sections.

3.4.1. Opportunities of Open Data as part of a company's CSR strategy

The literature describes numerous aspects of CSR and why it is important to manage. Most authors addressed the advantage of the influence on the company reputation (Weber M. , 2008). Like CSR, Open Data has an impact on a company's reputation. The advantages arising from this will be discussed in detail within this chapter.

It was found that CSR-related actions have a direct impact on a company's reputation and image (Weber M. , 2008). An excellent reputation can give several advantages to a company, such as an increase in customer loyalty, which in turn helps companies to go through crises (Himme & Fischer, 2014), (Caruana & Ewing, 2010). There are also unique competitive advantages that arise from a well-managed corporate reputation (Fernández-Gámez, Gil-Corral, & Galán-Valdivieso, 2016), (Weng & Chen, 2017).

A very important point from the business perspective is always the financial side. It has different characteristics and range from addressing the market value of a firm in general to an increase in stock prices. A more positive perception in the public eye leads to a higher brand image, which in turn increases sales and the overall revenue of a firm (Caruana & Ewing, 2010), (Fernández-Gámez, Gil-Corral, & Galán-Valdivieso, 2016), (Himme & Fischer, 2014), (Weng & Chen, 2017).

Another often-mentioned point is the employer's perspective. It goes hand in hand with a good company reputation. A good reputation attracts outstanding employees with outstanding skills, which leads to an increase in efficiency and profitability (Weng & Chen, 2017), (Caruana & Ewing, 2010). If a company has a fixed spot in everyday news, its reputation can affect its product appearance in public and help the company be recognized as a great employer because CSR also includes the working environment of a company. This affects the employees within a company, as well. An outstanding

working environment affects their motivation and in a second step their productivity (Black & Carnes, 2000), (Himme & Fischer, 2014), (Wang, Yu , & Chiang, 2016), (Weber M. , 2008).

A very important phenomenon, and one which is important in this case, is called the halo effect. It says that the company reputation is transferred to the brand reputation. This means that by increasing the overall reputation of the company, its products and services gain an advantage (Black & Carnes, 2000), (Himme & Fischer, 2014), (Wang, Yu , & Chiang, 2016), (Weber M. , 2008).

To return to financial aspects, the point should be stressed that investments in CSR could lead to savings. These are realized through the increased efficiency of motivated employees, a smaller usage of resources, and through better conditions in supplier contracts or easier access to capital. CSR investments also enable better terms from suppliers through easier negotiations. A company with a great reputation is more attractive for investors, which results in lower equity costs (Himme & Fischer, 2014), (Weber M. , 2008).

The management of CSR-related topics can proactively forestall negative appearances in the media, such as boycotts from NGOs or customer groups (Weber M. , 2008).

3.4.2. Risks of Open Data as part of a company's CSR strategy

The negative effects of an investment in a company's reputation can be grouped into three parts: financial consequences, company reputation and industry reputation.

One aspect that has a negative impact on the topic of corporate reputation is that a company has to make an investment whereby no direct outcomes can be expected. These investments can be one-time actions or recurring, permanent engagements (Weber M. , 2008). Sometimes the decision whether to invest in a CSR strategy is not made by the company itself; the company might be forced to do so because all other companies of its industry are adopting a CSR strategy and it has to keep up with them to stay at the same level.

If a company already has a bad reputation in the public eye, it has to be really careful about releasing news about reputational issues because they might be taken for hypocrites, thus worsening the situation (Shim & Yang, 2016) (Weber M. , 2008).

A bad corporate reputation for one company can lead to a shift in the distribution of sales to another company (Gatzert, 2015). This means that the company suffers losses if nothing is done about its poor reputation. This argument is supported by Himme and Fischer, who assert that "a decline in corporate reputation is expected to influence customer purchase decisions and thus the revenue base of a firm" (Himme & Fischer, 2014).

The negative effects mainly consist of the danger of making the situation worse. This could be done by not releasing data sensitively with respect to the situation. The other factor is that financial losses could be the consequence of a bad reputation.

To conclude, the advantages as well as the risks can be summarized as follows (see Table 6):

Opportunities of CSR		Risks of CSR	
Finance	- Higher company reputation, better brand image leads to an increase in revenue - Savings through better contract conditions, lower costs for equity, more efficient workers	Finance	- No direct returns If CSR has a negative impact, decrease in revenue
Employer position	- Better qualified employees More motivated employees	Reputation	If the company is identified as hypocritical, the situation gets worse
Reputation	- Increase in company value - Increase in brand value - Increased customer loyalty - Less sensitive to crises	Industry reputation	A negative image of industry has a negative effect on the company

Table 6: Opportunities and Risks of CSR

3.5. Conclusion: Opportunities and risks of Open Data for business

In the above sections of this chapter, the opportunities and risks of Open Data from a government and several business perspectives were put in focus. The aim of this concluding part of the present chapter is to bring all the loose ends together.

In the sections developed above, categories were found to conclude several arguments from each point of view. Each approach has different priorities and therefore assigns different weights to similar topics. Thus, categories can have similar titles, but might contain different kinds of arguments. For that reason, it is not possible to simply compare the categories. It is necessary to take a closer look into the components. The following chapters describe the arguments of all topics discovered in the literature and compare them through the use of tables. The aim of the next two sections is to have a

comprehensive list of opportunities and risks for a company undertaking the project of opening company data to a public audience.

3.5.1. Consolidated opportunities of Open Data for business

In what follows, the opportunities of all approaches will be consolidated based on the opportunities of Open Data for business.

Category	Open Government Data *(Chapter 3.1)*	Open Data for business *(Chapter 3.2)*	Knowledge sharing *(Chapter 3.3.1)*	Open innovation *(Chapter 3.3.2)*	CSR *(Chapter 3.4)*
Finance	Indirect profitability through taxes	Improved services, products and customer fit leading to increased sales		Improvement of customer relationships leading to better product-customer fit, leading to an increase in sales and revenue	Better company reputation, better brand image leading to an increase in revenue
	Savings through efficiency gains: - Outsourcing of data quality management - Use of free resources - Easier identification of unneeded services New resources support economic growth	Savings through efficiency gains by increased processes	Savings through efficiency gains in processes and avoidance of work done twice	Savings: - Through improved processes - Savings in innovation through incorporating free resources from outside the company	Savings - Through better contract conditions - Lower costs for equity - More efficient workers
Reputation	Increased transparency leads to - More trust in Government - Confinement of corruption Better informed civil society able to comprehend government actions better	Increased transparency leads to an increase in - Trustworthiness - Social responsibility - Company value - Attracts more talented employees			Increase in brand value Increase in company value Increased customer loyalty Less sensitive to crises
Employees	More open culture		Employees develop more skills New culture is established New knowledge is generated	New skills evolve through new modes of working	Better qualified employees More motivated employees

Core tasks		Improvement of services and products Improvement of customer relationships Strengthen customer-product fit		Improvement of product-customer fit
Industry reputation		Increased reputation of the industry leading to an increase in company reputation Push/pull effects of industry standards effect the company's position		
Societal effects	More educated and informed society			
Technological				Faster innovation circles Shorter time to market

Table 7: Summarized opportunities

Table 7 shows the summarized and compared opportunities of the above-analyzed streams of literature. As in the previous chapter, the arguments concerning the Open Data for business approach will first be looked at and compared to the arguments from the other fields. Second, the categories will be examined that do not match aspects from ODfB. Although these points are not found in the ODfB literature, they will be discussed because they might be important for the topic in general, but might not yet have been discussed from the academic perspective.

The first category presented in the table above is about financial issues. The opportunity to increase the company's revenues after undertaking the implementation of an Open Data strategy is supported by three out of the four approaches, although it is called something different in different approaches. For example, a government increases its tax income as a consequence of detour revenues. The OI approach shows in increase in revenue via an improved product-customer fit. CSR, however, justifies the increase in income by means of the improved company and brand image. Another very important point about financial issues is possible savings. They are identified by all approaches, which makes them a clear focal point concerning financial opportunities of ODfB. One

argument that was only mentioned from the Open Government Data perspective is focused on the economic growth of a country. That is a clear governmental objective, so it is not pursued within this thesis. The second argument not mentioned from another approach concerns returns from licensing IPs. This business model is not included in the Open Data project of a company because its focus is to release data without cost barriers. Therefore, this point is not pursued either.

The next area focuses on company reputation. Caring about the image of a company is only possible if the whole picture is taken into consideration and not only a part of it, as it is done within the topics of OI and KS. No opportunities concerning reputation are found from these streams of literature. Open Government Data and CSR support the importance of managing a company's reputation and argue that that increasing it is followed by numerous positive benefits. One more factor about reputation was identified from the Open Government Data approach. It says that a more well-informed society is able to comprehend governmental actions better. Society, as the public, is also important for a company; however, because increased trust through more transparency is already included in the first argument about reputation, the other mentioned factor will not be discussed separately.

A category that was mentioned by every stream of literature except ODfB deals with employees. The main premise is that applying such a project can result in the development of a new culture, new skills, new knowledge, better and higher qualifications and increased motivation for the employees. This point will be included in the further considerations about ODfB.

However, although the consequences were already put in focus in the finance section, the basics were not discussed in detail. The category about the core tasks of a company is mentioned from the ODfB perspective as well as from the OI perspective. An investment in an Open Data project can lead to an improvement in the core tasks of a company, which include its produced products and services. This is not to forget its customer relations, which are necessary to have stable turnover. As a means to an end, the customer-product fit has to be developed to a maximum. Therefore, these points will be considered in further discussion.

A point only mentioned from the perspective of ODfB is the dependency between the industry and the company. If the company invests in a better reputation, it affects the

reputation of the industry, and vice versa. If the reputation of the industry improves, the reputation of the company might automatically improve, as well. A second important point is the company's position within the industry and the industry standards. If it is common that every company releases data, it could be a risk to refuse to do so. If it is not common, it could be a great opportunity to gain a better position.

An argument from Open Government Data that was mentioned above was about society. The present argument deals with society, as well. An opportunity from the Open Government Data perspective is a more educated and informed society. Because it is a governmental goal, this thought will not be pursued.

The last opportunity identified from the OI approach is of a technological nature. It is about faster innovation circles and a shorter time to market. The argument is based on incorporating information from outside a company into its processes. For the research question of the present thesis, it is not relevant. Therefore, it will not be taken under consideration in the following discussion.

To conclude, there are five opportunities that are most important for Open Data for companies:

- Finance
- Reputation
- Employees
- Core tasks
- Industry

3.5.2. Consolidated risks of Open Data for business

In the following section, parallel to the section about consolidated opportunities of Open Data for business, the risks of all approaches in the literature will be consolidated and the risks of Open Data for business will be extracted.

Category	Open Government Data *(Chapter 3.1)*	Open Data for business *(Chapter 3.2)*	Knowledge sharing *(Chapter 3.3.1)*	Open innovation *(Chapter 3.3.2)*	CSR *(Chapter 3.4)*
Finance	Implementation costs, both internal (resources, employees) and external (system setup)	Implementation costs, both internal (resources, employees) and external (system setup)	Implementation costs, both internal (resources, employees) and external (system setup)	Implementation costs, both internal (resources, employees) and external (system setup)	

	Maintenance costs, both internal (resources, employees) and external (license fees)	Maintenance costs, both internal (resources, employees) and external (license fees)	Maintenance costs, both internal (resources, employees) and external (license fees)	Maintenance costs, both internal (resources, employees) and external (license fees)	
		Education costs of employees	Education costs of employees		
		No direct revenues from the efforts			No direct revenues from the efforts
	Revenue losses: Former generated profits can no longer be realized	Revenue losses: Former generated profits can no longer be realized			
		Indirect financial effects: Potential loss of competitive advantage	Indirect financial effects: Potential loss of competitive advantage		If CSR has a negative impact, decrease in revenue
Reputation	Misinterpretation of data	Misinterpretation of data	Misinterpretation of data *(from another category)*		
	Liability issues for usage of released data (mosaic effect)	Liability issues (mosaic effect)			
	Enforcement of digital divide in society				
	Information overflow leads to no distinction between important and unimportant information				
					If a company is identified as hypocritical, the situation gets worse
Employees	High cultural barriers, no support from employees	Radical change in culture	No sharing culture (radical change in culture)	Change in culture	
	Active counteraction	Resistance to change (denial/refusal of projects)	Resistance to change	Active resistance to project	
		Frustration	Documentation is time-consuming, leading to frustration and even more resistance	Frustration	
			Fear of losing unique knowledge and advantage		
				High turnover rate	
More control		Increased scrutiny by government			

Data and technology			Different formats might hinder collaboration	Insufficient tools might hinder participation
Contributor risks				Out of control of organization Too little input Biased discussion Dependency from few contributors IP of inputs has to be clear

Table 8: Summary of risks

As a first result from the listed arguments in Table 8, it is observable that most arguments from ODfB are supported by the other streams of literature. The outline of this chapter is structured in the same way as the table. Based on the arguments from ODfB and in the same order as they are presented in the table, the categories and the deeper arguments will be discussed.

The first aspect to discuss concerns the financial part of the decision. All aspects found in the Open Data approach were also extracted from the other streams of literature. However, it can also be argued that some aspects lead to the same outcome, although they have a different background. For example, the last argument in the list of Open Data risks concerns a potential loss in competitive advantage leading to an indirect loss in revenue. While the argument from the KS follows nearly the same line of thought, the CSR approach also gives the result of a decrease in revenue but explains the loss as caused by a loss in company reputation. For the following discussion, the arguments will be combined into one point.

The next issues are about reputation. While it is clear that reputation is a risk for Open Data for companies (ODfC) through the misinterpretation of data and related liability issues, Open Government Data also identified societal risks arising from the engagement in Open Data. The first mentioned argument deals with the consequences for the society. That is an important point for a government deciding how to best manage its inhabitants, but is less relevant to a company; therefore, this argument will not be pursued. The other point concerns an information overflow that might result from the release of data, so that people are no longer able to judge if information is important or not. That could also happen to companies and affects their reputation in combination with the release of data; therefore, this argument will be kept for further investigation.

This goes along with the point identified within the CSR approach. If CSR activities are not well thought through, companies might appear in public as hypocrites and the CSR activities might backfire. This point should be kept in mind.

A success factor in most companies is its employees. If not handled carefully, this truth can result in risks. The point stressed most often is the mentality and culture within a company, which can significantly affect the result of an Open Data project. This was identified as a risk by every stream of the literature, except the CSR point of view. Here, only advantages were found. In addition to the arguments from ODfB, KS puts a focus on employees' fear of losing their unique knowledge and competitive advantage with respect to their colleagues. The process by which it is possible to change people's way of thinking about these issues has to be managed with great sensitivity, otherwise it could lead to a risk factor identified from the OI approach, that of a high turnover rate in employees. For the reason that both risks are relevant for a successful company, they will be treated here.

One argument that only pertains to the risks of ODfB is the potential increase in scrutiny from the government. It is not mentioned from the other perspective, because one of them is the government-view and the others deal only with an excerpt of the company, while the examination of ODfB observes every aspect of it. Thus, this must be a future concern.

Data and technology are combined into one category because both are points that have to be considered during the conception phase of the project. If the chosen tool has a poor usability, no one will use it (see OI). The same is true for the format (see KS), which is necessary for the reuse and repurposing of data. Therefore, this point will be treated as a risk during the setup of the project.

The contributor risks only evolve if data are taken from a source outside the company. While it was important to focus on these risks to have a comprehensive picture of the risks of OI, it is not important in answering the question of whether a company should release data or not, because the company would be in the position of the contributor and others would be dependent on it.

According to Martin et. al (2013) "Barriers to Open Data are not technical. They are rather 1) cultural, 2) economic 3) legal and 4) semantic." The further findings of the

present paper can partially support the findings of Martin et al. (2013). The most important risks to a company undertaking a project to open its data are:

- Finance
- Reputation
- Employees
- More control
- Data and technology

3.5.3. Opportunities and risks of Open Data for business

The following table presents the identified categories with the relevant criteria in detail, as examined in the previous chapters.

Category	Opportunity	Risk
Finance	Improved services, products and customer fit lead to an increase and sales Savings through efficiency gains by increased processes	Implementation costs, both internal (resources, employees) and external (system setup) Maintenance costs, both internal (resources, employees) and external (license fees) Education costs of employees No direct revenues from the efforts Revenue losses: Formerly generated profits can no longer be realized Indirect financial effects: Potential loss of competitive advantage
Reputation	Increased transparency leads to an increase in -Trustworthiness -Social responsibility -Company value - Attracts more talented employees	Misinterpretation of data Liability issues (mosaic effect) Information overflow leads to no distinction between important and unimportant information If a company is identified as hypocritical, the situation gets worse
Employees	Employees develop more skills New culture established New knowledge is generated	Radical change in culture Resistance to change (denial/refusal of projects) Frustration

	Better qualified employees More motivated employees	Fear of losing unique knowledge and advantage High turnover rate
More control		Increased scrutiny by government
Data and technology		Different formats might hinder collaboration Insufficient tools might hinder participation
Core tasks	Improvement of services and products Improvement of customer relationships Strengthens customer-product fit	
Industry	Increased reputation of the industry leads to an increase in company reputation Push/pull effects of industry standards effect the company's position	

Table 9: Final opportunities and risks of ODfB

From the table above (see Table 9), it can be seen that some categories contain opportunities as well as risks, while other categories are only applicable for one area.

4. Decision-Making Model for Open Data

In this chapter, a decision model is developed to support companies confronted with the question as to whether or not they should undertake an Open Data project. The first step in solving the task is to specify the requirements of the basic model.

The second section of the chapter deals with the model's theoretical background, which is used in the third part to form a specific decision-making model to help companies evaluate the question of whether to invest in such a project or not.

4.1. Selection of a decision-making model

The literature describes several approaches in decision taking. According to Dillerup and Stoi (2011) the strategic decisions a company can take have to be examined and assessed. The underlying question is which alternative the company should choose. Every company has different ways to rate alternatives and to find a solution.

Taking a first look towards the analyzed categories, reveals different dimensions. For example, financial factors, such as indirect revenues, which are hardly able to be calculated in advance. An example of this might be an increase in sales due to an improved brand image. For these arguments, numbers are hard to calculate or are only creatable via estimates, which does not produce very reliable results. They are clearer to name in retrospect. This does not help the company with its decision. From even these brief observations it is clear that a strict financial approach is not the best choice for this problem. As a result, a requirement for the decision model is that it should be able to include not only numbers but also qualitative measures and should be able to handle different dimensions.

Taking a closer look at the different categories shows that the different categories and the arguments within the categories cannot have the same weights within the decision problem. Every criterion has to be examined separately. An example of this is the comparison between possible indirect revenues caused by an increase in brand image and the risk of increased control by the government. Thus, the model needs to give advice how to set both aspects in relation to each other.

For the reason that every company has different preferences, the model should also be able to give each company the ability to rank the risk of more control by the government

compared to an increase in sales. This demonstrates that another requirement of the model is to include both risk and opportunity factors in the same process.

These requirements are not new. They are also supported by Carr et al., who argue that strategic investment decisions "are not always primarily based on financial considerations and there may be considerable differences in the extent to which strategic versus financial considerations are emphasised in their evaluation" (Carr, Kohlemainen, & Mitchell, 2010).

Based on all these findings, the known financial models of net present value or return on investment are rejected because they are driven by the monetarization of their components, which is not possible in a reliable way. Methods like scoring models might be quite interesting in this context, but they are not sensitive enough to pay attention to all facets of the problem. multi-criteria decision-making models (MCDM) combine all these requirements, so they will be investigated in the following chapters.

4.2. Multi-criteria decision-making

Amongst many aAlternatives in decision making methods, for the present thesis, one has to be found that is able to combine qualitative and quantitative criteria. Furthermore, these criteria are unstructured in such a way that there are sometimes cost and benefit criteria. One approach that is able to deal with all these specifications is MCDM. In the following chapters MCDM will be explained in detail and one method that best meets the requirements will be found.

4.2.1. Introduction to MCDM

MCDM does not refer to one specific method. It is a collective term that summarizes a large number of different methods and approaches. The underlying assumption of all MCDM methods is a complex world in which more rational and comprehensible decisions are needed. The overall aim of all MCDM models is to provide an efficient and rational approach to dealing with a multi-faceted problem. In MCDM approaches, it is possible to integrate not only a varying number of solutions to a problem but also different criteria with regard to each solution. This circumstance enables the illustration and consideration of a multidimensionality of goals. For this reason, MCDM approaches have become more and more popular in addressing scientific, governmental and economic questions (Zavadskas & Turskis , 2011). The main advantage of all MCDM models is the possibility of merging all given alternatives and criteria into one

analysis (Vytautas , Marija , & Vytautas , 2015). Another advantage of MCDM methods is the ability to compare different dimensions to each other as well as to combine tangible and intangible criteria, e.g., working hours, euros or rated points, on a scale.

Generally, MCDM methods are focused on a certain number of criteria that are structured beforehand and a comparative weighing with regard to a target. MCDCM methods are considered to be a good approach for decision-making in complex, multi-dimensional problems, such as socioeconomic or sustainability issues. One of their advantages lies in their possibility to deal with many opposite interests (Zavadskas & Turskis , 2011), (Weber K. , 1993).

As mentioned in the introductory sequence, there are multiple MCDM techniques that can be structured into two main groups. On the one hand, there is the so-called French school that focuses on ranking concepts to evaluate alternatives. On the other hand, there is the "American school" that promotes multi-attribute value function and multi-attribute utility theory (Zavadskas & Turskis , 2011). Many studies have been undertaken to show and evaluate the different models of MCDM (Sabaei, Erkoyuncu, & Roy, 2015), (Kumar, et al., 2017), (Serrai, Abdelli, Makdad, & Hammal, 2017), (Zavadskas & Turskis , 2011), (Mulliner , Malys , & Maliene , 2016). They have pointed out that each method has its own advantages above the others. The criteria to differentiate the methods, according to the authors mentioned above, are:

- If it is a ranking method or a compensatory one, such that elements with a positive valuation can outweigh others with negative valuations
- What type of data are used (quantitative, qualitative)
- The consideration of uncertainty
- The number of considered criteria
- The complexity of the calculation
- The inputs of different decision-makers

Literature findings have shown that different techniques give different results, according to the integration of the different factors listed above. Findings have further shown that the results become more accurate if methods are combined to examine a problem (Mulliner , Malys , & Maliene , 2016).

Although methods vary according to above-mentioned factors in their final calculation, every MCDM method follows the same process (Zavadskas & Turskis , 2011), (Vytautas , Marija , & Vytautas , 2015), (Weber K. , 1993):

- Define the target (or the target system) of a problem
- Form a system with criteria and weights, where the weights show the preference structure of the decision-maker
- Define a finite number of options that can lead to the defined goal
- Identify the impact of each alternative on the different criteria.

The first three steps can be described as preparatory in the MCDM method. The fourth step is the critical part, as it includes the combination of the different goals to reach one result. In the following section, the approach for setting up an Open Data decision model will be described.

4.2.2. Theoretical outline of an MCDM model for Open Data

For this thesis, it is important to find a MCDM method that meets all of the requirements mentioned in the introductory section of this chapter. In addition, the chosen method should take advantage of the characteristics of MCDM concepts. The aim in this case is to find an efficient use of such a method to make decisions more rational and comprehensible. Another point is that both cost and benefit criteria need to be easy to integrate and assess.

In the following chapters, the listed points that every MCDM model follows will be evaluated in detail, with respect to their ability to solve the problem of whether or not a company should invest in an Open Data strategy. For this reason, a preselection was made, especially for the determination of weights and the identification of impacts. The reasoning behind these choices will be explained in every chapter.

4.2.3. Problem definition and target systems

The first step of every decision-making process is to clarify the underlying problem, and as a consequence, to define the target of the examination. Kleindorfer, Kunreuther and Schoemaker (1997) point out that is necessary to be certain about this first step because it is possible to reach the wrong solution, if neither the target nor the problem is properly specified.

Sub-targets need to be derived from the superior goal and identified. Designing a target system begins with establishing goals. They can have their roots in different situations, including deficiencies in future situations, strategic goals, the comparison of alternatives or external requirements (Keeney & Raiffa, 1993).

Goals can be differentiated into fundamental and instrumental goals. While the fundamental goals are those that stand on top of a goal hierarchy system, the instrumental goals help to achieve the fundamental ones. For example, assume that the decision problem is buying a car (see Illustration 1). For the decision-maker, two goals are fundamental: the performance and the price. In the first branch of the diagram, to reach the fundamental goal of good performance, the instrumental goals are fuel consumption, acceleration and maintenance intervals. To assess the price, the decision-maker takes a closer look into the criteria of the selling price and the maintenance costs.

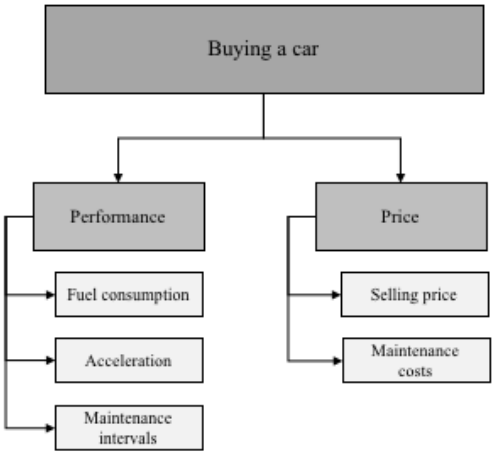

Illustration 1: Example goal system of a MCDM problem

The target system needs to fulfil certain requirements. According to (Eisenführ & Weber, 2003), target systems need to be complete, free of redundancies, measurable and simple, which means the fewest possible number of goals (Eisenführ & Weber, 2003).

Once a system of objectives with sub-targets has been established, the sub-targets form the basis for the decision problem criteria, as shown in the next section.

4.2.4. Criteria and weights

Derived from the target system, criteria have to be elaborated to measure and examine all possible solutions against them. According to the criteria established by (Keeney &

Raiffa, 1993), attributes, as they call them in their work, need to fulfil the two requirements of comprehensiveness and measurability: “An attribute is comprehensive, if, by knowing the level of an attribute in a particular situation, the decision maker has a clear understanding of the extent that the associated objective is achieved. An attribute is measurable if it is reasonable both (a) to obtain a probability distribution for each alternative over the possible levels of the attribute—or in extreme cases to assign a point value—and (b) to assess the decision maker’s preferences for different possible levels of the attribute, for example, in terms of a utility function or, in some circumstances, a rank ordering” (Keeney & Raiffa, 1993). The authors further argue that a set of attributes needs to have the following qualities (Keeney & Raiffa, 1993):

- The set needs to be complete. This serves a similar purpose as comprehensiveness, mentioned earlier.
- The set needs to be operational. This criterion should be self-explanatory to the decision-maker and others, as the set is supposed to be easy to use for everyone confronted with the decision.
- The set should be decomposable. It should be possible to break down the set of criteria into smaller groups to reduce complexity in their assessment.
- The set should include no redundancies. This point says that every criterion should measure something different, without overlaps.
- The set should be the smallest possible size. The sample of criteria should be as small as possible, to minimize complexity in making judgements and in the evaluation and calculation of the decision, on the one hand, and on the other hand to avoid redundancies.

Because some criteria are more important or just more relevant than others to a decision-maker, there is a need to rank them or give certain weight to some of them. If the decision-maker is clear about his preferences, he can assign a weight and move on. If this is not the case, he has to find some method to do so (Kleindorfer, Kunreuther, & Schoemaker, 1997).

A common method is the analytical hierarchy process (AHP). This process is based on the pairwise comparison of two items. The method was introduced by Saaty in the 1980s (Kolios, Mytilinou, Lozano-Minguez, & Salonitis, 2016), (Saaty, 1996). Although it was introduced as an MCDM technique in its own right, it is often used as a method to rate criteria and assign weights to them.

The criteria, for example C_1, C_2 and C_3, are put in a 3x3 matrix for comparison (see Table 10). The criteria in the left column are always compared to the criteria in the row at the top. The pairwise comparison of criteria underlies a scale with nine entries. To compare two criteria, it must be determined how much one outweighs the other. If both criteria are of equal importance, the value 1 shall be inserted in the matrix. This value can be inserted in the diagonal row even before assessing the other comparisons, because if one criterion is compared to itself, there is no preference.

	C_1	C_2	C_3
C_1	1		
C_2		1	
C_3			1

$$\Rightarrow \quad \boldsymbol{A} = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}$$

Table 10: AHP Matrix 1

The other values are assigned according to the nine-point scale, which determines how much more important one criterion is compared to the other. For the reason that the left column is always compared to the row above, such that the baseline criterion can be less important than that to which it is compared, the scale is inverted in the other direction, as shown in Table 11.

1/9	1/7	1/5	1/3	1	3	5	7	9
Absolutely less important	Very strongly less important	Strongly less important	Weakly less important	Equality	Weakly more important	Strongly more important	Very strongly more important	Absolutely more important

Table 11: AHP values

The example from the previous chapter, “buying a car”, will be used to clarify (see Illustration 1). To assign weights to the different criteria, the so-called fundamental goals would be set in relation to each other. In the following table, the stated preferences between performance and price are shown (see Table 12). In this case, the decision-maker has a weak preference towards performance in comparison to price. The value is filled in the light grey cell. The dark grey cell shows the inverse value, which is derived from the first.

	Performance	Price
Performance	1	3
Price	1/3	1

Table 12: Weighing fundamental goals of the example decision problem

In the next step, the functional goals have to be assessed (see Table 13), which requires pairwise comparison. In this case, the decision-maker has no preference between fuel consumption and acceleration, a weak preference for fuel consumption above maintenance intervals and a strong preference for acceleration above maintenance intervals (all of these values are only assumed for this example and have no further indication.)

	Fuel consumption	Acceleration	Maintenance intervals
Fuel consumption	1	1	3
Acceleration	1/3	1	5
Maintenance intervals	1/3	1/5	1

Table 13: Example buying a car functional goals of performance

The example is only important to illustrate the functionalities of the AHP model, so only the first branch is shown and examined.

The next step is to calculate the relative importance of each criterion. This is done by computing the eigenvector of the current matrix (Saaty, 1996).

For the given example, this means for the fundamental goals:

	Eigenvector of matrix
Performance	0.75
Price	0.25

Table 14: Example of fundamental goals

For the functional goals of performance, the values are as follows:

	Eigenvector of matrix	
Fuel consumption (FC)	0.41	w_1
Acceleration (A)	0.48	w_2
Maintenance intervals (MI)	0.11	w_3

Table 15: Example AHP for functional goals of dividends

To complete the calculation of the weights, the calculated numbers of the functional goals have to be multiplied with the calculated weight of the corresponding fundamental goal. That gives the following weights:

	Overall Weight
Fuel consumption (FC)	0.30
Acceleration (A)	0.36
Maintenance intervals (MI)	0.09

Table 16: Example overall weights

As shown in the example, the result of this step is an assigned weight to each criterion. To put it in a more general form, each criteria C_i receives an associated weight w_i. The number of weights must always match the number of criteria.

A comprehensive consistency of AHP use cases is hard to reach and only in exceptional situations achievable, e.g., in 2x2 matrixes (Weber K. , 1993). To measure the consistency of these results, the consistency index (CI) and consistency ratio (CR) are used.

$$CI = \frac{(\lambda_{max} - n)}{(n-1)}$$

Formula 1: Consistency index of the AHP matrix according to (Weber K. , 1993)

$$CR = CI/R$$

Formula 2: Consistency ratio of the AHP matrix according to (Weber K. , 1993)

For the AHP calculations, (Weber K. , 1993) defines λ_{max} as follows:

$$\boldsymbol{A} * \begin{bmatrix} w_1 \\ w_2 \\ \dots \\ w_n \end{bmatrix} = \begin{bmatrix} u_1 \\ u_2 \\ \dots \\ u_n \end{bmatrix} \quad , \quad [1 \quad 1 \quad \dots \quad 1] \begin{bmatrix} \frac{u_1}{w_1} \\ \frac{u_2}{w_2} \\ \dots \\ \frac{u_n}{w_n} \end{bmatrix} \left(\frac{1}{n}\right) = \lambda_{max}$$

Formula 3: Definition of the eigenvalue

To calculate the CR, a random index is needed, which is presented in the table below (see Table 17).

n Number of entries in Matrix	1	2	3	4	5	6	7	8	9	10
R according to Saaty	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Table 17: Random index for the consistency ratio calculation

In the following section, the alternatives which are to be rated will be defined.

4.2.5. Options and alternatives

The options, often called alternatives (A_1, …, A_n), describe the possible projects or actions that can be undertaken to achieve the defined targets (Keeney & Raiffa, 1993). Every alternative has to be evaluated under the same criteria. By looking at the alternatives through a standardized perspective, it is possible to reach more transparent and comprehensible results.

The alternatives can be seen as independent from each other, such that no alternative has an impact on the other. In other cases, there are interdependencies between alternatives and in some theories, it is possible to choose more than one alternative, if, for example the defined budget is not exhausted by the first choice. These theories are of a more complex nature and are often limited to a certain number of alternatives and criteria (Eisenführ & Weber, 2003). In this thesis, we focus on a limited number of alternatives from which only one can be chosen, with no dependencies.

Returning to the example mentioned above, the alternatives would be different cars from a different or from the same manufacturer. For example, the DM might have three different offers to choose from:

- Renault Megane (RM)
- Volkswagen Golf (VWG)
- Fiat Punto (FP)

He has to evaluate which car fits best with his preferences.

In the following chapter, the method of how to make the decision between the alternatives will be explained.

4.2.6. Identification of impact

The final step of solving an MCDM problem is to calculate the impact of each alternative and determine which alternative fits best to the defined target.

To reach this outcome, the AHP method, as described earlier (see Chapter 4.2.4), will be used once more. Therefore, the alternatives are compared to each other according to each examined criterion. The alternatives have to be assessed only on the lowest level of the developed criteria.

To set up a model, this means that the total number of criteria (C_1, …, C_i) gives the number of new AHP comparison matrixes. The number of alternatives (A_1, …, A_n) gives the matrix size n X n (see Table 18).

C_1	A_1	…	A_n
A_1	1		
…		1	
A_n			1

Table 18: Comparison of alternatives

For the above-mentioned example, this means that each car (Renault Megane (RM), Volkswagen Golf (VWG), Fiat Punto (FP)) is one alternative. They are examined according to the example's criteria (C_i) from the first fundamental target (fuel consumption, acceleration, maintenance intervals). The example is only calculated for the first branch to show the method, not to solve the example (see the following table).

Criterion: **Fuel consumption (C_{FP})**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of alternative according to fuel consumption
Renault Megane (RM)	1	1	3	0.41

Volkswagen Golf (VWG)	1	1	5	0.48
Fiat Punto (FP)	1/3	1/5	1	0.11
Criterion: **Acceleration (C_A)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of alternative according to acceleration
Renault Megane (RM)	1	1/5	1	0.13
Volkswagen Golf (VWG)	5	1	7	0.75
Fiat Punto (FP)	1	1/7	1	0.12
Criterion: **Maintenance intervals (C_{MI})**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of alternative according to maintenance intervals
Renault Megane (RM)	1	1/3	1	0.19
Volkswagen Golf (VWG)	3	1	5	0.66
Fiat Punto (FP)	1	1/5	1	0.16

Table 19:Assessing example buying a car criterion performance with sub criteria

After having calculated these matrixes, the overall rank of each alternative has to be determined. Before this can be done, one more step is needed. The criteria have to be

analyzed once more with respect to whether a high value is positive or negative. Then the following classification is obtained (Table 20):

	Benefit / Disadvantage
Fuel Consumption (C_{FC})	-
Acceleration (C_A)	+
Maintenance Intervals (C_{MI})	+

+ … high value is beneficial

- … high value is disadvantageous

Table 20: Classification of criteria regarding benefits/disadvantages

To calculate the overall ranks of the alternatives, a ratio between the benefits and disadvantages for each alternative has to be calculated. As a preliminary work, a sum over all beneficial criteria with the according weights has to be calculated for each alternative. The same process has to be undertaken for the disadvantages (see Formula 4.)

$$Benefits\ of\ A_n = \sum_{\substack{i:\ benefits \\ i=1}}^{n} w_i * C_{iA_n}$$

$$Disadvantages\ of\ A_n = \sum_{\substack{i:disadvantages \\ i=1}}^{n} w_i * C_{iA_n}$$

Formula 4: Benefit and disadvantage sums for each alternative

$$Benefits\ and\ Disadvantage\ Ratio\ for\ A_n = \frac{B_{A_n}}{D_{A_n}}$$

Formula 5: Benefit and disadvantage ratio for each alternative

This method of calculating one sum for the benefits, one sum for the disadvantages and setting them in relation to each other is based on the findings of Saaty (1996). The approach was also used by more papers that targeted the comparison between costs and benefits (Akaa, Abu, Spearpoint, & Giovinazzi, 2016) (Khaki & Shafiyi, 2011). Both values are combined ta a ratio of benefits and costs for comparing the alternatives (see Formula 5).

Returning to the above-mentioned example, the overall rank of alternative "Renault Megane" is calculated as follows:

$$B_{RM} = w_A * C_{A_{RM}} + w_{MI} * C_{MI_{RM}} = 0{,}48 * 0{,}13 + 0{,}11 * 0{,}19 = 0{,}07$$

$$D_{RM} = w_{FC} * C_{FC_{RM}} = 0{,}41 * 0{,}41 = 0{,}12$$

$$\frac{B_{RM}}{D_{RM}} = \frac{0{,}07}{0{,}12} = 0{,}58$$

Formula 6: Calculation of the alternative for the Renault Megane (example case)

The other alternatives are calculated following the same scheme. That gives these results:

Renault Megane (RM)	0.58
Volkswagen Golf (VWG)	2.20
Fiat Punto (FP)	1.67

Table 21: Ranking alternatives of the example

The decision for one alternative is made following the simple formula $max(B_i/D_i)$ (Saaty, 1996). Referring to the example above, one alternative seems to dominate the others (see table 21). The result can easily be shifted after the consideration of the second branch of criteria (see Illustration 1; the complete example calculation with overall results can be found in the Appendix under 9.1.).

After the relative significance of the alternatives has been calculated, a ranking result presents the best solution to the aimed target, as shown in Table 21.

The presented method will be applied to solve the MCDM problem of whether or not companies should invest in an Open Data strategy.

4.3. Open Data as an MCDM approach

As mentioned earlier, an MCDM approach needs various components to be able to be processed. This application of an MCDM technique has to undertake the same steps as presented in the introductory section about MCDM. For this reason, the following chapters are structured as follows. First, a system of objectives is set up, from which we derive the criteria. In the same chapter, the alternatives are described. The second section contains the numerical measures of the relative importance of each criterion and

its sub-criteria. Finally, the numerical values are processed and a ranking of the alternatives is calculated. This three-phase approach is also supported by Mulliner et. at. (2016).

4.3.1. Setting up an Open Data objective system with criteria for an MCDM approach

From the literature findings, we learned about the opportunities and risks of Open Data (see Chapter 3.). In this section, the findings will be applied to a system of objectives which shall be achieved through implementing an Open Data strategy. The combined table of opportunities and risks (see Table 9, Chapter 3.5.3) serves as a basis for setting up a system of objectives. The overall goal is the improvement of the company's current situation. The second level of hierarchy of goals is formed by the categories which were investigated in the previous chapters. The specific arguments of the described risks and opportunities are integrated with objectives. The objectives in an MCDM approach can be benefits as well as disadvantages. This means that objectives can be established as either needing to be achieved or avoided. In the following sequence, the transformation from opportunities and risks to disadvantages will be examined in detail.

Starting with the finance category, the developed opportunities are described on the one hand as a consequence of improved services, products and customer relationships. Thus, the target in this case is the consequence itself, which is the increase in sales and revenue. To reach this target, a functional target is needed, in the form of an improvement of the customer relationship and the customer-product fit. These arguments are also found in the category of core tasks. As an anticipation, we can determine customer-product fit as well as customer relationship as objectives under the category of core tasks (see Illustration 1). Furthermore, it can be stated that both targets are benefits.

Returning to the first addressed category, finance, the first target was set as sales and revenue, which is a benefit category. The second identified opportunity is about savings through efficiency gains. Again, efficiency gains is a functional target, which is important to achieve, but has to be allocated to the section of core tasks of a company. Thus, the objective concerning finances in this case is savings. The identified costs can be distinguished as direct and indirect costs. Direct costs consist of implementation costs, on the one hand, under which education costs are summarized, and maintenance costs, on the other hand. For the reason that both aspects have different dimensions in

time, organizational consequences, one-time costs and recurring costs, they are taken as two objectives that have the character of disadvantages. One more direct cost issue was identified as a risk of ODfB. This issue is the potential but not yet realized returns in the future for services that were once charged for, but which are now given away for free. This target is named “direct revenue losses” and is a disadvantage. The indirect cost issues are caused by other effects, like a loss of competitive advantage. Thus, the indirect losses should be minimized, as well.

The next category is about company reputation. The opportunities can be directly transferred into targets that benefit the company. They are transparency, trustworthiness and social responsibility. The other mentioned opportunity, that more talented employees are attracted by a growing company reputation, is shifted to the category of employees as an employer brand. That target should be maximized, too. The identified risks within the category of reputation concern the misinterpretation of data, questionable liability, information overflow and questioned credibility.

The next category is that of employees. On both sides, culture is listed as an opportunity as well as a risk. As a consequence of the dominant culture, employees suffer more or less from the fear of losing their unique knowledge and position if they share it with other employees or even people outside the organization. Therefore, the factors are given another title, so that the target is to create a confidence culture. With a shift in culture and the ambience within a company, people feel more motivated to work for the company. In addition to these two objectives (confidence culture and motivation) more beneficial targets in the category employees are the development of new skills, qualification and knowledge. The objectives that should be avoided are an increase in the turnover rate and frustration concerning the ODfB project.

More control by the government is a disadvantage identified by the literature of ODfC. If a company opens up its data, there is the potential that the government will use it to enforce control. The company therefore has to pay special attention to the quality of data that are released.

The following category is called “data and technology”. Its arguments are that the more that formats and software are coordinated within a company, the easier collaboration and participation is for the employees. These points are combined with the target of usability.

The category of core tasks was already mentioned above, but because of its importance, it should be put in focus once more. The results from the findings above are that all the examined targets benefit the company. These targets are customer relationships, customer-product fit and process efficiency.

The last category of the summarized risks and opportunities concerns the industry in which the company acts. If a company increases its own reputation, the industry reputation is likewise affected. Thus, an increase of the industry reputation is identified as another beneficial target.

All these targets, with the factors determining whether they should be maximized or not, are summarized in the following illustration (see Illustration 2).

The identified targets can be seen as the criteria to the present decision problem. The next chapter addresses the assignment of weights to the different criteria.

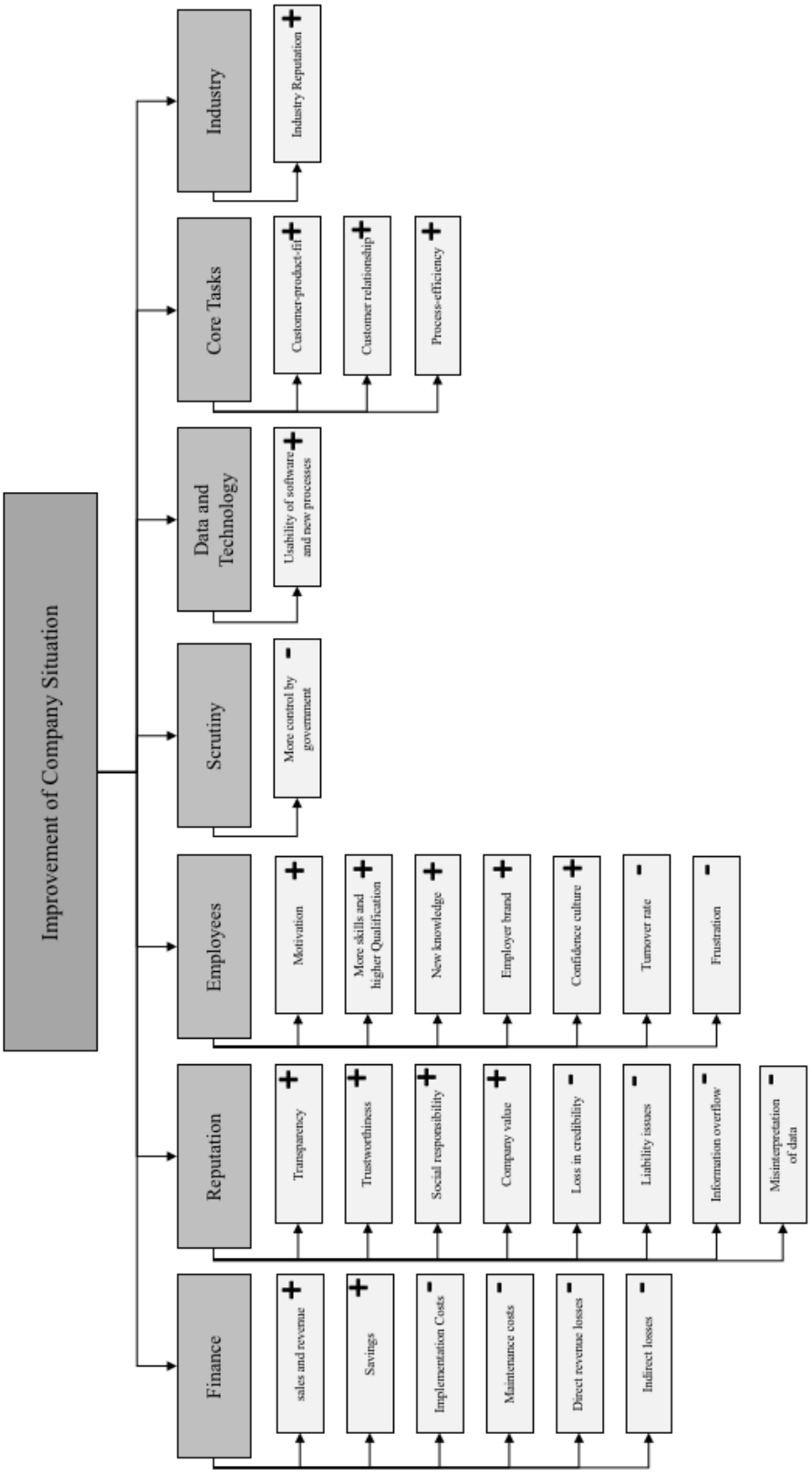

Illustration 2: Goal system of the Open Data MCDM approach with minimizing and maximizing indicators

4.3.2. Assigning weights and relative importance to criteria of an Open Data MCDM Model

To assign weights to the main criteria and the sub-criteria, the AHP method is used. For the main criteria, this gives a 7x7 matrix. The criteria can be found in the dark grey fields of Illustration 2 and also in Table 22. From these 15 decisions, the criteria weights are calculated to fill in Table 22.

	Finance	Reputation	Employees	Scrutiny	Data and technology	Core tasks	Industry
Weights of main branches	w_F	w_R	w_E	w_S	$w_{D\&T}$	w_{CT}	w_I

Table 22: Criteria weights of main criteria

To evaluate each of the shown criteria, the sub-criteria need to be considered, as well. They will also be ranked using the AHP method. The approach is the same for every sub-criteria branch. First, the AHP method is used to compare the sub-criteria and receive the weights y_n. In a second step, the sub-criteria are multiplied with the main criteria weight from Table 22.

An example is given in Table 23 for financial aspects.

	Sales and Revenue	Savings	Implementation costs	Maintenance costs	Direct revenue losses	Indirect losses
Intermediate weights of sub branch	y_1	y_2	y_3	y_4	y_5	y_6
Criteria weights after combination with main criterion weight	w_1	w_2	w_3	w_4	w_5	w_6

Table 23: Criteria weights of the section financial aspects

After having calculated the intermediate weights within the present branch, these sub-branch weights have to be included within the main branch of the financial aspects. Therefore, the calculated values $y_1, \ldots, y_6$ have to be multiplied by the weight of the financial aspects w_F. The results are the overall weight of the relevant criteria for the present decision problem.

These calculations are done for all sub-criteria branches. In the case where there is only one sub-criterion within a given category, the sub-criterion inherits 100% of the main criterion level above. For an example of this, see the scrutiny criterion ($w_S=w_{22}$).

After all the criteria have been ranked, the next step is to continue to the description of the alternatives.

4.3.3. Definitions of alternatives in an Open Data MCDM approach

There are only two alternatives in this case. They consist of the decision to undertake the approach and apply an Open Data strategy or to reject it. While the rejection depicts the current state of the company and is very clear, the future prospects of the status after having implemented the new strategy is harder to describe. Nevertheless, this scenario has to be illustrated for each decision-making company be able to face the problem.

4.3.4. Application of AHP to an Open Data MCDM approach

After all the necessary information has been collected, the last step in comparing the alternatives can be undertaken. For each criterion, a decision matrix with the size 2x2 should be formed. After evaluating one alternative above the other, the following table with the shown indicators as results should be the output:

Main criterion (see Chapter 4.3.1)	Criterion (see Chapter 4.3.1)	Benefits and disadvantages	Assigned weight to criterion	Alternative 1 Invest in an Open Data strategy	Alternative 2 Do not invest in an Open Data strategy
Finance	Sales and revenue	+	w_1	$a_{1\,1}$	$a_{2\,1}$
	Savings	+	w_2	$a_{1\,2}$	$a_{2\,2}$
	Implementation costs	-	w_3	$a_{1\,3}$	$a_{2\,3}$
	Maintenance costs	-	w_4	$a_{1\,4}$	$a_{2\,4}$
	Direct revenue losses	-	w_5	$a_{1\,5}$	$a_{2\,5}$
	Indirect losses	-	w_6	$a_{1\,6}$	$a_{2\,6}$
Reputation	Transparency	+	w_7	$a_{1\,7}$	$a_{2\,7}$
	Trustworthiness	+	w_8	$a_{1\,8}$	$a_{2\,8}$
	Social responsibility	+	w_9	$a_{1\,8}$	$a_{2\,8}$
	Company value	+	w_{10}	$a_{1\,10}$	$a_{2\,10}$
	Loss of credibility	-	w_{11}	$a_{1\,11}$	$a_{2\,11}$

	Liability issues	-	w_{12}	$a_{1\,12}$	$a_{2\,12}$
	Information overflow	-	w_{13}	$a_{1\,13}$	$a_{2\,13}$
	Misinterpretation of data	-	w_{14}	$a_{1\,14}$	$a_{2\,14}$
Employees	Motivation	+	w_{15}	$a_{1\,15}$	$a_{2\,15}$
	Skills and qualification	+	w_{16}	$a_{1\,16}$	$a_{2\,16}$
	New knowledge	+	w_{17}	$a_{1\,17}$	$a_{2\,17}$
	Employer brand	+	w_{18}	$a_{1\,18}$	$a_{2\,18}$
	Confidence culture	+	w_{19}	$a_{1\,19}$	$a_{2\,19}$
	Turnover rate	-	w_{20}	$a_{1\,20}$	$a_{2\,20}$
	Frustration	-	w_{21}	$a_{1\,21}$	$a_{2\,21}$
Scrutiny	More control by government	-	w_{22}	$a_{1\,22}$	$a_{2\,22}$
Data and technology	Usability of software and processes	+	w_{23}	$a_{1\,23}$	$a_{2\,23}$
Core tasks	Customer-product fit	+	w_{24}	$a_{1\,24}$	$a_{2\,24}$
	Customer relationship	+	w_{25}	$a_{1\,25}$	$a_{2\,25}$
	Process efficiency	+	w_{26}	$a_{1\,26}$	$a_{2\,26}$
Industry reputation	Industry reputation	+	w_{27}	$a_{1\,27}$	$a_{2\,27}$

Table 24: Decision matrix for ODfB

The next step is to calculate the relative weights according to each identified criterion with regard to the alternatives. This means that for every criterion, a 2x2 matrix arises and has to be calculated according to the presented method.

This is followed by the calculation of the overall weights for each alternative. Therefore, the sum of all the products of criterion weight and its alternative has to be calculated. In the present case, special attention has to be paid to the fact that the criteria contain benefits as well as disadvantages. For this reason, two sums per alternative have

to be calculated - one for all benefit criteria (b_i), and one for all disadvantage factors (d_i) (see Chapter 4.2.6, Formula 4), (Saaty, 1996), (Mu & Pereyra-Rojas, 2017).

For the present case, this means the benefits for both alternatives can be calculated like this (based on Formula 4):

$$b_1 = a_{1\,1} * w_1 + a_{1\,2} * w_2 + a_{1\,7} * w_7 + a_{1\,8} * w_8 + a_{1\,9} * w_9 + a_{1\,10} * w_{10} + a_{1\,15} * w_{15} + a_{1\,16} * w_{16} + a_{1\,17} * w_{17} + a_{1\,18} * w_{18} + a_{1\,19} * w_{19}\, a_{1\,23} * w_{23} + a_{1\,24} * w_{24} + a_{1\,25} * w_{25} + a_{1\,26} * w_{26} + a_{1\,27} * w_{27}$$

Formula 7: Calculation of the benefits for Alternative 1, applying an Open Data strategy

$$b_2 = a_{2\,1} * w_1 + a_{2\,2} * w_2 + a_{2\,7} * w_7 + a_{2\,8} * w_8 + a_{2\,9} * w_9 + a_{2\,10} * w_{10} + a_{2\,15} * w_{15} + a_{2\,16} * w_{16} + a_{2\,17} * w_{17} + a_{2\,18} * w_{18} + a_{2\,19} * w_{19} + a_{2\,23} * w_{23} + a_{2\,24} * w_{24} + a_{2\,25} * w_{25} + a_{2\,26} * w_{26} + a_{2\,27} * w_{27}$$

Formula 8: Calculation of benefits for Alternative 2, NOT applying an Open Data strategy

and the disadvantages can be calculated following these formulas (based on formula 4):

$$d_1 = a_{1\,3} * w_3 + a_{1\,4} * w_4 + a_{1\,5} * w_5 + a_{1\,6} * w_6 + a_{1\,11} * w_{11} + a_{1\,12} * w_{12} + a_{1\,13} * w_{13} + a_{1\,14} * w_{14} + a_{1\,20} * w_{20} + a_{1\,21} * w_{21} + a_{1\,22} * w_{22}$$

Formula 9: Calculation of disadvantages for Alternative 1, applying an Open Data strategy

$$d_2 = a_{2\,3} * w_3 + a_{2\,4} * w_4 + a_{2\,5} * w_5 + a_{2\,6} * w_6 + a_{2\,11} * w_{11} + a_{2\,12} * w_{12} + a_{2\,13} * w_{13} + a_{2\,14} * w_{14} + a_{2\,20} * w_{20} + a_{2\,21} * w_{21} + a_{2\,22} * w_{22}$$

Formula 10: Calculation of disadvantages for Alternative 2, NOT applying an Open Data strategy

The decision should be made in favor of the best benefit/disadvantage ratio; thus, the target is to find the max b_n/d_n (following Formula 5):

$$overall\ disadvantage\ benefit\ ratio\ of\ Alternative\ 1 = \frac{b_1}{d_1}$$

Formula 11: Overall disadvantage-benefit ratio of Alternative 1, applying an Open Data strategy

$$overall\ disadvantage\ benefit\ ratio\ of\ Alternative\ 2 = \frac{b_2}{d_2}$$

Formula 12: Overall disadvantage-benefit ratio of Alternative 2, applying an Open Data strategy

To prove the model, a survey was undertaken as presented in the following chapter.

5. Survey

5.1. Description of methods

The survey's goal is to validate the arguments described above and the developed decision model.

The study concentrates on testing the developed model as a pilot survey for further investigations. It is important to see whether the candidate's evaluation of their situation fits to the results of the model as to whether a company should invest in an Open Data strategy or not. Therefore, a short introductory question about their views of Open Data will be asked, and in a second step, the model will be worked out. An important point in these direct, face-to-face interviews the ability to explain the model in detail and ask questions about missing points or potential improvements.

The survey is designed in German because it was performed in Austria, where German is the official language.

5.2. Selection of experts

The target group are Austrian companies that have undertaken a planning process concerning whether or not to release data to public. Therefore, three companies that have already released data and three companies that refused to do so were chosen.

In Austria, the place to publish Open Data for companies is opendataportal.at. It was released by Wikimedia Österreich in cooperation with the Open Knowledge Foundation Österreich and the Cooperation Open Government Data Österreich (Wikimedia Österreich, nd). The complete list of companies who released their data to the public contains 39 entities (August, 2017). Only 16 of them are from the private sector. Of these 16 companies, 10 released three or fewer datasets. Thus, the companies with five or more releases were asked for expert interviews. Through the publication of more than one dataset they send the signal that they have put some effort into the topic. This leaves the following companies eligible for further investigation:

- HP Enterprise Business Hewlett Packard
- Semantic Web Company GmbH
- KDZ Zentrum für Verwaltungsforschung (Verein)

During the research and interviews, another company was mentioned that publishes company data, but has not released them on the Open Data portal. This company was interviewed as well.

- Has.To.Be GmbH

The complementary companies that have not released data to the public were identified during the interviews with the above-mentioned companies.

- APA – Austria Presse Agentur eG.
- Unwired Networks GmbH
- Insuro (GmbH in Gründung)[8]

Although all companies belong to different industries, they act within an IT-affine environment.

5.3. Guideline for interviews

The interviews were conducted personally and face-to-face with the individuals responsible for Open Data (or with those holding a similar position) in the respective companies. For this purpose, a questionnaire based on the former findings was developed. It contains the developed model, as well as a few open-ended questions about the company's view on this topic and questions about the company's strategy for those who already apply Open Data.

5.3.1. Basics

At the beginning of the interview, the interviewee is asked about the company. Data concerning the company's purpose, operating markets and number of employees will be raised. This section is important to identify a possible bias from that specific perspective.

[8] The founders of Insuro were employed in different companies that had already undertaken a planning process regarding Open Data. Therefore, they spoke quite early about the possible value of Open Data for their current company.

5.3.2. Decision criteria and their weights

In this section, the findings from the literature are tested in a structured sequence of the questionnaire. Subjects are asked about the above-described opportunities and risks and the criteria derived from them for the presented decision model. A structured format results in better comparability. However, open questions and questions with possible extensions will also be asked, in order not to miss an important fact or new input that has not yet been addressed in the literature. Therefore, an open section for further ideas and inputs was also included in every section of criteria.

5.3.3. Evaluation of alternatives

After having asked for the weights of the criteria, the alternatives need to be evaluated against each other. The aim of this sequence is to see whether the developed decision model gives the same result as that which the companies came to on their own.

5.4. Interview results

The interviews took place between March 2nd and March 15th, 2018. The interviews were held at the interviewee's offices, in a pleasant atmosphere. The average duration of an interview was 46 minutes. The interviews were not interrupted at any point.

The questionnaire used in the interviews can be found in the Appendix. Because the model is built on personal ideas and estimates, all interviewees asked that the data be anonymized before publishing. The list of names and companies can be requested from the author.

5.4.1. Basics

As described in the introductory section of this chapter, all of the companies are in the IT industry in some capacity. In other ways, they are highly heterogeneous, as can be seen in the following chart describing the characteristics of the pertinent companies:

	UWN	APA	INS	HPE	KDZ	SWC	HTB
Industry	IT	Media	Health-Tec	IT	Survey and market analysis	IT	E-Mobility
Number of employees	15	650	4	600	23	42	35
Annual turnover	> 1 M €	>10 M €	0	>10 M €	>1 M €	> 1 M €	>1 M €
Engagement in Open Data	No	No	No	Yes	Yes	Yes	Yes

Table 25: Structure of interview partners

Possibilities for grouping them together include groupings according to the number of employees, in groups of those with under 40 employees (67% of the companies) and those above 60 employees (33% of the companies). Regarding the annual turnover, it is possible to form groups within the section of those with more than €10,000,000 in annual turnover (33% of the companies), those with more than €1,000,000 (50% of the companies) and those with €0 (17% of the companies). Another easy way to distinguish the companies is if they are already engaged in an Open Data project or not (50% on both sides).

In the next section, the results will be presented according to each company and the presented groups.

5.4.2. Decision criteria

In a first step, the decision criteria were weighted according to the main groups. In a second step, the candidates examined all sub-criteria. To do so, the candidates were asked to rate the criteria pairwise according to their importance for company decisions. The above-presented AHP matrixes were used, as they can be found in the questionnaire in the Appendix (see 9.2).

Because the interviewees were asked about their personal thoughts and opinions, their names were anonymized in the following chapter as well as in the interviews printed in the Appendix (see 9.3).

The survey consists of seven interviews, with seven datasets resulting from them. These datasets will be examined and described in detail within the following sections. Seven datasets are not many, and so statistical tools cannot be applied to find significant results.

	C1	C2	C3	C4	C5	C6	C7	Average (geometric)
Finance	14.85%	14.40%	18.54%	10.68%	15.95%	11.84%	12.51%	13.90%
Reputation	34.31%	9.20%	7.46%	10.66%	17.47%	20.31%	5.74%	12.62%
Employees	11.37%	24.23%	31.82%	8.83%	15.55%	19.49%	27.03%	18.09%
Scrutiny	1.59%	1.53%	1.73%	10.67%	4.72%	2.80%	2.44%	2.83%
Data and Technology	14.06%	18.47%	10.51%	26.96%	8.75%	21.71%	25.90%	16.70%
Core Tasks	12.03%	23.16%	26.11%	27.11%	35.49%	18.40%	17.33%	21.65%
Industry Reputation	11.79%	9.01%	3.83%	5.10%	2.07%	5.45%	9.04%	5.77%

Table 26: Valuation of main criteria

The results within the main criteria were quite heterogeneous (see Table 26). Illustration 3 shows the differences printed in a box plot diagram. It is observable that some criteria show significant scattering - for example, the criterion "reputation" - while others seem to be clustered together, like the criterion "finance". Another point that can be seen in the diagram is that the values are not normally distributed; all quartiles have different lengths. Outliers can also be found within the criteria reputation, such that the length of the fourth quartile is as long as the other three. The same pattern can be found in the criterion "scrutiny".

The smallest spectrum of observed values has the criterion "finance", with a difference of 7.86% between the lowest and the highest value, while "company reputation" has the biggest bandwidth of 28.57%.

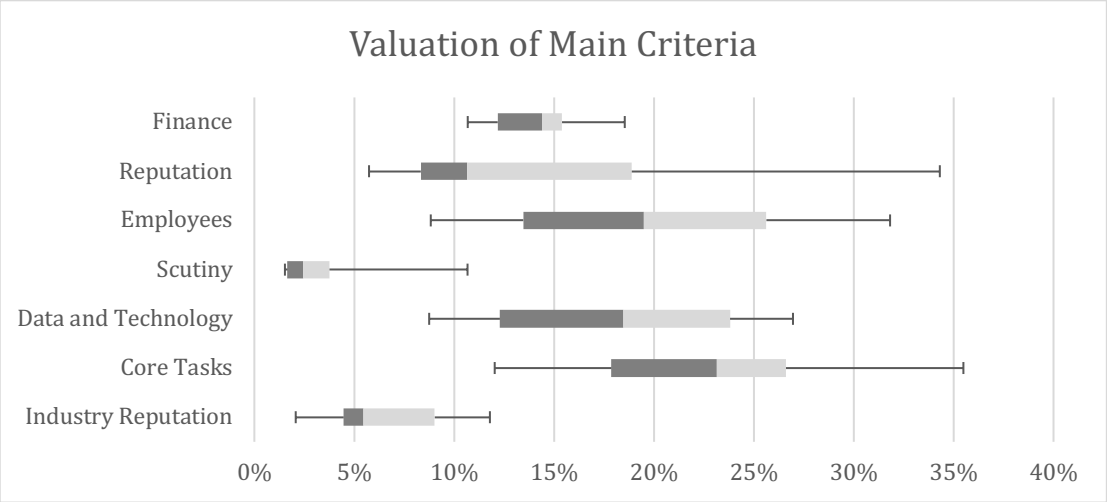

Illustration 3: Boxplot diagram of main criteria

The geometric average is in no case identical with the median. The biggest difference can be found in the criterion of company reputation and the smallest in industry reputation.

	C1	C2	C3	C4	C5	C6	C7	Average (geometric)
Sales and revenue	32.74%	21.75%	33.51%	13.84%	39.85%	27.36%	50.82%	29.25%
Savings	9.95%	16.72%	15.85%	15.89%	16.58%	37.78%	6.76%	15.08%
Implementation costs	25.03%	12.91%	9.61%	5.39%	9.92%	27.36%	10.12%	12.44%
Maintenance costs	5.28%	4.00%	33.51%	26.30%	24.36%	37.78%	6.84%	14.22%
Direct revenue losses	13.67%	17.69%	2.11%	1.93%	5.21%	17.68%	12.74%	7.34%
Indirect losses	13.33%	26.93%	5.41%	36.65%	4.08%	5.20%	12.74%	10.98%
Transparency	5.50%	5.98%	9.22%	5.72%	8.81%	7.90%	2.82%	6.17%
Trustworthiness	9.71%	9.93%	13.14%	12.89%	23.43%	4.08%	10.31%	10.70%
Social responsibility	7.49%	15.01%	6.07%	11.12%	14.07%	7.11%	2.42%	7.85%
Company value	14.05%	8.05%	39.24%	5.20%	9.38%	8.36%	35.96%	13.07%
Loss in credibility	32.32%	9.49%	7.95%	10.87%	23.42%	3.94%	10.85%	11.50%
Liability issues	23.34%	3.35%	19.97%	48.27%	14.98%	26.15%	23.46%	18.32%
Information overflow	2.42%	32.82%	1.44%	2.47%	3.53%	11.33%	4.25%	4.67%
Misinterpretation of data	5.17%	15.36%	2.97%	3.46%	2.38%	20.62%	9.94%	6.31%
Motivation	23.92%	5.36%	29.34%	5.98%	18.79%	4.89%	21.70%	12.39%
Skills and qualification	33.72%	11.23%	27.13%	16.46%	8.78%	17.59%	24.95%	18.16%
New knowledge	9.31%	6.42%	5.90%	18.06%	4.66%	17.72%	6.29%	8.54%
Employer brand	15.46%	11.24%	4.37%	4.46%	24.17%	17.46%	4.41%	9.36%
Confidence culture	2.85%	3.86%	4.04%	6.98%	20.49%	12.90%	4.81%	6.30%
Turnover rate	5.90%	28.93%	16.17%	33.03%	7.05%	3.91%	17.25%	12.33%
Frustration	8.85%	32.96%	13.04%	15.02%	16.07%	14.45%	20.60%	16.04%
More control by government	1.59%	1.53%	1.73%	10.67%	4.72%	21.11%	2.44%	3.78%
Usability of software and processes	14.06%	18.47%	10.51%	26.96%	8.75%	12.46%	25.90%	15.42%
Customer-product fit	13.95%	14.29%	72.33%	18.67%	33.28%	2.80%	58.70%	20.40%
Customer relationship	79.38%	42.86%	7.08%	65.55%	30.15%	21.71%	33.24%	32.00%
Process efficiency	6.67%	42.86%	20.59%	15.78%	36.57%	71.43%	8.06%	21.25%
Industry reputation	11.79%	9.01%	3.83%	5.10%	2.07%	14.29%	9.04%	6.62%

Table 27: Unweighted sub criteria

After evaluating the main criteria, the interviewees were asked to evaluate the sub-criteria (see Table 27). Again, it is easy to see that the spectrum of all criteria varies strongly.

For further calculations, the sub-criteria are weighted with the main criteria. It has to be kept in mind that all criteria without sub-criteria inherit their values from the main criteria. The following table shows the weighted sub-criteria that are used for the further calculations. The original, unweighted values of all sub-criteria can be found in the Appendix, as can the weighted values (see Chapter 9.4).

One characteristic applied to describe the calculated values is the geometric average. In this final version of the criteria weights, it is hard to compare their average values, because some of them just inherit the percentages of the main criteria. That is the case if there is only one sub-criterion. Another point is that not all main criteria are divided into the same number of sub-criteria, which does not make it possible to compare all sub-criteria easily to each other.

A first conclusion that can be drawn at this point is that there is no tendency observable concerning the criteria weights, neither within the main criteria nor within the sub-criteria.

As mentioned in the previous chapter, it is possible to group the companies according to their characteristics. While looking at clustered groups, it has to be kept in mind that the whole sample only consists of seven interviews. Every fraction of it is even smaller. Thus, the conclusions that can be drawn from cluster groups must be handled carefully.

The first groups observed consist of companies that use Open Data and companies that do not invest in it. Comparing these two groups shows that the spectra of the main criteria deviate between 5.28% and 18.21% for the companies that employ an Open Data strategy and between 0.20% and 28.85% for those that do not (see Appendix 9.4.2). Going into detail, for example in the category finance, demonstrates that both clusters have a similar spectrum which deviates only by 1%, but their medians differ more. One of the companies that uses Open Data is at 12%, while the other one is nearly 15%. The category with the biggest difference in terms of medians is “data and technology” (nearly 10%) and that with the smallest difference is “core tasks” (0.4%). Looking at the weighted sub-criteria, the graphs show a similar picture. Some criteria

differentiate a lot from each other, while others seem to be merged together more than before.

Other possible clusters would be to form groups according to company size, for example of those with less than 100 employees or with a yearly turnover between €1,000,000 and €10,000,000 (the boxplot diagrams for these groupings can be found in the Appendix). Neither of these clusters show significant patterns.

After going through the criteria, the interviewees were asked if there were aspects missing from the survey that are important to them. Two of them pointed to external factors like legal restrictions. Another interviewee mentioned the fit to the company's strategy, which was supported by another interviewee who argued that the calculability would be an important factor for company decisions as well as the profitability and liquidity of the company.

In the introductory section about the AHP model, the consistency ratio (CR) was presented. This measure was calculated for all AHP tables that resulted from the interviews; see Table 28, below.

	C1	C2	C3	C4	C5	C6	C7
Overall	0.26	0.33	0.24	0.36	0.16	0.04	0.27
Finance	0.37	0.38	0.37	0.46	0.31	0.08	0.20
Company reputation	0.34	0.25	0.23	0.15	0.28	0.07	0.14
Employees	0.12	0.26	0.18	0.27	0.34	0.07	0.07
Core competencies	0.00	0.12	0.27	0.03	2.14	0.00	0.21

Table 28: CR of the AHP tables for analyzing preferences

The literature states that the CR of an AHP analysis should to be smaller than 0.1, but according to the table size, the tolerable ratio could be up to 0.2 (Wedley, 1993). The calculated ratios from the interviewee's tables did not match this limit of 0.1, except for one candidate, who fulfilled this request in all tables (C6). The majority of all CRs were even above 0.2. These results for the CR values show inconsistencies in some of the interviewees' answers. The consequence of this is that all of the results have to be considered with caution, because they are not reliable.

In the next section, the results of the tests of the model by the employees are discussed.

5.4.3. Valuation of alternatives

Every interviewee was asked to rate the alternative "engagement in Open Data" and "no engagement in Open Data" according to the impact of each criterion for their company. The matrix and questionnaire used in the interview can be found in the Appendix.

The overall results are as follows in Table 29:

	Current engagement in Open Data	Ratio Alternative 1 (engagement in Open Data)	Ratio Alternative 2 (NO engagement in Open Data)	Overall tendency after processing the model
C1	No	3.40	3.59	No
C2	No	2.58	1.86	Yes
C3	No	1.47	5.32	No
C4	Yes	3.24	1.37	Yes
C5	Yes	3.66	5.72	No
C6	Yes	3.55	2.10	Yes
C7	Yes	4.30	2.92	Yes

Table 29: Results after applying the model

Looking at the individual cases, the results are quite interesting.

For C1, it was quite clear during the interview that there is not enough benefit in implementing an Open Data project, which is also shown from the model. C2, in contrast, has no engagement in Open Data as yet, but could profit from it. The interviewee realized during the interview, before knowing the results, that Open Data is a topic worth discussing more closely. C3 was in the same situation as C1. The company was sure that Open Data did not carry enough benefits for them, and the model draws the same conclusion. In the case of C4, the facts are reversed. C4 was persuaded that Open Data benefitted the company, as the success stories show. The case of C5 is quite interesting. C5 already applies Open Data, but according to the model, does not benefit from it. During the interview, the candidate stated that their first goal is to support the broader Open Data initiative, not to serve company goals. Looking at C6 and C7, the cases look straightforward. They have a current engagement in Open Data and according to the model they should do so.

These results depend on each company's valuation of the criteria as well as its assessment of the alternatives for each company. To make the results more comparable, another calculation has been undertaken with the averages of the final weights.

	Current engagement in Open Data	Overall tendency after processing the model with the company-specific weights	Overall tendency after processing the model with the geometric average weights
C1	No	No	No
C2	No	Yes	No
C3	No	No	No
C4	Yes	Yes	Yes
C5	Yes	No	Yes
C6	Yes	Yes	Yes
C7	Yes	Yes	Yes

Table 30: Results after applying the model with average weights

It is observable that four out of seven samples are completely constant and remain the same (see Table 30). The interesting lines are those concerning C2 and C5, which result in a change in the advised options. The fact that the interviews supported the results of the calculation with the company-specific weights, support the use of the calculation with company-specific weights rather than that calculated with average weights.

Despite this conclusion, it can be argued that the present sample is too small to give representative average values. Therefore, the only conclusion that can be drawn from these results is that more data need to be found so that it can be determined whether these two are the exception or whether the model needs to be thoroughly revised.

6. Results

The goals of this thesis were the analysis of risks and benefits resulting from ODfC and the development of a model that is able to support companies in making their decision whether or not to invest in an Open Data strategy.

The result for the first goal is the list of risks and benefits of Open Data for companies presented in Chapter 3.5.3; see Table 9. The list was tested during the survey and supported by the interviewees. Some interviewees mentioned supplementary criteria, but not all.

One aspect of the interviews was intended to test the importance of the criteria. The sample was divided into clusters, but none of them showed a clear tendency for the weights of the criteria. The observation from this finding is that companies are very different in their valuations.

The second goal of the present thesis was to develop a model that supports companies in making their decision whether or not to open their data. The developed model is built on the AHP method, which is a MCDM tool. Per the aforementioned criteria, the model was tested within the interviews. First, the model was calculated for each company with company-specific weights. For all but two companies, the model results matched their current status of engagement on this topic. For two companies, the model suggested that they would change their mind about it. In a second step, the model was processed for each company with average values for the criteria weights derived from the sample as a whole. The results showed a different picture compared to the prior iteration. After this modification had been made to the weights, all companies in the model accorded with their current status on the issue. This observation shows that the model is strongly dependent on the criteria weights and that results change according to the changing weights.

In the following section, these observations will be interpreted and conclusions will be drawn.

7. Conclusion and Critical Discussion of Future Steps

The risks and benefits of publishing data and making them available for free are multi-faceted, as the literature analysis has shown. Therefore, a holistic approach is needed to make the topic of ODfB tangible for companies. An MCDM approach was used to combine all the aspects analyzed from different streams of literature. This model was tested within a small survey, using face-to-face interviews.

The goal of the developed model is to support companies in making their decision whether or not to invest in an Open Data approach. The interviews showed that companies that are sure about their status and have their aims clear in mind come to the same decision predicted by the model as that which they had previously considered. In the two cases for which the model calculated, it could be reasonable to change their status, as the results changed when the calculations were performed with average weights instead of the original values. For the reason that the statements in the interviews supported the first results, it can be stated that the model works best with the company-specific weights.

One question that arises is if the model provides a knowledge profit for its users. There are several answers to this question. On the one hand, it is easy to argue that there is no knowledge gained, because companies that are certain about their targets do not earn new insights; on the other hand, the model does not address companies that know everything about Open Data, in the first place. The model should be applied by companies that have not yet gone through a decision process about whether to invest in Open Data or not. For these companies, the model opens new opportunities and new dimensions as to how to address Open Data. Thus, the model is useful as a first contact point.

Another reason why the model could be a valuable tool is that Open Data is still a hardly known topic in the private sector. Knowledge about which data to publish and what consequences, and for whom, will result from the decision, is not yet commonly available. Therefore, the model could be used to help spread the topic and position it in the business sector.

Despite these prospects, the model could benefit from a number of improvements.

One possibility of improving the model lies in the presented criteria. During the interviews, the candidates mentioned criteria that were not included in the given list, like

legal restrictions, more financial indicators and the fit to the company strategy. The improvement in this case would be to look for the theoretical background of these inputs and test them with new candidates.

Another possibility is to use a computer-supported tool instead of a questionnaire with pen and paper to evaluate the criteria weights. The reason for this lies in the high CRs the interviews produced. If a software tool is used, these inconsistencies can be addressed directly and corrected.

Nevertheless, there are two main limitations within the developed model. First, according to the small sample, the results have to be handled carefully when it comes to generalizability, because the outcomes are strongly affected by the present cases. The other limitation concerns the origin of the companies within the sample. Although all are data-affine, they belong to different industries. To gain insights into industry-specific weights, a bigger sample would be needed to cover all industries.

One more point to think about is the possible internationalization of the model. Although the literature review has no clear Austrian focus, the interviews do reflect country-based concerns. Another country-specific aspect is the approach towards Open Data. While costs are excluded in Austria, other countries include marginal costs for datasets into their definition of Open Data. Thus, for the model to be internationalized, this aspect has to be reviewed, and the model, if necessary, adapted.

In conclusion, it can be said that the developed model is able to provide support to companies confronted with the question of whether or not to apply an Open Data strategy, if companies insert their own perception of the criteria weights.

8. References

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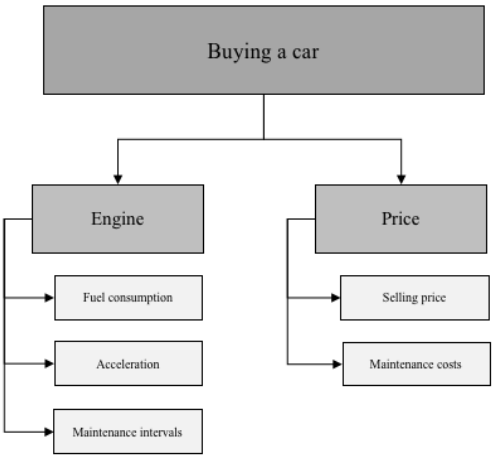
9. Appendix

9.1. AHP complete Example

Decision Problem/ Goal System:



Alternatives:

- Renault Megane
- Volkswagen Golf
- Fiat Punto

Main Goals/ Overall Criteria Weights:

	Performance	Price	Eigenvector
Performance	1	3	0,75
Price	1/3	1	0,25

CR =0,00

Functional Goals: Criteria for Performance:

	Fuel con-sump-tion	Acceleration	Maintenance intervals	Eigenvector
Fuel consumption (FC)	1	1	3	0,41
Acceleration (A)	1/3	1	5	0,48
Maintenance Inter-vals (MI)	1	1/5	1	0,11

CR =0,03

Functional Goals: Criteria for Price:

	Selling Price	Maintenance Costs	Eigenvector
Selling Price (SP)	1	1/3	0,25
Maintenance Costs (MC)	3	1	0,75

CR =0,00

Evaluation of each alternative according to analysed criteria:

Criterion: **Fuel consumption (FP)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of Alternative according to Fuel consumption
Renault Megane (RM)	1	1	3	0,41
Volkswagen Golf (VWG)	1	1	5	0,48
Fiat Punto (FP)	1/3	1/5	1	0,11
CR =0,03				

Criterion: **Acceleration (A)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of Alternative according to Acceleration
Renault Megane (RM)	1	1/5	1	0,13
Volkswagen Golf (VWG)	5	1	7	0,75
Fiat Punto (FP)	1	1/7	1	0,12
CR =0,01				

Criterion: **Maintenance intervals (MI)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of Alternative according to Maintenance Intervals
Renault Megane (RM)	1	1/3	1	0,19
Volkswagen Golf (VWG)	3	1	5	0,66
Fiat Punto (FP)	1	1/5	1	0,16
CR =0,03				

Criterion: **Selling Price (SP)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of Alternative according to Selling Price
Renault Megane (RM)	1	1/7	1/3	0,08
Volkswagen Golf (VWG)	7	1	5	0,72
Fiat Punto (FP)	3	1/5	1	0,19
CR =0,06				

Criterion: **Maintenance Costs (MC)**	Renault Megane (RM)	Volkswagen Golf (VWG)	Fiat Punto (FP)	Importance of Alternative according to Maintenance Costs (MC)
Renault Megane (RM)	1	1/7	1	0,12
Volkswagen Golf (VWG)	7	1	5	0,75
Fiat Punto (FP)	3	1/5	1	0,13
CR =0,01				

Overview of all examined values:

Main criteria	Main criteria weights	Sub criteria	Sub criteria weights	Combined weights	benefit/ disadvantage	Importance of Alternative according to criterion			Importance of Alternative according to criterion – weighted with combined weights		
						RM	VWG	FP	RM weighted	VWG weighted	FP weighted
performance	0,75	FC	0,41	0,30	-	41%	48%	11%	12%	15%	3%
		A	0,48	0,36	+	13%	75%	12%	5%	27%	4%
		MI	0,11	0,09	+	19%	66%	16%	2%	6%	1%
price	0,25	SP	0,25	0,06	-	8%	72%	19%	1%	5%	1%
		MC	0,75	0,19	-	12%	75%	13%	2%	14%	3%

Benefit / Disadvantage ratio:

	RM	VWG	FP
benefits	0,06	0,32	0,06
disadvantages	0,15	0,33	0,07
ratio	0,43	0,98	0,79

Result: Decision for Volkswagen Golf

9.2. Introduction Letter and Questionnaire

Svenja Mensing

svenja.mensing@rmedv.com

0043/676/5651342

28.02.2018

Sehr geehrte Damen und Herren,

im Rahmen meiner Masterarbeit an der Universität Wien untersuche ich Open Data im privaten Sektor. Das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells, das Unternehmen dabei unterstützen soll sich für oder gegen ein Engagement im Bereich Open Data zu entscheiden.

Ich würde mich freuen Sie als Interviewpartner gewinnen zu können, um Ihre Erfahrungen in mein Modell einfließen zu lassen. Mein Modell basiert auf einem multikriteriellen Entscheidungsmodell, insbesondere dem Analytical Hierarchy Ansatz. In dem Gespräch geht es einerseits darum die Gewichtung entscheidungsrelevanter Kriterien zu beurteilen und andererseits die möglichen Szenarien gegenüber zu stellen. Die Szenarien sind das Engagement in Open Data und die Ablehnung des Unterfangens.

Ich würde mich sehr über eine positive Rückmeldung freuen.

Mit besten Grüßen,

Svenja Mensing

Fragebogen für Experteninterview

Datum: _____

Uhrzeit: _____

Vorgehen im Interview:

1.) Basisdatenerhebung

2.) Ziele von Open Data für das Unternehmen

3.) Kriterien für Open Data

4.) Alternativen-Bewertung von Open Data

1.) Basics

1.1) Person

Name:

_____

Firme:

_____

Position im Unternehmen:

_____

1.2) Unternehmen

Tätigkeitsfeld:

_____

Anzahl Mitarbeiter:

_____

Umsatz des vergangenen Jahres:

< 0,5Mio €	0,5 - 1 Mio €	1 – 5 Mio€	5 – 10 Mio €	> 10Mio €

(nur relevant, wenn bereits Daten publiziert werden)

1.3) Open Data

Welche Art von Datensätzen publiziert Ihr Unternehmen? _____

_____

Wo publizieren Sie die Datensätze?

_____

Wann haben Sie damit angefangen?

_____

Wie viele Datensätze publizieren Sie?

_____

2) Ziele von Open Data für das Unternehmen

2.1) Welche Ziele verfolgte das Unternehmen mit dem erstmaligen Einsatz von Open Data?

_____

_____

_____

2.2) Konnten diese Ziele bereits erreicht werden? / Welche Teilziele wurden bereits erreicht?

_____

_____

_____

2.3) Welche Erfolgsbeispiele gibt es?

_____

_____

_____

3.) Entscheidungskriterien und Gewichtung

Das Modell basiert auf dem paarweisen Vergleich von Kriterien und/ oder Alternativen. Es wird folgende Skala verwendet:

- 9	- 7	- 5	- 3	1	3	5	7	9
absolut weniger wichtig	wesentlich weniger wichtig	weniger wichtig	ein bisschen weniger wichtig	Gleichheit	ein bisschen wichtiger	wichtiger	wesentlich wichtiger	absolut wichtiger

3.1) Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchen-image
Finanzen	1						
Unternehmensruf		1					
Mitarbeiter			1				
Kontrolle durch den Staat				1			
Daten und Technologie					1		
Kernkompetenzen						1	
Branchen-image							1

(nur graue Felder ausfüllen)

3.2) Finanzen

	Umsatz	Einsparungen	Einmalige Kosten	Wiederkehrende Kosten	Nicht realisierte Erlöse	Indirekte Umsatzeinbußen
Umsatz	1					
Einsparungen		1				
Einmalige Kosten			1			
Wiederkehrende Kosten				1		
Nicht realisierte Erlöse					1	
Indirekte Umsatzeinbußen						1

(nur graue Felder ausfüllen)

3.3) Unternehmensimage

	Transparenz	Vertrauenswürdigkeit	Soziale Verantwor-tung	Unternehmenswert	Glaubwürdigkeit	Haftungsfragen	Informationsüberfluss	Fehlinterpretation von Daten
Transparenz	1							
Vertrauenswürdigkeit		1						
Soziale Verantwor-tung			1					
Unternehmenswert				1				
Glaubwürdigkeit					1			
Haftungsfragen						1		
Informationsüberfluss							1	
Fehlinterpretation von Daten								1

(nur graue Felder ausfüllen)

3.4) Mitarbeiter

	Motivation	Fähigkeiten und Qualifikation	Neues Wissen	Arbeitgebermarke	Kultur der Zuversicht	Mitarbeiterfluktuation	Frustration
Motivation	1						
Fähigkeiten und Qualifikation		1					
Neues Wissen			1				
Arbeitgebermarke				1			
Kultur der Zuversicht					1		
Mitarbeiterfluktuation						1	
Frustration							1

(nur graue Felder ausfüllen)

3.5) Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1		
Kundenbeziehung		1	
Prozesseffizienz			1

(nur graue Felder ausfüllen)

3.6) Fehlen Kriterien, die für Sie wichtig waren?

_____

_____

_____

_____

3.7) Kommentare

_____

_____

_____

_____

_____

_____

_____

4.) Bewertung der Alternativen

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—3—1—3—5—7—9	
	Einsparungen	9—7—5—3—1—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	9—7—5—3—1—3—5—7—9	
	Wartungskosten / Wiederkehrende Kosten	9—7—5—3—1—3—5—7—9	
	Nicht realisierte Erlöse	9—7—5—3—1—3—5—7—9	
	Indirekte Umsatzeinbußen	9—7—5—3—1—3—5—7—9	
Unternehmensruf	Transparenz	9—7—5—3—1—3—5—7—9	
	Vertrauenswürdigkeit	9—7—5—3—1—3—5—7—9	
	Soziale Verantwortung	9—7—5—3—1—3—5—7—9	
	Unternehmenswert	9—7—5—3—1—3—5—7—9	
	Glaubwürdigkeit	9—7—5—3—1—3—5—7—9	
	Haftungsfragen	9—7—5—3—1—3—5—7—9	
	Informationsüberfluss	9—7—5—3—1—3—5—7—9	
	Fehlinterpretation von Daten	9—7—5—3—1—3—5—7—9	
Mitarbeiter	Motivation	9—7—5—3—1—3—5—7—9	
	Fähigkeit und Qualifikation	9—7—5—3—1—3—5—7—9	
	Neues Wissen	9—7—5—3—1—3—5—7—9	
	Arbeitgebermarke	9—7—5—3—1—3—5—7—9	
	Kultur der Zuversicht	9—7—5—3—1—3—5—7—9	

	Mitarbeiterfluktuation	9—7—5—3—1—3—5—7—9
	Frustration	9—7—5—3—1—3—5—7—9
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—5—3—1—3—5—7—9
Daten und Technologie	Usability der Software und Prozesse	9—7—5—3—1—3—5—7—9
Kernkompetenzen	Customer-Product-Fit	9—7—5—3—1—3—5—7—9
	Kundenbeziehung	9—7—5—3—1—3—5—7—9
	Prozesseffizienz	9—7—5—3—1—3—5—7—9
Branchenimage	Branchenimage	9—7—5—3—1—3—5—7—9

4.1 Kommentare

_____

_____

_____

_____

_____

_____

_____

Vielen Dank für Ihre Unterstützung!

9.3. Interviews

9.3.1. Company 1

Mensing: Guten Tag Herr Company 1, vielen Dank, dass Sie sich die Zeit genommen haben.

Company 1: Guten Tag Frau Mensing, sicher, ich helfe gerne bei Masterarbeiten.

Mensing: Ich würde das Gespräch gerne aufzeichnen, ich muss das transkribieren und in den Anhang meiner Arbeit anfügen.

Company 1: Ja, natürlich. An dieser Stelle muss ich Ihnen jedoch sagen, dass ich kein Unternehmenssprecher der APA bin und daher meine Aussagen nicht direkt veröffentlich werden dürfen. Wenn meine Angaben anonymisiert werden oder nur für einen bestimmten Leserkreis zugänglich sind, ist das in Ordnung.

Mensing: Ok, das werde ich berücksichtigen.

Ich habe den Fragebogen zwei Mal ausgedruckt, weil es so einfacher ist die Bewertungsschemata nachzuvollziehen.

Noch einmal grundsätzlich: das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt „ja“ oder „nein“. Es ist sinnvoll sich mit dem Thema näher zu befassen oder nicht.

Um das Modell zu entwickeln habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Perspektive des dritten Sektors reinzubringen noch OI, KS, und CSR besteht. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden.

Aus diesen vielen Aspekten habe ich Chancen und Risiken abgeleitet, die auf ein Unternehmen zukommen könnten. Sie bilden die Basis für das Zielsystem, das dem Entscheidungsmodell zugrunde liegt. Das habe ich auch ausgedruckt mitgebracht.

Als oberstes Ziel steht die Verbesserung der Unternehmenssituation. Auf der ersten Ebene sind die Haupt-Kriterien aufgelistet. Unter diesen kommen die Detailpunkte, die sich zu den oberen Punkten summieren.

Company 1: Verstehe. Was bedeuten „+“ und „-“ ?

Mensing: Das Modell, das ich ausgewählt habe geht sowohl auf positiv zu beurteilende Kriterien ein, das heißt, dass ein hoher Wert hier gut für ein Unternehmen ist als auch auf negative Aspekte, bei denen ein hoher Wert schlecht für das Unternehmen ist. Beispiele sind Kosten, hier sind hohe Werte natürlich schlecht, bei den Einsparungen sind hohe Werte gut für das Unternehmen. Diese Ausprägung geht aber erst im letzten Schritt des Alternativenvergleichs in das Modell ein.

Company 1:

Ok

Mensing: Das Gespräch ist so aufgebaut, dass ich Sie zuerst ein paar Basisdaten Abfrage und wir dann zu dem Entscheidungsmodell übergehen. Zuerst schauen wir uns die Kriterien an und dann vergleichen wir die Alternativen im Bezug auf die Kriterien.

Company 1: Das heißt, dass wir das System gleich anwenden.

Mensing: ja, genau. Also beginnen wir mit den Basisdaten:

Mensing: Name: Clemens Company 1, Firma: APA Austria Presse Agentur, Position im Unternehmen: Chief Digitalization Officer, Das Tätigkeitsfeld der APA?

Company 1: Medien.

Mensing: Wie hoch ist die Anzahl der Mitarbeiter?

Company 1: Aktuell haben wir ca. 650 Mitarbeiter.

Mensing: Wie hoch war der Umsatz im vergangenen Jahr?

Company 1: Unser Umsatz lag bei ca. 75Mio €.

Mensing: Die Fragen auf der nächsten Seite betreffen Unternehmen, die bereits Daten publizieren. Wenn es hier Punkte gibt, zu denen Sie Input haben, können wir uns gerne darüber unterhalten.

Company 1: Das Kerngeschäftsfeld Nr 1 der APA ist die Redaktion und sie lebt davon ihre Daten zu verkaufen. Wenn wir sie gratis zur Verfügung stellen, würde unser Einnahmen wegbrechen. Die Mitglieder der APA zahlen ja genau dafür diesen Service zu beziehen.

Es gibt allerdings ein Produkt, das heißt Top-Easy News“ das sind die wichtigsten Nachrichten des Tages in einfacher Sprache, sodass Menschen, die nicht sinnerfassend

lesen können oder eine nicht so hohe Bildungsstufe haben diese auch verstehen und nachvollziehen können. Diese Meldungen sind frei aber nicht in einem Open-Data-Format verfügbar.

Mensing: Das heißt sie werden auf der APA-Homepage veröffentlicht?

Company 1: Ja, das ist das Projekt was am nächsten an Open-Data herankommt.

Mensing: Ok, vielen Dank für den Input, dann gehen wir zu dem Teil der Kriterienbewertung über.

Company 1: Gut

Mensing: Das Modell basiert auf dem Analytical Hierarchy Prozess. Es funktioniert so, dass immer zwei Kriterien paarweise miteinander verglichen werden. Der Vergleich erfolgt mittels der angedruckten Skala. Sie gibt die Werte vor, die einzutragen sind, ob ein Kriterien wichtiger oder unwichtiger ist als ein anderes und wenn ja, in welcher Ausprägung. Wenn eine Gleichheit der beiden Kriterien existiert, wird eine 1 eingetragen. Wenn Ein Kriterium absolut wichtiger ist als das andere, erhält es eine 9.

Es werden immer Zeilen zu Spalten verglichen.

Company 1: Ok, soll ich das einfach selber ausfüllen oder soll ich es ansagen?

Mensing: Wie Sie möchten. Wir können drüber sprechen, ich helfe gerne bei den Punkten und erkläre sie gerne.

Company 1: Ich fange mal an.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	1/5	3	9	1	1/5	5
Unternehmensruf		1	3	9	5	5	5
Mitarbeiter			1	9	3	1	1/3
Kontrolle durch den Staat				1	1/9	1/9	1/9

Daten und Tech-nolo-gie					1	5	3
Kern-kompe-tenzen						1	1/3
Branchen -image							1

Finanzen

	Umsatz	Ein-sparungen	Einmalige Kosten	Wiederkeh-rende Kosten	Nicht real-isierte Erlöse	Indirekte Umsatzein-bußen
Umsatz	1	5	7	3	3	3
Ein-sparungen		1	1/5	5	1	3
Einmalige Kosten			1	1	5	5
Wiederkeh-rende Kosten				1	1/3	5
Nicht real-isierte Erlöse					1	3
Indirekte Umsatzein-bußen						1

Unternehmensimage

	Transpar-enz	Vertrau-ens-würdigkeit	Soziale Verant-wor-tung	Unterneh-menswert	Glaubwür-digkeit	Haftungs-fragen	Informa-tions-überfluss	Fehlinter-pretation von Daten
Transpar-enz	1	1/3	1/3	1/5	1/5	1/7	5	3
Vertrau-ens-würdigkeit		1	1/3	3	1/5	1/7	3	3
Soziale Verant-wor-tung			1	1/3	1/5	1/7	3	1
Unterneh-menswert				1	1/5	3	5	3
Glaubwür-digkeit					1	5	5	7
Haftungs-fragen						1	9	9
Informa-tionsüber-fluss							1	1/7
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Quali-fikation	Neues Wis-sen	Arbeitgeber-marke	Kultur der Zuversicht	Mitarbeiter-fluktuation	Frustration
Motivation	1	1/3	5	5	5	5	5

Fähigkeiten und Qualifikation		1	5	5	5	5	5
Neues Wissen			1	3	5	1	1
Arbeitgebermarke				1	7	7	7
Kultur der Zuversicht					1	1/5	1/5
Mitarbeiterfluktuation						1	1/5
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	1/9	3
Kundenbeziehung		1	9
Prozesseffizienz			1

Mensing: Super, dann sind wir mit dem vorgegebenen Part der Kriteriengewichtung soweit durch. Gab es Punkte, die Sie Vermissen oder Kriterien die wichtig sind, die hier nicht genannt wurden?

Company 1: Nein, es wurde alles abgedeckt, direkt oder indirekt. Mir fällt z.B. auf, dass die Unternehmensstrategie nicht direkt angesprochen wurde aber sie kann durch Punkte wie Finanzen, Transparenz usw. abgebildet.

Mensing: Der letzte Part besteht aus dem Vergleich der Alternativen in Bezug auf die gewichteten Kriterien. Die Alternativen sind einerseits ein Engagement in Open Data und andererseits das Ablehnen der Strategie.

Die Frage ist hier In welchem Szenario gibt es einen stärkeren Ausschlag und um wie viel ist er stärker in Richtung welches Szenarios?

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—3—**1**—3—5—7—9	
	Einsparungen	9—7—5—3—**1**—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	9—7—5—**3**—1—3—5—7—9	

	Wartungskosten / Wiederkehrende Kosten	9—7—5—**3**—1—3—5—7—9
	Nicht realisierte Erlöse	9—7—5—3—**1**—3—5—7—9
	Indirekte Umsatzeinbußen	9—7—5—3—**1**—3—5—7—9
Unternehmensruf	Transparenz	9—7—**5**—3—1—3—5—7—9
	Vertrauenswürdigkeit	9—7—**5**—3—1—3—5—7—9
	Soziale Verantwortung	9—7—5—3—**1**—3—5—7—9
	Unternehmenswert	9—7—5—3—**1**—3—5—7—9
	Glaubwürdigkeit	9—7—5—**3**—1—3—5—7—9
	Haftungsfragen	9—7—5—**3**—1—3—5—7—9
	Informationsüberfluss	9—7—5—3—1—**3**—5—7—9
	Fehlinterpretation von Daten	9—7—5—3—**1**—3—5—7—9
Mitarbeiter	Motivation	9—7—5—3—**1**—3—5—7—9
	Fähigkeit und Qualifikation	9—7—5—3—**1**—3—5—7—9
	Neues Wissen	9—7—5—3—**1**—3—5—7—9
	Arbeitgebermarke	9—7—5—**3**—1—3—5—7—9
	Kultur der Zuversicht	9—7—5—3—**1**—3—5—7—9
	Mitarbeiterfluktuation	9—7—5—3—**1**—3—5—7—9
	Frustration	9—7—5—3—**1**—3—5—7—9
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—5—**3**—1—3—5—7—9
Daten und Technologie	Usability der Software und Prozesse	9—7—5—**1**—1—3—5—7—9
Kernkompetenzen	Customer-Product-Fit	9—7—5—**3**—1—3—5—7—9
	Kundenbeziehung	9—7—5—**3**—1—3—5—7—9
	Prozesseffizienz	9—7—5—3—1—**3**—5—7—9
Branchenimage	Branchenimage	9—7—5—**3**—1—3—5—7—9

Company 1: Das ist ein sehr interessantes Bewertungsschema!

Mensing: Vielen Dank für das sehr genaue Ausfüllen des Fragebogens!

9.3.2. Company 2

Mensing: Guten Tag Herr Company 2, vielen Dank, dass Sie sich Zeit genommen haben, um mich bei meiner Masterarbeit zu unterstützen.

Company 2: Guten Tag Frau Mensing, ja, sehr gerne. Es ist ein interessantes Thema, da helfe ich gern.

Mensing: Ich würde das Gespräch gerne aufzeichnen, da ich es im Anhang meiner Arbeit schriftlich anfügen muss,

Company 2: Ja, natürlich.

Mensing: Ich habe den Fragebogen auch für Sie ausgedruckt, da das Besprochene so besser nachvollziehbar ist.

Company 2: Ja, Danke.

Mensing: Das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt eine Tendenz ausgibt, die zeigt, ob eine weitere Beschäftigung mit dem Thema sinnvoll ist oder nicht.

Um das Modell zu entwickeln habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Unternehmensperspektive einzubinden, habe ich noch OI, KS, und CSR einbezogen. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden.

Aus diesen vielen Aspekten habe ich Chancen und Risiken abgeleitet, die auf ein Unternehmen zukommen könnten. Sie bilden die Basis für das Zielsystem, das dem Entscheidungsmodell zugrunde liegt. Das habe ich auch ausgedruckt mitgebracht.

Company 2: Das ist das Chart hier?

Mensing: ja, genau. Als oberstes Ziel steht die Verbesserung der Unternehmenssituation. Auf der ersten Ebene sind die Haupt-Kriterien aufgelistet. Unter diesen kommen die Detailpunkte, die sich zu den oberen Punkten summieren.

Zuerst nochmal kurz zum Aufbau unseres Gesprächs. Ich würde gerne erst noch die Basisdaten von Ihnen und Ihrem Unternehmen besprechen, bevor wir mit der Kriterienbewertung beginnen.

Mensing: Name: Alexander Company 2, Firma: Unwired Networks GmbH, Position im Unternehmen: CEO und Gründer, was ist Ihr Tätigkeitsfeld?

Company 2: IT

Mensing: Wie hoch ist die Anzahl der Mitarbeiter?

Company 2: In unserem Team sind insgesamt 15 Personen an verschiedenen Standorten

Mensing: Wie hoch war der Umsatz im vergangenen Jahr?

Company 2: Unser Umsatz lag bei ca. 1 Mio €.

Mensing: Die Fragen auf der nächsten Seite betreffen Unternehmen, die bereits Daten veröffentlichen. Wenn es hier Punkte gibt, über die Sie sich gerne unterhalten möchten, freue ich mich über Input, ansonsten überspringen wir sie.

Company 2: Nein, wir haben noch nichts in der Richtung unternommen.

Mensing: Ok, dann gehen wir zu den Gewichtungen der Entscheidungsrelevanten Kriterien.

Company 2: Gerne.

Mensing: Das Modell basiert auf dem Analytical Hierarchy Prozess. Es funktioniert so, dass immer zwei Kriterien paarweise miteinander verglichen werden. Immer die Zeile gegen die Spalte. Der Vergleich erfolgt mittels der angedruckten Skala. Sie gibt die Werte vor, die einzutragen sind, ob ein Kriterien wichtiger oder unwichtiger ist als ein anderes und wenn ja, in welcher Ausprägung. Wenn eine Gleichheit der beiden Kriterien existiert, wird eine 1 eingetragen. Wenn Ein Kriterium absolut wichtiger ist als das andere, erhält es eine 9.

Company 2: Soll ich das eintragen oder soll ich das ansagen?

Mensing: Ganz wie Sie möchten.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	7	1	9	1/3	1/5	1/3
Unternehmensruf		1	1	9	1/3	1/3	1
Mitarbeiter			1	9	5	1	5
Kontrolle durch den Staat				1	1/9	1/9	1/9

Daten und Tech-nolo-gie					1	1	5
Kern-kompe-tenzen						1	5
Branchen -image							1

Finanzen

	Umsatz	Ein-sparungen	Einmalige Kosten	Wiederkeh-rende Kosten	Nicht real-isierte Erlöse	Indirekte Umsatzein-bußen
Umsatz	1	5	3	7	1/3	1/3
Ein-sparungen		1	5	1	1	1
Einmalige Kosten			1	7	1	1
Wiederkeh-rende Kosten				1	1/9	1/5
Nicht real-isierte Erlöse					1	1/5
Indirekte Umsatzein-bußen						1

Unternehmensimage

	Transpar-enz	Vertrau-ens-würdigkeit	Soziale Verant-wor-tung	Unterneh-menswert	Glaubwür-digkeit	Haftungs-fragen	Informa-tions-überfluss	Fehlinter-pretation von Daten
Transpar-enz	1	1/9	1/5	1/7	1/5	1	1	1/3
Vertrau-ens-würdigkeit		1	1/7	5	1	1	1/7	1/5
Soziale Verant-wor-tung			1	3	1	5	1/5	1
Unterneh-menswert				1	1/3	3	1/5	1
Glaubwür-digkeit					1	3	1/5	1/5
Haftungs-fragen						1	1/5	1/5
Informa-tionsüber-fluss							1	5
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Quali-fikation	Neues Wis-sen	Arbeitgeber-marke	Kultur der Zuversicht	Mitarbeiter-fluktuation	Frustration

Motivation	1	1/5	1/3	1	3	1/5	1/9
Fähigkeiten und Qualifikation		1	3	1/3	3	1/3	1/5
Neues Wissen			1	1/3	1	1/3	1/5
Arbeitgebermarke				1	3	1/5	1/5
Kultur der Zuversicht					1	1/9	1/5
Mitarbeiterfluktuation						1	1
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	1/3	1/3
Kundenbeziehung		1	1
Prozesseffizienz			1

Mensing: Prima, dann sind wir auch schon soweit mit der Bewertung der von mit identifizierten Kriterien durch. Gibt es Faktoren, di bei Ihnen für Unternehmerische Entscheidungen wichtig sind, hier aber nicht genannt wurden?

Company 2: Für mich ist es besonders wichtig eine Fragestellung aus verschiedenen Blickwinkeln zu betrachten. So wäre hier die Betrachtung aus Investorensicht oder einer anderen Stakeholder-Perspektive interessant einzufügen.

Allgemein sollte noch ein Fokus auf externe Einflussgrößen, wie etwa rechtliche Rahmenbedingungen, ich denke da ganz konkret an die DSGVO, oder auch technische Entwicklungen gelegt werden. Ein wichtiges Kriterium im unternehmerischen Alltag sind Markt- und Kundenverhalten.

Mensing: Dankeschön für die Ergänzungen. Haben Sie allgemein Kommentare oder Anmerkungen zum Fragebogen?

Company 2: Es ist gut, dass wir die Methode und Kriterien besprochen haben. Die Begriffe alleine haben zu wenig Aussagekraft, das hätte näher erläutert werden müssen, wenn ich den Bogen allein vor mir gehabt hätte. Auch die Methode ist ungewohnt und daher war es gut, dass wir es gemeinsam ausgefüllt haben.

Mensing: Danke für das Feedback.

Wir kommen nun zum letzten Part unseres Fragebogens. Er besteht aus dem Vergleich der Alternativen in Bezug auf die gewichteten Kriterien. Die Alternativen sind einerseits ein Engagement in Open Data und andererseits das Ablehnen der Strategie.

Die Frage ist hier In welchem Szenario gibt es einen stärkeren Ausschlag und um wie viel ist er stärker in Richtung welches Szenarios?

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—3—**1**—3—5—7—9	
	Einsparungen	9—7—5—3—**1**—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	9—7—**5**—3—1—3—5—7—9	
	Wartungskosten / Wiederkehrende Kosten	9—7—**5**—3—1—3—5—7—9	
	Nicht realisierte Erlöse	9—7—5—3—**1**—3—5—7—9	
	Indirekte Umsatzeinbußen	9—7—5—3—**1**—3—5—7—9	
Unternehmensruf	Transparenz	9—7—**5**—3—1—3—5—7—9	
	Vertrauenswürdigkeit	9—7—**5**—3—1—3—5—7—9	
	Soziale Verantwortung	9—7—5—3—**1**—3—5—7—9	
	Unternehmenswert	9—7—5—3—1—3—**5**—7—9	
	Glaubwürdigkeit	9—7—5—**3**—1—3—5—7—9	
	Haftungsfragen	9—7—**5**—3—1—3—5—7—9	
	Informationsüberfluss	9—**7**—5—3—1—3—5—7—9	
	Fehlinterpretation von Daten	9—**7**—5—3—1—3—5—7—9	
Mitarbeiter	Motivation	9—7—**5**—3—1—3—5—7—9	
	Fähigkeit und Qualifikation	9—7—5—**3**—1—3—5—7—9	
	Neues Wissen	9—7—**5**—3—1—3—5—7—9	
	Arbeitgebermarke	9—**7**—5—3—1—3—5—7—9	
	Kultur der Zuversicht	9—7—5—**3**—1—3—5—7—9	
	Mitarbeiterfluktuation	9—7—5—3—**1**—3—5—7—9	
	Frustration	9—7—5—3—**1**—3—5—7—9	
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—**5**—3—1—3—5—7—9	

Daten und Technologie	Usability der Software und Prozesse	9—7—**5**—3—1—3—5—7—9
Kernkompetenzen	Customer-Product-Fit	9—7—5—**3**—1—3—5—7—9
	Kundenbeziehung	9—7—5—**3**—1—3—5—7—9
	Prozesseffizienz	9—7—5—3—**1**—3—5—7—9
Branchenimage	Branchenimage	9—7—**5**—3—1—3—5—7—9

Mensing: Vielen Dank, dass Sie sich die Zeit genommen haben!

Company 2: Sehr gerne, bitte senden Sie mir die fertiggestellte Arbeit zu, wenn es soweit ist.

9.3.3. Company 3

Mensing: Guten Tag Herr Company 3, vielen Dank, dass Sie sich Zeit genommen haben, um mich bei meiner Masterarbeit zu unterstützen.

Company 3: Guten Tag Frau Mensing, ja, sehr gerne. Es ist ein interessantes Thema, da helfe ich gern.

Mensing: Ich würde das Gespräch gerne aufzeichnen, da ich es im Anhang meiner Arbeit schriftlich anfügen muss,

Company 3: Ja, ok.

Mensing: Das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt eine Tendenz ausgibt, die zeigt, ob eine weitere Beschäftigung mit dem Thema sinnvoll ist oder nicht.

Um das Modell zu entwickeln habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Unternehmensperspektive einzubinden, habe ich noch OI, KS, und CSR einbezogen. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden.

Company 3: Ok.

Mensing: Aus diesen vielen Aspekten habe ich Chancen und Risiken abgeleitet, die auf ein Unternehmen zukommen könnten. Sie bilden die Basis für das Zielsystem, das dem Entscheidungsmodell zugrunde liegt. Das habe ich auch ausgedruckt mitgebracht.

Company 3: Das ist das Chart hier?

Mensing: Ja, genau. Als oberstes Ziel steht die Verbesserung der Unternehmenssituation. Auf der ersten Ebene sind die Haupt-Kriterien aufgelistet. Unter diesen kommen die Detailpunkte, die sich zu den oberen Punkten summieren.

Zuerst nochmal kurz zum Aufbau unseres Gesprächs. Ich würde gerne erst noch die Basisdaten von Ihnen und Ihrem Unternehmen besprechen, bevor wir mit der Kriterienbewertung beginnen.

Company 3: Ok.

Mensing: Ich habe mir folgende Daten notiert: Name: Klaus-M. Company 3, Firma: Insuro GmbH in Gründung, Position im Unternehmen: CMO/CSO, was ist Ihr Tätigkeitsfeld?

Company 3: Digital Health-Insurance for young generation.

Mensing: Wie hoch ist die Anzahl der Mitarbeiter?

Company 3: Wir sind momentan zu viert.

Mensing: Wie hoch war der Umsatz im vergangenen Jahr?

Company 3: Da wir noch in der Gründungsphase sind, haben wir noch keinen Umsatz.

Mensing: Die Fragen auf der nächsten Seite betreffen Unternehmen, die bereits Daten veröffentlichen. Wenn es hier Punkte gibt, über die Sie sich gerne unterhalten möchten, freue ich mich über Input, ansonsten überspringen wir sie.

Company 3: Da kann ich leider noch nichts zu sagen.

Mensing: Ok, dann gehen wir zu den Gewichtungen der Entscheidungsrelevanten Kriterien.

Company 3: Ok.

Mensing: Das Modell basiert auf dem Analytical Hierarchy Prozess, kommt aus der multikriteriellen Entscheidungstheorie. Es funktioniert so, dass immer zwei Kriterien paarweise miteinander verglichen werden. Immer die Zeile gegen die Spalte. Der Vergleich erfolgt mittels der angedruckten Skala. Sie gibt die Werte vor, die einzutragen sind, ob ein Kriterien wichtiger oder unwichtiger ist als ein anderes und wenn ja, in welcher Ausprägung. Wenn eine Gleichheit der beiden Kriterien existiert, wird eine 1

eingetragen. Wenn Ein Kriterium absolut wichtiger ist als das andere, erhält es eine 9. Es können auch grade Zahlen eingetragen werden, die Gewichte sind in der Literatur aber in der ungeraden Abstufung genutzt.

Company 3: Soll ich das eintragen oder soll ich das ansagen?

Mensing: Ganz wie Sie möchten.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	5	1	7	3	1/5	7
Unternehmensruf		1	1/5	7	1/3	1/5	7
Mitarbeiter			1	9	5	5	9
Kontrolle durch den Staat				1	1/7	1/7	1/7
Daten und Technologie					1	1/5	9
Kernkompetenzen						1	9
Branchenimage							1

Finanzen

	Umsatz	Einsparungen	Einmalige Kosten	Wiederkehrende Kosten	Nicht realisierte Erlöse	Indirekte Umsatzeinbußen
Umsatz	1	5	9	1	9	9
Einsparungen		1	7	1/5	9	9
Einmalige Kosten			1	1/9	9	9
Wiederkehrende Kosten				1	9	9
Nicht realisierte Erlöse					1	1/9
Indirekte Umsatzeinbußen						1

Unternehmensimage

	Transparenz	Vertrauenswürdigkeit	Soziale Verantwor-tung	Unternehmenswert	Glaubwürdigkeit	Haftungsfragen	Informationsüberfluss	Fehlinterpretation von Daten
Transparenz	1	1/3	3	1/9	3	1/3	9	7
Vertrauenswürdigkeit		1	3	1/5	5	1/3	9	7
Soziale Verantwor-tung			1	1/5	1/3	1/7	7	7
Unternehmenswert				1	7	7	9	9
Glaubwürdigkeit					1	1/7	9	9
Haftungsfragen						1	9	9
Informationsüberfluss							1	1/7
Fehlinterpretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Qualifikation	Neues Wissen	Arbeitgebermarke	Kultur der Zuversicht	Mitarbeiterfluktuation	Frustration
Motivation	1	3	5	9	3	1	5
Fähigkeiten und Qualifikation		1	7	7	3	3	7
Neues Wissen			1	3	3	1/5	1/5
Arbeitgebermarke				1	3	1/3	1/5
Kultur der Zuversicht					1	1/5	1/5
Mitarbeiterfluktuation						1	1
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	7	7
Kundenbeziehung		1	1/5
Prozesseffizienz			1

Mensing: Gut. Gibt es Faktoren, die bei Ihnen für unternehmerische Entscheidungen wichtig sind, hier aber nicht genannt wurden?

Company 3: Externe Vergleiche sind immer interessant. Also eine andere Firma wie gehen sie mit diesen Fragestellungen um, wie lösen sie das Problem, und allgemein Marktstudien, Marktvergleiche, Benchmarks.

Für uns in der Health-Tec-Branche sind rechtliche Rahmenbedingungen ein ganz großes Thema, weil es um hochsensible Daten geht.

Bei den Finanzkennzahlen fehlen mir noch Punkte wie Profitabilität oder Liquidität. Aber auch Planbarkeit und die Sicherheit der Planung.

Mensing: Danke! Das sind ganz interessante Punkte, die ich gerne diskutieren.

Company 3: Die Frage, die sich mir bei diesem Themenkomplex „Open Data" stellt, ist immer „What's in for me?".

Mensing: Genau das ist die Frage bei der ich Unternehmen mit meinem Modell unterstützen möchte. Wir haben nun die Kriterien gewichtet und im kommenden Schritt geht es darum, welche Ausprägungen haben diese Kriterien für dein Unternehmen bei den Alternativen „Open Data machen" oder „Open Data nicht machen".

Company 3: Ein allgemeiner Kommentar ist noch, dass ich glaube, dass es bei den Begrifflichkeiten zu starken Schwankungen kommen kann, weil sie als Stichwort dastehen und sehr unterschiedlich ausgelegt werden können. Wenn es ein Fragebogen zum selbst-ausfüllen ist, müssten sie besser beschrieben werden. Grundsätzlich ist das sehr interessant, aber ich glaube, dass das ein schwieriger Punkt ist.

Mensing: Ok, Dankeschön. Nun zum letzten Punkt des Interviews. In dieser Tabelle sehen Sie oben angeführt die zwei Alternativen. Je Kriterium soll nun die Frage beantwortet werden, ob es bei der einen oder anderen Alternative einen Ausschlag für mein Unternehmen gibt und wenn ja, wie stark er ist. Wenn es keinen Unterschied für das Unternehmen bei dem entsprechenden Kriterium gibt, wird die 1 angekreuzt, wenn es einen Unterschied geht, dann rechts oder links, eben bei der entsprechenden Alternative und in der Höhe des Ausschlages.

Company 3: Ok, fangen wir gleich an.

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—3—1—**3**—5—7—9	
	Einsparungen	9—7—5—3—1—3—5—7—**9**	
	Einrichtungskosten / einmalige Kosten	9—7—5—3—1—3—5—7—**9**	
	Wartungskosten / Wiederkehrende Kosten	9—7—5—3—1—3—5—7—**9**	
	Nicht realisierte Erlöse	9—7—5—3—1—3—5—7—**9**	
	Indirekte Umsatzeinbußen	9—7—5—3—**1**—3—5—7—9	
Unternehmensruf	Transparenz	9—7—5—3—**1**—3—5—7—9	
	Vertrauenswürdigkeit	9—7—5—3—1—3—5—7—**9**	
	Soziale Verantwortung	9—7—5—3—1—3—5—7—**9**	
	Unternehmenswert	9—7—5—3—1—**3**—5—7—9	
	Glaubwürdigkeit	9—7—5—3—1—3—5—7—**9**	
	Haftungsfragen	9—7—5—3—**1**—3—5—7—9	
	Informationsüberfluss	9—7—5—3—**1**—3—5—7—9	
	Fehlinterpretation von Daten	9—7—5—3—**1**—3—5—7—9	
Mitarbeiter	Motivation	9—7—5—3—1—3—5—7—**9**	
	Fähigkeit und Qualifikation	9—7—5—3—**1**—3—5—7—9	
	Neues Wissen	**9**—7—5—3—1—3—5—7—9	
	Arbeitgebermarke	9—7—5—3—1—3—5—7—**9**	
	Kultur der Zuversicht	**9**—7—5—3—1—3—5—7—9	
	Mitarbeiterfluktuation	**9**—7—5—3—1—3—5—7—9	
	Frustration	9—7—5—3—**1**—3—5—7—9	
Kontrolle	Verstärkte Kontrollen durch den Staat	**9**—7—5—3—1—3—5—7—9	
Daten und Technologie	Usability der Software und Prozesse	9—7—5—3—1—3—5—7—**9**	
Kernkompetenzen	Customer-Product-Fit	9—7—5—3—1—3—5—7—**9**	
	Kundenbeziehung	9—7—5—3—1—3—5—7—**9**	
	Prozesseffizienz	9—7—5—3—1—3—5—7—**9**	
Branchenimage	Branchenimage	9—7—5—3—1—3—5—7—**9**	

Mensing: Haben Sie noch Kommentare oder Anmerkungen?

Company 3: Nein, ich denke wir haben alles besprochen.

Mensing: Dann vielen Dank, dass Sie sich die Zeit genommen haben!

9.3.4. Company 4

Mensing: Guten Tag Herr Company 4, vielen Dank, dass Sie sich Zeit genommen haben, um mich bei meiner Masterarbeit zu unterstützen.

Ich würde das Gespräch gerne aufzeichnen, da ich es im Anhang meiner Arbeit schriftlich anfügen muss,

Company 4: Ja, ok.

Mensing: Das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt eine Tendenz ausgibt, die zeigt, ob eine weitere Beschäftigung mit dem Thema sinnvoll ist oder nicht.

Company 4: Wie ist der wissenschaftliche Titel Ihrer Arbeit?

Mensing: „Opportunities and Risks of Open Data for Companies -Should Companies release their Data?“

Company 4: Ah, ok, sehr interessant, versteh ich.

Mensing: Ja. Um das Thema zu entwickeln und mich der Fragestellung zu nähern, habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Unternehmensperspektive einzubinden, habe ich noch OI, KS, und CSR einbezogen. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden. Meine Arbeit zielt ganz konkret darauf ab, ob Unternehmen Daten veröffentlichen sollen, nicht ob sie Daten von außen holen sollen.

Company 4: Ok. Wenn Sie von Daten sprechen, klassifizieren Sie diese Daten dann?

Mensing: personalisierte Daten sind immer ausgenommen, bei jeder Betrachtung aber da jedes Unternehmen andere Daten hat, Standorte, Zutatenlisten usw., habe ich keine Einschränkung vorgenommen.

Company 4: Ja, genau. Wie ist der Ablauf jetzt?

Mensing: Ja, dazu wollte ich grade kommen. Ich würde gerne erst noch die Basisdaten von Ihnen und Ihrem Unternehmen besprechen, dann die Ziele die Ihr Unternehmen mit dem Einsatz von Open Data hatte und natürlich auch die Erfahrungen, die daraus gewonnen werden konnten, bevor wir mit der Kriterienbewertung beginnen und uns dann die möglichen Szenarien anschauen.

Company 4: Ok.

Mensing: Gut, dann gleich zu den Basisdaten. Ich habe mir folgende Daten notiert: Name: Werner Company 4, Firma: Hewlett Packard Gesellschaft mbH.

Company 4: Ja, im Firmenbuch stehen wir so drin, ansonsten treten wir unter dem Namen HPE „Hewlett Packard Enterprise“ auf.

Mensing: Ok, wie ist Ihre Position im Unternehmen?

Company 4: Public Director.

Mensing: In welchem Tätigkeitsfeld ist die HPE engagiert?

Company 4: Wir sind ein IT-Unternehmen. Unsere Kernkompetenzen liegen im Bereich Hardware und die dazu erforderliche Dienstleistungen. Das reichern wir mit strategischen Partnerschaften an.

Mensing: ok, wie viele Mitarbeiter sind Sie?

Company 4: In Österreich ca. 600. Wir wurden im vergangenen Herbst neu strukturiert, vorher waren ca. 400.000 Mitarbeiter im ganzen Unternehmen. Im Zuge dessen wurden alle Mitarbeiter neu aufgeteilt.

Mensing: Ok, in welcher Größenordnung lag der Umsatz?

Company 4: Die offiziellen Zahlen sind 190Mio€.

Mensing: Gut, dann würde ich jetzt gerne über Open Data bei Ihnen im Unternehmen sprechen.

Company 4: Ja, gern.

Mensing: Welche Art von Datensätzen Publizieren Sie?

Company 4: Ja, also wir legen das Thema ein bisschen anders aus. Bei uns geht es speziell um unsere Partner. Unser Geschäftsmodell ist auf indirektes Business ausgerichtet, also über Partner. Und die Partner benötigen gewisse Informationen, damit

sie überhaupt arbeiten können. Hier haben wir eine eigene Plattform etabliert. Das heißt, dass die zertifizierten Partner können dort jederzeit zugreifen. Also das sind Daten, die tagesaktuell sein müssen, wie Preise mit Wechselkursinformationen, allgemein Angebot und Nachfrage. Ganz speziell sind Verfügbarkeitsinformationen. Hier müssen die Partner natürlich wissen, wann ist was verfügbar und zu welchem Preis.

Ganz wichtig ist auch die Information wann etwas „end of life" geht. Also wann welche Komponente nicht mehr unterstütz oder nicht mehr gebaut wird. Auch weitere Details zur Supplychain werden hier veröffentlicht.

Mensing: Und diese Informationen werden nur der ausgewählten Gruppe innerhalb des Partnernetzwerks zur Verfügung gestellt.

Company 4: ja, genau, jeder Händler unabhängig vom Status, platinum, gold, silber, normal, hat Zugriff auf diese Open Data, da er sonst sein Business nicht machen könnte. Also das ist nicht Open Data im klassischen Sinne, dass die ganze Welt zugreifen kann aber für HP ist das eine ganz wichtige Komponente des Open-Data Engagements.

Mensing: Ok.

Company 4: Also ganz wesentliche Daten, die wir online stellen sind Preise, Produkte, Produktvariationen, aber auch Support Informationen, wie end-of-life usw.

Mensing: Also war das Ziel hier Steigerung der Prozesseffizienz?

Company 4: ja, genau. Innerhalb unseres Supportnetzes verwenden wir auch Open Data. Wenn eine Frage auftritt, die schon einmal irgendwo auf dieser Welt gelöst wurde, kann auf die Information zugegriffen werden und Probleme wesentlich schneller gelöst werden oder es wird dafür gesorgt, dass sie gar nicht erst zum wiederholten Male auftreten. Alles auf Open Data Basis, wobei das natürlich gleich eingegrenzt wird auf den bestimmten Personenkreis.

Wir haben hier auch einen Businesszweig, der heißt IoT – Internet of Things. Hier haben wir wiederum eine eigene Netzwerksparte, im Besonderen der Bereich der Sensorik. Weil die ganzen Maschinen plötzlich miteinander sprechen, ergeben wich hier ganz interessante Daten, die konsolidiert werden und einer bestimmten Zielgruppe zur Verfügung gestellt werden. Sei es zur Optimierung von Lieferketten, sei es zur Risikominimierung, andere Automatisierungen, oder auch, dass Mehrwert daraus abgeleitet werden können und wir diese Mehrwerte als goodie wieder jemand anderem

zur Verfügung gestellt werden können. Die Geräte werden immer intelligenter, wenn man nur mal alle Alexas dieser Welt anschaut, wissen wir noch gar nicht, was das für Chancen oder Risiken hat. Man hat da vllt ein Security Loch gefunden und wir wissen

Mensing: Gut, Open Data im eigentlichen Sinne, um wieder drauf zurück zu kommen....

Company 4: Ja, genau das haben wir auch, auch eine eigene Plattform und posten quasi stündlich auf allen social media Plattformen produkt- und unternehmensinformationen. Da gibt es auch eigene IoT Communities, wo wir Informationen teilen, damit dann neue Usecases gefunden werden können. Da passiert ein reger Austausch.

Mensing: Und das Ziel von diesem Unterfangen...

Company 4: ... das Ziel ist natürlich die Menschen für diese Technologie zu begeistern, dass diese Technologie etwas Wertvolles ist aber auch neue Usecases zu finden. So haben wir eine Technik für einen Usecase entwickelt und die Daten dann einer Community zur verfügung gestellt und plötzlich war klar, dass man die Technologie noch für ganz andere Einsatzgebiete nutzen kann. In dem spezieleln fall waren es Drucksensoren für Öl-Borungen, der jetzt auch im Bahnbereich eingesetzt wird und für geschwindigkeite optimierungen im Bahnbereich eingesetzt werdne kann. Das heißt, dass wir plötzlich ein neues Geschäftsfeld identifiziert haben, nur weil wir Daten geteilt haben.

Mensing: Super, nun haben wir schon gleichzeit über alle Punkte gesprochen, das ist prima, die einzige Frage, die ich och habe ist, wann damit gestartet wurde.

Company 4: Also Wir hatten vor ca. 3 Jahren die Open Data Government initiative der Stadt Wien, da war HP auch seit der ersten Stunde mit dabei, aber das Thema gibt es schon wesentlich länger, also geschätzt seit über 7 Jahren in unserem Unternehmen.

Mensing: Wunderbar, vielen Dank. Dann würde ich auch gerne gleich in das Modell einsteigen.

Company 4: Ja, bitte. Ist das Ihr Modell oder ist das ein klassisches Modell?

Mensing: Es ist ein erprobtes Modell aus der multikriteriellen Entscheidungstheorie, genauer AHP, Analytical Hierarchy Process. Ich habe es mit den Ergebnissen meiner Literaturrecherche kombiniert und so die folgenden Tabellen erhalten.

Noch einmal kurz zu meinem Modell. Aus der angesprochenen Literaturrecherche haben ich Chancen und Risiken extrahiert und daraus dann ein Zielsystem erstellt. Das

oberste Ziel ist die Verbesserung der Unternehmenssituation, warum auch sonst, sollte ein Unternahmen sich bei einem Projekt engagieren, wo es nicht um direkten Umsatz geht. Im ersten Hierarchielevel finden Sie die Hauptkriterien und dann die Detailpunkte, die sich zu den Hauptkriterien summieren.

Im ersten Schritt vergleichen wir die erste Ebene miteinander und im zweiten Schritt, dann die Details.

Company 4: Sollen wir das alles im Hinblick auf Open Data betrachten?

Mensing: Nein, jetzt geht es um die generelle Einschätzung von HP im Bezug auf die Kriterien, später betrachten wir dann die Sicht auf Open Data.

Company 4: Ok, verstehe.

Mensing: Es funktioniert so, dass immer Zeile gegen Spalte verglichen wird. Je nachdem, welches Kriterium wichtiger ist und dann nach der Ausprägung, wird eine Zahl vergeben. Dabei unterstützt die angegebene Skala.

Company 4: Das heißt, dass ich hier meine persönliche Einschätzung abgebe, in wie weit das eine Kriterium wichtiger ist, als das andere?

Mensing: Ja, das ist korrekt.

Company 4: Ich helfe Ihnen da natürlich gerne, allerdings dürfen diese Angaben dann nicht als offizielle Meinung oder Sichtweise von HP veröffentlicht werden.

Mensing: Ok, darauf werde ich Rücksicht nehmen.

Company 4: Gut, dann fangen wir an.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	1/3	1	1	1	1/7	5
Unternehmensruf		1	1/5	1	1/5	1/7	7
Mitarbeiter			1	1	1/7	1/7	1

Kontrolle durch den Staat				1	1	1	1
Daten und Tech-nolo-gie					1	5	3
Kern-kompe-tenzen						1	9
Branchen -image							1

Finanzen

	Umsatz	Ein-sparungen	Einmalige Kosten	Wiederkeh-rende Kosten	Nicht real-isierte Erlöse	Indirekte Umsatzein-bußen
Umsatz	1	1/7	3	1/7	9	1
Ein-sparungen		1	5	1/7	7	1/7
Einmalige Kosten			1	1/7	7	1/7
Wiederkeh-rende Kosten				1	9	1/7
Nicht real-isierte Erlöse					1	1/7
Indirekte Umsatzein-bußen						1

Unternehmensimage

	Transpar-enz	Vertrau-ens-würdigkeit	Soziale Verant-wor-tung	Unterneh-menswert	Glaubwür-digkeit	Haftungs-fragen	Informa-tions-überfluss	Fehlinter-pretation von Daten
Transpar-enz	1	1/7	1/5	1	1/3	1/9	3	5
Vertrau-ens-würdigkeit		1	1/3	3	1	1/9	5	7
Soziale Verant-wor-tung			1	3	1/3	1/9	3	3
Unterneh-menswert				1	1/3	1/9	3	3
Glaubwür-digkeit					1	1/9	3	3
Haftungs-fragen						1	9	9
Informa-tionsüber-fluss							1	1/3
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Qualifikation	Neues Wissen	Arbeitgebermarke	Kultur der Zuversicht	Mitarbeiterfluktuation	Frustration
Motivation	1	1/7	1/9	5	1/3	1/5	1/5
Fähigkeiten und Qualifikation		1	3	3	3	1/3	1/3
Neues Wissen			1	3	3	1/5	5
Arbeitgebermarke				1	1/3	1/3	1/3
Kultur der Zuversicht					1	1/5	1/3
Mitarbeiterfluktuation						1	5
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	1/3	1
Kundenbeziehung		1	5
Prozesseffizienz			1

Mensing: So, Dankeschön. Gibt es Punkte, die bei Ihnen für unternehmerische Entscheidungen wichtig sind, hier aber nicht genannt wurden?

Company 4: Nein, das wurde von Ihnen sehr umfassend dargestellt, umfassender als ich es erwartet hätte. Auf die Schnelle ist das ein sehr rundes Bild.

Mensing: Dankeschön!

Dann gehen wir zum letzten Punkt des Interviews über. In dieser Tabelle sehen Sie oben angeführt die zwei Alternativen. Je Kriterium soll nun die Frage beantwortet werden, ob es bei der einen oder anderen Alternative einen Ausschlag für mein Unternehmen gibt und wenn ja, wie stark er ist. Wenn es keinen Unterschied für das Unternehmen bei dem entsprechenden Kriterium gibt, wird die 1 angekreuzt, wenn es einen Unterschied geht, dann rechts oder links, eben bei der entsprechenden Alternative und in der Höhe des Ausschlages.

Company 4: Ok, das kann man schwer messen, aber tendenziell kann man eine Aussage treffen. Fangen wir mal an.

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—**3**—1—3—5—7—9	
	Einsparungen	9—7—5—**3**—1—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	9—7—5—3—**1**—3—5—7—9	
	Wartungskosten / Wiederkehrende Kosten	9—7—5—3—**1**—3—5—7—9	
	Nicht realisierte Erlöse	9—7—5—3—**1**—3—5—7—9	
	Indirekte Umsatzeinbußen	9—7—**5**—3—1—3—5—7—9	
Unternehmensruf	Transparenz	9—**7**—5—3—1—3—5—7—9	
	Vertrauenswürdigkeit	9—**7**—5—3—1—3—5—7—9	
	Soziale Verantwortung	9—**7**—5—3—1—3—5—7—9	
	Unternehmenswert	9—7—5—**3**—1—3—5—7—9	
	Glaubwürdigkeit	9—7—**5**—3—1—3—5—7—9	
	Haftungsfragen	**9**—7—5—3—1—3—5—7—9	
	Informationsüberfluss	**9**—7—5—3—1—3—5—7—9	
	Fehlinterpretation von Daten	9—7—**5**—3—1—3—5—7—9	
Mitarbeiter	Motivation	9—**7**—5—3—1—3—5—7—9	
	Fähigkeit und Qualifikation	9—7—**5**—3—1—3—5—7—9	
	Neues Wissen	9—**7**—5—3—1—3—5—7—9	
	Arbeitgebermarke	9—7—5—**3**—1—3—5—7—9	
	Kultur der Zuversicht	9—7—5—**3**—1—3—5—7—9	
	Mitarbeiterfluktuation	9—7—5—3—**1**—3—5—7—9	
	Frustration	9—7—5—3—**1**—3—5—7—9	
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—5—3—**1**—3—5—7—9	
Daten und Technologie	Usability der Software und Prozesse	9—7—**5**—3—1—3—5—7—9	
Kernkompetenzen	Customer-Product-Fit	9—7—**5**—3—1—3—5—7—9	
	Kundenbeziehung	9—7—5—**3**—1—3—5—7—9	
	Prozesseffizienz	9—7—5—**3**—1—3—5—7—9	
Branchenimage	Branchenimage	9—7—5—**3**—1—3—5—7—9	

Mensing: Haben Sie noch Kommentare oder Anmerkungen?

Company 4: Die Daten sind das Gold der Zukunft und wer sie für sich zu verwenden weiß, kann nur gewinnen.

Mensing: Vielen Dank, dass Sie sich die Zeit genommen haben!

9.3.5. Company 5

Mensing: Guten Tag Herr Company 5, vielen Dank, dass Sie sich die Zeit genommen haben.

Company 5: Guten Tag Frau Mensing, sicher, ich helfe gerne bei Masterarbeiten.

Mensing: Ich würde das Gespräch gerne aufzeichnen, ich muss das transkribieren und in den Anhang meiner Arbeit anfügen.

Company 5: Ja, natürlich. Was studieren Sie und wo?

Mensing: Mein Studium heißt internationale Betriebswirtschaftslehre an der Universität Wien. Das heißt mein fachlicher Hintergrund bezieht sich mehr auf die Unternehmenssicht auf die Thematik Open Data sowie auf Entscheidungsmodelle. Mit meiner Arbeit möchte ich Unternehmen bei der Frage unterstützen ob es sich für sie lohnt sich mit dem Thema Open Data weiter auseinander zu setzen oder eben nicht. Das heißt, das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt „ja“ oder „nein“. Es ist sinnvoll sich mit dem Thema näher zu befassen oder nicht.

Um das Modell zu entwickeln habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Perspektive des dritten Sektors reinzubringen noch OI, KS, und CSR besteht. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden.

Aus diesen vielen Aspekten habe ich Chancen und Risiken abgeleitet, die auf ein Unternehmen zukommen könnten. Sie bilden die Basis für das Zielsystem, das dem Entscheidungsmodell zugrunde liegt. Das habe ich auch ausgedruckt mitgebracht.

Als oberstes Ziel steht die Verbesserung der Unternehmenssituation. Auf der ersten Ebene sind die Haupt-Kriterien aufgelistet. Unter diesen kommen die Detailpunkte, die sich zu den oberen Punkten summieren.

Company 5: Und woher stammen die Kategorien?

Mensing: Die stammen aus der Literatur. Jeder einzelner der Punkte tritt in der Literatur auf und ich habe eben diese verschiedenen Ströme der Literatur zusammengefasst und zu vorhanden Kategorien aggregiert.

Company 5: ok.

Mensing: Wir werden dann auch gleich in das Modell einsteigen, aber zuvor möchte ich gerne mit Ihnen ein paar Basisdaten abklären und dann auch noch über Open Data in Ihrem Unternehmen sprechen bevor wir zu dem Entscheidungsmodell übergehen. Bei dem Modell schauen wir uns zuerst die Kriterien an und dann vergleichen wir die Alternativen in Bezug auf die Kriterien.

Also beginnen wir mit den Basisdaten. Name: Bernhard Company 5, Firma: KDZ Zentrum für Verwaltungsforschung, Position im Unternehmen?

Company 5: Meine offizielle Bezeichnung ist Teamkoordinator europäische Governance- und Städtepolitik. Im Bezug auf Open Data bin ich der Experte für Open Government im Unternehmen.

Mensing: Das Tätigkeitsfeld des KDZ?

Company 5: Forschung, Beratung und Weiterbildung für den öffentlichen Sektor. Mitarbeiter sind wir aktuell 32.

Mensing: Wie hoch war der Umsatz im vergangenen Jahr?

Company 5: Wir gehören in die 1-5Mio € Kategorie.

Mensing: Der nächste Punkt betrifft bereits Open Data. Welche Art von Datensätzen publizieren Sie?

Company 5: Ergebnisse von Umfragen, freiverfügbare Ergebnisse von unseren Projekten. Wir veröffentlichen auf Opendataportal.at. Wir waren mit einer der ersten Dateneinsteller. Ich bin auch Teil der Open Knowledge Foundation. Ich schätze ca. ½ Jahr nachdem es online gegangen ist, haben wir dort Daten publiziert.

Mensing: War das ein einmaliges Einstellen oder werden sie permanent über eine API zur Verfügung gestellt?

Company 5: Sie werden ergänzt aber wir haben es noch nicht internalisiert. Wir haben noch keinen Prozess etabliert, der dazu führt. Aktuell sind es noch wenige Datensätze und mehr ein „goodwill-zeigen“ um die Sache zu unterstützen.

Mensing: Was für Ziele verfolgen Sie damit?

Company 5: Ziel war es damit das Opendataportal zu unterstützen. Das war das oberste Ziel, kein Unternehmensziel.

Mensing: Hat sich das mittlerweile gewandelt?

Company 5: Ja, das ist auch etwas, das sich wandelt allgemein. Wenn wir Umfragen durchführen und dann den Auftraggeber fragen, ob wir die Ergebnisse veröffentlichen dürfen, ist er nicht abgeneigt aber er ist einfach auf die Frage nicht vorbereitet. Es betrifft natürlich auch unsere Geschäfts Modelle, weil wir die Daten ja auch exklusiv haben und diese Daten ja auch ein Teil unseres Know-Hows sind. Ein ganz konkretes Beispiel ist eine aktuelle Umfrage, die wir gemacht haben über das Archivwesen in Gemeinden. Hier haben wir angefragt, ob wir die Rohdaten – natürlich anonymisiert- auf dem opendataportal veröffentlichen dürfen, weil der Städte- und Gemeindebund auch nicht auf data.gv.at ist. Das wird vermutlich kommen aber das Anliegen muss erst in den entsprechenden Ausschüssen diskutiert werden. Aber wir müssen den Schritt des Hinweises übernehmen. Das heißt, dass sich dieser Prozess erst etablieren muss.

Bei dem nächsten Punkt zu Erfolgsbeispielen und Nutzen, kann ich leider noch von keinem Nutzen berichten, vielleicht weil wir auch noch zu wenig Datensätze veröffentlicht haben. Es gibt eine Ausnahme. Die heißt data.offenerhaushalt.at. Dort können alle Gemeinden ihre Haushaltsdaten, ihre Finanzdaten veröffentlichen. Diese können dann über ein CSV abgerufen werden. Allerdings eben nur pro Gemeinde, pro Jahr ein Datensatz. Die Datensätze sind auch um Metadaten erweitert worden und können ebenfalls über data.gv.at abgerufen werden. Hier gibt es die Anwendungsbeispiele, dass Studenten diese Daten für ihre Arbeiten genutzt haben oder auch Journalisten. Da stehen aber wirklich viele Datensätze dahinter, wir haben 980 Gemeinden, die ihre Finanzdaten veröffentlichen und das in einer Detailtiefen, die die Statistik Austria nicht erfasst. Das ist das einzige Erfolgsbeispiel.

Das Ziel, das wir damit verfolgen ist, dass wir Kompetenz beim Thema Open Data zeigen. Da wir öffentliche Stellen in dem Bereich beraten ist es für uns wichtig hier zu zeigen, dass wir wissen was das ist und wie man damit umgeht.

Mensing: Ziele in dem Zusammenhang können auch nach Innen gerichtet sein. Wie Motivation. Prozesseffizienz usw.

Company 5: Ja, aber das wäre eher eine Hoffnung als ein Ziel. Also diesen Effekt kenne ich von den Verwaltungen, dass es dort so ist. Bei uns im Hause sehe ich das nicht so, wir haben motivierte Mitarbeiter. Es geht schon darum, dass die Kollegen die Prinzipien kennenlernen und eine Bewusstseinsbildung erfolgt aber als Unternehmensziel würde ich es noch nicht formulieren.

Mensing: Ok, ja, vielen Dank. Dann würde ich gern gleich in das Modell einsteigen.

Das Modell basiert auf einem multikriteriellen Entscheidungsmodell, genauer dem Analytical Hierarchy Prozess. Es funktioniert so, dass immer zwei Kriterien paarweise miteinander verglichen werden. Immer die Zeile gegen die Spalte. Der Vergleich erfolgt mittels der angedruckten Skala. Sie gibt die Werte vor, die einzutragen sind, ob ein Kriterien wichtiger oder unwichtiger ist als ein anderes und wenn ja, in welcher Ausprägung. Wenn eine Gleichheit der beiden Kriterien existiert, wird eine 1 eingetragen. Wenn Ein Kriterium absolut wichtiger ist als das andere, erhält es eine 9.

Company 5: Ok, verstehe.

Mensing: Die erste Tabelle bezieht sich auf die Oberziele, die nächsten Tabellen dann auf die Details, sie summieren sich dann zu den oberen Kriterien.

Company 5: Ok, allgemein aus Unternehmenssicht oder im Bezug auf Open Data?

Mensing: Ja, allgemein aus Unternehmenssicht, welches Kriterium die Entscheidung stärker beeinflusst.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	1/3	3	5	3	1/5	7
Unternehmensruf		1	1	3	3	1/3	9
Mitarbeiter			1	3	7	1/3	5
Kontrolle durch den Staat				1	1/5	1/9	5

Daten und Tech-nolo-gie					1	1/3	5
Kern-kompe-tenzen						1	9
Branchen -image							1

Finanzen

	Umsatz	Ein-sparungen	Einmalige Kosten	Wiederkeh-rende Kosten	Nicht real-isierte Erlöse	Indirekte Umsatzein-bußen
Umsatz	1	7	7	3	5	5
Ein-sparungen		1	5	3	1	3
Einmalige Kosten			1	1/7	5	5
Wiederkeh-rende Kosten				1	9	9
Nicht real-isierte Erlöse					1	1
Indirekte Umsatzein-bußen						1

Unternehmensimage

	Transpar-enz	Vertrau-ens-würdigkeit	Soziale Verant-wor-tung	Unterneh-menswert	Glaubwür-digkeit	Haftungs-fragen	Informa-tions-überfluss	Fehlinter-pretation von Daten
Transpar-enz	1	1/7	1/7	5	1/3	1/5	3	9
Vertrau-ens-würdigkeit		1	3	7	1	3	3	3
Soziale Verant-wor-tung			1	5	1/3	1/3	5	7
Unterneh-menswert				1	1/5	3	5	7
Glaubwür-digkeit					1	3	7	9
Haftungs-fragen						1	7	9
Informa-tionsüber-fluss							1	3
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Quali-fikation	Neues Wis-sen	Arbeitgeber-marke	Kultur der Zuversicht	Mitarbeiter-fluktuation	Frustration
Motivation	1	3	5	3	1/3	3	1/3

Fähigkeiten und Qualifikation		1	3	1/3	1/3	5	1/5
Neues Wissen			1	1/5	1/5	3	1/5
Arbeitgebermarke				1	3	5	3
Kultur der Zuversicht					1	3	3
Mitarbeiterfluktuation						1	3
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	5	1/5
Kundenbeziehung		1	3
Prozesseffizienz			1

Mensing: Gut, das heißt wir haben nun alle Kriterien, die ich aus der Literatur extrahiert habe soweit gewichtet. Gibt es Punkte, die Sie vermissen oder Kriterien die wichtig sind, die hier nicht genannt wurden?

Company 5: Über die Qualität der Daten und unserer Arbeit wird wenig Aussage getroffen. Sie schwingt mehr so mit. Ansonsten fällt mir nichts ein, was noch fehlen könnte.

Mensing: Ok, dann gehen wir zum letzten Punkt des Fragebogens über. Er besteht aus dem Vergleich der Alternativen in Bezug auf die gewichteten Kriterien. Die Alternativen sind einerseits ein Engagement in Open Data und andererseits das Ablehnen der Strategie.

Die Frage ist hier In welchem Szenario gibt es einen stärkeren Ausschlag und um wie viel ist er stärker in Richtung welches Szenarios?

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—5—**3**—1—3—5—7—9	
	Einsparungen	9—7—5—3—1—3—5—7—**9**	
	Einrichtungskosten / einmalige Kosten	**9**—7—5—3—1—3—5—7—9	

	Wartungskosten / Wiederkehrende Kosten	**9**—7—5—3—1—3—5—7—9
	Nicht realisierte Erlöse	9—7—5—3—**1**—3—5—7—9
	Indirekte Umsatzeinbußen	9—7—5—**3**—1—3—5—7—9
Unternehmensruf	Transparenz	**9**—7—5—3—1—3—5—7—9
	Vertrauenswürdigkeit	9—7—**5**—3—1—3—5—7—9
	Soziale Verantwortung	**9**—7—5—3—1—3—5—7—9
	Unternehmenswert	9—7—5—**3**—1—3—5—7—9
	Glaubwürdigkeit	9—7—**5**—3—1—3—5—7—9
	Haftungsfragen	9—7—5—3—**1**—3—5—7—9
	Informationsüberfluss	9—7—5—**3**—1—3—5—7—9
	Fehlinterpretation von Daten	9—7—5—3—**1**—3—5—7—9
Mitarbeiter	Motivation	9—7—**5**—3—1—3—5—7—9
	Fähigkeit und Qualifikation	9—**7**—5—3—1—3—5—7—9
	Neues Wissen	9—7—**5**—3—1—3—5—7—9
	Arbeitgebermarke	9—7—**5**—3—1—3—5—7—9
	Kultur der Zuversicht	9—7—5—3—**1**—3—5—7—9
	Mitarbeiterfluktuation	9—7—5—3—**1**—3—5—7—9
	Frustration	9—7—5—3—**1**—3—5—7—9
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—5—**3**—1—3—5—7—9
Daten und Technologie	Usability der Software und Prozesse	9—7—**5**—3—1—3—5—7—9
Kernkompetenzen	Customer-Product-Fit	9—7—5—3—**1**—3—5—7—9
	Kundenbeziehung	9—7—5—3—**1**—3—5—7—9
	Prozesseffizienz	9—7—5—3—1—3—**5**—7—9
Branchenimage	Branchenimage	9—7—**5**—3—1—3—5—7—9

Mensing: Prima, dann sind wir mit dem Fragebogen soweit durch. Gibt es noch Anmerkungen oder Kommentare?

Company 5: Ja, also ein Punkt, der mir wichtig wäre ist, dass ich ja hier sehr persönliche Angaben über meine Beurteilung der Kriterien und Alternativen gemacht habe. Ich möchte nicht, dass das ungefiltert so weitergegeben wird. Ich bitte Sie meine Daten zu anonymisieren, bevor die Ergebnisse der Studie veröffentlicht werden.

Mensing: Ja, die Anmerkung habe ich bereits von anderen Befragten gehört, das werde ich berücksichtigen. Haben Sie sonst noch Anmerkungen zu dem Modell?

Also ich habe das sehr interessant gefunden, auch weil ich die Methodik so noch nicht kenne. Können Sie mir die Ergebnisse bitte zusenden?

Mensing: Selbstverständlich, sehr gern. Vielen Dank für das sehr genaue Ausfüllen des Fragebogens!

9.3.6. Company 6

Mensing: Guten Tag Herr Company 6, vielen Dank, dass Sie sich die Zeit genommen haben.

Company 6: Guten Tag Frau Mensing.

Mensing: Ich würde das Gespräch gerne aufzeichnen, um es dann zu transkribieren. Ist das in Ordnung für Sie?

Company 6: Ja, das ist ok. In wie weit wird das Interview veröffentlicht?

Mensing: Von anderen Interviewpartnern gab es bereits den Wunsch Namen und Unternehmen zu anonymisieren, also werde ich dann bevor ich die Arbeiten weitergebe die Interviewpartner dementsprechend mit Unternehmen 1,2,3 usw. kennzeichnen.

Company 6: Ja, das wäre auch mir sehr recht.

Mensing: Gut, ich hatte Ihnen ja auch schon einen kleinen Einblick per E-Mail in meine Masterarbeit gegeben. Mein Ziel ist ein Modell zu entwickeln, das Unternehmen bei der Entscheidung unterstützt „Lohnt sich Open Data für mein Unternehmen? Also dass ich mich damit befasse oder nicht?“.

Company 6: Ja, das ist sehr spannend, es gab vor kurzer Zeit eine Studie der Wirtschaftsuni zu dem Thema, warum Open Data von der Wirtschaft noch nicht angenommen wurde und eines der größten „Bottle-Necks“ war, dass das Thema noch zu unbekannt ist. Also dass Unternehmen immer noch nicht wissen, was Open Data eigentlich ist, ein völliges Missverständnis in der Hinsicht vor allem in Bezug auf Datenschutz und personenbezogene Daten.

Mensing: Ja, das habe ich nun schon öfter gelesen und gehört.

Da ich Betriebswirtschaft studieren, habe ich das Thema, das ja nun aus dem öffentlichen Bereich kommt, mehr aus dem privaten Sektor zu betrachten. Dazu habe ich eine Literaturrecherche aus den Bereichen OGD, OD, KS, OI, CSR unternommen, aus diesen ganzen verschiedenen Literaturrichtungen habe ich gemeinsame Chancen und Risiken extrahiert und daraus wiederum ein gemeinsames Zielsystem entwickelt, das ein Unternehmen in Bezug auf OD haben kann.

Das Interview ist so aufgebaut, dass zuerst Basisdaten erhoben werden, aus denen dann eventuell Cluster gebildet werden können. Als zweiten Punkt würde ich dann gerne mit Ihnen über Ziele Ihres Unternehmens von Open Data sprechen und dann gleich in das Modell einsteigen. Also dass wir einen Realitätscheck machen, ob viele Punkte zutreffen oder nicht, wie sie die einzelnen Punkte bewerten würden usw.

Ich habe Ihnen eine ausgedruckte Version des Fragebogens mitgebracht, damit Sie hier mitlesen können.

Company 6: Ok, Dankeschön.

Mensing: Dann fangen wir gleich mal an mit den Basisdaten. Name, Firma und Position im Unternehmen habe ich hier auf Ihrer Karte. (Martin Company 6/ Semantic Web Company / CFO)

In welcher Branche sind Sie tätig? Was ist das Tätigkeitsfeld Ihres Unternehmens?

Company 6: Wir sind Softwareanbieter. Unser Kernprodukt macht semantisches Datendifferenzierungsmanagement. Das können Sie irgendwo in Ihren IT-Stack hineinstecken und dann wird Ihr ganzen Dateninformationsmanagement mittels semantischer Modelle angereichert und verbunden. Weitere Erklärungen würden vermutlich zu weit führen.

Mensing, Ja, obwohl das super spannend klingt. Wie viele Mitarbeiter sind Sie aktuell?

Company 6: 42 sind wir.

Mensing: In welchem Umsatzbereich würden Sie Ihr Unternehmen sehen?

Company 6: Knappe 4 Mio.

Mensing: Also bei 1-5 Mio. Dann kommen wir zu Open Data. Publizieren Sie Daten?

Company 6: Ja, hauptsächlich Wissensmodelle, Taxanomien, Teasauro – Ontologien...

Mensing: Auf dem Open Data Portal veröffentlichen Sie auch Daten?

Company 6: Ja, machen wir auch

Mensing: Wann haben Sie damit angefangen?

Company 6: 2011, glaube ich.

Mensing: Wie viele Datensätze publizieren Sie?

Company 6: Nicht viele, insgesamt werden es um die 40-50 sein. Aber wie gesagt, wir machen nur Wissensmodelle. Wir generieren keine echten Daten als Softwarehersteller. Wir produzieren keine echten Daten, wir verwenden sie nur.

Mensing: Laden Sie sie dann einmal hoch auf das Portal oder stellen Sie sie über eine API zur Verfügung?

Company 6: Nein, wir laden sie entweder hoch oder bei uns im Katalog und verlinken dann nur die Metadaten im ODP.

Mensing: Welche Ziele verfolgen Sie damit?

Company 6: Naja, im Prinzip geht es hier ja um Interoperabilität, das heißt wenn Sie ein Wissensmodell verwenden an das Sie dann Daten dranhängen also Knowledge Graphen machen und Sie publizieren das, dann können andere dasselbe Wissensmodell verwenden und dann haben sie mehr oder weniger für Datenintegration einen guten Ansatz wenn die Begrifflichkeiten von den semantischen Wissensmodellen wiederverwendet werden und dass die verknüpft sind. Durch das dass sie wiederverwendet werden und verknüpft sind, dann können Daten einfach viel einfacher integriert werden.

Mensing: Das heißt Ihr Ziel wäre es da einen Standard zu etablieren?

Company 6: Zum Teil, ja.

Mensing: Meine nächste Frage ist ob diese Ziele bereits erreicht werden konnten?

Company 6: Also es ist erreicht worden für einige Bereiche. Wir haben mit einer internationalen Organisation, die sitzen auch im Vienna International Center, ein gemeinsames Wissensmodell erarbeitet, was dann Open Data gestellt wurde und das ist in diesem Bereich nun der gängige Standard und wird immer wieder verwendet. Insofern hat sich das Publizieren von solchen Wissensmodellen für uns durchaus gelohnt.

Mensing: War es dahingehend auch eines der Ziele die Bekanntheit zu steigern?

Company 6: Durchaus, am Anfang also Open Data war sicher einerseits um es zu verwenden und im Forschungsbereich einfach Daten zu haben und andererseits um einfach Sichtbarkeit zu generieren, klar.

Mensing: Auch im Kompetenz in dem Bereich zu zeigen?

Company 6: Also zum Thema Datenmanagement, ja. Also Open Data ist manchmal ein recht schöner Türöffner, um zu sagen, dass man sich als Organisation grundsätzlich anfängt sich mit Datenmanagement zu befassen und mit einem Open Data Pilot kann man einmal sehen, was man überhaupt an Daten in der Organisation hat, welche sind sensibel, welche sind es nicht, ist ja aktuell sowieso ein schönes Thema wegen der GDPR. Grade in dem NGO/NPO Bereich ist Transparenz ein ganz großes Thema oder auch im Government Bereich, dort ist es dann einfacher, sage ich schon länger, zu argumentieren, warum wir das offen stellen, um dann halt Dinge, die mit öffentlichen Geldern oder durch Funding finanziert worden sind und die dann auch wiederum zurück gibt, um zu sagen gut, man hat damit etwas getan und diese Daten stehen wieder allen zur Verfügung.

Mein letzter Punkt zu diesem Thema wäre Erfolgsbeispiele, die haben Sie ja grade quasi schon genannt.

Company 6: Ja, wie gesagt, Sichtbarkeit, Standards, auch Folgeprojekte zu machen.

Mensing: Gut, dann gehen wir gleich in das Modell.

Das hier ist das Zielsystem, was ich vorhin beschrieben habe. Aus der Literatur wurden eben ganz viele Punkte extrahiert, die hier nun gebündelt und zusammengefasst wurden. Hier oben sehen sie die Oberbegriffe der Themenblöcke und darunter dann die Detailpunkte. Dazu gibt es jeweils positive oder negative Aspekte. Bei Einsparungen ist ein hoher Wert beispielsweise gut, bei Mitarbeiterfrustration eher nicht. Diese Punkte müssen auch dementsprechend in das Modell einfließen. Zuvor müssen aber die Kriterien noch gewichtet werden. Dazu wird das AHP- Verfahren genutzt. Es basiert auf einem jeweils paarweisen Vergleich von Möglichkeiten.

Sie sehen hier die vorbereitete Matrix, es werden nur die grauen Felder ausgefüllt, da die Matrix invers ist, ergeben sich die Lösungen für die anderen Felder daraus entsprechend. Es werden immer Zeilen mit Spalten verglichen und auf einer Skala von 1 bis 9 bewertet, wobei eine 1 Unentschieden, also Gleichheit bedeutet und eine 9 absolute Dominanz, bzw. -9 absolute Unterlegenheit.

Company 6: Ok, verstanden, fangen wir an.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	1/3	1/3	7	1/3	1	3
Unternehmensruf		1	1	7	1	1	3
Mitarbeiter			1	5	1	1	3
Kontrolle durch den Staat				1	1/7	1/5	1/3
Daten und Technologie					1	1	5
Kernkompetenzen						1	5
Branchenimage							1

Finanzen

	Umsatz	Einsparungen	Einmalige Kosten	Wiederkehrende Kosten	Nicht realisierte Erlöse	Indirekte Umsatzeinbußen
Umsatz	1	1	1	5	5	7
Einsparungen		1	5	5	7	7
Einmalige Kosten			1	5	3	3
Wiederkehrende Kosten				1	1	1
Nicht realisierte Erlöse					1	5
Indirekte Umsatzeinbußen						1

Unternehmensimage

	Transparenz	Vertrauenswürdigkeit	Soziale Verantwortung	Unternehmenswert	Glaubwürdigkeit	Haftungsfragen	Informationsüberfluss	Fehlinterpretation von Daten
Transparenz	1	1	3	1/5	1	1/3	1	1/3

Vertrau-ens-würdigkeit		1	3	1/5	1	1/3	3	1/3
Soziale Verant-wor-tung			1	1/5	1/3	1/3	1	1/5
Unterneh-menswert				1	5	1	3	1
Glaubwür-digkeit					1	1	3	1
Haftungs-fragen						1	3	3
Informa-tionsüber-fluss							1	1/5
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Quali-fikation	Neues Wis-sen	Arbeitgeber-marke	Kultur der Zuversicht	Mitarbeiter-fluktuation	Frustration
Motivation	1	1	1	5	3	1/2	1
Fähigkeiten und Quali-fikation		1	3	3	1	1	1
Neues Wis-sen			1	5	1/2	1	1
Arbeitgeber-marke				1	1/3	1/5	1/3
Kultur der Zuversicht					1	1	1
Mitarbeiter-fluktuation						1	3
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	5	5
Kundenbeziehung		1	1
Prozesseffizienz			1

Mensing: Dann haben wir die Bewertung der Kriterien jetzt soweit durch. Gibt es Faktoren, die Sie vermissen?

Company 6: Bei den finanziellen Faktoren wäre mir der Gewinn wichtiger als der Umsatz. Die anderen Punkte, die mir jetzt einfallen sind bereits in einigen Kriterien inkludiert. Innovation wäre mir noch wichtig, dass aufzunehmen, wir sind eher innovationsgetrieben, daher wäre ein Punkt Research und Innovation für mich interessant.

Mensing: Ok, vielen Dank.

Dann würden wir auch schon zum letzten Punkt des Fragebogens kommen. Hier geht es darum die Kriterien anhand der zwei Szenarien zu bewerten. Die Frage kann so gelesen werden: Bei welchem Szenario gibt es einen höheren Ausschlag bei dem jeweiligen Kriterium und wie hoch ist der Ausschlag? Bei Unentschiedenheit, wählen wir die 1.

Company 6: Gut, starten wir einfach.

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—7—**5**—3—1—3—5—7—9	
	Einsparungen	9—7—5—3—**1**—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	9—7—5—**3**—1—3—5—7—9	
	Wartungskosten / Wiederkehrende Kosten	9—7—**5**—3—1—3—5—7—9	
	Nicht realisierte Erlöse	9—7—5—3—**1**—3—5—7—9	
	Indirekte Umsatzeinbußen	9—7—5—3—**1**—3—5—7—9	
Unternehmensruf	Transparenz	9-**8**-7—5—3—1—3—5—7—9	
	Vertrauenswürdigkeit	9—7-**6**-5—3—1—3—5—7—9	
	Soziale Verantwortung	9—7—5—**3**—1—3—5—7—9	
	Unternehmenswert	9—7—5—**3**—1—3—5—7—9	
	Glaubwürdigkeit	9—**7**—5—3—1—3—5—7—9	
	Haftungsfragen	9—7—5—**3**—1—3—5—7—9	
	Informationsüberfluss	9—7—5—3-**2**-1—3—5—7—9	
	Fehlinterpretation von Daten	9—7—**5**—3—1—3—5—7—9	
Mitarbeiter	Motivation	9—7—5—**3**—1—3—5—7—9	
	Fähigkeit und Qualifikation	9—7—5—3—**1**—3—5—7—9	
	Neues Wissen	9—**7**—5—3—1—3—5—7—9	
	Arbeitgebermarke	9—7—**5**—3—1—3—5—7—9	
	Kultur der Zuversicht	9—7—5—**3**—1—3—5—7—9	
	Mitarbeiterfluktuation	9—7—5—3—**1**—3—5—7—9	

	Frustration	9—7—5—3—1—**3**—5—7—9
Kontrolle	Verstärkte Kontrollen durch den Staat	9—7—**5**—3—1—3—5—7—9
Daten und Technologie	Usability der Software und Prozesse	9—**7**—5—3—1—3—5—7—9
Kernkompetenzen	Customer-Product-Fit	9—7—**5**—3—1—3—5—7—9
	Kundenbeziehung	9—7—5—**3**—1—3—5—7—9
	Prozesseffizienz	9—7—5—3—**1**—3—5—7—9
Branchenimage	Branchenimage	9—7—5—**3**—1—3—5—7—9

Mensing: Dann sind wir ja auch schon soweit durch. Gibt es noch etwas, dass sie allgemein anmerken möchten?

Company 6: Wir haben ja schon viel besprochen, das Thema und die Untersuchung ist sehr spannend, hätte ich gerne, schicken Sie's mir bitte durch, wenn es fertig ist.

Mensing: Ja, vielen Dank, mache ich gerne.

9.3.7. Company 7

Mensing: Guten Tag Herr Company 7, vielen Dank, dass Sie sich Zeit genommen haben, um mich bei meiner Masterarbeit zu unterstützen.

Company 7: Guten Tag Frau Mensing.

Mensing: Ich würde das Gespräch gerne aufzeichnen, da ich es im Anhang meiner Arbeit schriftlich anfügen muss,

Company 7: Ja, das ist ok

Mensing: Ich habe den Fragebogen auch für Sie ausgedruckt, da das Besprochene so besser nachvollziehbar ist.

Company 7: Ja, Danke.

Mensing: Das Ziel meiner Arbeit ist die Entwicklung eines Entscheidungsmodells für Unternehmen. Das Wunschergebnis ist, dass Unternehmen ihre Daten eintragen können und sie am Ende ein Ergebnis erhalten, das dann sagt eine Tendenz ausgibt, die zeigt, ob eine weitere Beschäftigung mit dem Thema sinnvoll ist oder nicht.

Um das Modell zu entwickeln habe ich eine umfassende Literaturrecherche unternommen, die aus den Bereichen OGD, ODfB, und um die Unternehmensperspektive einzubinden, habe ich noch OI, KS, und CSR einbezogen. Das Thema sollte also umfassend aus verschiedenen Gesichtspunkten betrachtet werden.

Aus diesen vielen Aspekten habe ich Chancen und Risiken abgeleitet, die auf ein Unternehmen zukommen könnten. Sie bilden die Basis für das Zielsystem, das dem Entscheidungsmodell zugrunde liegt. Das habe ich auch ausgedruckt mitgebracht.

Als oberstes Ziel steht die Verbesserung der Unternehmenssituation. Auf der ersten Ebene sind die Haupt-Kriterien aufgelistet. Unter diesen kommen die Detailpunkte, die sich zu den oberen Punkten summieren.

Zuerst nochmal kurz zum Aufbau unseres Gesprächs. Ich würde gerne erst noch die Basisdaten von Ihnen und Ihrem Unternehmen besprechen, bevor wir mit der Kriterienbewertung beginnen.

Company 7: Einverstanden.

Mensing: Name: Matthias Company 7, Firma: Has.To.Be GmbH, Position im Unternehmen: Company 7: Vetriebsleiter.

Mensing: Was ist das Tätigkeitsfeld der Has.To.Be GmbH?

Company 7: E-Mobilität, E-Ladestationen und die dazugehörige Software.

Mensing: Wie viele Mitarbeiter haben Sie momentan?

Company 7: Wir sind zurzeit 35.

Mensing: In welchem Bereich liegt Ihr Jahresumstz?

Company 7: Zwischen 1 und 5 Mio €.

Mensing: Dann kommen wir auch schon zu den Fragen betreffend Open Data. Welche Art von Datensätzen publiziert Ihr Unternehmen?

Company 7: Wir veröffentlichen von den E-Ladestationen die Locations und Realtime-Daten. Das ist alles über eine API abrufbar, angefangen haben wir damit 2016. Wir publizieren ca. 1Mio Datensätze.

Mensing: Welches Ziel verfolgte Ihre Unternehmen mit dieser Initiative?

Company 7: Wir wollten gerne ein europaweites Ladenetz mit Echtzeitdaten für E-Autos etablieren und haben das auch geschafft. Wir haben laufend mehr Stationen auf unserer Software, also man kann sagen, dass halb Europa auf unserer Software läuft und das ist ein super Erfolg.

Mensing: Prima, vielen Dank. Dann steigen wir gleich in das Bewertungsmodell ein.

Das Modell basiert auf dem Analytical Hierarchy Prozess. Es funktioniert so, dass immer zwei Kriterien paarweise miteinander verglichen werden. Immer die Zeile gegen die Spalte. Der Vergleich erfolgt mittels der angedruckten Skala. Sie gibt die Werte vor, die einzutragen sind, ob ein Kriterien wichtiger oder unwichtiger ist als ein anderes und wenn ja, in welcher Ausprägung. Wenn eine Gleichheit der beiden Kriterien existiert, wird eine 1 eingetragen. Wenn Ein Kriterium absolut wichtiger ist als das andere, erhält es eine 9.

Company 7: Ok, habe ich verstanden.

Ausfüllen des Fragebogens

Gewichtung der Bereiche

	Finanzen	Unternehmensruf	Mitarbeiter	Kontrolle durch den Staat	Daten und Technologie	Kernkompetenzen	Branchenimage
Finanzen	1	5	1	7	1/5	1/5	1/5
Unternehmensruf		1	1/5	5	1/5	1/3	1
Mitarbeiter			1	5	3	3	3
Kontrolle durch den Staat				1	1/7	1/7	1/3
Daten und Technologie					1	3	7
Kernkompetenzen						1	5
Branchenimage							1

Finanzen

	Umsatz	Ein-sparungen	Einmalige Kosten	Wiederkeh-rende Kosten	Nicht real-isierte Erlöse	Indirekte Umsatzein-bußen
Umsatz	1	7	7	3	7	7
Ein-sparungen		1	1/3	1/7	1	1
Einmalige Kosten			1	1/7	1	1
Wiederkeh-rende Kosten				1	1/7	1/7
Nicht real-isierte Erlöse					1	1
Indirekte Umsatzein-bußen						1

Unternehmensimage

	Transpar-enz	Vertrau-ens-würdigkeit	Soziale Verant-wor-tung	Unterneh-menswert	Glaubwür-digkeit	Haftungs-fragen	Informa-tions-überfluss	Fehlinter-pretation von Daten
Transpar-enz	1	1/7	1	1/7	1/5	1/5	1	1/7
Vertrau-ens-würdigkeit		1	5	1/7	1/3	1/5	3	3
Soziale Verant-wor-tung			1	1/7	1/5	1/7	1/5	1/5
Unterneh-menswert				1	7	3	7	5
Glaubwür-digkeit					1	1/5	5	1
Haftungs-fragen						1	7	5
Informa-tionsüber-fluss							1	1/5
Fehlinter-pretation von Daten								1

Mitarbeiter

	Motivation	Fähigkeiten und Quali-fikation	Neues Wis-sen	Arbeitgeber-marke	Kultur der Zuversicht	Mitarbeiter-fluktuation	Frustration
Motivation	1	1	5	5	5	1	1
Fähigkeiten und Quali-fikation		1	5	5	3	1	3
Neues Wis-sen			1	3	1	1/3	1/3
Arbeitgeber-marke				1	1	1/3	1/3
Kultur der Zuversicht					1	1/5	1/5
Mitarbeiter-fluktuation						1	1/3
Frustration							1

Kernkompetenzen

	Customer-product-fit	Kundenbeziehung	Prozesseffizienz
Customer-product-fit	1	3	5
Kundenbeziehung		1	7
Prozesseffizienz			1

Mensing: Dankeschön für das Ausfüllen der Kriterien. Gibt es Faktoren, di bei Ihnen für Unternehmerische Entscheidungen wichtig sind, hier aber nicht genannt wurden?

Company 7: Nein, das war sehr umfassend.

Mensing: Ok, wir kommen nun zum letzten Part unseres Fragebogens. Er besteht aus dem Vergleich der Alternativen in Bezug auf die gewichteten Kriterien. Die Alternativen sind einerseits ein Engagement in Open Data und andererseits das Ablehnen der Strategie.

Die Frage ist hier In welchem Szenario gibt es einen stärkeren Ausschlag und um wie viel ist er stärker in Richtung welches Szenarios?

Ausfüllen des Fragebogens

Haupt Kriterium	Unter Kriterium	Alternative 1 Engagement in Open Data	Alternative 2 KEIN Engagement in Open Data
Finanzen	Umsatz	9—**7**—5—3—1—3—5—7—9	
	Einsparungen	9—**7**—5—3—1—3—5—7—9	
	Einrichtungskosten / einmalige Kosten	**9**—7—5—3—1—3—5—7—9	
	Wartungskosten / Wiederkehrende Kosten	9—7—**5**—3—1—3—5—7—9	
	Nicht realisierte Erlöse	9—7—5—**3**—1—3—5—7—9	
	Indirekte Umsatzeinbußen	9—7—5—**3**—1—3—5—7—9	
Unternehmensruf	Transparenz	**9**—7—5—3—1—3—5—7—9	
	Vertrauenswürdigkeit	9—**7**—5—3—1—3—5—7—9	
	Soziale Verantwortung	9—7—5—3—**1**—3—5—7—9	
	Unternehmenswert	9—**7**—5—3—1—3—5—7—9	
	Glaubwürdigkeit	9—**7**—5—3—1—3—5—7—9	
	Haftungsfragen	**9**—7—5—3—1—3—5—7—9	

	Infor-mationsüberfluss	**9**—7—5—3—1—3—5—7—9
	Fehlinterpretation von Daten	**9**—7—5—3—1—3—5—7—9
Mitarbeiter	Motivation	9—7—5—3—**1**—3—5—7—9
	Fähigkeit und Qual-ifikation	9—7—**5**—3—1—3—5—7—9
	Neues Wissen	9—**7**—5—3—1—3—5—7—9
	Arbeitgebermarke	9—7—5—**3**—1—3—5—7—9
	Kultur der Zuver-sicht	9—7—5—**3**—1—3—5—7—9
	Mitarbeiterfluktua-tion	9—7—5—3—**1**—3—5—7—9
	Frustration	9—7—**5**—3—1—3—5—7—9
Kontrolle	Verstärkte Kontrol-len durch den Staat	9—7—**5**—3—1—3—5—7—9
Daten und Tech-nologie	Usability der Soft-ware und Prozesse	9—7—**5**—3—1—3—5—7—9
Kernkompeten-zen	Customer-Product-Fit	9—**7**—5—3—1—3—5—7—9
	Kundenbeziehung	9—7—**5**—3—1—3—5—7—9
	Prozesseffizienz	9—7—5—3—**1**—3—5—7—9
Branchenimage	Branchenimage	**9**—7—5—3—1—3—5—7—9

Mensing: Vielen Dank, dass Sie sich die Zeit genommen haben!

Company 7: Sehr gerne.

9.4. Overview of Interview Results

9.4.1. Tables

	C1	C2	C3	C4	C5	C6	C7	Average (geometric)
Finance	14.85%	14.40%	18.54%	10.68%	15.95%	11.84%	12.51%	13.90%
Reputation	34.31%	9.20%	7.46%	10.66%	17.47%	20.31%	5.74%	12.62%
Employees	11.37%	24.23%	31.82%	8.83%	15.55%	19.49%	27.03%	18.09%
Scrutiny	1.59%	1.53%	1.73%	10.67%	4.72%	2.80%	2.44%	2.83%
Data and Technology	14.06%	18.47%	10.51%	26.96%	8.75%	21.71%	25.90%	16.70%
Core Tasks	12.03%	23.16%	26.11%	27.11%	35.49%	18.40%	17.33%	21.65%
Industry Reputation	11.79%	9.01%	3.83%	5.10%	2.07%	5.45%	9.04%	5.77%

Table 31: Main criteria weights

	Finance	Reputation	Employees	Scrutiny	Data and Technology	Core Tasks	Industry Reputation
Minimum Value	10.68%	5.74%	8.83%	1.53%	8.75%	12.03%	2.07%
1st Quartile	12.18%	8.33%	13.46%	1.66%	12.29%	17.87%	4.47%
Median	14.40%	10.66%	19.49%	2.44%	18.47%	23.16%	5.45%
3rd Quartile	15.40%	18.89%	25.63%	3.76%	23.81%	26.61%	9.03%
Maximum Value	18.54%	34.31%	31.82%	10.67%	26.96%	35.49%	11.79%

Table 32: Main criteria values for boxplot diagram

For unweighted sub criteria, please see Table 27.

	Min	Q1	Median	Q3	Max
Sales and Revenue	13.84%	24.56%	32.74%	36.68%	50.82%
Savings	6.76%	12.90%	15.89%	16.65%	37.78%
Implementation Costs	5.39%	9.76%	10.12%	18.97%	27.36%
Maintenance Costs	4.00%	6.06%	24.36%	29.91%	37.78%
Direct revenue losses	1.93%	3.66%	12.74%	15.68%	17.69%

Indirect losses	4.08%	5.30%	12.74%	20.13%	36.65%
Transparency	2.82%	5.61%	5.98%	8.35%	9.22%
Trustworthiness	4.08%	9.82%	10.31%	13.01%	2343%
Social Responsibility	2.42%	6.59%	7.49%	12.59%	15.01%
Company Value	5.20%	8.21%	9.38%	25.01%	39.24%
Loss in credibility	3.94%	8.72%	10.85%	17.14%	32.32%
Liability issues	3.35%	17.48%	23.34%	24.80%	48.27%
Information Overflow	1.44%	2.45%	3.53%	7.79%	32.82%
Misinterpretation of Data	2.38%	3.22%	5.17%	12.65%	20.62%
Motivation	4.89%	5.67%	18.79%	22.81%	29.34%
Skills and Qualification	8.78%	13.84%	17.59%	26.04%	33.72%
New Knowledge	4.66%	6.09%	6.42%	13.52%	18.06%
Employer Brand	4.37%	4.43%	11.24%	16.46%	24.17%
Confidence Culture	2.85%	3.95%	4.81%	9.44%	20.49%
Turnover Rate	3.91%	6.47%	16.17%	23.09%	33.03%
Frustration	8.85%	13.75%	15.02%	18.33%	32.96%
More control by government	1.53%	1.66%	2.44%	7.70%	21.11%
Usability of software and processes	8.75%	11.49%	14.06%	22.18%	26.96%
Customer-Product-Fit	2.80%	14.12%	18.67%	45.99%	72.33%
Customer-Relationship	7.08%	25.93%	33.24%	54.20%	79.38%
Process-efficiency	6.67%	11.92%	20.59%	39.71%	71.43%
industry reputation	2.07%	4.47%	9.01%	10.41%	14.29%

Table 33: Unweighted sub criteria values for boxplot diagram

	C1	C2	C3	C4	C5	C6	C7	Average (geometric)
Sales and Revenue	4.76%	3.43%	6.21%	2.23%	6.36%	3.24%	5.63%	4.52%
Savings	1.50%	1.97%	2.94%	2.56%	2.65%	4.47%	0.69%	2.36%
Implementation Costs	3.38%	1.82%	1.78%	0.87%	1.58%	2.09%	0.98%	1.84%
Maintenance Costs	1.71%	3.14%	6.21%	4.24%	3.89%	0.62%	2.10%	2.25%
Direct revenue losses	2.01%	1.63%	0.39%	0.31%	0.83%	0.94%	1.55%	1.22%
Indirect losses	1.48%	2.42%	1.00%	5.91%	0.65%	0.48%	1.55%	1.93%
Transparency	1.89%	0.55%	0.69%	0.60%	1.54%	1.44%	0.14%	0.98%
Trustworthiness	3.33%	0.91%	0.98%	1.35%	4.09%	1.70%	0.57%	1.85%

Social Responsibility	2.57%	1.38%	0.45%	1.16%	2.46%	0.80%	0.11%	1.28%
Company Value	4.82%	0.74%	2.93%	0.54%	1.64%	5.31%	1.50%	2.58%
Loss in credibility	11.09%	0.87%	0.59%	1.14%	4.09%	2.3%	1.17%	2.96%
Liability issues	8.01%	0.31%	1.49%	5.05%	2.62%	4.19%	1.47%	3.30%
Information Overflow	0.83%	3.02%	0.11%	0.26%	0.62%	0.99%	0.22%	0.87%
Misinterpretation of Data	1.78%	1.41%	0.22%	0.36%	0.42%	3.57%	0.56%	1.19%
Motivation	2.50%	1.30%	9.34%	0.52%	2.92%	3.45%	5.87%	3.73%
Skills and Qualification	3.61%	2.72%	8.63%	1.42%	1.37%	3.40%	6.74%	4.02%
New Knowledge	0.88%	1.56%	1.88%	1.56%	0.72%	2.51%	1.70%	1.57%
Employer Brand	1.78%	2.72%	1.39%	0.38%	3.76%	0.76%	1.19%	1.71%
Confidence Culture	0.31%	0.94%	1.29%	0.60%	3.19%	2.82%	1.30%	1.49%
Turnover Rate	0.90%	7.01%	5.14%	2.85%	1.10%	4.11%	4.66%	3.66%
Frustration	1.38%	7.99%	4.15%	1.29%	2.50%	2.43%	5.57%	3.57%
More control by govern-ment	1.59%	1.53%	1.73%	8.86%	4.72%	2.80%	2.44%	3.64%
Usability of software and processes	14.06%	18.47%	10.51%	24.29%	8.75%	21.71%	25.90%	18.05%
Customer-Product-Fit	1.68%	3.31%	18.88%	3.27%	11.81%	13.15%	10.17%	9.15%
Customer-Relationship	9.55%	9.92%	1.85%	16.22%	10.70%	2.63%	5.76%	8.31%
Process-efficiency	0.80%	9.92%	5.37%	7.67%	12.98%	2.63%	1.40%	5.34%
Industry Reputation	11.79%	9.01%	3.83%	4.49%	2.07%	5.45%	9.04%	6.61%

Table 34: Weighted sub criteria

	Minimum Value	1st Quartile	Median	3rd Quartile	Maximum Value
Sales and Revenue	1.48%	3.19%	4.86%	6.29%	6.36%
Savings	0.85%	1.59%	2.41%	2.79%	4.47%
Implementation Costs	0.58%	1.42%	1.78%	1.98%	3.72%
Maintenance Costs	0.58%	0.70%	0.86%	3.35%	6.21%
Direct revenue losses	0.21%	0.61%	0.94%	1.81%	2.55%
Indirect losses	0.48%	0.83%	1.59%	2.93%	3.91%
Transparency	0.16%	0.58%	0.69%	1.49%	1.89%
Trustworthiness	0.59%	0.95%	1.37%	2.51%	4.09%
Social Responsibility	0.14%	0.63%	1.19%	1.92%	2.57%
Company Value	0.55%	1.19%	2.06%	3.87%	5.31%

Loss in credibility	0.59%	0.75%	1.16%	3.20%	11.09%
Liability issues	0.31%	1.42%	2.62%	4.67%	8.01%
Information Overflow	0.11%	0.25%	0.62%	0.91%	3.02%
Misinterpretation of Data	0.22%	0.39%	0.57%	1.59%	3.57%
Motivation	0.53%	2.01%	2.92%	4.66%	9.34%
Skills and Qualification	1.37%	2.09%	3.40%	5.29%	8.63%
New Knowledge	0.72%	1.31%	1.59%	1.79%	2.51%
Employer Brand	0.39%	0.98%	1.39%	2.24%	3.76%
Confidence Culture	0.32%	0.78%	1.29%	2.06%	3.19%
Turnover Rate	0.67%	2.01%	4.11%	4.90%	7.01%
Frustration	1.01%	1.88%	2.50%	4.86%	7.99%
More control by government	1.53%	1.66%	2.44%	3.76%	10.67%
Usability of software and processes	8.75%	12.29%	18.47%	23.81%	26.96%
Customer-Product-Fit	1.68%	4.18%	10.17%	12.48%	18.88%
Customer-Relationship	1.85%	4.20%	9.55%	10.31%	17.77%
Process-efficiency	0.80%	2.01%	4.28%	7.65%	12.98%
Industry Reputation	2.07%	4.47%	5.45%	9.02%	11.79%

Table 35: Weighted sub criteria values for boxplot diagram

9.4.2. Basic Boxplots

The boxplot including the main criteria can be found in Illustration 3.

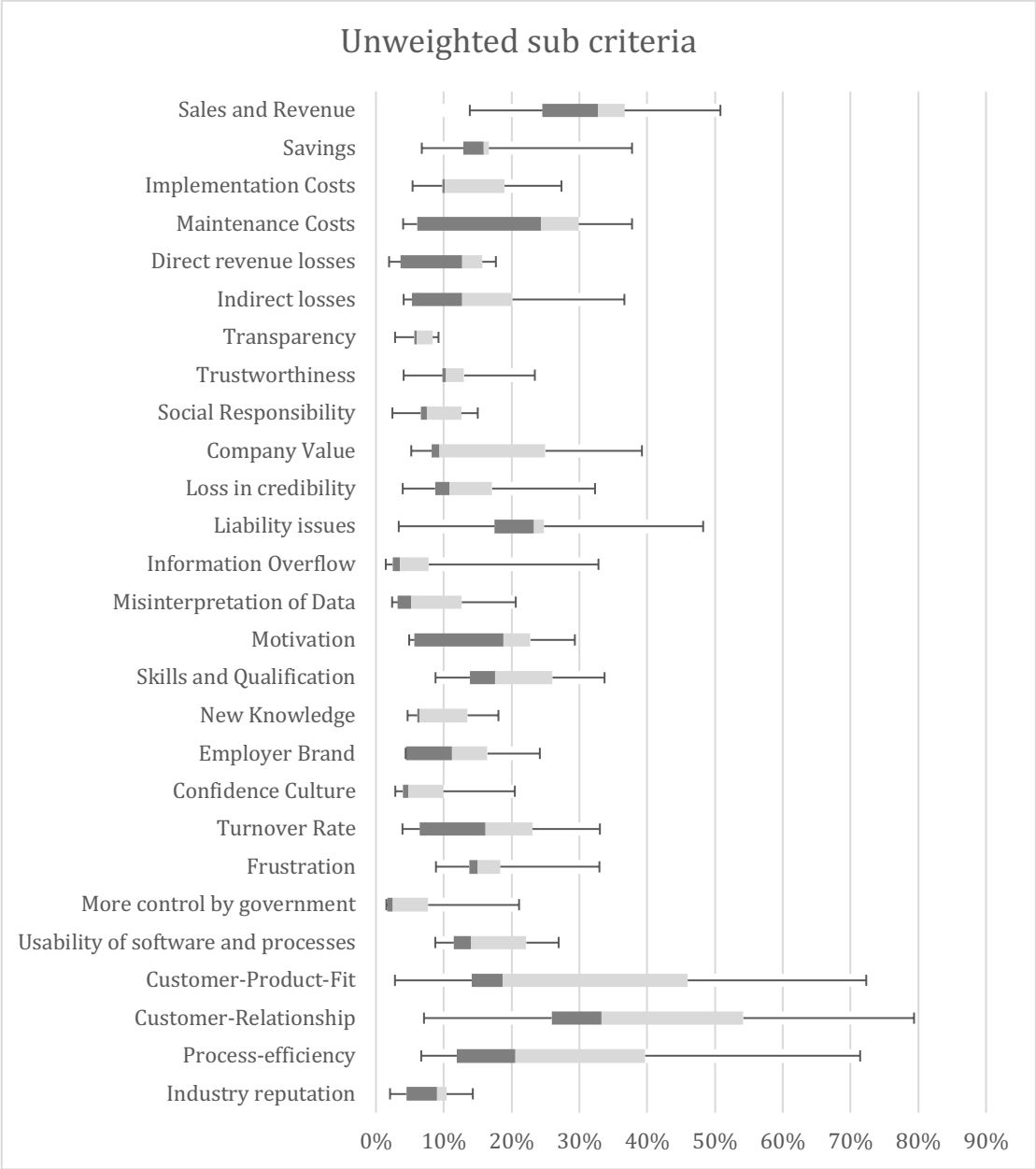


Illustration 4: Boxplot unweighted sub criteria

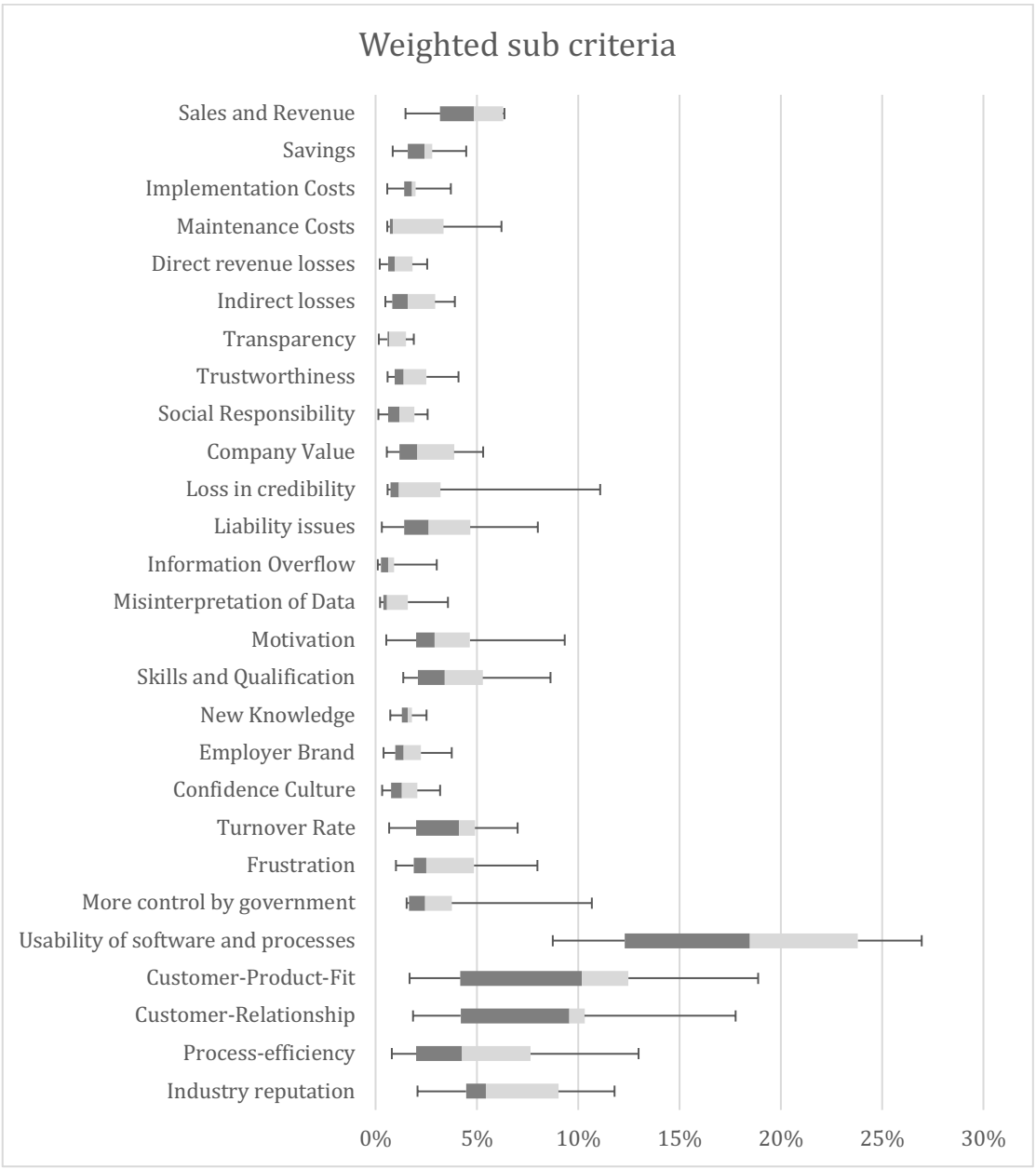


Illustration 5: Boxplot weighted sub criteria

9.4.3. Cluster Boxplots

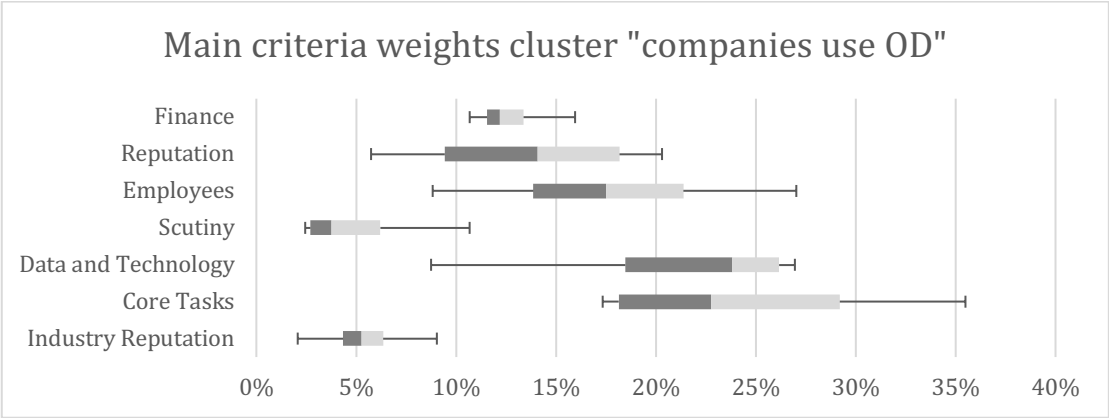


Illustration 6: Main criteria weights cluster "companies use OD"

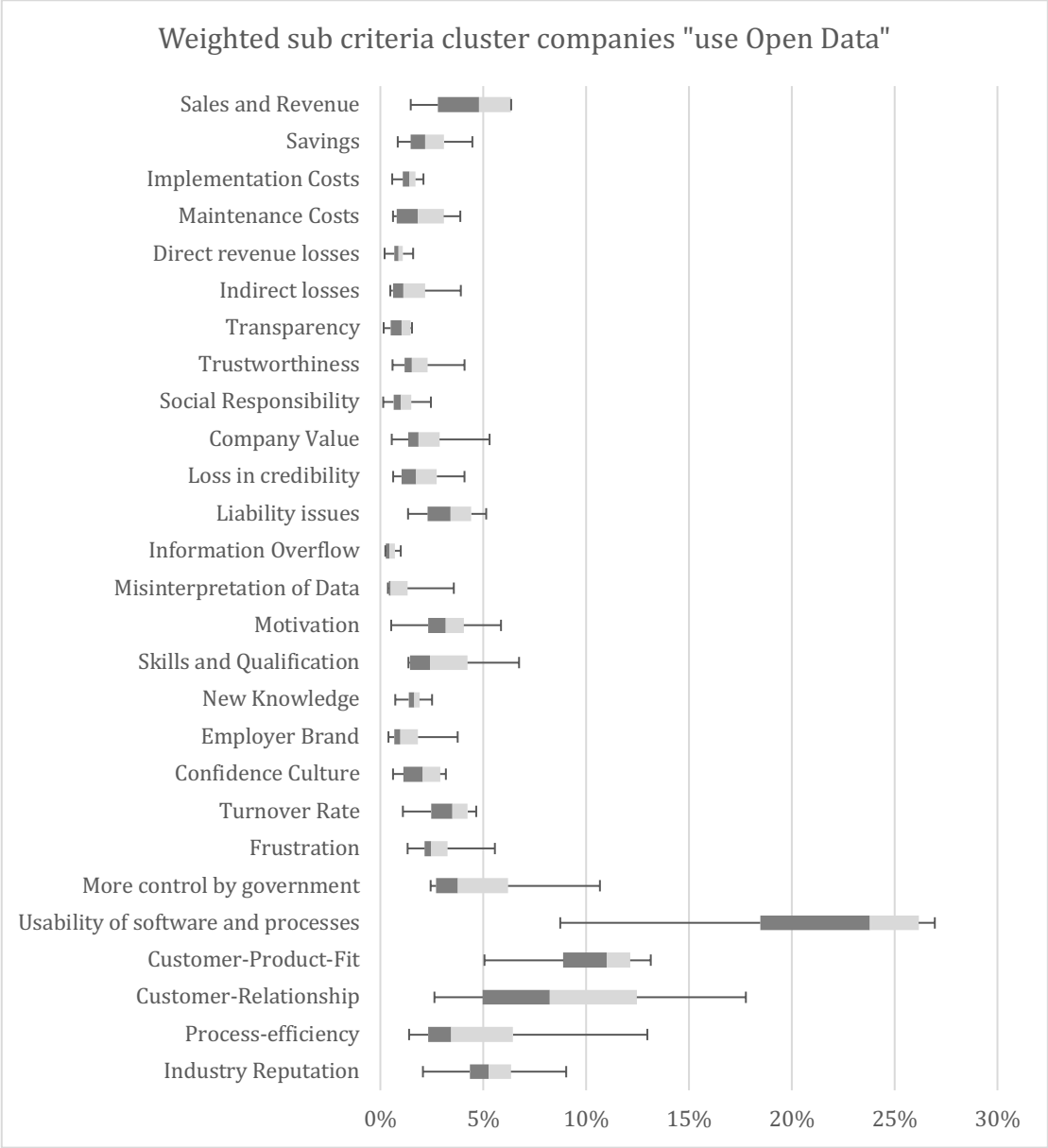


Illustration 7: Weighted sub criteria cluster "companies use OD"

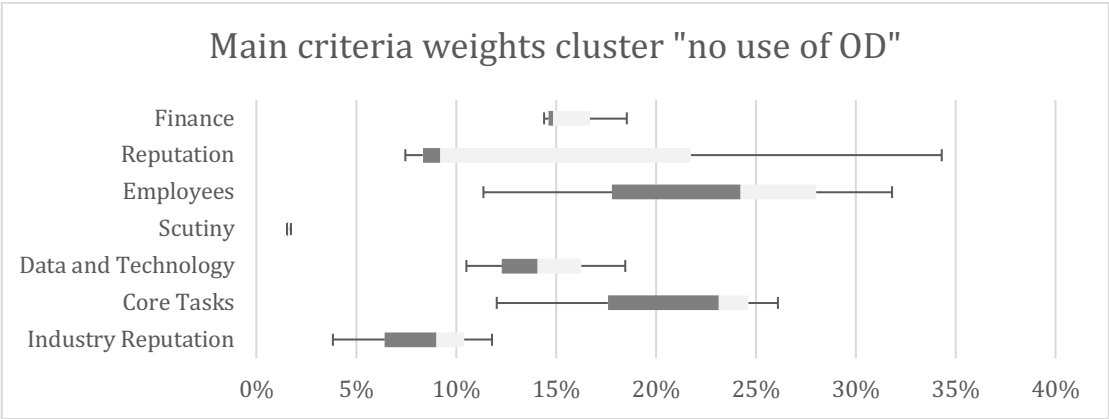


Illustration 8:Main criteria weights cluster "no use of OD"

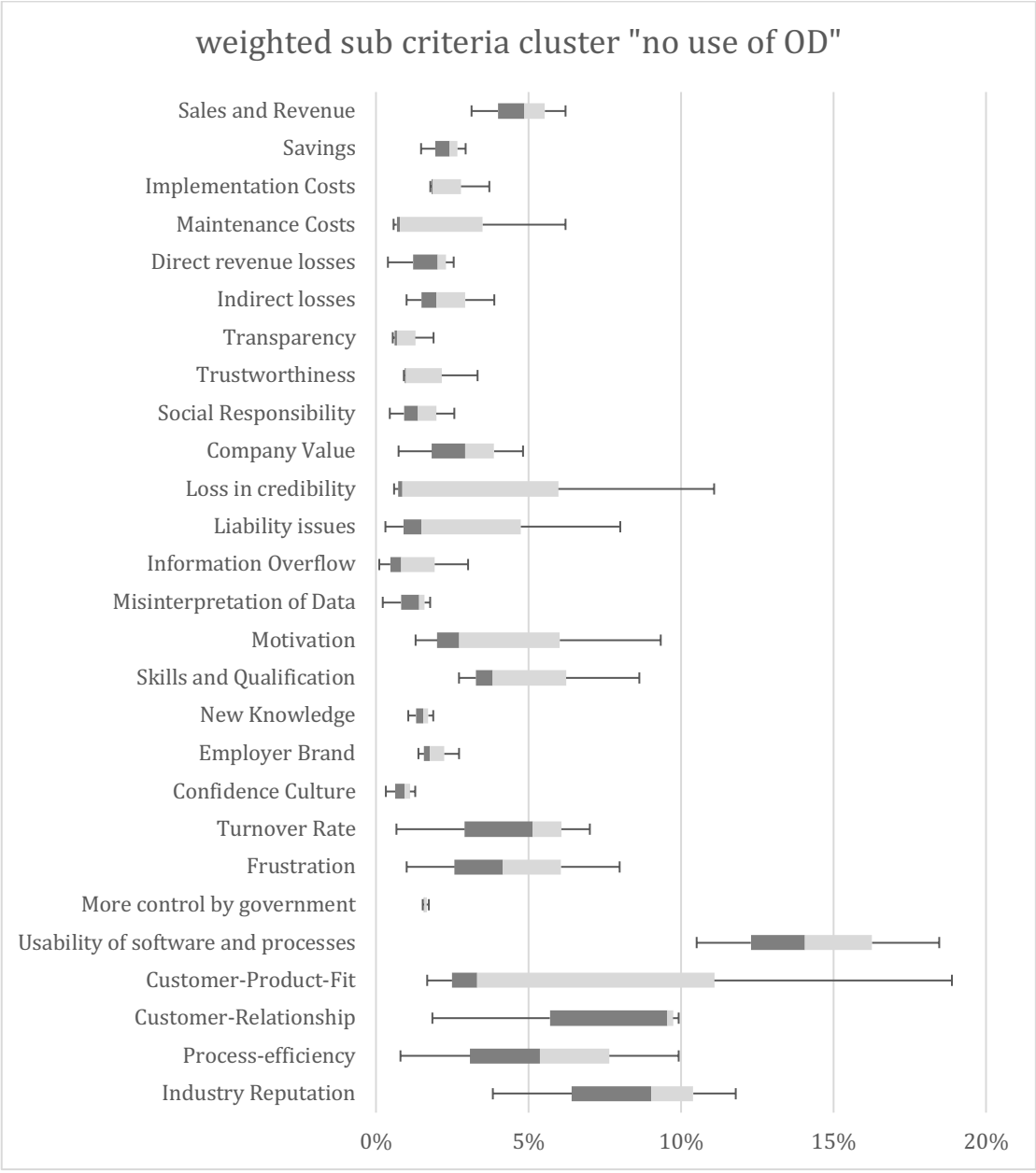


Illustration 9: Weighted sub criteria cluster "no use of OD"

Illustration 10: Main criteria weights cluster "companies <100 employees"

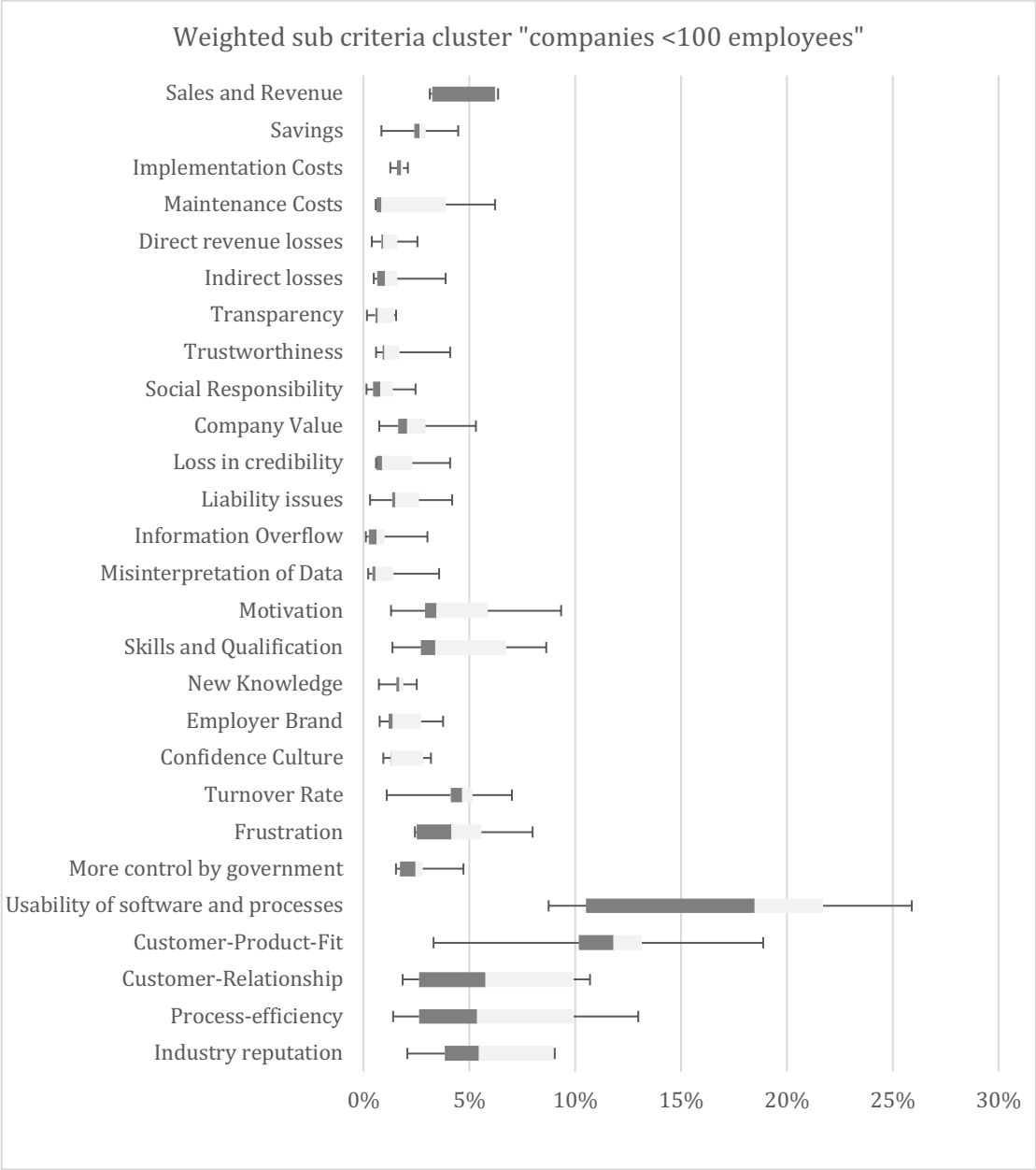


Illustration 11: Weighted sub criteria cluster "companies <100 employees"

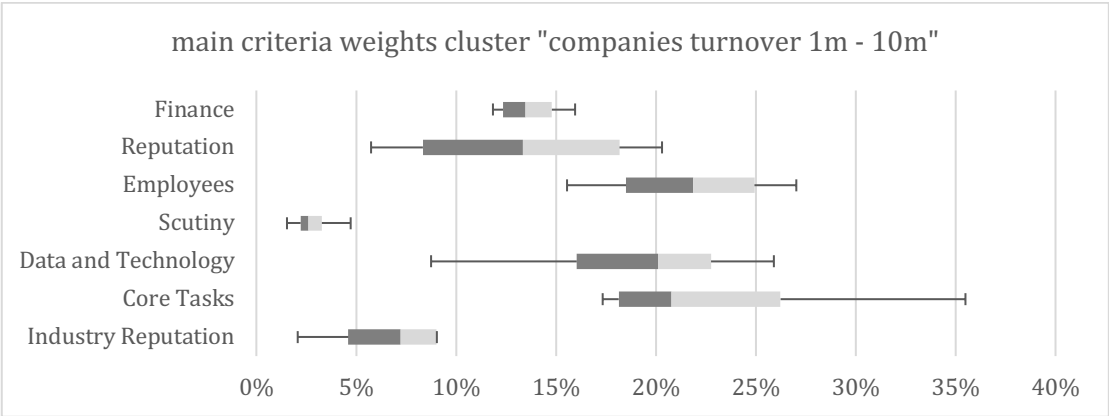


Illustration 12: Main criteria weights cluster "companies turnover 1m-10m"

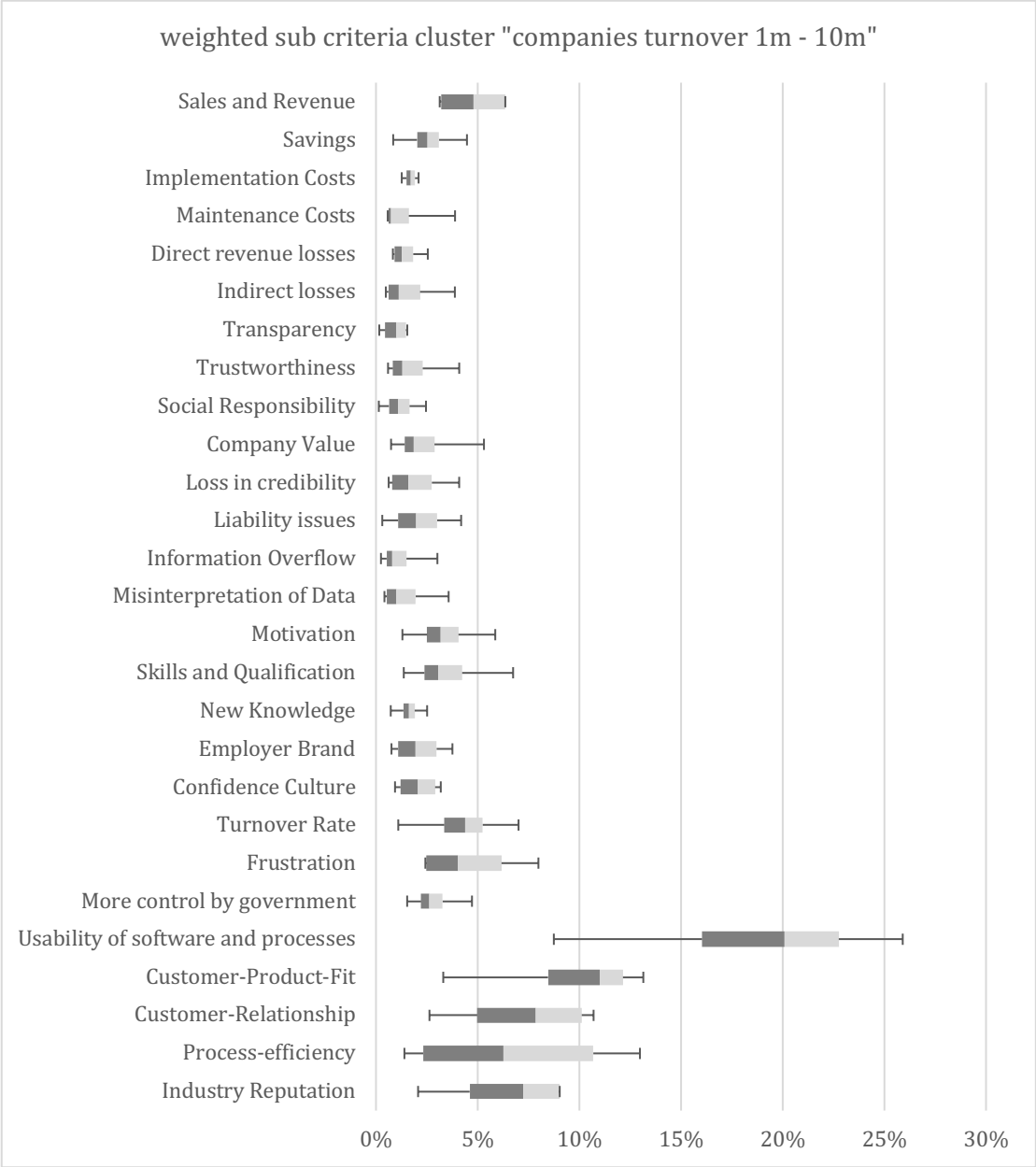


Illustration 13: Weighted sub criteria cluster "companies turnover 1m - 10m"

10. English Abstract

Open Data is widely recognized as a topic with high potential. Its consequences can be a gain in transparency and trust, on the one hand, and a strong increase in economic and welfare factors, on the other hand. This potential has not yet been unleashed in the private sector. Its use cases and advantages could be numerous.

The topic of Open Data has not yet been examined from a business perspective, accounting for all of the potential consequences for companies. Thus, the advantages that could lead a company to decide on an Open Data approach have also not been clearly worked out. The target of the present thesis is to develop a decision model that supports companies in making the decision whether or not to apply an Open Data strategy.

After a comprehensive literature review, the advantages and disadvantages for companies resulting from an Open Data strategy are presented. From these results, a target system is derived which forms the basis for the developed decision model, in which the analyzed advantages and disadvantages serve as the models' decision criteria. This model has its roots in a MCDM approach using the AHP method. The model was tested in a small survey consisting of companies that already publish data and companies that do not publish data. This survey verified whether tendencies concerning the weighting of the decision criteria are observable, in a first step, and second whether a company should decide for or against an Open Data strategy.

The results showed no tendencies for the weighting of the decision criteria. The calculated suggestions as to whether to apply an Open Data strategy or not were comprehensible and corresponded to the content of the interviews.

In conclusion, it can be stated that the model is a supportive instrument for companies in making their decision whether or not to invest in an Open Data project. Nevertheless, the model could benefit from some improvements regarding the examined criteria in general and the standardization of their weights, which can be achieved by re-examining it using a larger sample group, for example.

11. German Abstract

Open Data hat hohes Potential sowohl auf volkswirtschaftlicher Ebene als auch für einzelne Unternehmen. Die Konsequenzen können einerseits ein Zuwachs in Transparenz und Vertrauen aber andererseits ein starkes, wirtschaftliches Wachstum sein. Dieses Potential ist im privaten Sektor noch nicht ausgenutzt worden, obwohl die Anwendungsgebiete und Vorteile vielfältig sein können.

Die Themenstellung Open Data für die Wirtschaft ist noch nicht umfassend mit allen Konsequenzen untersucht worden. Das heißt alle resultierenden Vor- und Nachteile, ob ein Unternehmen seine Daten veröffentlichen soll, sind noch nicht ausgearbeitet worden. Das Ziel der vorliegenden Arbeit ist die Entwicklung eines Entscheidungsmodells, das Unternehmen in der Fragestellung unterstützt, ob sie diesen Schritt, Daten zu veröffentlichen, unternehmen sollen, oder nicht.

Nach einer umfassenden Literaturrecherche wurden Vor- und Nachteile, die aus einer Open-Data-Strategie für ein Unternehmen resultieren können, ermittelt. Aus diesen Ergebnissen wurde ein Zielsystem abgeleitet, das die Basis für das Entscheidungsmodell bildet. In diesem Modell sind die ermittelten Vor- und Nachteile als Entscheidungskriterien integriert. Die Grundlage für dieses Modell bildet ein Ansatz aus dem Bereich MCDM, genauer basiert es auf dem AHP-Verfahren. Das entwickelte Modell wurde in einer Untersuchung getestet. Die Untersuchung überprüfte, ob Tendenzen bei der Gewichtung der Entscheidungskriterien erkennbar sind. In einem zweiten Schritt wurde untersucht, ob es für das jeweilige Unternehmen sinnvoll ist sich weiter mit dem Thema Open Data zu befassen.

Die Ergebnisse der Untersuchung zeigten keine Tendenzen bei der Gewichtung der Entscheidungskriterien. Die berechneten Handlungsvorschläge, ob ein Unternehmen sich weiter mit Open Data befassen sollte oder nicht, sind nachvollziehbar und mit den übrigen Aussagen innerhalb der Interviews überprüfbar.

Abschließend kann festgehalten werden, dass das Modell eine Möglichkeit bietet Unternehmen bei der Fragestellung zu unterstützen, ob sie sich weiter mit dem Thema Open Data befassen sollen oder nicht. Nichtsdestotrotz gibt es auch Verbesserungsmöglichkeiten des Modells, die insbesondere die Entscheidungskriterien betreffen. So könnte ein einer größer angelegten Studie ihre Vollständigkeit und Möglichkeiten zur Standardisierung ihrer Gewichtungen überprüft werden.