How to find potential business ideas using Open Data
- a case study on Swedish Open Data Portal and Road Safety Data in UK

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Abstract

As more and more governmental datasets are going from being locked inside a drawer to being public accessible for free, there is a consensus about the fact that the Open Data provides companies with great opportunities to create value and new revenue streams. Based on the two cases of Open Data published by the Swedish Open Data Portal and by by the Department for Transport in UK in combination with current Open Data business model, this paper has identified and presets several business opportunities that arise from this. These opportunities are followed by a discussion about the common denominators of the opportunities. The discussion also covers the current state of art of Open Data as well as what might be the biggest current constraints for why it has not yet reached its full potential in regards to value creation.

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1. Introduction

Open Data is a relatively new and emerging field of study, yet there is a relatively small amount of literature connected to it. With the opening up of governmental data, a huge amount of data is accessible for free. There is no doubt that companies can create value of this data, however, there is no general guidelines of how to do it and, mainly most important, how to catch that value and turn it into profit. Open Data can be considered as a bridge between public and private sector which promotes innovation, and with the possibility to create a cumulative causation where both sectors are mutually benefiting from each other's development.

This paper aims for identifying, analysing and describing business opportunities were Open Data would act as a key resource. To narrowing it down, these opportunities will be based on two cases of Open Data; oppnadatas.se, i.e. the Swedish Open Data portal, and Open Data on Road Safety in UK. In order the get inspiration, a literature study of what research there is on these two cases have been conducted. Additionally, a review of existing companies based n Open Data have been made. This boils down in the following research question:

How can companies create and catch value based on the two cases of the the Open Data published by the Swedish Open Data Portal and by the Department for Transport in UK?

1.1 Method and Delimitations

The procedure of creating this paper started with a literature review to get familiarised on the subject. Initially, the aim was to identify new business opportunities based on Open Data, without any delimitations. Plenty of Open Data were reviewed and analysed, but an insight was reached that it was difficult to come up with business ideas that was neither stating the obvious nor already existing. An iteration in the ways of working was made at this stage as a realisation appeared about need for both a delimitation and a clearer structure of how to generate realistic and feasible business ideas. At this stage, a closer review of the two cases of the Swedish Open Data Portal and Road Safety in UK was made. Subsequently, a review of existing Open Data companies was done in order to gain insight on how value based on Open Data can be caught, and later on apply this on the two cases of Open Data publication.

1.2 Concept and Definition

The concept of Open Data is that it is public data published by governments or other organisations and is accessible for anyone for personal or business use. Subsequently, this free and public data can be used to, among other things, create new business ventures or solve tough strategic issues. To make it somewhat more tangible, the most commonly used examples of Open Data is national weather data and GPS data. (Gurin, 2014)

Even though the concept of Open Data is fairly simple, the definition of it is not as straightforward as it may seem at a first glance. Breaking it down word by word, data is *open* when 'anyone can freely access, use, modify and share for any purpose' (Open Definition, n.d.) However, the use, the reuse or the redistribution often have different terms and licenses connected to it implying that the access to the data might be open but not what is allowed to do with it (Kitchin, 2014).

The term *data* appeared for the first time in the English language during the seventeenth century, and what has been agreed on as data have since then changed in pace with the development of science (Rosenberg, 2013). However, the general accepted view of data is today is that it is material generated through conceptualizing the surrounding to different representative forms such as categories and measures (Kitchin, 2014). Data may be extracted through different methods such as observations, experiments or records keeping (Borgman, 2007). It can roughly be categorized as qualitative or quantitative, where the latter can further categorised as nominal, ordinal, interval and ratio data (Kitchin 2014).

Many organisations have been keen to set out the ultimate features of Open Data. For instance, Open Definition states that data is open if the distribution conditions satisfies a number of criterion. These criterion imply few constraints regarding the access, use, reworking and redistribution and are promoters for the usage of Open Data without any financial compensation to its original creator (Open Definition, n.d.). Nevertheless, these ultimate features mainly consider Open Data as a product rather than a service (Kitchin,

2014). On the other hand, Gurstein (2013) argues Open Data should be viewed as a service where the needs and wished of the end user should be taken into account. Kitchin (2014) is sceptical about this, meaning that viewing Open Data as a service require may be favourable in theory, but difficult in practice unless efficient models for funding are developed.

Gurin (2014) notes that the common denominator for all definitions of Open Data is that the data have to be accessible under an open license allowing the data to be reused. Gurin (2014) further uses the below definition of Open Data, which this paper also builds upon.

'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'

1.3 History of Open Data

Traditionally, access to datasets has been limited in various ways, mainly due to the cost and resources required to produce these datasets. Consequently, data as well as the information and knowledge gained from it have historically mainly been closed and locked inside an organisation or an archive. The Open Data movement aims to disrupt this situation by both opening up data for a broader range of reuse but also to provide user friendly research tools that reduce the need for analytical skills by specialists on the subject. A lot of attention has been put on opening data created by state agencies, often referred to as Public Section Information (PSI), and publicly financed research. (Kitchin, 2014)

The Open Data movement has evolved during the last couple of decades, and has developed in parallel to, but mainly separated from, the open source (Kitchin, 2014). The movement started gaining attention and power in the late 2000s when the newspaper *Guardian* campaigned in UK with an article about making data free (Kitchin, 2014). In 2008, the Organization of Economic Cooperation and Development (OECD) requested member governments to open up their data and in 2009, the US government launched a website that

offered access to some datasets created by the US state and federal agencies (Kitchin, 2014). Later on in 2009, President Obama published the White House's Open Government Directive, which builds upon three principles in order to create an open government; transparency, participation and collaboration (The White House, 2009). A couple of years later, in 2013, President Obama held a speech where he further mentioned that Open Data is going to be favourable for the launch of new startups and help entrepreneurs develop products and services far beyond imagination (The White House, 2013). However, the rapid opening up of data has not only been welcomed and in parallel to the growth of it, there has also been a rise of property rights (Pollock, 2016).

1.4 Open Data and Startups/Business Applications

Gurin (2014) explains that Open Data can be viewed as a business resource. The resource itself is free but enables a variety of business opportunities such as fostering better healthcare, improve transportation as well as investment tools. An interesting example of this is the case of the company The Climate Corporation. The Climate Corporation is using weather data to design insurances that compensate weather dependent companies, such as farmers and ski resorts, if they make losses due to unfavourable weather.

Deloitte (2012) has identified five types of Open Data business archetypes:
- *Suppliers* - Companies and organisations that are publishing their Open Data, and make it easy to use for free.
- *Aggregators* - This archetype collect and analyse Open Data, and then charge for their insights or make money from it in other ways.
- *Developers* - These companies are designing, building and selling different applications that are utilizing Open Data as a free resource.
- *Enrichers* - Typically large and established organisations that use Open Data to boost their existing products and services.
- *Enablers* - Are charging companies to simplify the use of Open Data for them

However, Gurin (2014) argues these categories are insufficient and claims a need for adding additionally two:

- *Better Business Through Open Data* - Improves aspects of consumer society such as healthcare, energy and education.
- *Open Data Pure Plays* - Companies and industries that would not exists without open data.

When considering Open Data as a free business resource and the tremendous amounts this resource exists in, there is no consensus on how to make money out of this resource. Gurin (2014) discusses how one of the most common businesses created from Open Data are choice engines that utilizes Open Data in order facilitate decision making for consumers. There are four major types of business models used to make these business ideas profitable:

- *Paid subscription* - The choice engines provide a service for e.g. consumers or business owners and charge them for this service.
- *Payment from institutional clients* - The choice engines work for large institutions that pays a fee.
- *Payment for lead generation* - The choice engines recommend vendors (e.g. airlines, hotels, credit card companies) who pay for every new customer
- *Non-profit* - This category consists of choice engines that support public good in areas such as education and health.

2. Current Business Applications

In the follow section, examples and business cases will be presented in order to show how Open Data can generate new revenue streams.

2.1 Usage of Open Data and Examples

2.1.1 Zillow - Real estate marketplace and open data portal

The real estate site Zillow is a marketplace dedicated to assist customers such as homeowners, home buyers, renters, sellers and other professional agents with data to create, find and share information concerning real estates, homes and mortgages. The mission is to enrich customers with a variety of information and tools to make smart choices about their homes and real estate businesses. The information services Zillow provides are created based on a combination of different open governmental datasets such as rate of crime, access to education and transportations with public open information and undisclosed information such as sales prices of homes, valuations and loan rates presented as metrics and rankings in a given neighbourhood. (Grant & Cherif, 2013)

As a corporate, Zillow creates revenue through advertising, automated house-selling, market data analysis tools such as *Zestimate* and other business offerings. As a central real estate platform, property management companies subscribe to advertise their listings on *Zillow Rental Network* which is an offering that includes websites such as Zillow.com, Trulia.com and HotPads.com in which Zillow claims has a 59 percent more combined advertising traffic than their next closest competitors. Also, Zillow offers different advertising offerings such as *Zillow Premier Agent Advertising* for real estate agents, loan officers and mortgages, new construction companies and home builders, and also other third-party brand advertisers in which Zillow include the offering *Zillow Group Brand Advertising*. Zillow, n.d.a)

Another central revenue model is as mentioned; the service of automated house-selling called *Zillow Offers*. Launched in 2018, *Zillow Offers* is a home-selling service for homeowners who wants a fast and predictable cash offering. The automated service takes into consideration how eligible a house is based on market information and data analysis in which

Zillow responds with a business proposal that customers can either accept or refuse. If the transaction succeeds, Zillow buys the home, fixes it and relists it for sale within a couple of months. (Zilllow, n.d.b.)

A core activity for Zillow in their business model is data collection and market analysis. *Zestimate* is Zillow's home valuation model where the company estimates home's market value and incorporates it into their offerings. To create this valuation tool, Zillow integrates open and public data with user-submitted data, taking into consideration the location and market conditions and other relevant facts for homes. The company has developed a sophisticated algorithm that takes into consideration home characteristics such as size and number of bathrooms, location, landscaped backyard, on market data such as listing price and comparable homes in the area, with off-market data and publicly available records such as tax assessments, metro stations and other national information. (Zillow, n.d.c)

To further elaborate on Zillow as a business, the business model canvas in Figure 1 below has been created. It illustrates an overview on how Zillow reaches its market, the value creation process for their business, who their customers are, how to reach them and how to generate revenue.
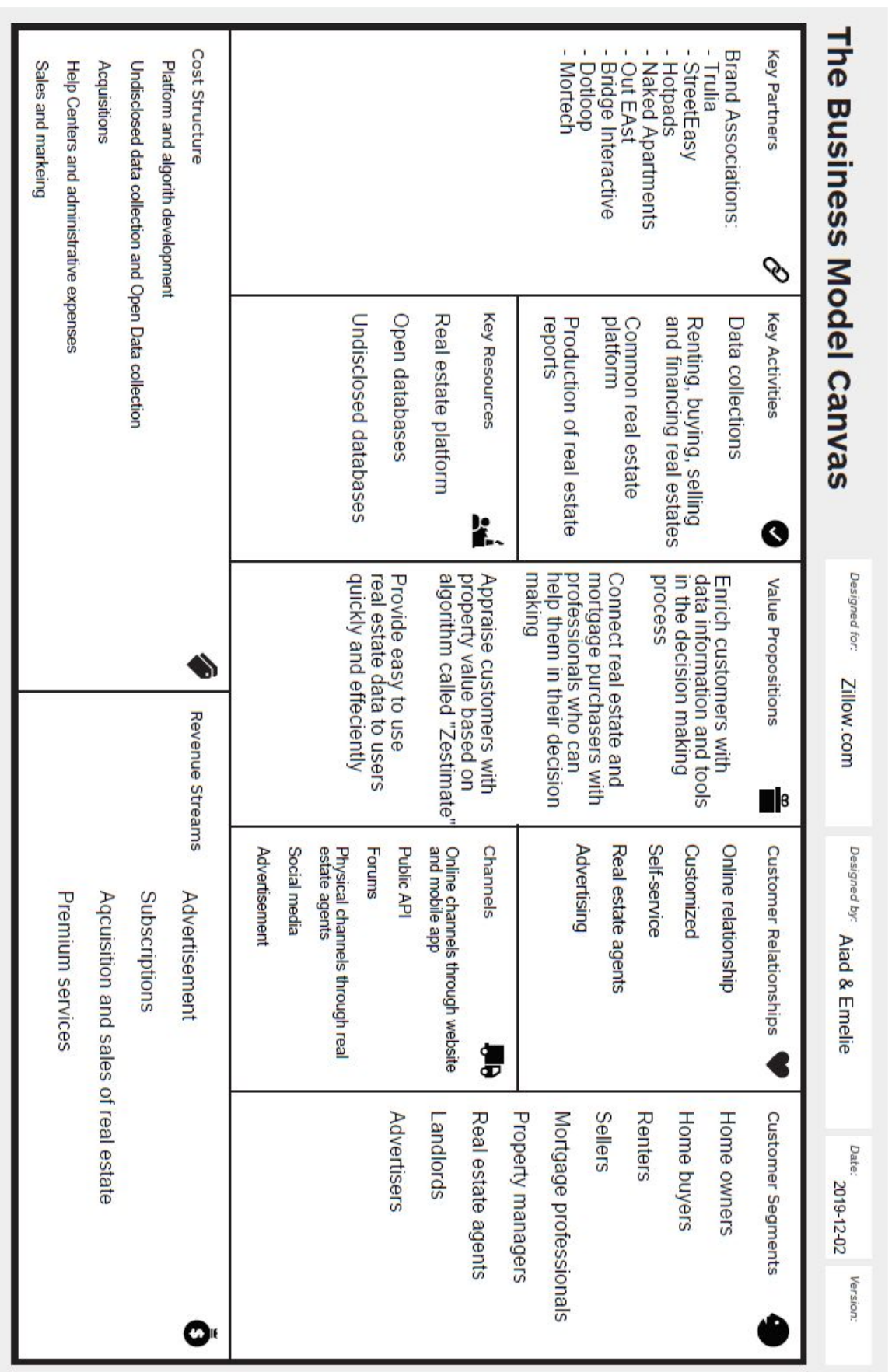
The Business Model Canvas

Key Partners

Brand Associations:
- Trulia
- StreetEasy
- Hotpads
- Naked Apartments
- Out EAst
- Bridge Interactive
- Dotloop
- Mortech

Key Activities

Data collections

Renting, buying, selling and financing real estates

Common real estate platform

Production of real estate reports

Key Resources

Real estate platform

Open databases

Undisclosed databases

Value Propositions

Enrich customers with data information and tools in the decision making process

Connect real estate and mortgage purchasers with professionals who can help them in their decision making

Appraise customers with property value based on algorithm called "Zestimate"

Provide easy to use real estate data to users quickly and effeciently

Customer Relationships

Online relationship

Customized

Self-service

Advertising

Channels

Online channels through website and mobile app

Public API

Forums

Social media

Physical channels through real estate agents

Advertisement

Customer Segments

Home owners

Home buyers

Renters

Sellers

Mortgage professionals

Property managers

Real estate agents

Landlords

Advertisers

Cost Structure

Platform and algorith development

Undisclosed data collection and Open Data collection

Acquisitions

Help Centers and administrative expenses

Sales and markeing

Revenue Streams

Advertisement

Subscriptions

Acquisition and sales of real estate

Premium services

Figure 1. Business Model Canvas created to illustrate Zillow.com

2.1.2 Open Data Nation

Open Data Nation, hereby referred to as ODN, was founded in 2015 with the aim to make risk measurements more modern and is currently delivering risk rating for roads in the US. In July 2019, they covered 13 percent of all drivers in the US and is using federal, state and local official government open data sources. Some of the factors evaluated are traffic density, proper street signage, the availability of bike lanes and potentially dangerous road gradients. ODN combines this with detailed public records and industry expertise, which enables them to deliver customised risk scores for both each roadway and each driver. The major customers of ODN are insurance companies which are offered deeper knowledge about who their customers are in respect to where they drive and their risk exposures on the road. (ODN, 2019)

ODN's tool 'Hopper' is a cloud-based machine learning engine that reveals indicators of risk with the intention to help risk managers and public agencies to both plan and prioritise for safety. Hopper acts as a proactive tool by predicting danger instead of counting injuries and death after the the occurrence of an accident. (ODN, 2019).

The case of ODN illustrates a classic example of how digitalisation in general and open data in particular disrupts old insurance models by pricing risks based on where the people drive, rather than who they are. This also enables people with poor credits to afford covering and extensive insurances, contributing to a more equal society. (Nadeau, 2019)

2.2 Existing Open Data Businesses

Company name	Business Idea	Open Data business archetypes (Deloitte, 2012)
Owler https://corp.owler.com/about	Owler helps you track companies you are interested in based on information in existence, latest industry news and alerts and social media discussions around a given company. Either if it is a company you work in, you are interested of or if you are a decision maker in a company.	Enablers
Brightscope https://www.brightscope.com/about/	Brightscope finds and pulls together open government data on retirement plans to make it easier for people to evaluate their own retirement plans.	Aggregators
Open Corporates https://opencorporates.com/info/about/	Open Corporates gathers corporate registration data all around the world to keep consumers updated without hassle.	Enablers
Opendatabot https://opendatabot.ua/en	Opendatabot is an analytics service that helps customers to monitor registration data of companies and court registers in Ukraine. With that information, customers can protect themselves by controlling contractors and against other type of corporate threats.	Enablers
Premise https://www.premise.com/howitworks/	Premise is an analytic platform that by combining global data networks with industry information, allows decision makers to have real time insights by providing actionable information	Aggregators
Urbint https://urbint.com/process	Urbint is a data intelligence company that helps cities anticipate their risks by applying AI technology to urban data enabling utilities and infrastructure operators solve problems and making communities safer and more resilient.	Developers
Grafana	Grafana supports and visualises over 30 open source data and commercial data and pulls it together by creating metrical	Aggregators

https://grafana.com/grafana	dashboards with a variety of accessible tools that can be used and monitored across the organization.	
Datapress https://datapress.com/	Datapress is a tailor-made data portal that helps local and regional governments to release open data, present it in dashboards, manage its transparency and engaging with the community.	Suppliers
Intellibins http://thegovlab.org/intellibins-llc-announces-launch-of-private-beta-mobile-app/	Intellibins is an app that uses recycling locations in cities and informs users of the nearest place to recycle their waste. It is an iterative app where users will be able to "check in", update and recommend recycle points. Obtained data from users will be used to inform local government about recycling habits of the citizens.	Developers
DataFrance https://datafrance.info/	DataFrance is an interactive open data visualisation platform created as a map from more than 50 datasets in which users can explore a variety of information about France.	Aggregators
Polly – The Parking Fairy https://www.parking-polly.com/business-22	Polly is a mobile app that helps drivers find most suitable parking space by putting open data released by local authorities. The app recognizes all city car parks and where you can find near your destination and which hours.	Developers
Walkonomics http://thisbigcity.net/using-smartphones-to-improve-urban-walkability/	Walkonomics helps users find the most beautiful walking route rather than just the fastest. Walkonomics analyses over 2 million street trees based on open data and thousands of urban parks.	Developers
StreetCred https://www.streetcred.co/	StreetCred collects information about places people care about in the real world. It creates and validates places in communities such as restaurants, shops and much more to create reliability.	Suppliers

Table 1: Collection of companies using open data with respective business idea.

2.3 Discussion

The similarities perceived between the above companies analyzed is that by categorizing them according to Deloitte (2012), the spread of categorization is even, even though *Suppliers* tend to be quite few. As the focus of the study has been on analyzing small

businesses, the category of *Enrichers* is clearly missing. However, the following companies can be concluded in doing one or more of the following statements:

- Building a platform or interface for customers to access already open information.
- Connecting data from multiple open data sources.
- Constructing exclusive tools and models on top of open data.
- Permitting users to complement the product or service with their own information.

3. Cases

In this section are the two cases of the Swedish Open Data governmental entity and Open Road Safety Data in UK presented, and business opportunities emerging from these are identified and presented.

3.1 Oppnadata.se and the Swedish governmental entity

In mid 2012, The Ministry of Enterprise and Innovation within the government of Sweden orders the Swedish Innovation Systems Agency, Vinnova, to develop a technical platform called "oppnadata.se" for the dissemination of data made available for reuse. The purpose of "oppnadata.se" is to promote the reuse of available data in such way to support the development of e-services made by citizens, companies and other users in focus. Particular attention should be paid to how public information can be facilitated towards citizens, businesses and other actors with efforts considering privacy and other security aspects.

The reasons for the government's decision is that new ideas, solutions and approaches are needed to simplify people's everyday lives. To eliminate unnecessary barriers and bureaucracy with a goal to reach better and more efficient innovation results. In propositions, the government made the assessment that a large part of the available information is a common social resource that can create great value for the society. The government believes that it should be as simple as possible for the citizens to take advantage of the value collected from this public information. Therefore, the authorities should actively strive for an effective reuse of public information to strengthen people's self government. (Regeringen, 2012)

The mission of the Agency for Digital Government, DIGG, is hence to facilitate the access to public sector data, support different actors to create social benefits and work on open data-driven innovations. The mission is also to help public actors cooperate on challenges and be inspired to create new solutions. Therefore the assignment is to collect and publish lists about available public sector information (PSI) according to common guidelines and also develop the national open data portal 'oppnadata.se'. The data created by the public sector in Sweden includes a vast amounts of every day information. Including data about people's health, welfare and environment. About competitiveness and swedish economy. Geography,

meteorology, agriculture and forestry. By making this information available for the people, citizens and different companies it can help solving challenges and social problems. (Oppna Data och PSI, n.d.)

Figure 2. Swedish National Data Portal. (https://www.oppnadata.se, retrieved 2019-11-30)

3.1.1 Trafiklab - A community for open traffic data

Trafiklab was founded in 2011 as a collaboration between different Swedish entities including Samtrafiken, SL and RISE. The aim is to link and create interconnections between Sweden´s public transportation companies. Trafiklab is a community for open traffic data where developers and stakeholders easily access data and APIs for public transports, to develop new services. Through the API´s, Trafiklab offers access to all of Sweden's public data in realtime and the necessary tools to create and share new products and services. Trafiklab also offers helping to connect designers and developers to co-develop new products and services. It is a platform that collects everything from experimental test projects to apps and other activities to improve the platform further. (Trafiklab, n.d.)

3.1.2 Project Ladds - Lab for the Data Driven Society

Umeå School of Business in cooperation with the Swedish Innovation Systems Agency, Vinnova, has made an investigation on the opportunities using open data to establish a data-driven lab. With the purpose of creating new services to prosper open data innovations for the emergence of circular economy, ecological and sustainable cities and countryside. Through this lab, participants will have access to open data that is published, including environmental, economical and social data from different governmental entities and private actors such as energy companies. The lab will act as a platform and an incubator for innovations where companies, different organizations and individuals can use or upload data hence encouraging new ways of co-developing products or services, by experimenting with data, capturing new data, analysing relationships between texts and images to help find patterns and deviations and commercialise innovations. The lab is, however, financed through public funds provided by Vinnova to enhance sustainability and creating public value as value capturing. (Biedenbach & Bostrom, 2018).

3.1.3 Business opportunities

Home Finder

Considering the business model of Zillow, it has demonstrably shown that people tend to seek as much information as possible in their decision making process of buying and selling homes and real estates. However, a lot of information that Zillow offers are already available

as open data sources. As a result, customers seek a reliable, easy to grasp information that is presented in a quick and methodological approach. Another important factor to consider is that Zillow solely offers their services within the United States. In fact that the open data is rapidly increasing in Sweden, a sensible approach is to perform similar services Zillow offers in countries like Sweden, hence increasing the possibility for swedish customers to gather information about their homes and increase the confidence in the decision making process.

Additionally, as from experience, it is known that Sweden is a large country and sparsely populated. People live and buy houses distanced from their jobs, schools and other visiting centers such as malls and health centers. Therefore, it is vital for home buyers to confiscate as much uncertainties as possible related to their decision making of home purchase. Not only are the purchasers interested in the cost, house validation, location, and other obvious items but also the importance of travelling in between workplaces, schools and supermarkets. Consequently, the business case is not to copy Zillow in particular but also slightly modify it so it fit new market needs. In this case modify it and include the road safety data as per ODN:s application hence calculating the risk of traveling by car to workplaces and schools in your daily life. Including the systematic service of real estate cost validation, customers can add location as their workplace, school and other commonly visited places and the service or product that we offer suggest possible traveling routes and the road safety metric of these routes based on open data as per ODN´s service offering.

One could argue that this risk taking reflection can be one of the aspects people consider in countries that have dark winters, cold and frosty roads and wild animals while deciding the location of their home. Therefore Sweden would be a possible market for this modified solution.

Industry Visualiser

Another simple idea considering business opportunities using swedish open data is to develop a tool that uses similar frameworks as the company Premise. By combining swedish industry information with oppnadata.se, the business idea is to analyse and visualise open data, allowing decision makers to have insight in appropriate businesses in real time. This information can be offered for both private corporates and governmental entities.

Park Your Car

Moreover, utilizing the business idea of Polly, a recognized problem for car owners in bigger cities is to find parking slots in crowded locations. Creating an app that presents live information on where to find an empty parking slot is considered to create great value for the driver and for the environment, eliminating idle driving and unnecessary parking space searching. In cases of not having available open data live feed for parking locations, the app can once again use historical open data to calculate the likelihood of finding an empty spot in appropriate parking locations based on for example people's behavior in that location during the hours.

Smart Recycling Stations

A great impact in swedish society has been the awareness of environmental effects. Therefore it is most common that citizens in sweden drives long distances to find a recycling station. A horrible scenario would be if people drives this long distances just to find out that the recycling station is full or to crowded. Considering the business idea of the company Intellibins, a similar tool can be created based on oppnadata.se for swedish recycling stations. Illustrating not only where to find them as for Intellibins, but also live open data information on the degree of garbage fullness and people crowdedness. If live open data is not available for a specific recycling station, the tool can predict the likelihood for that specific station.

3.2 Road Safety Data in UK

The ministerial Department for Transport in UK has published open datasets on road accidents on public roads reported to the police from 1979 to present. Except for datasets on the actual event of the accidents, the Department for Transport has also published datasets of the casualties and vehicles involved in the accidents. Moreover, the published data also includes results of breath test from digital breath testing advices. The datasets are delimited to solely relate to personal injury accidents that has occured on public roads and reported to the police and thereafter redcorded by using a common accident reporting form called STATS19. The STATS19 system has been used since 2005. (Department for Transport, 2019)

The reason for the publication of this data is an increased demand from the public, different stakeholders as well as researchers for up to date data on the subject. This resulted in the Department for Transport publishing datasets on accidents for the first half year of 2018 for the first time at http://data.gov.uk. All the variables in the data are coded instead of containing textual string. The Department for Transport has also published lookup tables for these codes in order to facilitate the interpretation of the data variables. (Department for Transport, 2019)

3.2.1 Occurrence in academia

In academia, the existing research made on the subject is mainly of analytical and statistical characters in order to find different relationships between the variables in the datasets. For instance, Greig and Hopkin (2011) have analysed the contributory factors to road accidents in UK between the years 2005-2009. Other researchers, such as Plainis and Murray (2006) have focused on the fact that a large majority of fatal road incidents occur during night, and have deep-dived into explaining this with respect to biological factors due to the photoreceptors in the eye. Clarke et al. (2006) are other authors focusing on the high rate of accidents that occur in nighttime, and claim that it is not a matter of bad visibility but rather a matter of how young drivers use the roads by night. Jaroszewski and Mcnamara (2014) have combined the data on road accidents with weather data in order to analyse the influence of rainfall on road accidents. Abdalla et al. (1997) investigates the relationships between areas' social characteristics and road accident casualties.

However, there are research that differentiates from those described in the section above. Lenard and Danton (2010) are taking a business and product development approach of the applications of the datasets, and are discussing how it can be used to support the development of autonomous emergency braking test procedures.

3.2.2 Business Opportunities

Below are four identified business opportunities described that arise from the Open Data on road safety in UK.

Insurance in UK

Based on what ODN currently are doing in the US, the Open Data on road safety in UK may be used in a similar way in UK. Insurance companies in UK can use the datasets in order to be more data driven when designing and pricing their insurance offerings and change their model to be dependent on where their customers drive rather than who they are. The existing research on the subject may be used to refine the further refine the offerings towards the insurance customers. The results of Jaroszewski's and Mcnamara's (2014) research on the influence of rainfall on road accidents may be make the insurance models include an additional dimension depending on weather.

Road Transports in UK

In combination with the risk identifications discussed in the section above, road transport companies could also benefit from the Open Data on road safety in UK. Especially where fast and precis deliveries are crucial, such as industries with Just-In-Time deliveries, but also for emergency vehicles on their way to the spot of an accident. Here, the transport companies can use the information about when and where accidents are most likely to occur, adjust their routes based on this and thus decrease the risk of delayed deliveries.

Manufacturers of Cars and Eyeglasses

Taking a product development approach, Plainis' and Murray's (2006) research on the incidents occurring by night due to biological factors of the eye may be further elaborated. Although a comprehensive R&D work would be required, it creates opportunities for both eyeglasses and car manufacturers. Given the assumption that the the biological factors discussed are validated, manufacturers of eyeglasses may create eyeglasses with glass characteristics that compensates for these factors for use during night time driving. Similarly, car manufacturers can introduce these glass characteristics in the car windows and thus increase the safety for driving in darkness.

Autonomous Driving

Based on Lenard's and Danton's (2010) discussion used to support the development of autonomous emergency braking test procedures, interesting business opportunities emerge. The data may be further used in the development of autonomous driving systems, both in the

development towards fully automated driving as well as advanced driver-assistance systems (ADAS). For instance, an example at a very basic level would be for autonomous driving software developers to utilise the risks revealed from the Open Data to limit the speed on high-risk roads. This also opens up for collaboration across industrial borders such as between insurance companies and autonomous driving software companies, and more knowledge can be shared.

4. Discussion and Conclusion

The field of open data is interesting in many aspects, but maybe primarily due to the fact that the concept is fairly new and emerging. Consequently, there is a relatively small amount of current research of the subject, but the research that do exist have one thing in common; it identifies Open Data as something with great potential of creating value in completely new ways. Open Data thus enables the creation of *Blue Oceans* as defined and discussed by Kim and Mauborgne (2016). Taking the view of Gurin (2014), who describe Open Data as a business resource that is free, there is a no financial entry barrier for companies to take part of this resource.

A preview of this potential in creating value can be found in the cases described and analysed in this paper. The case of ODN shows how Open Data can disrupts the insurance industry by redrawing the rules for the pricing of insurance models. The Open Data sets that exist on Road Safety in the United Kingdom has a huge potential of being used in a similar way that disrupt the prevailing insurance models in the United Kingdom. These data sets could also create value for road transport companies where fast and precise deliveries are essential. By utilising the data on when and where accidents presumably occur, the transport companies can adapt their routes and driving schedule based on this. However, the opportunities are not only linked to services. There are also a huge amount of opportunities in product development, and not least in the area of servitization as the data sets on Road Safety have potential to be used in the development och autonomous driving. At a national level and in regards to public good, the discussed opportunities would contribute to cities in UK coming closer the Vision Zero, i.e. the goal of zero fatalities or serious injuries involving road traffic. This may also motivate the government and Department for Transport to publish additional data and thus add extra transparency, as well as motivate governments in other countries to publish more of their data in an open manner.

There is no doubt there is a huge potential in Open Data, although one of its main strengths may also be one of its main constraints. The fact that so much data exists and is free to access generates a confusion in whether there is a 'best practice' of using it and if so, what guidelines could be generated to create a profitable Open Data business.

However, a way to utilize the potential of Open Data is to analyse current businesses and ideas, and induce slight modifications that creates that little extra value for customers. In the case of the business model from Zillow allows us to understand that this is possible. By including for example the crime rate of home locations in already existing real estate platforms, crime rate information that are retrieved from governmental Open Data, customers will have an increased knowledge on different living areas hence smarten their decision making. Further on, considering the same strategy of copying an already existing business and applying it with slight modifications, it is an easy and reliable way of intercepting customer needs in other countries. This method is however not in accordance to *Blue Oceans* strategy as earlier described, but a practicable way of creating new businesses.

In similar terms, analyzing the existing Open Data businesses as illustrated in chapter 2.2, it is clear that there is a lack of *Enrichers* as described by Deloitte (2012). This means that established and large enterprises still need to be convinced that Open Data is a business recourse, which if not exploited, they may miss out on the potential of free available information. On the other hand, Open Data may still be on the emerging cycle and there will be lots of future cases where large companies find relevant use to enhance their businesses.

There is also a clear difference on how far different countries have embraced this new way of making data available. For example, the two cases of Open Data analysed in this paper, Sweden and UK, is by far superior in terms of implementing Open Data portals in large scales and governed by central entities such as The Ministry of Enterprise and Innovation in Sweden. However, these leading countries are still on the starting line of creating a well functioning Open Data Portals. And the sense of usability and data visibility in oppnadata.se is still a berrier, obstructing users and other stakeholders from seizing the full potential of Open Data and the available free resources.

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