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**OPEN GOVERNMENT DATA AND SUSTAINABLE VALUE:
MULTI-CASE COMPARATIVE ANALYSES OF SOFTWARE STARTUPS IN
BRAZIL**

Brasília – DF
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BRAZIL

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Professor Orientador: Caio César Medeiros Costa

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Curso de Administração da Universidade de Brasília da aluna:

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I dedicate this work to my family, for the constant support and encouragement in my personal, intellectual and professional evolution.

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ABSTRACT

This work consists of a comparative analysis of three software startups that consider Open Government Data (OGD) as a key resource of their value propositions. The main objective involves describing and comparing the current and potential for multi-stakeholder value generation in startups that use Open Government Data. To do this, the author referred to OGD theories and compared them with the primary qualitative data collected. The value generation and the barriers to value delivery identified and analyzed. The external factors thought to influence the startups were contrasted, which contributed to the evaluation of the relationship that this group of OGD users with the overall OGD ecosystem. All of the primary source qualitative data information used was based on the perceptions of the startup's founders collected through semi-structured interviews. The research is characterized as a descriptive and interpretative multi-case study. From the results obtained strong relationships were noticed between OGD and sustainable value, signaling the potential for these organizations to be multipliers of a scalable solution that generates sustainable value through OGD. The author hopes that the research enriches and creates trails of investigation regarding the potential for private sector startups to contribute to the evolution of the OGD Ecosystem.

Key-Words: Open Government Data, sustainable value, startups

FIGURES AND TABLES

LISTA OF ABREVIATIONS

OGD – Open Government Data
TEDTALK – Technology, Entertainment, Design Conference
OGB4B – Open Government Data for Business
UNB – University of Brasília
IT – Information and Technology
PEST Analysis – Political, Economical, Social and Technological Analysis
CEFOR – Centro de Formação, Treinamento e Aperfeiçoamento or Center of formation, Training and Perfecting
Open Data 500 – OD500

SUMMERY

1 INTRODUCTION

This section will address the main issues that will underpin the present study. To do so, this chapter includes a contextualization of the subject, the formulation of the research problem, the general objective, specific objectives and the justification and importance of the theme.

1.1 Contextualization

"Open Government Data (OGD) is a philosophy- and is increasingly becoming a set of policies - that promotes transparency, accountability and value creation by making government data available to all" (UBALDI, 2013, p. 1). The resource that sustains this philosophy is public sector information collected by government institutions made freely available in open formats in ways that facilitate public access and exploitation (DAVIES, 2010).

Business models have emerged in response to the economic value opportunity presented by the increasing availability of open data (ZELETI; OJOCURRY, 2016). However, by thoroughly exploring this topic the author concluded that there is a knowledge gap regarding the social values these same businesses can generate. This motivated the study to explore how startups in private sector can generate sustainable value through the use of OGD.

"Sustainable value is defined as a multidimensional construct, reflecting the simultaneous generation of sustainable economic, social and environmental value in society by multiple collaborating actors" (JETZEK, 2017, p. 56). To tackle this analysis a multiple case study proved to be an interesting strategy for the research, allowing the author to compare and identify patterns in qualitative data. After a review of the concepts and the context of OGD in Brazil and the world, different tools were carefully selected to provide a structured investigation of the startup case studies. A multi-stakeholder approach was used to evaluate the value delivered, along with an external environmental analysis and a tool specific for evaluating OGD use in the business environment, were utilized to further comprehend current and potential sustainable value creation through

OGD. Dynamics and interviews were accomplished to collect information from the perspective of entrepreneurs and visionaries of these organizations.

Open Government and Open Data have the ability to facilitate the network of collaboration and co-creation of social and economic impact (JETZEK, 2017). With this in mind the author contributes to the understanding of how interactions between government and startups through OGD relates to this phenomenon.

1.2 Research Problem

Throughout the present article there is a continuous reflection on how OGD can generate value. Data alone has little value, for its when combined with context and interpretation that data becomes useful information. Knowledge is the union of data and information, to which is added expert opinion, skills, and experience, to result in a valuable asset which can is also used to aid decision making (ROWLEY, 2007). Wisdom is accumulated knowledge, which allows you to understand how to apply concepts from one domain to new situations or problems (JESSUP; VALACICH, 2003). With wisdom with people can create the future rather than just grasp the present and past. It is thought that information technology has the ability to catalyze this process and accelerate the creation of value.

Public entities are among the largest creators of data, and the reuse of this data is said to contribute to increased transparency, public sector efficiency and open innovation (MAGALHAES, ROSEIRA, MANLEY, 2014). It's up to governments, individuals and businesses to manipulate this data with analytics and information technology, for it to become useful and actionable, having a more direct positive impact on people's lives. Applying analytics to a greater share of all data can lead to productivity increases, economic growth, and societal development through the creation of actionable insights. (PEPPER, R. AND GARRITY, J, 2014).

Open Data is "going to help launch more startups. It's going to help launch more businesses. It's going to help more entrepreneurs come up with products and services that we haven't even imagined yet"—President Barack Obama, May 9, 2013.

Obama expressed the potential of OGD in society in his speech in 2013 and today startups across various industries are probing disruptive data-driven applications to improve competitiveness and to develop effective solutions. However little is known

how data actually creates value for companies (MAGALHAES; ROSEIRA; MANLEY, 2014) and even less is known about what value these companies create for the overall OGD ecosystem. With this, the present article further explores the question of;

How are startups using Open Government Data to generate sustainable value?

1.3 Main Objective

Describe and compare the value generation in startups that use Open Government Data and its relationship to the OGD Ecosystem.

1.4 Specific Objectives

Relate OGD theories with primary qualitative data collected.

Analyze the value delivered to multiple stakeholders.

Identify external factors that influence the delivery of value.

Describe the overall relationship of startups with OGD and the public sector.

1.5 Justification

1.5.1 Why Open Government Data

> "In this world, the power of digital information to catalyze progress is limited only by the power of the human mind. Data are not consumed by the ideas and innovations they spark but are an endless fuel for creativity. The power of a data set is amplified by ingenuity through applications unimagined by the authors and distant from the original field." (Interagency Working Group on Digital Data to the Committee on Science of the National Science and Technology Council, 2009, page 1)

Data alone has little value it's when governments, individuals and businesses manipulate this data with analytical and information technology that it becomes useful and actionable, having a more direct positive impact on people's lives. Applying analytics

to a greater share of data can lead to productivity increases, economic growth, and societal development through the creation of actionable insights (PEPPER; GARRITY, 2014).

Today's governments are being pressured like never before to become more agile, citizen-centered and assertive in the delivery of services. From budget cuts, to urbanization, to exponential increase of consumer-citizen expectations, the causes of these pressures are a combination of social, economic and demographic phenomenon. In this scenario, the digital transformation of government will play a key role in redesigning the process of governance to tackle these problems by being more efficient, data-driven, collaborative and open (OECD, 2016).

With the help of technology citizens and organizations are making complex products to solve complex problems at record speeds. As society becomes more efficient and governments problems more complex the need for integration and collaboration becomes greater. The digitalization of government and Open Government Data, are seen as potential stepping stones for redesigning the business model and processes of institutions and ideally permitting the co-production of governance (OECD, 2016).

Citizens have been creating startups, foundations and other various types of organizations to develop platforms, websites, products etc. around OGD, impacting the political, social and economic spheres in different ways (GRANICKAS, 2013). With this, we are beginning to comprehend that the "world is at an inflection point where technological advances and boundary crossing societal challenges have come together to create a paradigm shift in our collective thinking" (JETZEK, 2017, page 239).

1.5.1 Why Value and Private Sector Startups

According to Jetzek (2014) there is a huge gap in the literature when it comes to understanding how Open Government Data (OGD) generates value, the type of value that is generated, and the best means by which this value can be exploited and identified. While the commercial re-use of open government data is broadly expected to generate economic value, the practice and study of this trend is still new (MAGALHAES; ROSEIRA; MANLEY, 2014). Even less information was found in respects to the social value the use of OGD in the private sector can create.

As society matures we have been facing new and more complex challenges. OGD presents itself as a new powerful resource to attack these problems through the use of

technology. The author was motivated to focus on for-profit businesses, after watching Michael Porter's TEDTalk of "the case for letting businesses solve social problems" (PORTER, 2013). Porter (2013) explains how businesses generate wealth through problem solving, which allows them to grow and become scalable. This tackles the problem of resource scarcity, a well-known barrier when solving our complex social problems, the traditional way (through government actions and non-profit organization). He suggests the framework of shared value, which involves creating economic value in a way that also creates value for society (PORTER; KRAMER, 2011).

Knowing that software startups tend to catalyze the potential of government data, an abundant resource, the author concluded it would be an interesting approach to study how startups generate shared value through OGD.

2 THEORETICAL REFERENCE

This chapter intends to present the main theoretical basis for the understanding of the subject studied. The concept and evolution of the Open Government Data (OGD) as a means for generating value will be approached as well as the theoretical influences attempting to explain different relationships between private and public sectors in the ecosystem and the overall scenario Open Government Data in Brazil.

2.1 Open Government Data: Origins and Evolution

On December 7, 2007, a group of 30 open government advocates held a meeting in Sebastopol California. Their goal was to develop a clearer understanding of OGD and set values that could strengthen the use and impact of this data. Inspired by the open source movement, these advocates defined 8 principles that were later considered in various open government strategies (OpenGovData.org).

OPEN GOVERNMENT DATA PRINCIPLES

According to the Sebastopol Group, December 2007 (p.1)

Complete – All public data is made available. Public data is data that is not subject to valid privacy, security, or privilege limitations.

Primary – Data is as collected at the source, with the highest possible level of granularity, not in aggregate or modified forms.

Timely – Data is made available as quickly as necessary to preserve the value of the data.

Accessible – Data is available to the widest range of users for the widest range of purposes.

Machine processable – Data is reasonably structured to allow automated processing.

Non-discriminatory – Data is available to anyone, with no requirement of registration.

Non-proprietary – Data is available in a format over which no entity has exclusive control.

License-free – Data is not subject to any copyright, patent, trademark, or trade secret regulation.
Reasonable privacy, security and privilege restrictions may be allowed.

In this context, the publishers found it was important to highlight that the Open Data Principles do not address what data should be published, rather than defining conditions that public data should meet to be considered "open". It's also important to clarify that their understanding of data is electronically stored information or recording, some examples given included documents, databases of contracts, transcripts of hearings, and audio/visual recordings of events (OpenGovData.org).

On Obama's first day in office, his administration issued an "Open Data directive" that set out concrete steps to reach "unprecedented levels openness in government" (Memorandum for the Heads of Executive Departments and Agencies; 2009). This included demands based on the eight principles, expansion public access and increased protection to the right to information. These actions gave momentum for other open government and transparency policies to be put in place around the world.

Still in 2011, the United Kingdom published the report "Putting the Frontline First: Smarter Government", promoting transparency as an important step to strengthen the role of citizens and civic society (CHIEF SECRETARY TO THE TREASURY, 2009). The next year the Australian Government published the "Declaration of Open Government and the Danish government launched an Open Data Innovation Strategy (HUIJBOOM; VAN DEN DROEK, 2011). Brazil did not fall too behind with the reformulation of the Access to Public Information Law (Lei de Acesso à Informação) in 2011, creating the National OGD plan, and becoming a member of the Open Government Partnership, committed to making governments more open, accountable, and responsive to citizens (BRITO et al., 2015).

2.1.1 Who and how is OGD being used

Transparency portals have begun to pop up in all levels of government publishing vast amounts of data, that used to be available to only selected groups of people. This data is now being downloaded, shared, linked and analyzed by all sectors of the economy: the government (public), business (private), non-governmental organizations and citizens.

Davies (2010) conducted a research analyzing the motivations behind the use of OGD, and identified six "overlapping motivational clusters". Using multidimensional scaling he was able to analyze the relationship between the clusters in two-dimensions: Government focus and Technology focused.
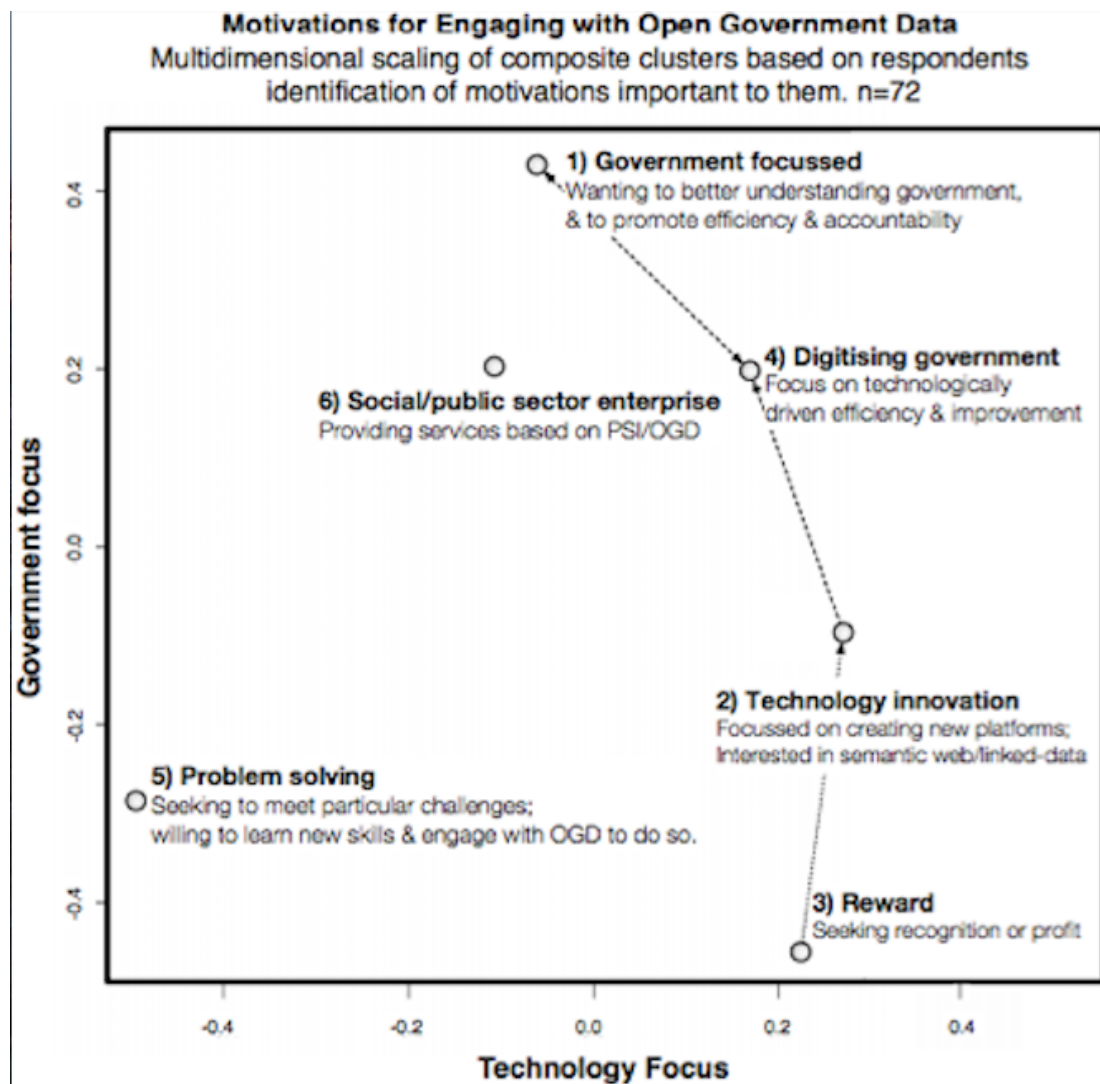

Figure 1 - Motivations for Engaging with OGD
Source: Davies, 2010 p. 22

These groups have been using OGD in diverse ways. By exploring the use of the government data from data.gov.uk, Davies (2010, p.5) also distinguished five non-mutually exclusive processes of OGD use:

Data to data – sharing derived data (either simply an original dataset in a new format, or data that is augmented, combined with other data, or manipulated in some way. A whole dataset may be shared, an API onto a dataset created, or an interface that makes it easy to download subsets of a large dataset.

Data to fact – often underestimated in accounts of 'data for developers' – individuals may seek out specific facts in a newly open dataset. These facts may support their engagement in civic or bureaucratic processes, or in business planning. Facts could be found through online interfaces, but also by browsing downloaded Excel spreadsheets.

Data to information – creating a static representation and interpretation of one or more data sources. Leading to visualizations, blog posts, infographics and written reports.

Data to Interface – creating a means to interactively access and explore one or more datasets. For example, creating a searchable mapping mash-up, or providing a tool to browse a large dataset and crowd source feedback or scrutiny. Interfaces often also include 'static' interpretations of data (data to information) – showing particular summary statistics or algorithmically derived assessments of underlying data.

Data to service – where OGD plays a 'behind the scenes' role in making some online or offline service function. For example, the use of boundary data to route messages reporting potholes to the responsible authority.

2.2 OGD Ecosystem

An ecosystem is defined as "a system of people, practices, values, and technologies in a particular local environment"; such systems are socio-technical in that the "spotlight" is "on human activities that are served by technology" (NARDI O'DAY, 1999, p. 49).

In recent research, Harrison et. al (2012), introduced the concept of *Open Government Ecosystem*. The metaphor *ecosystem* was chosen for the framework for conveying a sense of the interdependent social systems of actors, organizations, material

infrastructures, and symbolic resources, enabled by information technology, among them, open government (HARRISON et. al, 2012).

Jetzek (2017, p. 56) further explains the concept as a "distributed network characterized by the sharing of data across multiple stakeholders built around the sharing of data in order to create information, products and services that contribute to sustainable value generation". As a way to generalize the system-wide interdependent relationships Harrison et al, summarized the domains and environment into the framework in figure 2. This perception represents governments' interacting with innovators and citizens in a variety segments of society placed in a larger context of economy, legal and political constructs.

As shown in the diagram, the connection between government and innovators from technology sectors, private industry and academic institutions interact in order to *practice innovations*. This can take form as new data standards, new designs for information systems, and new technology platforms, among others, that contribute to development of information or technology resources for the future (HARISSON et. al, 2012).

Furthermore, the current and new forms of exchange between public managers and citizens, civil society organizations, and businesses enables government to collect important feedback from the kinds of data and information people desire from their institution (HARISSON et. al, 2012). Clearly, innovators also have interdependent relations with users, civil society and businesses. This group tests markets for their ideas and develop experience based on consumer-citizens expectations for what technology can achieve, especially visible in private sector environments (HARISSON et. al, 2012). In the heart of the ecosystem lies the intersection of government, innovators and civil society, in which data, information, and technology are transformed into innovative products and citizen tools for interacting with government across a range of purposes (HARISSON et. al, 2012). All of these domains collaborate and connect in a variety of ways creating waves of impact that ultimately influence the evolution of the ecosystem.
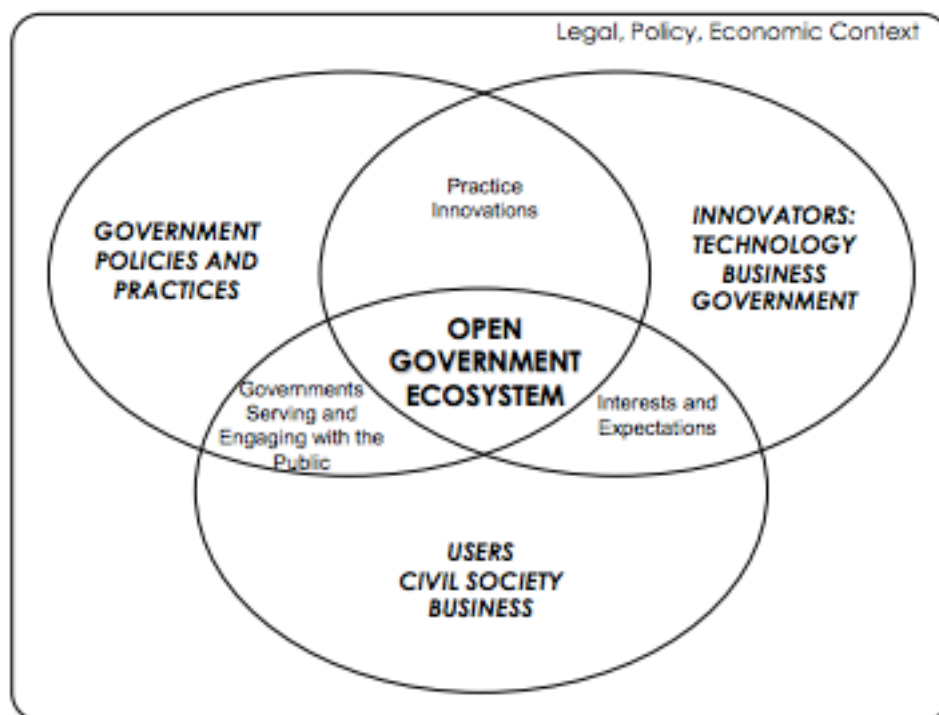
Figure 2 - Domains and Environment Compromising an OGD System
Source: Harisson et al., 2012 p. 909

Looking at another perspective, in deeply studying the City of Edmonton's OGD initiative case, Najafabadi and Luna-Reyes (2017) present the OGD Ecosystem as a closed loop system consisting in a variety of feedbacks processes within the actors (NAJAFABADI, LUNA-REYES, 2017). Using computer simulation techniques, the model aimed to understand what are the key factors and processes needed to promote an effective and sustainable open data ecosystem. The model illustrates the interactions of three sectors: the government sector, includes agencies in charge of opening data; the developers sector, who facilitate the use of openly available data for the citizens; and society, which includes citizens that take advantage of the applications and realize benefits from open data (NAJAFABADI; LUNA-REYES, 2017).

The dynamics of this ecosystem shows how the benefits impact multiple actors of the ecosystem demonstrating value creation as a delayed and secondary effect through what are called feedback mechanisms or processes (NAJAFABADI; LUNA-REYES, 2017). For example, once the benefits of opening data are perceived by the society, government will be pushed by the ecosystem to open more data. Another relationship described in the conceptual framework (*figure 3*) is how government

capacity and investments in OGD highly impacts quality of developed applications and productivity of applications created in the developers section.

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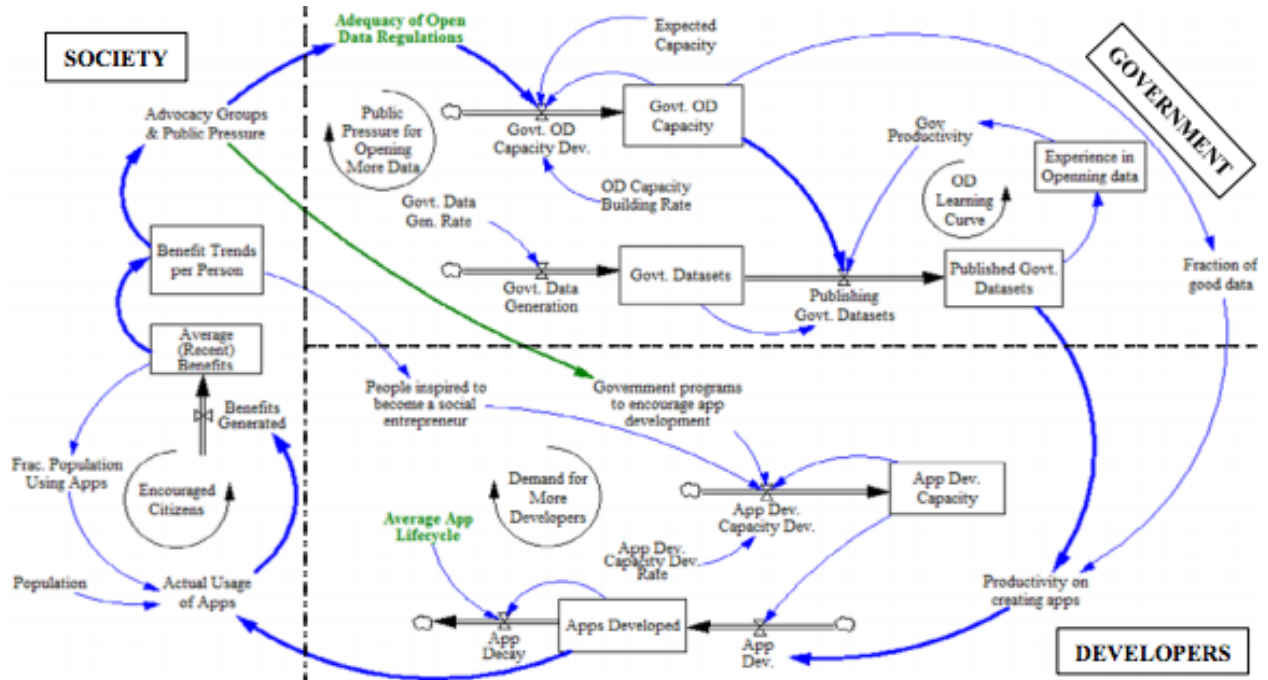
Figure 3 - OGD Ecosystem Closed-Loop
Source: Najafabadi, 2017 p. 2716

2.3 OGD and Value

"Government data, made available in machine-readable and linked datasets that can also be searched and manipulated using standard tools, is a critical new resource for fueling changes in value creation (economic, social and political)." (UBALDI, 2013, p. 1). In many of the studies the author found various links between OGD and value, for the specific investigation the concept of sustainable value was chosen to guide the research.

2.3.1 What is Sustainable Value

Sustainable value focuses on the proactive, concerted efforts of businesses, government institutions, and the overall community to address social challenges in innovative ways, thereby generating social, environmental, and economic value for all stakeholders and future generations (VAN OSCH and AVITAL, 2010, p.99).

This model creates competitive advantage through superior customer value while contributing to sustainable development of company and society (LUDEKE-FREUND, 2010). In other words, this describes when organizations seek to go beyond delivering

economic value and include other forms of value for a broader range of stakeholders in their strategies (BOCKEN et al., 2013).

2.3.2 What Drives Sustainable Value

Jetzek (2017) chose to structure the relationship of value of OGD using the concept of generative mechanisms to describe their effects in society. Mechanisms are used to explain causal relationships through the specification of how central events or outcomes are produced and reproduced by the structures, actions and contextual conditions in a particular setting (WILLIAMS & KARAHANNA, 2013).

Jetzek (2017) emphasizes the importance of creating a basic understanding of the main mechanisms that explain how value is generated in today's networked digital society. In a quest to improve our ability to evaluate complex interactions that occur in the generation of value through the use of open data, Jetzek proposes a Strategic framework of four archetypical generative mechanisms, showed below.

Figure 4 - Strategic Framework for four Archetypical Generative Mechanisms
Source: Jetzek, 2014 p. 140
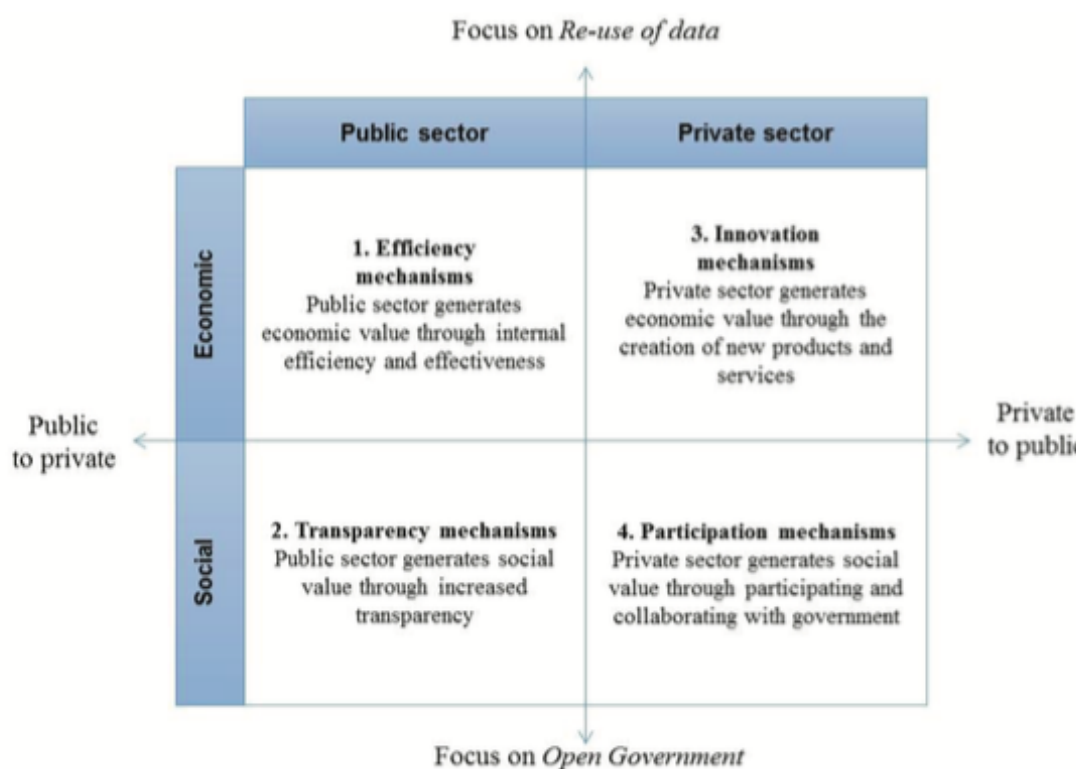
The two-by-two matrix explores the sectors that generate value through OGD spanning between public and private sectors (horizontal dimension), as well as the

strategic focus of the OGD initiatives, having either a social or economic focus (vertical dimension).

Efficiency Mechanism

The efficiency generative mechanism enables value generation through reducing transactional costs in operations. In the OECE (Organization for Economic Co-operation and Development) report on OGD, Ubaldi (2013) states that OGD can increase government efficiency, effectiveness and innovation in service delivery and internal public-sector operations. Open data not only allows for faster answers to civilian questions, reduces workload and transactional costs, but also permits a co-development of processes across public agencies and with society to design a more efficient government. Ubaldi exemplifies another value brought by this mechanism as the *empowerment of the public-sector workforce* (UBALDI, 2013). The Open Government Data Movement gives civil servants an opportunity to participate in ensuring the openness of governments, and strengthening its impact by better attending users' needs. Furthermore, effective public services unleash economic value generating in the private sector.

Innovation Mechanism

This mechanism allows value to be generated through OGD in new product and services in new and innovative ways. Jetzek utilized Schumpeter's concept of innovation as theoretical background for this mechanism. Schumpeter economic theory stated value is generated through innovation by " bringing about novel combinations of resources, new production methods, as well as new products and services, which, in turn, lead to the transformation of markets and industries, thus increasing value" (SCHUMPETER, 2012, p. 68).

Ubaldi 2003, also recognizes the potential of OGD creating value for the wider economy. According to the Open Data 500 (OD500), Open Data can be used to launch commercial and non-profit ventures, do research, make data-driven decisions, and solve complex problems, which can all lead to economic and gain. OD500 also states that drivers influencing the economic value of open data; new business created through apps and websites; more efficient interaction between Government and the private sector; and

more efficient business practices within Government itself which in turn benefits private sector. Capgemini Consulting highlights job creation as a direct and short-term impact of Open Data, but further than that it's creating a skilled and qualified workforce.

Transparency Mechanism

The sharing of more information increases transparency and reduces the effects of information asymmetry (JETZEK, 2017), which in extreme cases can lead to overarching political authority, territorial expansion, and inequitable distribution of power and wealth (HEYER; CROWLEY, 2008). While empirical studies have given conflicting evidence on the relationship between transparency and corruption, a recent study aimed to measure Public Corruption in the United States showed that corruption conviction rates almost doubled when Freedom of Information Act (FOI) laws were strengthened (CORDIS; WARREN, 2013).

Participation Mechanism

This mechanism describes how increase citizenship and collaboration through the positive effects of scale permitted by platforms where openness and sharing enable value generation drawing from a larger pool of resources (JETZEK, 2017). This mechanism is closely connected with the idea of Open Innovation that defends that sharing knowledge across boundaries expands the firm's innovative potential, as the firm is able to tap into a much larger pool of ideas and find such ideas faster, bringing positive public change. Jetzek sets out that this can happen in two different forms when it comes to OGD. 1) collecting opinions (citizen engagement) and 2) collecting ideas and solutions or crowdsourcing (LINDERS; WILSON, 2012).

Ubaldi (2013, p. 13) expresses this value as promoting citizens self-empowerment, social participation and engagement. This involves the idea that OGD can serve as a tool for people to make better and more informed decisions to enhance quality of life, while providing structured ways to increase active participation of citizens in public affairs, allowing for them to become part of the process of designing their own rights (UBALDI, 2013).

2.3 OGD and the Private Sector

In recent years society has started to view OGD not only as an essential resource for increased transparency and accountability but also for fostering innovation, bringing about both social and economic value (MAGALHAES; ROSEIRA; MANLEY, 2014). While Jetzek has chosen to explain the value creation through mechanisms to further explain the private sector use of OGD other authors chose to analyze the phenomenon using business models and archetypes. The Open Data institute and Deloitte Consultant (2012) firm have been collaborating to study the field and purposed five Open Data business "archetypes".

Suppliers: publish their data as Open Data that can be easily used. While they don't charge for the data—if they did, it wouldn't be Open Data—they increase customer loyalty and enhance their reputations by releasing it.

Aggregators: collect Open Data, analyze it, and charge for their insights or make money from the data in other ways.

Developers "design, build, and sell web-based, tablet, or smartphone applications" using Open Data as a free resource.

Enrichers are "typically large, established businesses" that use Open Data to "enhance their existing products and services," for example by using demographic data to understand their customers better.

Enablers charge companies to make it easier for them to use Open Data.

As a simplification to this approach Gurin (2014) also categorized them into "Better Business Through Open Data, improving healthcare, energy, education, finance, transportation, and many other aspects of consumer society" and "Open Data Pure Plays, companies, even whole industries, that simply would not exist without Open Data" (GURIN, 2014, p. 16). He described these companies as "startups that are revolutionizing agriculture by analyzing weather data; companies using Open Data to predict trends in healthcare, financial markets, or other fields; companies that manage and market government data; and companies developing market insights with data from the vast universe of social media" (GURIN, 2014, p. 16).

The OD500 Global Network coordinated by the Governance Lab at NYU has greatly contributed to the understanding the use and impact of Open Data. They seek to map out and evaluating organizations around the world that utilize open data to better understand social and economic generated through it. Through a structured analysis of 500 companies from the OD500 project Magalhaes, Catarina and Roseira (2014)

established a conceptual taxonomy composed of three OGD business model archetypes, based on how OGD is used.

In the first category stands the **Enablers** who represent companies that provide their "customers with technologies such as apps and or software programs mainly built on or for the use of OGD" (MAGALHAES; ROSEIRA; MANLEY, 2014, p. 3). The study summarized the main value proposition given to the supply-side (government) of OGD by offering high-performance technology for better management at all levels of government. To the user-side (citizens, organizations, developers etc.) the main value given by the *enablers* is personalization by providing custom-fitted solutions that incorporate ODG from multiple sources and with personal data. These services offer customers valuable tools for better decision making in a wide range of areas, such as health care, civic and political interests, home utility bills, etc. (MAGALHAES; ROSEIRA; MANLEY, 2014).

The second category represents the facilitators, who simplify and promote the exchange and access of OGD from the supply-side (government) to the user-side (civilians, hackers, entrepreneurs etc.). The facilitator's main value proposition for the user-side is "empowerment" which is provided through services that facilitate access and exploration of OGD, by reposting data relevant to a specific group of people or through user-friendly platforms (MAGALHAES; ROSEIRA; MANLEY, 2014, p. 4). To the supply-side the facilitators contribute to the standardization of data being submitted to government, leading to greater reliability in the process of delivering data to government either from private sector or the public sector itself, reducing fraud and waste. (MAGALHAES; ROSEIRA; MANLEY, 2014). A table summarizing these value propositions can be found below.

Table 1. Value proposition for each archetype

Archetype	Supply-side	User-side
Enablers	Efficiency	Personalization
Facilitators	Standardization	Empowerment

Figure 5 - OGD Business Models
Fonte: Magalhaes, Roseira, Manley, 2014 p. 3

The last category is composed of the **integrators**, which can be described as companies that use OGD to complement or enrich their current offers or business models, used to obtain competitive advantage but not seen as the core resource in their business

model. Integrators can be found in a variety of segments and can potentially extract value from OGD at any stage of the supply chain, for example logistics, R&D, marketing, and sales. Since this group is very diverse the study did not identify a very clear common factor between the value propositions of the organizations examined (MAGALHAES; ROSEIRA; MANLEY, 2014).

The study also presents a framework (see figure 6) that describes the archetypes in relation to two concepts or dimensions. The first is *business model openness*, which this relates to how much a firm relies on its value network, or in other words, its ecosystem, to provide an offering; the second is *open government centrality* which is the degree to which OGD is a central resource of the business model (MAGALHAES; ROSEIRA; MANLEY, 2014).
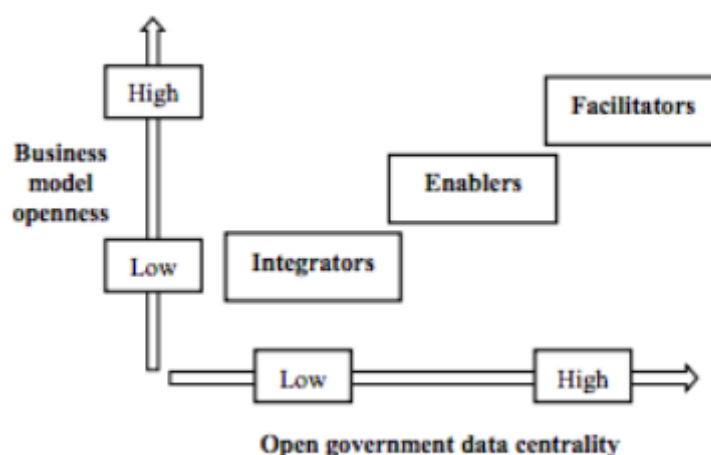
Figure 6 - Business model openness and OGD centrality
Source: Magalhaes, Roseira, Manley, 2014 p. 4

2.3 OGD in Brazil

2.3.1 What is Brazil's General Scenario

Brazil is one of the founding of the Open Government Partnership (OGP), put in motion in 2011 with the ultimate goal to disseminate good practices to help OGP governments implement their commitments and develop more ambitious and innovative action plans related to open data (PARTNERSHIP, 2011). As part of its first Action Plan,

which contains 32 commitments for OGD, Brazil created an organization of a nationwide conference on transparency (CONSOCIAL), implemented the Brazilian Access to Information Law (PRESIDÊNCIA DO BRASIL, 2011), milestone for the democratization of public information and launched its first open OGD Portal, dadosabertos.gov.

As part of "Projeto Democracia Digital" (2015) or "Digital Democracy Project" in English, an extensive research was done to evaluate the OGD scenario in Brazil. The study aimed to prospect, analyze and map government initiatives of open data, transparency and digital participation. Their analysis revealed that, despite great efforts and innumerable advances, the publication of open government data in Brazil is still in its infancy. From the OGD initiatives found a percentage of 29.6% of Brazilian Federative Units provide data in open format in and in a structured manner. This number is even lower when the sphere of analysis is municipal. Considering the Brazilian capitals and the municipalities of 400,000 inhabitants, 14.75% have data open in their own portals or systematized in transparency portals, with the vast majority (77.8%) referring to national capitals. The graph below from "Projeto Democracia Digital", illustrates this reality.
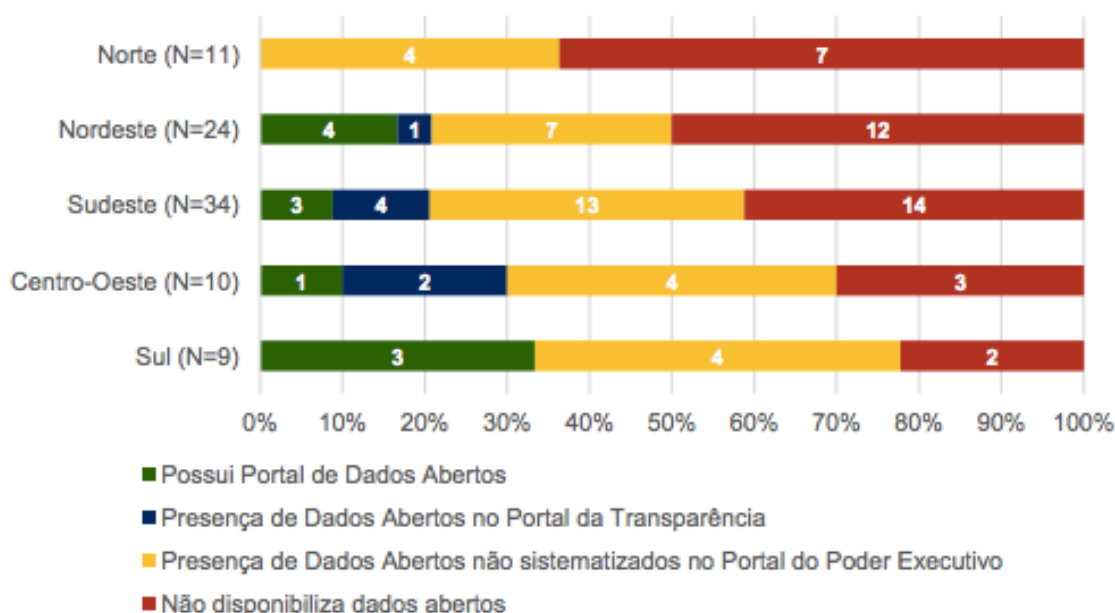
Figure 7 - Availability of OGD in States and Counties
Source: PROJETO DEMOCRACIA DIGITAL, 2014 p. 4

The results show that the budgetary and financial data are the prioritized sector of OGD efforts. This can be noticed both in state and municipal context of OGD shown in the graphs below that illustrate the distribution of public data by sector. Certainly, a

reflection of the Fiscal Responsibility Law and Transparency Law. Sucha, Grönlund and Janssen (2015) suggest the prioritization of data groups to be disclosed is pushed by legislation. If the prioritization of financial and budgetary data suggests advances in terms of transparency, other arguments for the use of open data, such as stimulating business economics and providing business services from OGD appear to be in the background.

In mapping out and studying the data portals of different spheres of government in Brazil the project "Democracia Digital" made some conclusions about the transparency, open data and e-participation in Brazil. They found much evidence of progress in recent years, but many challenges were clear. Related to Transparency, the results indicate that the data available are mainly focused on meeting the legal requirements, and there is inequality in the transparency of the different governmental spheres. The creation of portals centralizing different archives and public data is still at its infancy, with financial data being the one that is mostly prioritized *(shown in figures 6 and 7)*. For e-Participation, what is perceived is that the initiatives intend much more to inform the people about the government actions than to allow the decision making by the participants involved.
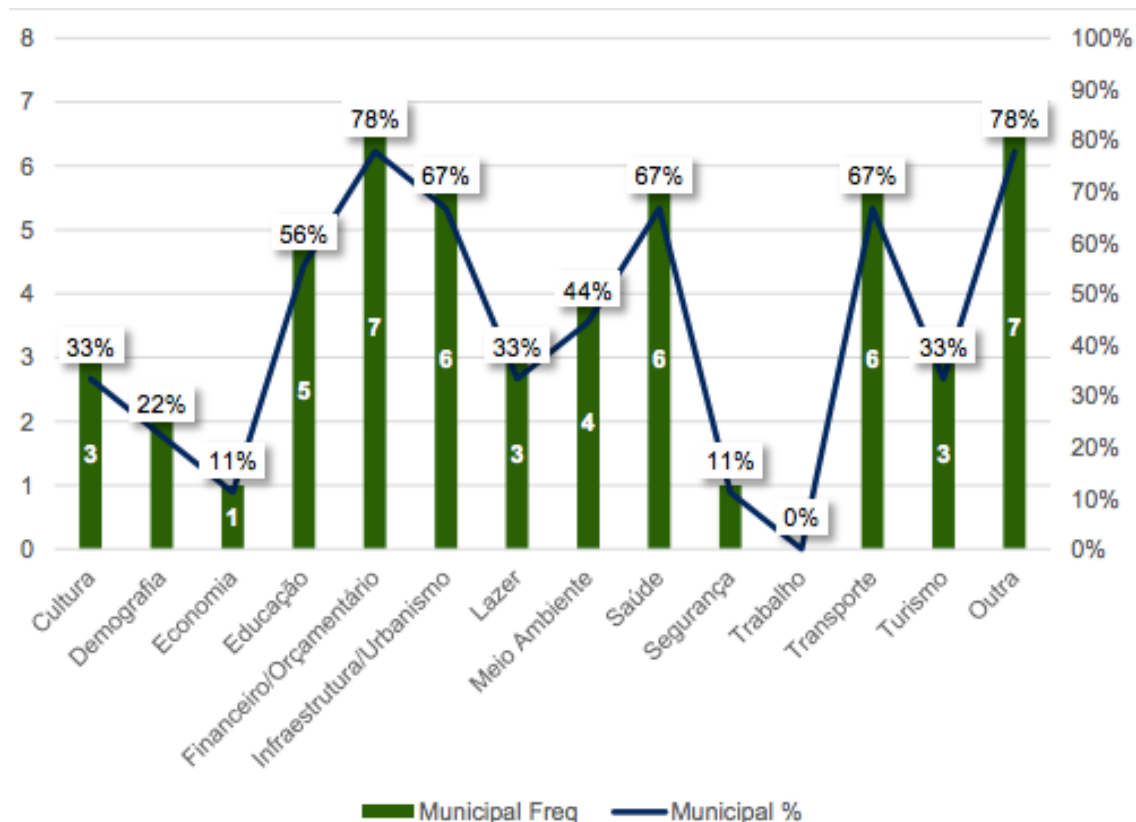
Figure 8 - Open Data Availability in County Governments According to Sector

Figure 9 - Open Data Availability in State Governments According to Sector
Source: Projeto Democracia Digital, 2014 p. 4

BRITO et al (2015) suggests in his studies that Brazilian OGD portals are not fully compliant with open data definitions. Even though the repositories publish primary, accessible, machine processable, nonproprietary, and cost-free datasets, they fail in terms of completeness, timeliness, non-discrimination, and being license-free. Moreover, developers who use repositories to develop application reinforced the problems with completeness and update policies. In addition, developers noted the lack of data source centralization and data publishing standards adds an unnecessary barrier to application development. Moreover, they consider that the creation of a mechanism to return data from people and applications to government could also allow the creation of new classes of applications.

The study concluded that in Brazil, the use of open data is still recent, with the "Access to Information Law" as its fundamental landmark. Therefore, their effective understanding and implementation depends on the political and social maturation that is expected to happen over time. Knowledge about the current state of open data in the country and its challenges, allows the establishment of guidelines that contribute to this maturation. For its second plan, Brazil used a broader participation process and

developed a bolder action plan, with 52 commitments—19 of which were proposed by Civil Society Organizations (CSOs)—and the involvement of 17 government bodies (BRITO et al, 2015).

2.3.1 How does Brazil compare Internationally

In 2014 the Accenture consulting firm conducted a comparative study of digital government performance across 10 countries which included Brazil. The study categorized these countries into three different groups the

(1) *Enhancers*, "which are already advanced on citizen engagement, are looking at creating a more open or networked government that encourages the creation of a digital society"

(2) *Cutters,* which "focus on cost efficiencies and adopt a "Digital by Default" approach that leads to i-government (a government that is innovative, insight driven and Internet ready)" and

(3) Builders which "are graduating from developing the basics to promoting mass adoption of digitalization in the longer term" (ACCENTURE, 2014, p. 9).

The overall ranking of each country are as follows.
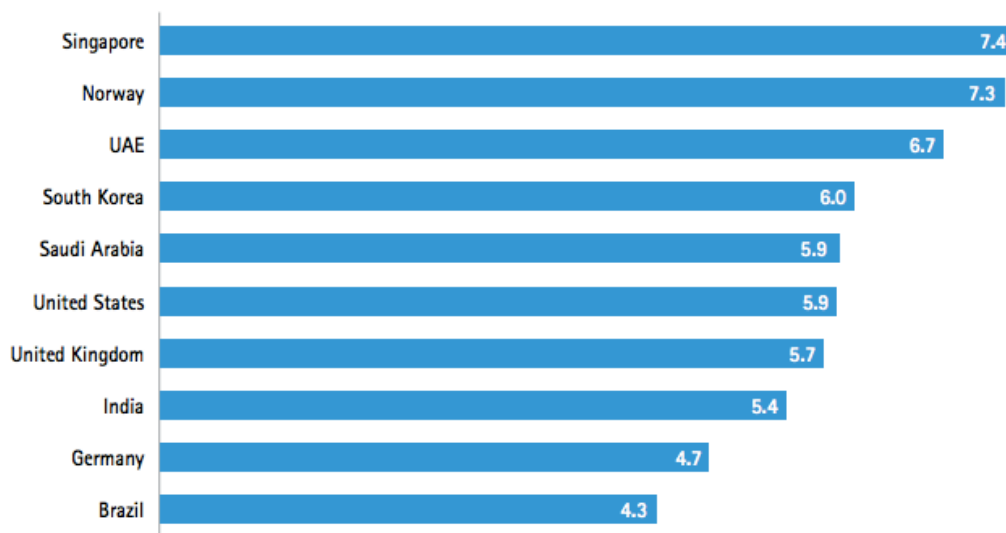
Figure 10 - Overall Ranking
Fonte: Accenture, 2014, p. 10

In the study it was observed that while the brazilian government is committed to a clear digital strategy and is building a robust infrastructure, its citizens seem less satisfied with the public services offered and want to be more involved in shaping them.

the study also suggests that in Brazil there is a need to support "plans for an efficient digital government with investments to build and promote their ICT infrastructure and access to majority of their citizens". Accenture (2014) also drew out the digital maturity journey for each of these categories. With this, brazil was categorized in the builders section.

3 Method and Research Strategies

In this chapter methodological strategy choices are presented to assign the objective of this work. It is divided into: typology and general description of research methods, research strategy, methods of data collection and analysis, characterization of the research instrument and study participants.

3.1 Typology and general description of search methods

The descriptive qualitative research, adopted in this dissertation, is based on a multiple case study analysis. Based on the ideas of Rossman and Rallis (2003), qualitative research is characterized by the use of multiple methods, where the researcher interacts with the participants in the humanistic way. It occurs in a natural setting, where the researcher goes to the participant, which allows the development of greater detail about a person or local analysis, as well as promoting the researcher's involvement in the participants' actual experiences. Another important aspect of qualitative research according to the authors is that it is fundamentally interpretive. The researcher makes an interpretation of data by filtering them through a personal lens. Godoy (1995) explains that a qualitative research does not aim to enumerate or measure the events studied, but rather analyzes broad questions of interest, which are designed as the study develops.

The study can be characterized as descriptive, which "has as its primary objective a description of the characteristics of a given population or phenomenon or the establishment of relations between variables" Gil (2002, p. 28). In addition, the author states that the type of research has as objective observed as opinions, attitudes and beliefs of the population analyzed.

3.1.1 Research Strategy

The strategy chosen for the dissertation a multiple case study approach, that describes an intervention or phenomenon and the real-life context in which it occurred

(YIN, 2003). A multiple case study enables the researcher to explore differences within and between cases and replicating findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory (YIN, 2003).

3.2 Characterization and description of research instruments

The data collected in the present dissertation are from primary and secondary sources. In addition to the collection of secondary data, the work used as a technique for collecting in depth perceptions, opinions and knowledge of a selected profile. "The qualitative interview is essentially a technique, or method, to establish or discover that there are perspectives or points of view about the facts, other than those of the person initiating the interview" (GASKELL, 2002, p. 64). A semi-structured interview was conducted providing uniform information while giving liberty for the participants to discuss other topics, allowing comparability of data through in-depth discussions (KUMAR, 2011).

Three research instruments were selected determine the structure of the interview and one online platform was used to unite important information from the dynamics conducted. It is important to note that these tools were used as a form to extract relevant and comparable information from the people interviewed. The interviews were then transcribed and analyzed by the author, and carefully compared to the theoretical information gathered.

3.2.1 Value Mapping Tool

Jetzek (2017) throughout her research united the concepts of sustainable value and OGD. According to her, sustainable value is "defined as a multidimensional construct, reflecting the simultaneous generation of sustainable economic, social and environmental value in society by multiple collaborating actors". In the context, the OGD ecosystem is a multi- stakeholder network that contributes to sustainable value generation (JETZEK, 2015, page 56).

The value mapping tool serves as a guide to achieve the following objectives;

BOCKEN e RANASHORT, 2015 p. 9

> Understand the positive and negative aspects of the value proposition of the value network (i.e. the network of stakeholders involved in creation, delivery and receipt of value associated with provision of a product/service);
>
> Identify conflicting values (i.e. where one stakeholder benefit creates a negative for another stakeholder), so that action can be taken to tackle these;
>
> Identify opportunities for business model redesign and realignment of interests to reduce negative outcomes and improve the overall outcome for the stakeholders in the value network - especially for society and the environment.

The framework conducts a discussion about the overall purpose and follows by discussing value created, value destroyed, value missed and value opportunities from the perspective of multiple stakeholders. Where value created means "positive tangible and intangible value is created for each of your stakeholders"; value destroyed means " negative outcomes of the business for any of your stakeholders"; Value missed refers to "how might the business be missing an opportunity to capture value, or wasting or squandering value in its existing operations" and value opportunity "new positive value might the network create for its stakeholders through introduction of new capabilities, activities and relationships" (BOCKEN et al., 2013, p. 482 - 497).

The following Stakeholder segments are provided in the framework to attract a more holistic visualization of value to multiple stakeholders; Environment, Society, Customers and network actors (BOCKEN et al. 2010). "The multi-stakeholder perspective of the tool was found to be useful for wider systems thinking" (BOCKEN et al. 2010, p. 76).

This tool was chosen to analyze if in the perspective of the leaders of Ubicity, SigaLei and Data Policy current and potential scenario to capture economic value, whilst generating environmental and social value, thereby establishing the business case for value sustainability.

3.2.1 PEST Analyses Tool

PEST analysis provides a framework for investigating and analyzing the external environment for an organization (PAUL et al. 2006), extending the analysis of value opportunities and threats in the guided by macro-level political, economic, social, and technical factors.

It is important to identify the factors that might in turn affect a number of vital variables that are likely to influence the organization's supply and demand levels and its costs (HAMMOND et al, 1993). The results can be used to take advantage of opportunities and to make contingency plans for threats when preparing business and strategic plans (BYARS, 1991). Kotler (1998) claims that P.E.S.T analysis is a useful strategic tool for understanding market growth or decline, business position, potential and direction for operations. The use of P.E.S.T. analysis can be seen effective for business and strategic planning, marketing planning, business and product development and research reports. P.E.S.T. also ensures that company's performance is aligned positively with the powerful forces of change that are affecting business environment (PORTER, 1985).

For the purposes of this analyses the PEST analysis limited itself to examining the external factors that the interviewed currently considered important in the strategy for the organization.

3.2.1 Realtime Board Platform

For the Value Mapping Tool and Pest Analysis a brainstorming platform caller RealTime Board (https://realtimeboard.com) was used to make the interview more dynamic and visual for all the participants. Below is a print screen of the platforms dashboard, which was visible to all throughout the dynamics. The platform was especially helpful with one of the remote interviews, where the screen was shared with the interviewee still allowing the dynamic to flow.
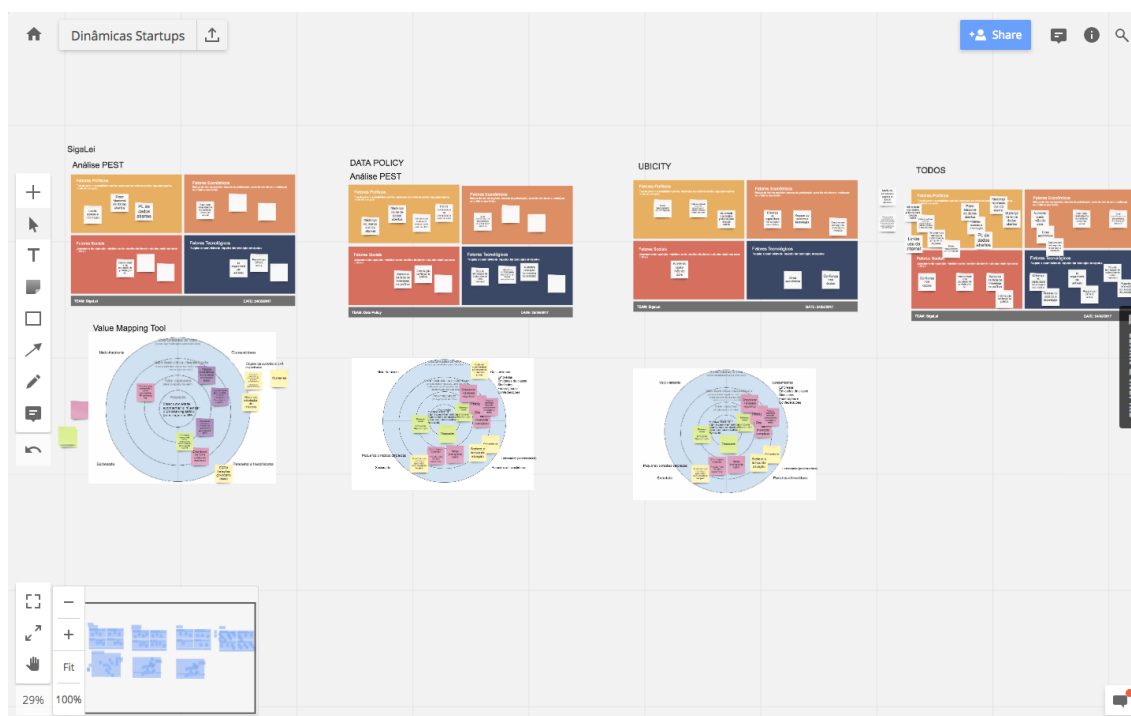
Figure 11 - Realtime Board printscreen
Fonte: https://realtimeboard.com/app/board

3.2.1 OGD4B Tool

Open Data for Business Tool is the first assessment methodology for private sector use of government data as part of the WORLD BANK OPEN DATA TOOLKIT, specifically designed to provide a deeper view of the private sector's current and potential use of government data (THE WORLD BANK, 2015).

> The purpose of this Tool is to increase the business use of government data through (1) increased private sector awareness of government data, (2) identification of high-value data and barriers to use, and (3) a recommended Action Plan to engage with private sector stakeholders on an ongoing basis. The Open Data for Business (OD4B) Tool provides a methodology to assess the private sector's current and potential use of government data in various countries. (THE WORLD BANK, 2015, p. 1)

For the current study the researcher selected prompt questions contained in the OGD4B tool Kit to assess the relationship between OGD in the three startups and to obtain feedback and opinions from the interviewees on conditions of government data.

3.3 Characterization of the Organizations Studied

Three startups that consider OGD essential to their business model were included. The startups chosen can be viewed as Open Data Pure Plays, which would not exist without Open Data" (GURIN, 2014, p.16). This specific group or locus was viewed as an interesting sample to study the OGD context due to this high dependency in the data suggesting that more in depth judgements about the data could be extracted.

Furthermore, it was required that the individuals interviewed be at least one of the founders of the startups and that they have daily experiences working close with the government data. This allows the study to absorb their views on technical aspects of OGD but also strategic aspects of their business model.

3.3.1 Ubicity

The first organization to be analyzed is called Ubicity which applying technique such as data mining, analytics, machine learning, predictive mathematical models and geospatial data visualization, aims to develop innovative solutions to make urban centers more efficient and promote better living. Though data science, Ubicity delivers useful information to society publicly and provides added valued solutions through commercial products.

Ubicity's products and services form a basis for this development and technological innovation for applications to be built that support: integration and availability of government information, treatment of market trends, social networking measures, availability of geographic data and smart cities (BUIATI, 2016). Specifically, in one product line called "Ubiplaces" the organization provides a platform described as a specialized Real Estate portal which helps people find the best place to live according to their profile and necessities. In this venture, they seek lucrative partnerships with real estate agencies to collaborate data on local listings in exchange for enriched leads and online behavioral data that would increase marketing and sales strategy efficiency.

The founders Tamer and Fábio, who were both interviewed in the study, found themselves working with massive amounts of Open Data in a project of the network engineering department of the University of Brasília. Both evolved in the academic field but wanted to move to the private sector as entrepreneurs. At this point, they already knew that this business would be in the area of data intelligence and today the company is

currently incubated at Center of Technological Development and Support, known as CDT in the University of Brasília.

Interviewees

Tamer Lima and Fábio Buiati are cofounders of Ubicity and were both interviewed for this research. Tamer has is an I.T. (information and technology) Professional with a solid academic background that focuses mainly in data science area of knowledge. He has worked at at Serpro, the leading public company in the development of Information and Communication Technology solutions for the federal government, and has been a researcher and developer in the UnB (University of Brasília). He has earned a bachelors Degree in Computer Science and a Master's in Electoral, Electronics and Communications. Today he works solely at Ubicity.

Fábio Buiati's academic upbringing began at in the network engineering field, going on the get a Master's Degreee in Electrical Engineering from the University of Brasília (Brazil), doctorates degree in Computer Engineering and a Post-doc in Intelligent Cities. Today he is getting a post-degree in Entrepreneurship and Innovation, while also running Ubicity. Both Tamer and Fábio work actively leading teams, putting forth strategies, as well as participating and managing technical aspects of the business.

3.3.2 SigaLei

SigaLei is a platform designed to achieve a more efficient monitoring of the legislative power and processes, being especially useful for Government Relations professionals. Some of its main features are; centralized search to find and monitor all kinds of propositions (Bills, requirements, PECs, draft resolutions). Mixing OGD with other Open Data (from social media for example) they build the most complete profile of parliament members. Their Interactive maps show different views of legislative data creates a better understanding of the scenario helping government relations professionals to make better decisions. The platform also provides a way for the users to organize all this information in dashboards, allowing them to collaboratively design the tool according to their interests and needs. To keep its users as up to date as possible so the platform includes personalized newsfeed about the latest happening in the legislative branch.

The organization was first born as a citizens' app to help the people follow the legislative process. In July, Danilo, the interviewee, and a friend, both from the computer science field, launched the idea and won an award from the Communications Ministry to develop it. In this process, they discovered that there was a demand for professionals who value this data. A business opportunity was identified and a need for a more in-depth and professional data analyses was required to make it viable. A political science student was added to the team and they began to created several prototypes of the solution guided by feedback from a member of the target audience of the brand. 9 months later their first payable prototype was completed.

Interviewee

Danilo Oliveira is 26 years old and began his superior academic studying Computer Engineering, and Computer Science (as a masters degree) in São Paulo. He started his entrepreneurship at a young age first developing SigaLei as a Citizens App, and mobilizing friends from different field in order to make his technical skills impact the political field through a payable solution.

3.3.3 Data Policy

Data Policy is very similar to SigaLei. The purpose of the organization involves following and monitoring the legislative and executive branches to minimize the risks of organizations to be negatively impacted. The platform promises to indicate the next steps of the legislative power, have a complete profile of political figures, centralize legislative and executive branches information, provide a simplified political agenda and to predict approval of laws. The platform is at its prototype stage and the business model is currently being refined in an acceleration center called "Lemonade" in Brasília, Brazil. Lemonade is a startup pre-acceleration program that aims to transform ideas and technologies into businesses. The program is carried out by Fundep and Fundepar, co-hosted by the Government of Minas Gerais through Simi, Sebrae MG and Techmall - startups accelerator.

Even though this company is still in its early stages the author thought it was still beneficial to maintain the startup in the research because it was determined that they have plenty experience with OGD to give quality feedback. The founder and CEO, Eduardo

Reis has always worked with qualitative data working in the academic field studying history and science politics. He was a researcher at the representatives' chamber when he decided to study data science as a means of speeding up the academic process. Eduardo envisioned a business opportunity when his research began to get a lot of attention and requests.

Interviewee

Eduardo Reis, founder of Data Policy, came from the started in the humans area having a Bachelors Degree in History and Master's in Science Politics, Democracy and Democratization. Later he decided to develop his quantitative skills by studying statistics and Data Science. He first combined Data Science and Politics as a researcher as CEFOR (Centro de Formação, Treinamento e Aperfeiçoamento or Center of formation, Training and Perfecting) of the Chamber of Representatives, where he decided to study data science as a means of speeding up the academic process. As his work received greater and greater attention he began to realize the business opportunity involved.

4 Results and Discussions

4.1 Ecosystem

The results of this study relates the concepts originated from secondary sources with observations and qualitative data extracted from the primary sources (case studies). As said, all three startups can be considered "Open Data Pure Breads", being disruptive Business Model that could not exist without OGD, (GURIN, 2014). Being more specific, they can also be seen as *enablers* (MAGALHAES; ROSEIRA; MANLEY, 2014) delivering personalization to the user, by providing custom-fitted solutions that incorporate OGD from multiple sources and with personal data. The startups studied develop products or services that combine data from different sources, including public sources. Some examples identified of the sources in the cases were, social networks of users and government officials, data bases from the house of representatives, data involving governments' investments in different areas of country, data involving security of regions and geographical data of cities. Another strategy used by the

enablers is to or creatively link OGD with other types of data such as user data (e.g. location, medical records), crowdsourced data, or thirdparty data, this was seen when SigaLei, Data Policy and Ubicity adapts the solutions according to the specific wants and needs of client and in users of platforms which are extracted through online questionnaires/conversations and research based mostly on qualitative data.

Using the criterion set by Davies (2010) the main process identified as a crucial part of the value proposal of the startups was the *Data to Interface*. Data to Interface creates means to interactively access and explore one or more datasets, providing information customized to the users input. This was presented in the forms of free services, free trial and paid format by the startups. Interactive maps and platforms were used to add value to the data and make it more visual and useful, allowing a wider range of people and professionals to thoroughly comprehend and act upon the information. The process, *data to service* also showed to be important to the startups being identified in all cases when products were described as a kind of personalized consulting project drawn to directly affect an organization's online and offline strategies. It was observed that in the cases studied, the main solution's processes lead to support decision making processes, having the ultimate goal actively influence an organizations' strategies.

Identifying where the startups stood in the specific frameworks of the Open Government Data Ecosystem (HARISSON et al., 2012 and NAJAFABADI, 2017) studied in the theoretical review helped reach important insights and show real practical examples of the concepts stated. It was determined that the startups are closest to the Innovator category (see figure 2) in Harrison's et al (2012) interpretation of the Ecosystem. Which suggests that they are all from the technology segment of the economy, making new business and technology platforms, that contribute to the evolution of information technology (HARISSON et al, 2012). Not only does this group proportion data-driven innovation through interactions that align interests and expectations with society, they also play an important role in showing society the potential value in Open Data and enable this value to be explored. This influences the expectations citizens have of government, while also providing government with further insight on how technology and data can de combined to fuel good governance.

The interactions with society (users, citizens and government) consists of aligning interests and expectations through practices like market testing (HARISSON, 2012). The organization Data Policy for example as part of its product development and validation

stage in the acceleration program applied over 30 interviews and 224 surveys to help them design the best solution and business model. SigaLei performed a 9 months prototyping stage in order to create their first product, this approach involved working closely with one representative of their target group until this person saw economic value in their solution. These are some of the strategies identified to help these startups capture the interests and expectations of society.

"However, all of these transactions are two-way in that government itself benefits from ideas and feedback about their own processes received through transactions with innovators and citizens" (HARISSON, 2012, p. 908). How does government benefit from the interactions of these organizations with citizens and society? All of the organizations showed some kind of commitment to educate society about Big Data (Ubicity's focus), technology and politics and government (SigaLei's focus). Concrete examples of this can be found in content form in SigaLei's and Ubicity's blogs. In the case of SigaLei some of the themes identified in content production were; State structure and government decision, digital government and political news; while in Ubicity's blog focused on Big Data, technology and Smart Cities. Since Data Policy is at its early stages it was harder for the author to have concrete examples of the companies contribution, however during interview they showed great concern for the worldwide decrease in political awareness and the founder has worked in academic projects that tackles these issues. In general, it was possible to observe from the data collected that these OGD startups want to meet citizen and consumer expectations but also aim to influence their relationship with government. To illustrate some of these findings the author placed important observations related to the concepts in the Ecosystem framework (see figure below).
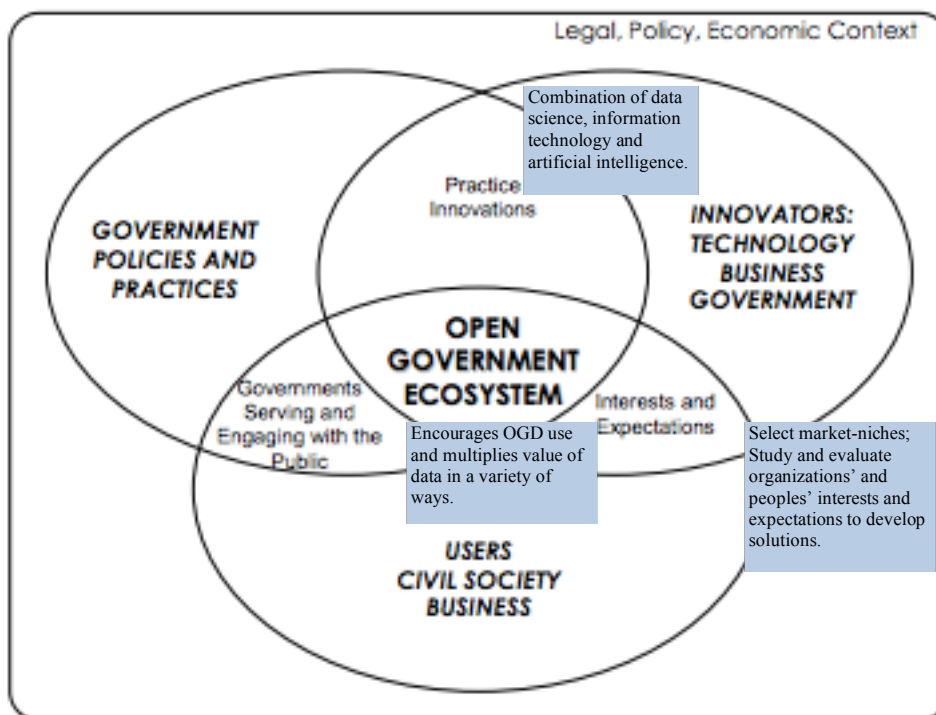
Figure 12 – Relating Ecosystem and cases
Source: Harisson, 2012 p. 909 and edited by author

Based on the *Open Government Data Ecosystem: a closed-loop* (NAJAFABADI, 2017), it was identified by the author that the case studies observed fall in the Developers Segment of the framework (*see figure 13*). Some of the feedback processes observed were; increase development capacity; increase demand for App development; Increases productivity of creating Apps. Clear examples of these feedback processes were seen throughout the research.

The startups all preferred to hire young professionals and students, due to cost and faster ability to learn data science methods. It was also seen that they propose to create learning experience to the collaborators and stimulate them to make innovative solutions. Furthermore, it was also observed that they have close relationships with universities setting partnerships that also contribute to the educating developers in this field. All of these factors influence the demand for more developers and the app development capacity. It was also interesting to see how these organizations joined professionals from different fields, such as political science and I.T. professionals to develop their business models.

Having a high dependency in data it was obvious that the more data there is the better. However, the level to which the barriers specifically with OGD negatively impacted the organizations surprised the author. This gave the founders good insights as to how these problems can be tackled (for they deal with them every day) and suggests that there is a high chance for them to be involved and participate in solutions to these problems through partnerships and projects. This could be an interesting finding to further investigate for academic reasons and in strategic planning in OGD ecosystem. These aspects connect the developers to governments as seen in figure below, where quality of data increases productivity of app creation.

Connecting society to the developers segment the startups showed to have solutions that intend to deliver value to society, this will be further described in the next segment of the paper. Also, the startups greatly benefit from the increase in society's interest and trust OGD, and actions have been done to try to improve this scenario. The ideas of the startups originated from either social (non-profit) projects or academic research, which usually had a societal objective. Business opportunities were identified in these contexts and more complex solutions were developed, through selecting and studying a market niche. Still, public value remained a key pillar of the organization. In the image below the author summarized the main findings of the study cases related to the closed loop Ecosystem framework.
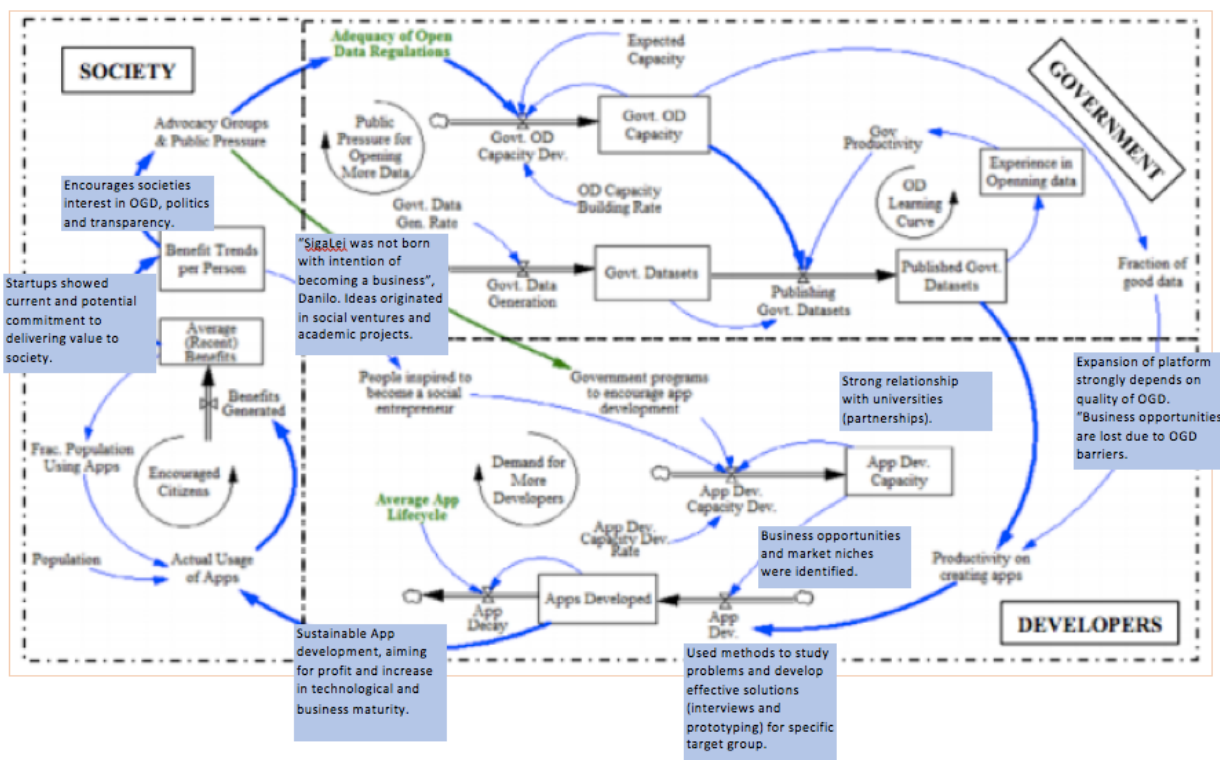
Figure 13 – Relating Ecosystem closed loop and cases
Source: Najafabadi, 2017 p. 2716 and edited by author

To systemize and further understand where these startups lie in the OGD ecosystem the author constructed the following chart comparing theories of OGD to the findings observed during the case studies.

Theory	Relating theory to case studies (classification/processes identifies)	Observations Research
Motivations of OGD (DAVIES, 2010). *See figure 1*	Social/public enterprise focus; Technology innovation; Problem solving and Reward	While observing the value creation process in OGD signs of these motivations were observed throughout founders discourses.
Processes of OGD (DAVIES, 2010).	Data to data Data to fact Data to information	All of these processes were identified business models

See page 18	Data to Interface Data to service	studied as important to their value delivery.
Open Government Data Ecosystem (HARISSON et al, 2012) See figure 2	Classified in the innovators group	In these cases, data, information, and technology are transformed into innovative products.
Open Government Data Ecosystems, a closed-loop perspective (NAJAFABADI, 2017) See figure 3	Classified in Developers Group	The following feedback processes were identified in Case Studies; Increases in Development Capacity in their contexts; Increase demand for App development; Create productivity related Apps.

Table 1 – Relationship between OGD Theories and Case Studies
Source: Self-Elaborated

4.2 Value

Real examples of value delivery through the innovation and participation mechanisms from Jetsek's (2017) strategic framework (see page 22) where observed. An interesting way to observe this value delivery is by looking at the mission statement or overall purpose of the organizations. Ubicity's mission is to find innovative solutions from data that improves people's quality of urban life. Clearly demonstrating the innovation mechanism. They propose to add value to data by making it useful for effective decision making. Meanwhile, SigaLei and Data Policy mixed two mechanisms; innovation and participation; to increase an organizations representation in government and to make more aware of decisions with the help of the platform. Their mission statements were; Help society follow and influence the legislative process and participate in the construction of public policies (SigaLei); and Minimize the risk of organizations being adversely affected by government decisions (executive and legislative). These purposes were then broken down to analyze the multi-stakeholder value delivery.

All three startups showed commitment to delivering value to multiple stakeholders including **society** as a whole, presenting current efforts and having long-term plans to deliver value to society while still gaining profit. Some examples of values mapped directed to society (stakeholder group) mentioned by the entrepreneurs included; creating a more accessible simplified, attractive and useful platform for citizens in general (complex project because it is hard to identify what are the general needs of society and political interest is a challenge); improvement of quality of urban life providing through valuable information about urban environments; educating and opening people's mind with respect to political engagement, technology and digital government.

Michael Porter reflects on the effects of the phenomenon of for-profit businesses tackling social problems in TedTalk global in 2015. He states that a fundamental problem we have in dealing with these social problems is the problem of scale, caused by the scarcity of resources.

> "There's simply not enough money to deal with any of these problems at scale using the current model. There's not enough tax revenue, there's not enough philanthropic donations, to deal with these problems the way we're dealing with them now. We've got to confront that reality. And the scarcity of resources for dealing with these problems is only growing, certainly in the advanced world today. So it's fundamentally a resource problem" (PORTER, 2013)

He further states that businesses are how most of our resources are created, through the creation of wealth when an offer meets need (or demand). Wealth is an important resource all institutions need and can be used to do important work, "but only businesses can create it" (PORTER, 2013), making their solution self-sustaining and scalable. It was clear to the author that in software startups scalability is an important goal and one of the most efficient formats to achieve this goal. "Scalability" at its core has a connection with the performance of systems from technical viewpoint (MESASCE, 2000).

In this perspective, in the OGD ecosystem governments have the potential to provide an essential resource for these startups to make scalable solutions related to social value. This observation was discussed with Laura Manley, Digital Entrepreneurship and Open Data Consultant. From her experience, the the majority of economic growth through OGD lies in the use of open government data to potentialize existing solutions and not in startups that grew from this data. However, an important contribution of this study is to

open up doors for further investigation of how these OGD private sector startups are delivering social value.

Analyzing the value proposition towards partners and investors revealed the startups' close relationship with universities. In addition to all the founders having significantly advanced in their respective academic fields the startups had partnerships and projects with universities, for example; Ubicity is incubated in the Center of technology in capital's federal university, hiring and educating students about data science and participating several events focused on innovation; SigaLei has opened their platform to students from a university in São Paulo for them to objectively and practically learn about the legislative processes. It was interesting to observe an opportunity for value creation towards partners to occure during one of the interviews which demonstrated the effectiveness of the tool for business brainstorming.

Another important partner found in the Data Policy value mapping tool was the startup accelerator responsible for the pre-acceleration program. The program gives startups useful knowledge to better formulate their solution, while continuously questioning them about potential "value destroyed", or if business model would deliver any negative consequences to society. This caught the author's attention for it showed in a way, that the program does evaluate and prioritize the idea of sustainable value. In none of the interviews government or government institutions were named as current or potential partners or even as a significant stakeholder group, which might indicate neutrality these startups want to maintain (especially in the case of Data Policy and SigaLei) neutrality; for bureaucratic reasons, etc. This might also signal a need for governments and startups to strengthen their relationships, through partnerships, projects etc. Nonetheless, this finding is also a crucial investigation point that should be further explored.

The value delivered to consumers greatly involved, in the broadest way possible, empowerment of the decision-making process, especially those related to governmental relationship (SigaLei and Data Policy) and market related decisions (UbiCity), ultimately giving organizations competitive advantage (minimizing risk). In this section, the values involved prediction models to help make more effective decisions, which is seen as an advanced stage in the data science maturity model. These prediction models had two main purposes in the startups analyzed, increase representation of organizations in government and to serve a tool for strategic business decisions.

In the case of Data Policy and SigaLei it was interesting to see that their target consumer groups include organizations from private (businesses) and public sectors (unions, associations, non-governmental organizations), they're target is mainly larger organizations which currently have the most interest in government decisions. "The political interest in small organizations and civilians is very low, that's why it's hard to create a sustainable product for this market" (quote from interview with Eduardo Reis, founder of Data Policy). However, both platforms have or intend to make a simplified and more accessible version for the general population (this was discussed in the society stakeholder group).

Ubicity, on the other hand, chose a specific market niche to begin the commercialization of Open Data (targeted real-estate agencies). To make the product financially viable and sustainable, Ubicity combined public data with profiles and in exchange used this data to qualify leads and to link important information for real estate agencies. Showing people the best region for them to live, while giving real estate agencies valuable information to help they're potential clients find their perfect home. Many of the value missed factors discussed had close relationship with the barriers of open government data.

It was interesting to the author how these startups used different strategies for OGD to become valuable to people, and meet a need. Daniel, founder of SigaLei in his interview states that "one of the challenges of OGD dissemination is the low interest rates in governance, politics and citizenship". "Through a solution that has to meet a consumers specific needs, we introduce people to data in a way that they won't stop wanting this information" (quote from Daniel, SigaLei).

The value destroyed or missed value greatly involved the barriers of OGD. Tamer from Ubicity explains how "unreliable data can lead to a greater risk of making wrong decisions" (Tamer). All of the examples used to show the lack of value delivery originated from government sources, not once mentioning difficulties of data coming from other organizations and institutions. Tamer said "much time is lost in collecting unreliable data and since it is governments duty to make this data available there should better channel for us to collect this data". Furthermore, in the perspective of the founders interviewed, much opportunity to deliver more value to their stakeholders is missed due to poor data quality.

4.3 External Environment

The PEST tool revealed that very similar external factors affect these startups and the value delivery in the perspective of its founders. Some of the risks and opportunities identified during PEST analysis are as follows.

The political factors concentrated mainly on two themes; open government policies and regulations and internet civil rights and regulations. In open government policies and regulations, the interviewees described some challenges they faced in accessing public information, in which they encountered situations where data was masked or not provided to them even with regulations in place, especially for political reasons. "Its like they are scared of publishing some data" (Fábio, founder of Ubicity), for some data might harm the current government or government official. All of them, in a way or another expressed the need for government to expand regulations to other levels, requiring local and state governments to adopt open government habits. The entrepreneurs showed that they followed OGD bills, have evaluated the National Open Government Data Plan (Plano Nacional de Dados Abertos) and recognize the importance of the Right to Information Law (Lei de Acesso à Informação). Factors regarding to the the neutrality of the internet laws and general internet rights were also discussed as important for their business models to prosper.

When discussing the economic environment, the discourses showed greater variety. Some of the factors mentioned were appetite of Venture Capital Investors, cost of labor in Brazil and international competitors. The economic crisis would affect them greatly for it was said that in difficult times their resource would be one of the first ones to be cut from organizations' budget.

In the technological section of the tool the interviewed went back to having similar responses. Here, they mentioned that one factor that greatly affected their organization was the lack of technological capacity and resources seen in some government institutions to adopt OGD principles (especially in local governments). Data Policy saw as an opportunity the "increase of harmonization between computer science and science politics in general through the use of technology, meaning the valuation of technology in all three powers" (quote from interview with Eduardo). Artificial Intelligence was another common factor between the startups being viewed as an opportunity to accelerate their analyses models, expand their reach, and multiply value of data.

The Social Factors the entrepreneurs identified as important to them broadly involved society's relationship with government. Factors mentioned as risks included increase in lack of political interest (SigaLei and Data Policy) and decrease in trust in government and its data (all three). The engagement and participation of civil society in governance and a more conscientious society is important for this group. "The more society is organized and aware, but it will demand a solution like ours" (quote from interview with Daniel founder of SigaLei).

Political Factors	Economic Factors
- Lei de Acesso á Informação or Public Access to Information Law - Plano Nacional de Dados Abertos (National Open Government Data Plan) - Bill regarding OGD - Lack of OGD public policies in other levels of Government - Institutions not following OGD regulations	- Decrease of Venture Capital appetite to invest - Increase in competitiveness of Market
Technological Factors	**Social Factors**
- Lack of technological capacity and resources necessary to apply OGB principles in all levels of government. - Increase of harmonization between computer science and science politics	- Increase in lack of political interest by society - Risk of decrease in trust in government

Table 2 – PEST Analysis
Source: Self-elaboration

In general, from looking at the overall boards of this tools it was noted that most external factors involve governmental decisions and citizens' relationship with government. The author perceived this as a potential for this type of organization to be great advocates and motivators for the open government movement.

4.3 Relationship to OGD

The OGD4B tool was used in this context to analyze more specific points of the relationship between the OGD and the startups in the perception of the founders.

Throughout the interview it was clear that the quality of OGD directly impacted their value delivery and overall survival of their business model. For this reason, this was an interesting profile to retrieve feedback and opinions about the situation of OGD in their

contexts. The interviewed recognized that Brazil has been making great efforts to be more transparent and that the country has made great advancements in recent years. However, they were far from being satisfied with the overall service of OGD databases.

One startup brought up the vision that the users of OGD, especially those in the private sector should be treated more like "clients", for "we are the ones that will multiply economic and social value" (Daniel SigaLei). As mentioned, long term solutions for these platforms have a tendency of involving more members of society and deliver more social value along with economic value.

Expansion of the utility and access of the platform depended on increases in quality of Data. Retrieving the data was also said to be very time consuming and require a lot of resources. Even with some obstacles there was a shared view that technical capabilities were not a limitation for the organizations studied. The founders showed to have great confidence in the resources they had and the quality and specialization of their team.

It was concluded that periodicity of the of the different types of data is crucial for government to analyze when planning their OGD strategies, for it is more important for some data to be updated for frequently than others. The format in which data is provided was a shared difficulty of all the participants, making it necessary for them to develop specific algorithms to make the data machine processable. One interesting comment, was that even data published in PDF formats differ from each other, demanding different codes to read each one.

In general all startups showed the desire for the OGD in Brazil to follow the OGB principles more rigorously and expand to other spheres of government, especially at the municipal level. "As we start investigating other levels of government, further from the executive branch, the quality of data tends to decrease. During Ubicitys' interview it was discussed how government focuses too much on transparency and not enough on efficiency. "The government is focusing too much on identifying the problem not enough on data the is purposed towards a solution or efficiency – how to really improve society" (Quote from interview with Tamer, Ubicity). This could be a reflection of how OGD is mainly prioritizes financial figures towards fighting corruption over other data such as demographic and security (PROJETO DEMOCRACIA DIGITAL, 2015, see figures 6 and 7).

5 CONCLUSIONS

In this research a combination of theoretical concepts and practical tools were used to further comprehend how OGD is used by private sector startups to impact society. "Open Data Pure Plays" (GURIN, 2014, p. 16), were an interesting group to evaluate this relationship, for the high dependency in Open Data of these organizations lead its founders to be very aware of the OGD movement, giving valuable feedback about the conditions of public data in the country.

Throughout the study it is possible to visualize the role that these business models play in the OGD Ecosystem, comparing theories and concepts to real observations of these interactions and their impact. The external factors, risks and opportunities envisioned by the entrepreneurs were very similar and mainly involved OGB policies, societies relationship and trust in government, data science advancements and harmonization of technology and government. It was concluded by the author this group is very aware of the OGD ecosystem and show great potential to become disseminators and advocates of the movement.

At the same time, the analyses of the value generation of the organizations showed they are committed to delivering sustainable value, being aware of multiple stakeholder groups. With this they multiply social and economic value through the use of OGD with scalable and sustainable solutions. All this potential to unlock sustainable value shocked with the fact that in general governments were not seen as very important stakeholders by the entrepreneurs, showing the need for this specific relationship tobe further explored. An interesting approach would also be in analyzing if governments view private sector startups as important stakeholders to consider in OGD strategies.

The organizations studied recognized Brazil's advancements in recent years but also shared many critiques and barriers. These barriers greatly affected the value delivery of the organization. While very interesting findings were discovered along the research an important limitation was the lack of profoundness in each item discussed. Therefore, as recommendation for future research the author pointed out some important themes that with further investigation could will greatly benefit the OGD movement. Some suggestions are as follows;

- Broaden the quantitative data of the research involving more startups
- Review action plans to minimize external risks and maximize opportunities in PEST Analysis and analyze performance.

- Explore motivations for entrepreneurs to enter OGD field in private sector.
- Apply these methodologies (Value Mapping Tool and PEST) to the supply side of OGD, to see where they meet and differ.
- Evaluate current feedback process between government and enablers of OGD.

In conclusion, the author hopes not only that the present study contributes to the comprehension of the potential private sector startups have in contributing to the evolution of the OGD ecosystem, but also that it unlocks other trails of investigation.

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7 APPENDEXES

Appendix A – Roteiro de Entrevista

Entrevista terá 3 fases:
1. Introdução
2. Mapeamento de valores
3. Análise do ambiente externo
4. Ecossistema de Dados Abertos do Governo

Entregar material das dinâmicas.

Nome da organização?

Qual o setor da empresa?

Quantos funcionários pertencem à organização?

Como a empresa surgiu?

VALUE MAPPING TOOL

Descrever objetivo da dinâmica. Entregar papel com a ferramenta.

- Compreender os aspectos positivos e negativos da proposição, entrega e recepção de valor associado à prestação de um produto / serviço;
- Identificar valores conflitantes;
- Identificar oportunidades.

Descreva o propósito da empresa em uma ou duas sentenças? Porque a organização existe?

Qual a (s) principal (s) razão (s) para a existência da sua empresa?

Propósito é mais do que apenas ganhar dinheiro, embora isso possa certamente ser visto como um

Definição (Freeman, 1984) "stakeholder são todos aqueles grupos e indivíduos que podem afetar ou são afetados pela realização pela organização".

Quais organizações ou indivíduos têm influência ou envolvimento nas operações de sua empresa, ou
São influenciados / afetados de alguma forma pelas suas operações comerciais?

Olhando para esses segmentos nomeie 4 principais stakeholder

Que valor tangível e intangível positivo é criado para cada um de seus stakeholders? Por exemplo, Por que seu cliente compra os produtos e serviços oferecidos?

A rede de negócios mitiga ou neutraliza total ou parcialmente alguns resultados negativos (como emissões de carbono)? Não confundir meios de entrega de valor com os valores em si.

Destas propostas de valor, quais dependem de OGD? Quais são os resultados negativos do negócio para qualquer um de seus interessados? Considere por exemplo, os impactos ambientais como a poluição ou a perda de emprego local Offshoring ou terceirização global.

Existe um risco potencial ou percebido de que o valor seja destruído pela continuidade do "negócio como de costume"
Por exemplo, risco de danos à reputação, perda de clientes, rentabilidade e Participação, risco de litígio e mudanças regulatórias.

A empresa está perdendo alguma oportunidade de capturar valor, ou está desperdiçando valor em suas atuais operações? Por exemplo, os clientes não estão recebendo o que realmente querem? Capacidade e os recursos estão subutilizados?

Que novo valor positivo a rede pode criar para os seus *stakeholders* através da introdução de novos capacidades, atividades e relacionamentos? (Incluir os resultados propostos e, se relevante, mecanismos
Para alcançar estes).

PEST ANALYSIS

Ferramenta que analisa ambiente externo a organização, avaliando atuais e potenciais ameaças e oportunidades.

Assume que circunstâncias específicas externas e indiretas caracterizam o ambiente de negócios são capazes de influenciar entregar valor.

Fatores externos relevantes e considerados no processo de tomada de decisão. (WARD; RIVANI, 2005).

Quem são seus concorrentes e qual seu diferencial em comparação a eles.

Fatores Políticos

Quais comportamentos políticos e atitudes governamentais afetam ou ameaçam a afetar a organização?

Exemplos: Políticas públicas, leis relacionado ao segmento, impostos, instabilidade política, etc.

Fatores Econômicos

Quais fatores econômicos impactam a organização?

Exemplos: Indicadores econômicos, ciclos organizacionais, desemprego, disponibilidade de recursos, estrutura de mercado.

Fatores Socioculturais

Quais fatores sociais e culturais que impactam a organização?

Exemplos: Dados demográficos, distribuição de renda, educação, comportamento dos consumidores, etc.

Fatores Tecnológico

Quais fatores tecnológicos impactam a organização

Exemplos: Capacidade tecnológica do país, acessibilidade dos dados necessários, fornecedores.

OGD4B Tool

Quais são as principais dificuldades da organização?

Quais são as barreiras atuais ou potenciais ao acesso e ao uso de dados? (Pergunte sobre observações sobre políticas públicas, capacidade dos recursos e barreiras tecnológicas).

De onde vêm esses dados? (Detalhes das peças: dados, regionais, municipais, ministérios e / ou conjuntos de dados específicos?)

Como você acessa esses dados? (Explicar processo)

Que tipo de capacidade técnica você tem para coletar, gerenciar e analisar dados?

Se a capacidade técnica é uma limitação, que tipos de recursos, assistência técnica ou outra ajuda seria necessário para melhorá-la?

Além dos dados que você tem atualmente, quais são os outros tipos de dados e conjuntos de dados mais importantes que você deseja ter?

Como esses dados podem melhorar ou beneficiar sua empresa?

Que tipos de soluções governamentais, comerciais ou de terceiros você gostaria de ver para ajudar a superar barreiras? Quais são as oportunidades imediatas?
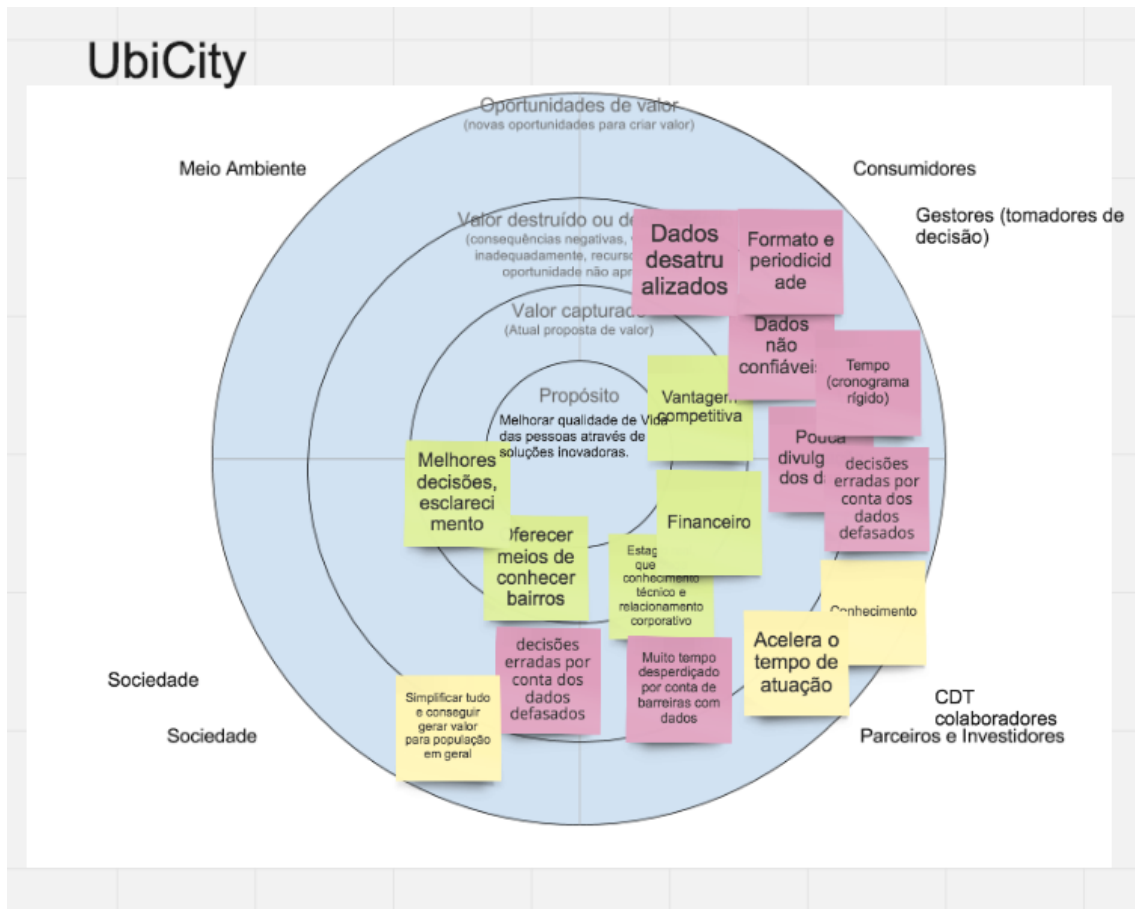
Quais são as soluções a longo prazo?

O que é necessário para realizar estes? (* Procure potenciais campeões que estejam dispostos a fazer parceria com o governo para testar a integração do setor privado)
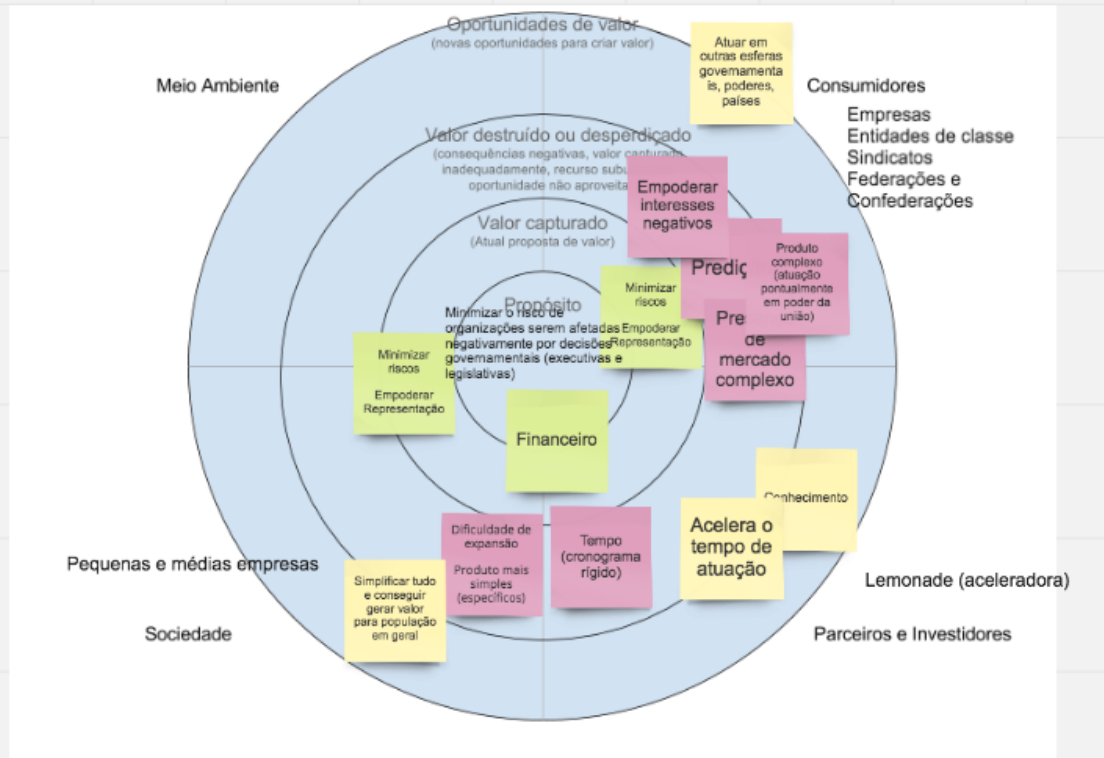
Quais são os canais de comunicação ideal para você com o governo?

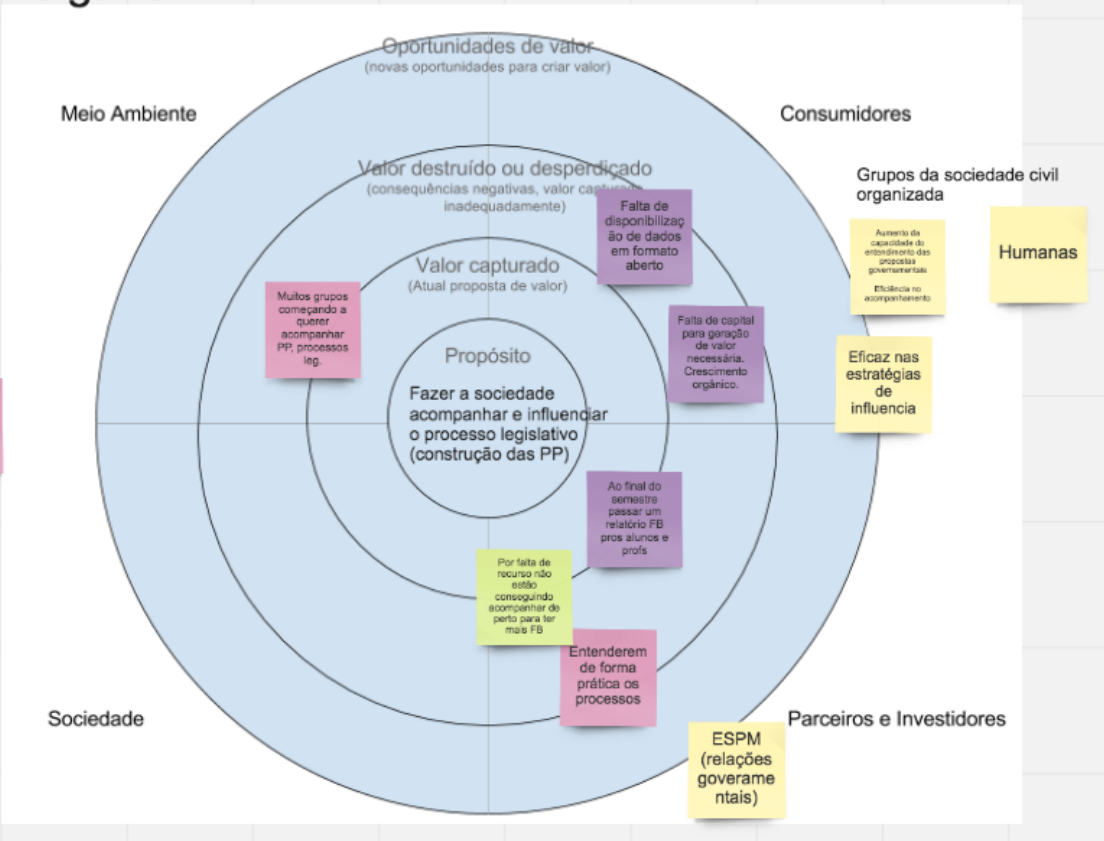Qual é a melhor maneira para o governo disseminar informações sobre seus dados?

Appendix B – VALUE MAPPING TOOL Diagram

Data Policy

Oportunidades de valor
(novas oportunidades para criar valor)

Valor destruído ou desperdiçado
(consequências negativas, valor capturado inadequadamente, recurso sub... oportunidade não aproveit...)

Valor capturado
(Atual proposta de valor)

Propósito
Minimizar o risco de organizações serem afetadas negativamente por decisões governamentais (executivas e legislativas)

Meio Ambiente

Consumidores
Empresas
Entidades de classe
Sindicatos
Federações e Confederações

Pequenas e médias empresas

Sociedade

Lemonade (aceleradora)

Parceiros e Investidores

Atuar em outras esferas governamentais, poderes, países

Empoderar interesses negativos

Prediç

Pre de mercado complexo

Produto complexo (atuação pontualmente em poder da união)

Minimizar riscos

Empoderar Representação

Minimizar riscos

Empoderar Representação

Financeiro

Conhecimento

Acelera o tempo de atuação

Dificuldade de expansão

Produto mais simples (específicos)

Tempo (cronograma rígido)

Simplificar tudo e conseguir gerar valor para população em geral

SigaLei

Oportunidades de valor
(novas oportunidades para criar valor)

Valor destruído ou desperdiçado
(consequências negativas, valor capturado inadequadamente)

Valor capturado
(Atual proposta de valor)

Propósito
Fazer a sociedade acompanhar e influenciar o processo legislativo (construção das PP)

Meio Ambiente

Consumidores

Grupos da sociedade civil organizada

Sociedade

Parceiros e Investidores

Falta de disponibilização de dados em formato aberto

Muitos grupos começando a querer acompanhar PP, processos leg.

Falta de capital para geração de valor necessária. Crescimento orgânico.

Aumento da capacidade do entendimento das propostas governamentais

Eficiência no acompanhamento

Humanas

Eficaz nas estratégias de influencia

Ao final do semestre passar um relatório FB pros alunos e profs

Por falta de recurso não estão conseguindo acompanhar de perto para ter mais FB

Entenderem de forma prática os processos

ESPM (relações governamentais)

Appendix C –PEST ANÁLISES Diagram