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OPEN GOVERNMENT DATA, CORRUPTION AND CITIZEN CONTROL: A CASE STUDY IN THE STATE OF PARANÁ, BRAZIL

Master's Thesis

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Tallinn 2020

TALLINNA TEHNIKAÜLIKOOL
Infotehnoloogia teaduskond

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VALITSUSE AVALIKUD ANDMED, KORRUPTSIOON JA KODANIKUKONTROLL: JUHTUMIANALÜÜS PARANÁ OSARIIGIS BRASIILIAS

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Doktorant

Tallinn 2020

Author's declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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07.05.2020

Abstract

Brazilian initiatives for open government data, e-governance, public transparency and the efforts to fight corruption in public procurement processes by enhancing the controls over the public administration seem not to be directly connected among each other. This master thesis traces a line connecting these aspects in a discussion to understand their connection and the citizen function and awareness in this process. To develop this research, an exploratory case study was conducted in the State of Paraná, Brazil aiming to understand the OGD initiatives as well as the legal framework of the public administration, its procurement processes together with the use of the transparency portal. Along with it further research of corruption to understand the citizen position as a controlling mechanism and how this could be further was developed. The main findings of this research showed that the government have a robust framework of internal and external control mechanisms and have implemented ICT tools, as well as open government data, is available along with a well-developed transparency portal. Even though transparency tools are available for the citizen, the research showed that their use and awareness are still not fully optimised to position them as a key element in the control of the public administration. In the final part, a discussion regarding the findings in the case study and the author comments are presented along with suggestions for future studies.

This thesis is written in English and is 70 pages long, including 6 chapters, 7 figures and 10 tables.

List of abbreviations and terms

DPI	*Dots per inch*
TUT	Tallinn University of Technology
OECD	Organisation for Economic Co-operation and Development
ICT	Information and communications technology
OGD	Open Government Data

Table of contents

List of figures

List of tables

1 Introduction

The correct use of public budget represents one of the many demands that modern society has towards the government. Every year a significant portion of the state budget is spent using procurement processes (Organisation for Economic Co-operation and Development - OECD, 2020).

Public procurement is one of the largest markets in developed countries. It is the way that the public administration has to acquire the materials and services needed to perform its activities and provide for its citizens. (Schøll & Ubaydi, 2017). The public procurement process is backed by a complex set of laws and regulations and the public administration knowing the importance and the resources it uses is constantly trying to make it more efficient and less vulnerable for corruption and frauds.

In Brazil, the same movement towards enhancing the public procurement process is happening. Even though improvements were made in the last years, there is still a lot to be done in Brazil. (Adriano, 2013). Corruption, frauds and schemes against the public administration procurement processes still happen in the country, and even with the open government data - OGD efforts and the implementation of transparency portals, these problems persist through all the levels of the country public administration.

Every day the Brazilian public administration held procurement processes to provide its citizens and entities with goods and services to keep the state working and the citizen's demands covered. (Adriano, 2013) All these processes generate data and information that most of the time are not fully used or processed the civil society, even with the country's increasing efforts to enhance OGD availability in recent years. (Pereira, 2012) On average, the information regarding the procurement processes ends up been published only to fulfil legal purposes. (Rodrigues, 2019)

A lack of analysis in procurement data enables disruptions to occur in the price and quantities of products requested without been noticed by the regulators or civil society.

When it comes to the possible uses of the public procurement data, not only prices disruptions might be detected by the authorities and citizens but as well as populational patterns. (Rodrigues, 2019). As most of the agencies in the public administration made their acquisitions using online procurement processes when analysing the data of all of them together, it can be possible to cross-check and detect patterns in the purchases of a region or population group.

The electronic procurement (e-procurement), use of technologies and the internet in procurement processes, (Davila, Gupta, & Palmer, 2003) enabled the public administration to have access to data in a scale and speed not available before. (Gascó, Cucciniello, & Nase, 2018). E-procurement, combined with OGD enables both government and citizen to use the data generated in the processes for multiple purposes. (Davila, Gupta, & Palmer, 2003). Brazil has initiatives to enhance its OGD levels such as the transparency portals. (Silva, 2010). The transparency portals are available in all states of the country, and it is used to publish data, including the ones concerning procurement and processes.

This study focus on the State of Paraná transparency portal. The selection of only one state was made because OGD laws and guidelines set by the federal government are followed and replicated by all the states in their local laws meaning that all the states follow the same guidelines regarding their transparency portals. The two main problems that this thesis aims to answer is: What is the current situation regarding OGD on the state of Paraná?, and how can OGD be used by citizens to decrease corruption in the State of Paraná procurement process? The expected outcome is to provide an overview of the transparency portal, citizen awareness of it and possible uses for the data generated to prevent corruption skins against the public administration by enhancing the citizen control mechanisms.

2 Framework

2.1 E-Governance

Thanks to the development of new technologies, it is possible to bring the government into a modern digital framework that is useful in the process of fighting corruption, increasing efficiency, transparency as well other things that in general lead to better and more efficient public administration. (Moon, 2002). These technologies enabled the government to gain similar advantages to the ones the private sector experience with its digitalisation.

New tools and methods of doing public administration are available for governments. These new methods and technologies can improve immensely the transparency, efficiency and trust in the government as well form a framework against corruption and crimes involving the public administration. (Adriano, 2013). These can be applied to all levels of the government.

Information and Communications Technology - ICT enhance the information exchange between the government and citizens, across all institutions in the government where they are implemented. It has the potential to increase transparency, accountability and citizen participation. (Chêne, 2014) (Adam & Fazekas, 2018). The main impact of ICT in lowering corruption is mainly in the reduction of discrepancies, automation and limitation of human interaction and intermediaries. (Grönlund, et al., 2010).

This process of taking the government processes, services, and systems into the digital world is also known as digital government. The success of e-Governance is the integration of all activities of the public sector, from intranets to the internet. (Ntiro, 2000). E-Governance is an improvement of the public administration; its goals include cutting costs improving the input and output ratio by decreasing the financial or and time costs. (Heeks, 2002)

E-government initiatives can are categorisable as internal, which are government to government (G2G) and government to the employee (G2E), or external, which are government to business (G2B) and government to citizen (G2C). (Iqbal & Seo, 2008). By proving an alternate to a departmental channel and the direct person to person interaction,

e-governance introduces competition, which improves service levels lowering corruption. (Iqbal & Seo, 2008). Web publishing of Government information builds accountability by providing documentation to citizens to substantiate their complaints against corrupt practices (Bhatnagar, 2003, p. 1).

The management of processes performance is another possibility when implementing e-Governance solutions; this management includes planning, controlling, and monitoring the performance of resources used in the process. (Heeks, 2002). New connections in government structure and creating empowerment to different authorities are two other possibilities enabled by e-Governance. While the use of ICT by government entities is increasing, the hope for impacts extends well beyond the boundaries of government itself. (Heeks, 2002).

The application of ICT in government often aims to improve efficiency and effectiveness in the public sector and increase transparency and accountability of informational and transactional exchanges within the government. To develop such innovations in e-Governance, the government needs to assume a posture of technology maker. Some solutions and needs of the state will not be achieved purely by buying solutions that already exist in the market. (Karo & Kattel, 2019).

The complexity of public administration and the uniqueness of each country and its relationship with their citizens generates a need for specific and unique ICT solutions fitted for each country and entities individually. (Heeks, 2002). By having the government playing a vital role in the development of new ICT solutions, an adequate solution will be for its necessities as the government environment and the citizen itself will act as an essential agent during the development and implementation process. (Karo & Kattel, 2019)

The use of information technology alone does not have the power to change the organisational reality that sometimes immersed in bureaucratic procedures that are inefficient in many aspects. (Karo & Kattel, 2019). However, the use of an electronic environment appropriate for the activity, as well as the qualification of the agents involved in the processes and procedures to computerised, can be essential tools to increase efficiency and reduce waste of materials and working hours of those involved.

2.2 Procurement and E-Procurement

Online procurement (e-procurement) describes one of the most critical elements for modern business operational excellence for large organisations. (Barua, Konana, Whinston, & Yin, 2001). An e-procurement technology comprehends any technology designed to facilitate the acquisition process of products or services by a private or public organisation over the internet. (Davila, Gupta, & Palmer, 2003)

E-procurement technologies "including e-procurement software, B2B (business-to-business) auctions, B2B market exchanges, and purchasing consortia" (Davila, Gupta, & Palmer, 2003, p. 13) focus on enhancing the performance and efficiency of workflows, giving it more speed and open opportunities for new sources to provide the services and products in better terms for the organisation. (Davila, Gupta, & Palmer, 2003)

About the usage of e-procurement in the public sector (Gascó, Cucciniello, & Nase, 2018) investigated the main factors that influence the adoption and diffusion e-procurement systems. The authors concluded that internal factors such as organisational culture, lack of understanding of e-procurement projects and complicated government arrangements could be negative factors for the implementation of e-procurement systems. According to the authors "(…), the political commitment and support are key" (Gascó, Cucciniello, & Nase, 2018, p. 2343) for the success of the e-procurement projects, showing that both inner and outside aspects are critical for the success of an e-procurement implementation.

Examining the performance of e-procurement system compared to regular procurements (Kovalchuk, Kenny, & Snyder, 2019) found a "(…), strong evidence of reduced time to procure goods and services." (Fernandes & Oliveira, 2015, p. 274) In a study comparing the electronic procurement system with the conventional system in Brazil, the authors described significant advantages in the economics and efficiency aspects for the electronic procurement bidding system over the traditional one.

To exemplify the main differences of e-procurement compared to conventional procurement processes for technology, transparency, speed and price, table 1 describe them:

Element	E-procurement	Regular procurement
Use of Technology	Everything is developed in an ICT environment and accessible using the internet from the publication to the conclusion (Gascó, Cucciniello, & Nase, 2018)	Use of physical media to publish and conduct the process. (Gascó, Cucciniello, & Nase, 2018)
Transparency	Higher grade of transparency as data can be shared faster and to a wider audience than convention procurement processes (Fernandes & Oliveira, 2015) and (Davoodi & Tanzi, 1997)	The transparency is dependent on later extraction and publication of the data generated in the process (Fernandes & Oliveira, 2015) and (Davoodi & Tanzi, 1997)
Speed	E-procurement processes are faster since the internet enables faster communication and data exchange between the parts. (Kovalchuk, Kenny, & Snyder, 2019)	Slower as the process is dependable on the physical movement of documents and requests. (Kovalchuk, Kenny, & Snyder, 2019)
Price	The technology enables a larger audience to be aware of the processes resulting in a higher competition and consequently lower prices on average (Faria, Ferreira, Santos, & Silveira, 2011)	Higher prices as the call are made on physical media, and in some times requires a physical presence of the competitors resulting in a lower competition in the process resulting in higher prices. (Faria, Ferreira, Santos, & Silveira, 2011)

Table 1 Advantages of e-procurement over regular procurement. Source: Author

With the comparison between traditional procurement processes and e-procurement, it is important to understand the types of e-procurement. For further understanding, the next section describes the types of e-procurement in better detail.

2.2.1 Types of e-procurement

Public e-procurement is defined as the use of technologies such as the internet, intranets, and other technologies by the public administration to conduct procurement processes and communications with bidders to acquire products and goods. (Davila, Gupta, & Palmer, 2003). It is known as a tool to improve efficiency, transparency and overall quality in the process.

There are different types of e-procurement systems with each type been specified for a different type of the procurement process; the public administration may choose to use e-

procurement systems in all the phases of the procurement process or just partially in the procurement process. (Vaidya & Neupane, 2011). Table 2 exemplifies the main common e-procurement systems

System	Description
e-Informing	The system used to publish information and calls regarding procurements usually over the internet. (Knudsen, 2003)
e-Sourcing	A tool used to identify and keep track of suppliers (De Boer, Harink, & Heijboer, 2002)
e-Tendering	The system used to receive requests, proposals and quotes from suppliers (Betts, et al., 2010)
e-auctioning	A tool used to promote tenders over the internet focused on price (Gardenal, 2010)
e-MRO	A system used to create and approve purchasing requests, orders and receiving or them by a web-based system. (De Boer, Harink, & Heijboer, 2002)
e-Order	Use of the internet to place, include, approve and request orders (Harink, 2003)
e-Market	Exchange tool to group and match suppliers and purchasers (Jolivet, Jullien, & Postel-Vinay, 2016)
e-Intelligence	The system used to do data analysis on the procurement process (Eakin, 2003)
e-Contract	Use of ICT tools to manage contracts (Betts, et al., 2010)

Table 2 Types of e-Procurement. Source: Author

There are different types of e-procurement solutions available for different functions. E-procurement can be fully implemented in all the functions or be partially implemented. The choice depends on the policymakers desire to go towards an environment fully electronic or just supported by electronic solutions. To further develop the research, the next section discusses OGD.

2.3 Open Government Data

Information is one of the critical elements for the success of democracy (Harrison & Sayogo, 2014). Citizens aware of the state decisions and processes are more susceptible to contribute to democratic processes and understand changes and decisions affecting them and shape their life accordingly. (Ruijer, Grimmelikhuijsen, & Meijer, 2017).

A significant number of organisations embraced the idea of open government data, but some still are reluctant do to so. One of the causes for this is that publishing data represents a shift from a close governance system to an open one. This shift brings a significant impact on the relationship between the organisations and the public. (Janssen, Charalabidis, & Zuiderwijk, 2012).

There are many definitions to open government data, according to the (Open Knowledge International, 2018) open government data means the availability and access as well as reuse and redistribution of data; still according to them the data needs to be fully available in an "(…), a reasonable reproduction cost, preferably by downloading over the internet." (Open Knowledge International, 2018). Data needs to be available in a reusable and processable form and granted permission to be reused and redistributed. (Open Knowledge International, 2018).

Data must also be machine-readable and universally usable that meaning that "(…), non-commercial' restrictions that would prevent 'commercial' use, or restrictions of use for specific purposes (e.g. only in education), are not allowed" (Open Knowledge International, 2018).

Open Government Data (OGD, 2020) and similar organisations share a set of approximately eight principles for OGD to be considered so. The main principles are described in table 3.

N	Principle	Description
1	Data must be complete	Public data should not be subject to access limitations. The entire data-set should be available and not limited by the type or source
2	Data must be primary	Data must be published with the lowest possible level or processing or modification.
3	Data must be timely	Data must be available as quickly as possible.
4	Data must be accessible	Data needs to be available to the broadest range of users for the most extensive range of purposes.
5	Data must be machine-processable	Data must be available in a format that allows automated processing of it.
6	Access must be non-discriminatory	It must be available for everyone with no need for registration or pre-selection.

7	Data format needs to be non-proprietary	Data must be available in a format that no organisation have exclusive control over it.
8	Data must be license-free	It should not be subject to any copyright, patent, trademark or similar.

Table 3 Open Government Data Principles. Source: Author based on (Opengovdata.org , 2017) and (OGD, 2020)

The open government data principles work as a set of guidelines when studying OGD solutions in the government.

Explaining the importance of open government data in the policymaking process (Janssen, Charalabidis, & Zuiderwijk, 2012) explains that open government data is often indispensable for public policy development and service delivery. This data is mostly reachable as public bodies are among the most significant creators and collectors of it.

Data should not only be published but actively be used to improve the government. According to the author, the data sources can range from traffic, weather, statistics, business, budgeting and all sorts of data about policies and inspections. (Janssen, Charalabidis, & Zuiderwijk, 2012).

The appeal of OGD is undeniable since it improves many aspects of the public administration and the relationship with society. The expectations are usually high for these initiatives as well as the investments. It is estimated that OGD initiatives can generate $3 trillion in improvements in the global economy by enabling better services, products and better decisions. (Manyika, Chui, Groves, Farrell, & Van Kuiken, 2013). The next section will discuss OGD in public procurements.

2.4 Open government data in public procurement

Public procurement is one of the largest markets in developed countries. Even though it is a critical process; recent data shows that public procurement in OECD countries has become more corrupt and less competitive over time. (Organisation for Economic Co-operation and Development - OECD, 2020)

To respond to this and to improve the public procurement processes, many governments started to develop and make available OGD platforms. Although this data has been used

many times in studies and analysis regarding the procurement processes, it is yet to know if they are improving these processes (Duguay, Rauter, & Samuels, 2019).

The process of embrace OGD for many public organisations is still complicated as it represents a shift from a closed to an open governance system. (Janssen, Charalabidis, & Zuiderwijk, 2012). This openness brings along a more significant interaction with elements that were not present before forcing the public agents to have a more prominent interaction with outsiders. (Janssen, Charalabidis, & Zuiderwijk, 2012).

The availability of OGD has increased significantly due to pressure from different sectors of the society, asking for all kinds of public organisations to be more open regarding their activities and budget. OGD can not only provide a higher level of the citizenry (Surowieeki, 2004) but as well provide the policymakers with the data needed to make better decisions to address the public problems. (Arzberger, et al., 2004).

E-procurement provides a more accessible way to access data related to the procurement processes such as calls to tenders, results, legal actions and the development of the procurement process itself. These aspects mean that this modality of procurement, especially the electronic bidding, is considered one of the most transparent in Brazil. (Fernandes & Oliveira, 2015).

Following the principles of open government data of OGD (OGD, 2020), the procurement processes also need to have their data accessible according to the principles previously described. The correct use of OGD, especially in procurement processes, can lead to lower corruption in the public administration. (Adam & Fazekas, 2018). The next section describes corruption and e-governance as a tool to help in the fight against it.

2.5 Corruption in procurement processes

Corruption is a problem that can lower a country's development, and there are many different initiatives and possibilities to control it. (Schøll & Ubaydi, 2017). Corruption is a problem with many aspects and is approached in many ways by different scholars. (Schøll & Ubaydi, 2017). For this research, we define corruption as the abuse or misuse of public power for private benefit. (Bhardan, 1997).

It is essential to mention that there are different approaches to understand this problem and different authors will provide their conceptualisation of it. For example, (Søreide & Rose-Ackerman, 2016) describes corruption as the trade-off decisions that should not be for sale. However, in general lines, most of the definitions follow the idea of corruption been a form of abuse of the public entity for private advantages and public procurements due to its economic relevance ends up been a subject for corruption.

When reviewing modern public procurements, it is essential to notice its complexity and its large amount of stakeholders involved in different states and levels of the process. (Schøll & Ubaydi, 2017). Public procurement is an important tool that the government have to perform its social functions, and its demand is constantly growing as the demands of the state follow the same patch. (Fernandes & Oliveira, 2015).

When it comes to corruption in the public procurement, it can be distinguished into two categories, the political corruption that according to (Davoodi & Tanzi, 1997) happens in the budgeting phase when the political decision is made and in as bureaucratic corruption that is the corruption that happens in the execution and planning of the procurement process. (Davoodi & Tanzi, 1997).

This research will work with possible uses of e-governance to deal with the bureaucratic corruption in the procurement processes since political corruption is harder to be distinguished and requires a set of tools and analysis that only technology alone cannot solve it. The next section will describe transparency, publicity and accountability in the public administration and its possible uses to help with lowering bureaucratic corruption.

2.6 Transparency, Publicity and Accountability in the public administration

For the World Bank (World Bank, 2017) there are three main elements for the effectiveness of information initiatives in the public administration: transparency, publicity and accountability. Making these three things to happen in the public administration involve challenges for both policymakers and public agents. (Naurin, 2006). Figure 1 exemplifies the correlation of these elements for the proper effectiveness of the information in the public administration.

Figure 1 Conditions for the effectiveness of the information

Based on: (World Bank, 2017, p. 248)

Transparency is an important first step towards a higher level of accountability; it is understood as a tool for external stakeholders to follow the activities and internal working of an organisation. (Moore, 1995). Transparency can be defined as the availability of information regarding an organisation enabling external actors to monitor its activities and values. (Meijer, 2012).

The concept of transparency in public administration has both supporters and non-supporters, for those that support it the main arguments are that its application helps in the corruption-fighting process, build trust and increase accountability. (Douglas & Meijer, 2016). For those that argue against transparency in public administration, the main arguments are that it undermines trust and increase outside meddling. (Tsoukas, 1997). Despite the reasonable arguments against it, it is undeniable the benefits of its implementation along with publicity for the increase of accountability.

Publicity is not to be confused with transparency. Even though it quite often demands transparency, it goes beyond being a principle of authority. (Filgueiras, 2015). It demands an organisation in a way it takes into consideration the pluralism of recipients, their demands and interests. (Christiano, 2004). Publicity also demands an open and democratic decision-making process of the rules and policies made by the government where institutions are established in a checks and balances system ultimately controlled by the citizens. Ultimately publicity ties government decisions to the citizens either through institutions or direct participation of the society.

Accountability in the public administration can be defined as the obligation of the public agency and employee to be accountable for its actions and decisions and report them for audits or any other control mechanism in the state. (Centro Latinoamericano de Administración - CLAD, 2000). Accountability can also be understood as a constant

evaluation process that public agents, both elected and non-elected, are submitted due to the obligation that they have with the society. (Rocha & Quintiere, 2008).

Mechanisms to make people accountable for their actions and results is a must for democracy keep itself sustainable. (Bobbio, 2007). In the past, authoritarian rulers had full power over their nation and citizens been not accountable for their actions as these actions represented the ruler's will rather than a democratic decision.

Currently, modern democratic societies are built on a series of different mechanics to control and audit the actions of the public administration in its different levels. (Bobbio, 2007). The democratic system brought the necessity of a series of audits and control mechanics performed both by the public administration and the citizens. The participation of citizens in the accountability and control process and the development of instruments to allow it to happen is one of the biggest challenges for policymakers in modern democratic societies. (Schedler, 1999).

Accountability together with transparency and publicity are the basis for the democratic system to work as each of them are dependable on the other. Accountability act as a protection mechanism for citizens as it prevents and monitors the actions of those in charge of the public administration. (Castro, 2011). It helps in the prevention of frauds, bad management and crimes against the state administration.

Accountability is directly related to democratic development as the interest for it grows along with the development of democracy in a state. (Centro Latinoamericano de Administración - CLAD, 2000). This development usually comes along with a higher interest in human rights, equality and overall democratic values. For accountability to happen, tools and controls mechanisms are necessary for the public administration both inside and outside. Next section discusses the external controls in the public administration.

2.6.1 External Controls in the public administration

Control is the process of manage risks and ensures that the activities developed by the entity or agent are being carried on following the established standards and procedures. (Stoner, Freeman, & Gilbert, 1995). Controls exist to help stakeholders to monitor the effectiveness of those in charge or perform an activity or task.

As a management function control involves four main stages according to (Sljivic, Skorup, & Vukadinovic, 2015). These stages are: establishing standards, measuring performance, compare performance with the standards and taking corrective actions. Figure 2 synthesise these stages.
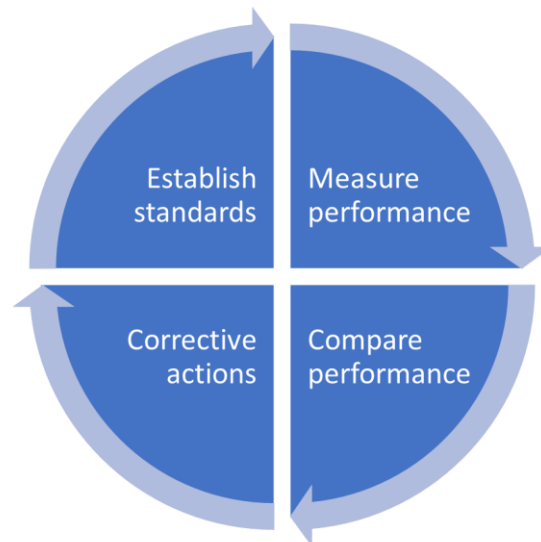
Figure 2 Stages in controlling. Source: Author, based on (Sljivic, Skorup, & Vukadinovic, 2015)

Regarding the external control, this is the designation of a task developed by institutions that are not part of the same government branch of the controlled one. It means that any public entity can act as an external control for other public institution from another government branch as long it has the legal attributions for that. (Aguiar, Albuquerque, & Medeiros, 2011).

These controls exist to establish mechanics that aim to guarantee the full effectiveness of the tasks developed by the public administration. According to (Guerra, 2005, p. 108), tasks developed by the administration need to be audited and supervised to guarantee that the best interests of the society are fulfilled. Such controls are commonly developed by the court of auditors, parliament and other control mechanisms depending on the legal framework of each country or region.

The financial-budgetary control is a form of controlling that according to (Bueno de Albuquerque, Gonçalves da Silva, & Gonçalves de Oliveira, 2018) consists of the accounting, financial, budget, operational and patrimonial control of the direct and indirect public administration. This control is not only for the public entity but as well all

of those involved in the financial-budgetary management of the public administration. (Moreira Neto, 2005).

The transparency portals enable the citizens to monitor the information regarding the government and its agent's activities; this participation of the citizen is understood as a form of external control over the public administration. The next chapter will discuss the methodology of this research, and the discussion regarding the transparency portal will be done in the analysis section of this research.

3 Research methodology

In this section, the methodological aspects of the research are presented. This research is an exploratory case study where exploratory and documentary techniques were used to achieve the proposed objective. This research focuses on OGD for public procurements of the state of Paraná in Brazil, its transparency portal, control mechanisms and citizen awareness to provide the information needed to achieve the research goals and questions.

Case study research, according to (Yin, 2009) refers to an empirical inquiry that aims to investigate a phenomenon within its real-life context using different sources of evidence during a limited number of events or conditions. The case study enables the researcher to examine the object within a specific context carefully. In the case study research, the boundaries between the background and the phenomenon are not clearly defined. (Yin, 2009). This research used two

(Yin, 2009) describes that exploratory case studies can be used when there is no pre-determined outcome, case studies are appropriate to answer questions involving "how", "why", "what" and "who", fitting what is propose in the research questions of this work. According to the author, exploratory case studies are also appropriate when the researcher aims to gain an extensive and profound description of a social phenomenon.

According to (Eisenhardt, 2007, p. 25) case studies involve using one or more cases, to "create theoretical constructs, propositions, and midrange theory from case-based, empirical evidence" Stake defends that the case study characterised itself by the interest in individual cases and not in the methods used. (Stake, 2000) also mentions that not everything can be considered a case as a case is a specific unit, a delimited system where the parts are integrated.

The case study research is one of the most appreciated qualitative research methods. (Hossieni, Dehkordi, & Aghapour, 2012) The authors also stated that this kind of research approach designed for complex issues enables the research to understand and explore a phenomenon deeply. (Hossieni, Dehkordi, & Aghapour, 2012)

Case study research can be classified into three main categories, as showed in table 4:

Category	Questions	Description	Example
Exploratory	How Why	Exploration of any phenomenon which serves as a point of interest to the researcher. The fieldwork and data collection may be conducted before the research questions and hypotheses proposed. (Kähkönen, 2011)	(Peck, 2005)
Explanatory	How Why	This category tries to explain a phenomenon in both surface and profound level. Based on explanatory case studies, researchers first form a theory and then tries to test the theory. (Blatter & Blume, 2008)	(Elango, 2008)
Descriptive	Who What Where	This category set to describe the natural phenomena which occur within the data in question. The difficult of a descriptive case study is that the researcher must begin with a descriptive theory to support the description of the phenomenon. (Yin, 2009)	(Murray, Rentell, & Geere, 2008)

Table 4 Case study categories Source: Author based on (Hossieni, Dehkordi, & Aghapour, 2012)

For this research, the exploratory case-study methodology was the chosen method to achieve the research goal. One of the main reasons to select a case study is that quantitative methods have limitations to provide in-depth explanations of social and behavioural problems that shape the vast proportion of social studies. (Hossieni, Dehkordi, & Aghapour, 2012).

Starting from the research question and objectives, the author understood the need for the exploratory case study, that was conduct using the world wide web to access to the data need for the analysis and conclusions. During the research process, a questionnaire was conducted among citizens of Paraná to enhance the understanding of the topic and further understand the citizen awareness of the transparency portal and its interaction with it. The questionnaire has been distributed using social networks on the internet. The target group of the survey was the citizens of the State of Paraná or people that have a professional relationship with the State. The total number of replies to the questionnaire was 113 replies. The results are described in the analysis section 5, and the questionnaire, translated from Portuguese to English, can be accessed in appendix 2.

The research had as the unit of analysis the State of Paraná, the Brazilian public administration and its procurement processes in a context to understand how it works and what is the currently OGD initiatives available. Another unit of analysis was the corruption problem and avoidance in public procurement processes and finally, as another unit of analysis the citizen and its perception and use of OGD tools.

3.1 Data Sources and Collection

Data collection for case study researches can be done from different sources. (Yin, 2009) defined the six most common as documentation, interviews/surveys, records, direct observation, participant-observation and physical artifacts. For this research, two of the six were used, the documentation research and surveys.

The documental research was done using the internet by accessing scientific databases, official government websites and other related sources available on the internet to collect pertinent articles from journals, books and institutional websites to formulate the research. The documental research was supported by a questionnaire sent via the internet to citizens of the State of Paraná. In total, 113 replies were made to the questionnaire. The questionnaire was available for answers for five days during May of 2020. The documental research was Overview of the research

ICT solutions increased the possibilities and usages for OGD both for the public administration as well as the citizens. One of the processes that mostly got benefitted from the usage of ICT solutions were the procurement processes. Along with more efficient processes possible by the use of e-procurement solution, it also enhanced its transparency for the citizens.

The citizen is an important element for the control of the state and avoidance of crimes against the public administration. The state transparency provided by OGD initiatives together with the ICT tools enabled the citizens to be an active part in the controlling and process of the state activities, especially those related to the expenditure of public money such as the procurement processes.

Brazil, a South American country and a relatively developed nation, is quite often positioned near leading positions in rankings for OGD development among nations. Even though with the OGD developments, the country still faces problems with corruption and frauds against its public administration, especially in its public procurements processes. Brazil has long been trying to solve the problem of corruption in its procurement processes by implementing stronger controls and higher transparency.

Transparency efforts have enabled the Brazilian citizen to access almost in real-time procurement process information, but the problem of frauds and corruption persists in many of these processes.

With this research, the author is aiming to analyse the transparency portal of the state of Paraná, the state controls and citizen awareness and use of the transparency portal to understand further how this transparency tool and the citizen relationship with it can help in preventing the corruption problem in procurement processes by enhancing the citizen control over the public administration.

The main motivation of this research is that Brazil as one of the leading countries in OGD but still faces serious problems related to corruption and frauds against its public administration, especially its procurement processes is an apparent contradiction that sparked the interest of the author to understand further what is happening in the country. The desire to better understand how this data is being used and presented to the citizens so they can execute their control over the public administration is the main motivation for the development of this research.

The selection of Brazil and the state of Paraná is because the state has long been one of the leading states in the country for ICT innovations in the public administration having its capital the city of Curitiba awarded international recognition for its urban innovations especially in the mobility sector. The State of Paraná is the 5th largest economy in the country and have a population of approximately 11 million habitants. (Instituto Brasileiro de Geografia e Estatistica - IBGE, 219).

As the leading economy of Latin America, Brazil can act as an influence for other nations in the region when it comes to the public administration processes and operations. This case-study can help not only Brazil and the state of Paraná but as well as other states and

countries of the region to understand and further improve their OGD and governance in public procurement processes.

This research will focus exclusively on the Brazilian public procurement system having the State of Paraná as research object among other reason but as well due to the fact of the political system of the country that as a federation means that all the states follow the same rules and regulations as previously mentioned in chapter 2. Understanding the State of Paraná situation will help to understand the country as a whole.

3.2 Research problem and questions

The main goal of this research is to analyse the main aspects of the transparency portal of the state Paraná and citizens perception and use of it. This research will provide an external overview of the open government data delivered by the transparency portal and its uses to enhance citizen control to prevent corruptions and frauds in public procurement processes of the state.

The specific objectives of this research are:

- Identify the availability of the OGD in public procurements taking the transparency portal of the state of Paraná as the case study object.

- Understand the citizen awareness of the transparency portal and its perception of its uses for citizen control.

- Understand the control mechanisms of the State of Paraná and how the transparency portal can enhance the citizen control to avoid corruption in the public administration

This research aims to answer the following two research problems: What is the current situation regarding OGD on the state of Paraná?, and how can OGD be used by citizens to decrease corruption in the State of Paraná procurement process? Figure 3 shows a flow diagram which summarises the development stages of the research.
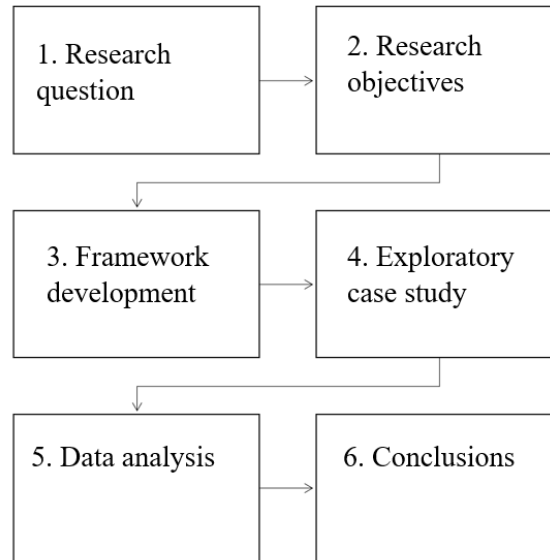
Figure 3 Flow diagram research stages. Source: The author.

Table 5 describes each of these stages in further detail.

Stage	Description
1	In this stage, the research problem was identified: What is the current situation regarding OGD on the state of Paraná?, and how can OGD be used by citizens to decrease corruption in the State of Paraná procurement process?
2	Objectives definition considering the research problem, the following objectives were established: 1. Identify the availability of the OGD in public procurements taking the transparency portal of the state of Paraná as the case study object. 2. Understand the citizen awareness of the transparency portal and its perception of its uses for citizen control. 3. Understand the control mechanisms of the State of Paraná and how the transparency portal can enhance the citizen control to avoid corruption in the public administration
3	Framework development. In this stage, bibliographical research was conduct to establish pertinent sections to be the foundations of the research. This section was developed by searching articles, books and documents to identify relevant previously done studies and topics that would help in the understanding of the topic and further development of the research.
4	Exploratory case study. An exploratory analysis was developed, aiming to understand: -How is the Brazilian government is organised -How the procurement processes are held in the country

	-The OGD situation in the country -The transparency portal of the state of Paraná, its features and functionalities as well as citizen's awareness, perception and use of it -The control mechanisms of the Brazilian public administration and its states -Understand the corruption in Brazil and how it happens and can be detected in procurement processes
5	Data analysis. In this stage, the information obtained in both exploratory research and a survey performed to understand further how citizens interact with this data and if they interact at all were analysed, and answers to the research question and problems were formulated.
6	Conclusion. In this stage, the author describes its conclusions after the data analysis as well as provide further research suggestions and give other comments about the contributions of the research to the further development of the topic.

Table 5 Research stages and description. Source: The Author

It is possible to understand with table 5 that the research process was conducted in a structured way in order to achieve the proposed objectives and answers. The entire process took approximately four months between the first drafts to the final version.

4 Case study

4.1 The Brazilian government

To understand modern Brazil is it important to acknowledge that thought all is history, the country faced different forms of government. The beginning of Brazil starts as a colony of the Portuguese Kingdom from the 1500s to 1815 AC when it was elevated as the centre of United Kingdom of Portugal, Brazil and the Algarves during the Napoleon invasion of Portugal and remained like this till its independence.

The independence happened in 1822, creating the Brazilian Empire, a monarch that least until 1889 when the first republic was established. During the 1900s Brazil had different governments including a military rule from 1964 AC to 1985 AC to finally, with the end of the military rule, the formation of the current republic and the consequent approval of the current constitution in 1988. As a federation, the federal government allows the states to have a certain independence, but the federal laws must be applied in all the states. That allows this research to go into Brazilian public administration and its OGD to understand the case of the State of Paraná.

The long history of Brazil as a nation and the different set of government forms that the country had thought its history resulted in the current Brazilian state. The government nowadays follows principles described in its constitution to guarantee that the activities developed by the state are well conducted. The Brazilian constitution, in its article 37 states that the direct and indirect public administration in Brazil, including the states and municipalities, should follow the principles of legality, impersonality, morality, publicity and efficiency. (Brasil, 1988).

The principles are guidelines for the government and should be followed by all of those subjected to the constitution. About these principles, legality is probably one of the most important ones as it refers to the fact that the public administration can only act according to what is described in the law. (Mazza, 2005). Having publicity as a principle described in the constitution also demonstrates the desire of the constitution-makers and the Brazilian state to be open and transparent for its citizens. The only exceptions are described in the document as cases involving the safety of the state and society and

privacy. The next section further enhances the publicity by describing the OGD in the country.

4.2 Open government data in Brazil

The publicity of the government of its actions is a duty described in the Brazilian constitution in its article 37. Although there is no description of how this should be performed, to regulate it, Law 12.527 from 2011 established the obligation of the public administration to publish its data on the internet in a machine-processable way. This Law aimed to establish international directives for OGD in the country public sector.

It is essential to mention that the OGD initiatives in Brazil started in the early 2000s with the Electronic Government initiatives in the country especially in 2004 with the guidelines set by the federal government for these initiatives in all the levels of the public administration. These initiatives set the pillars for the creation of the first transparency portals in the federal government, states and municipalities in the second half of that decade.

Brazil along with seven other countries (Norway, United Kingdom, United States, Mexico, Indonesia, Philippines and South Africa) became a founder member of the Open Government Partnership (OGP) an international initiative to promote the culture of OGD. The initiatives started in 2011 by the federal government were enchanted to all the states and municipalities of the country.

Developments of the 2000s and first half of 2010s lead to an improvement of the transparency portals, especially the federal portal to a level that is possible to find information regarding public properties, public servants, lists of people and organisations prohibited to do business with the government and check the money flow of the taxes from the federal government to the states and municipalities by sector and category.

The next section discusses the public procurements in the country to later in the analysis the discussion of OGD and public procurement in the country be further developed.

4.3 Public procurement in Brazil

About the procurement process in the public administration, the Constitution of (Brasil, 1988) in its Article 37 - XXI, determines that unless in some specific cases described in current legislation, all work, services, goods, and related purchases should be acquired through a public bidding process. This process must ensure equal participation between all competitors and establishing specific clauses to safeguard the public entity in the process.

To regulate Article 37 of the Brazilian Constitution (Brasil, 1988), Law No. 8,666 of June 21, 1993 (Brasil, 1993) was created and established the standards and regulated how service bids, works, purchases among other modalities as described in the 1st article of that law:

> This Law sets general rules on public tenders and administrative contracts relevant to the acquisition of construction work, services, including advertising, purchasing, disposals, and leases within the framework of the Union, states, the Federal District, and municipalities (Brasil, 1993)

The procurement process in public administration is established and controlled by a series of laws, decrees, and agencies. It is possible to find several definitions about public tenders in Brazil, for this study will be used the concept of (Meirelles, 2002) and (Di Pietro, 2012) two reputed authors in the public acquisition research field in Brazil. For Meirelles, bidding is a procedure in which the public entity chooses the most advantageous proposal for him; for the choice of this proposal, the State creates an environment of competitiveness equal to all those interested in hiring with the government (Meirelles, 2002).

Complementing this definition, (Di Pietro, 2012, p. 298) defines public tender as an administrative procedure in which, the public entity opens the opportunity to all interested parties who subject themselves to certain conditions to have their proposals, if accepted, contracted by the public administration.

About the competitiveness aspect of the tender process in Brazil, the Law No. 8,666/93 (Brasil, 1993) stated that public agents are not allowed to tolerate, admit, include clauses or conditions in the acts of summoning that prevent fair competition between those

participating in the event. Article 3 of the same law ensures that competitiveness is an essential principle for obtaining the most favourable result possible.

The public administration in Brazil has different modalities to choose from when initiating an acquisition process. The modalities are specified in the Law No. 8666/93, Law no. 10,520/202 (Brasil, 2002) and finally in the Presidential Decree No. 5450/2005 (Brasil, 2005); These modalities are described in Table 6.

Modality	Summary of the modality
Invitation	Modality to which interested parties are invited by the Administration, in a minimum number of three to offer proposals. This modality is for values up to R$ 80,000.00 for regular services and up to R$ 150,000.00 for construction and engineering services.
Competition	Design for everyday goods and services. Any interested parties who comply with the minimum requirements may participate. The maximum amounts are R$ 650,000.00 for acquisitions and services and R$ 1,500,000.00 for engineering works.
Price making	The modality for entities duly and previously registered. This modality has the same limits as the competition modality.
Contest	Intended for the choice of technical, scientific, or artistic works, through the awarding of financial remuneration to the winner, according to criteria established in the summons instrument.
Auction	Intended for the sale of immovable property unviable to the Public Administration or objects attached to the disposal of property and or legally seized.
Face-to-Face bidding	Bidding modality created to acquire common goods and services, whatever the estimated value in hiring. It presents a shorter time of realisation than other bidding processes, with the reduction of the time between the launch of the notice and the opening the offers envelopes.
Electronic bidding	Similar to the face-to-face trading session, with the difference of being realised through the internet. Currently, its use is mandatory for hiring common goods and services, except for specific cases where the public agency has to provide a detailed justification for it.
Bidding Waiver	Set of 31 items contained in article 24 of Law 8,666/93 establishing cases where, under normal conditions and situations, they can be acquired without a conventional bidding process.
Unenforceability	It is used when there is no possibility of a regular tending process because there is only one object or supplier that attend the requirements.
Electronic quotation	It aims to eliminate, in small purchases, the targeting to specific suppliers, as well as to facilitate the access of new suppliers to the public administration.

It is noticeable that the procurement process is complex and demands the attention of the public agent already in the choice of which modality better satisfies the needs of the public agency. Figure 4 summarises the main phases of the e-procurement process in Brazil for the electronic bidding type.
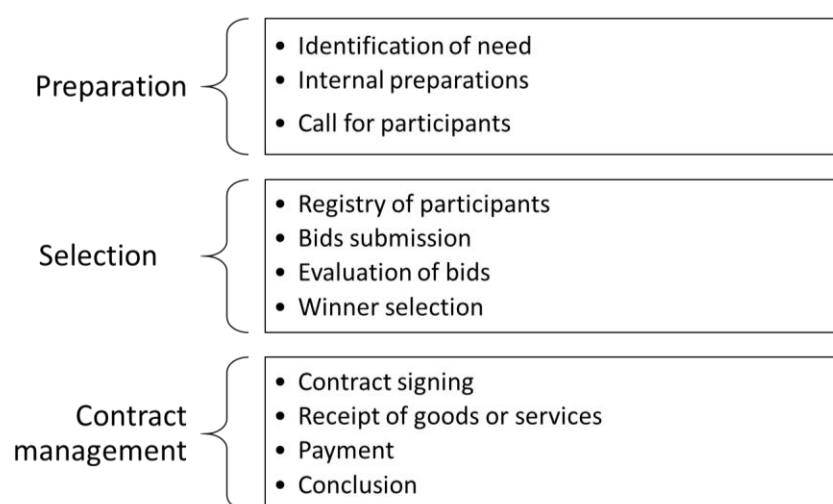
Figure 4 Main Phases of e-procurement in Brazil Source: Author

Similar to the principles described in the Brazilian constitution the procurement processes in Brazil the law that regulates the procurement process Law 8,666/93 (Brasil, 1993) brings principles to be followed by the public administration when conducting a procurement process, table 7 synthesise the principles described in the law.

Principle	Description
Legality	Public administration cannot execute or perform anything outside of what is contained in the Law. (SANTANA, 2008)
Impersonality	All participants of the procurement should be treated equally. The decisions of the public entity should be based on objective criteria. (Di Pietro, 2012, p. 305)
Morality	The principle of morality can be understood as the behaviour required of the Public Administration, not only legal but also consistent with the morality and the principles of equity and justice. (Di Pietro, 2012, p. 306)
Equality	The principle of equality aims to prevent discrimination or favouritism to any participant in a procurement process, either through biased clauses or by the impartial judgment of proposals. (Adriano, 2013, p. 35)

Publicity	All stages of the bidding should be properly disclosed to all interested parties in a way that the process is transparent and understandable. (Meirelles, 2002, p. 242)
Objective judging	Judgments in the procurement process must be supported by plausible and concrete arguments. This principle aims to eliminate discrimination in the selection of the proposals demanding that the public administration take its decisions based on pre-established criteria as described in the opening call. (Meirelles, 2002, p. 244)

Table 7 Principles for public procurement processes in Brazil. Source: Author

Described the main aspects of public procurement and e-procurement in Brazil, the next chapter discusses the problem of corruption in the country to discuss further the correlation between public procurement and corruption in the country.

4.4 Corruption detection in procurement processes

As described and synthesised by the Transparency International (Transparency International , 2018) corruption in procurement processes can occur in each of the five main stages from the needs assessment, preparation, contractor selection, execution and final accounting and audit. Unfortunately, it is not uncommon that in the result of procurement processes, the winner was somehow benefitted by a set of actions taken in one or more phases of the procurement process. (Caillaud & Lambert-Mogiliansky, 2019).

Discussing different indicators of possible corruption in procurement processes according to the stage (Ferwerda, Deleanu, & Unger, 2017) stated that in the decision to start a procurement process, some indicators of possible corruption. These indicators could include strong inertia of the evaluation team or commission or evidence of conflict of interest from one or more members of the team, for example, one of the members is a shareholder of a company that is making bids.

Regarding a possible conflict of interest (European Anti-Fraud Office, 2011) there is a possibility that this might happen due to a past or present filiation such as former employment or a family member working in one of the tendering companies. These types of connections might not be easily detectable and require further due diligence over the parties involved to be detected, but that often is not done due to time and resources limitations.

In the definition of contracts and terms (Caillaud & Lambert-Mogiliansky, 2019) discuss the risk of a tender contract be tailored in a way that benefits a special bidder instead of a specific need. According to the authors, the red flags to be taken into consideration in this phase are: Are there multiple middle persons/contacts? The contact office is not directly subordinated to the tender provider, a contact person that is not employed by the provider, any of the terms of reference might point to a specific supplier?

(Søreide & Williams, 2014) describes that one of the most common forms of corruptions is when the procurement is tailored in such a way that only one competitor has a product or service that fits what is described in the contract. In this case, public officials decide which enterprises or products will win the tender even before the bids are received.

During the contract phase, again (Caillaud & Lambert-Mogiliansky, 2019) indicate questions that should be made to identify possible indicators of frauds or corruption. Table 8 presents a set of ten questions to be applied in the process of corruption identification.

#	Question
1	Was there a shortened time for the bidding process?
2	Has the procedure for an accelerated tender been exercised?
3	Is the size of the tender exceptionally/unusually large (e.g. packaged)?
4	Is the time-to-bid allowed to the bidders not conform to the legal provisions?
5	Are bids submitted after the admission deadline still accepted?
6	How many offers have been received?
7	Are there any artificial bids (e.g. bids from non-existing firms)?
8	Are there any (formal or informal) complaints from non-winning bidders?
9	Are there any connections between bidders that would undermine effective competition?
10	Are all bids higher than the projected overall costs?

Table 8 Questions to identify corruption in the contracting stage. Source (Caillaud & Lambert-Mogiliansky, 2019, p. 250)

Regarding the corruption risks in this phase (Della Porta & Vannucci, 2002) mention that sometimes competition may seem real due to a large number of competitors presenting bids, but in reality, most of these companies are not real competitors. For (Kenny & Musatova, 2011) a short timespan of a procurement process can also happen to enable just a few bids and competitors and artificial bids to be placed.

In the contracting stage, there is also corruption risks, one of the main risks is that the evaluations criteria were not clear in the tender documents, opening the possibility for justifications over the selection of a corrupt supplier over the other competitors. For this stage (Caillaud & Lambert-Mogiliansky, 2019) suggests two questions be answered: Is there some restriction on the information regarding the winner and the reasons for its choice? Moreover, Is the related documents justifying this selection not public available?.

In this stage, it is noticeable the importance of a high level of OGD regarding the results and development of the procurement process. Without open communication with all companies involved in the process and other stakeholders, including the citizens, corrupt agents and companies may develop their corrupt actions without been easily detectable by the others.

For the next stage, the implementation and monitoring of the contract, there is the risk of changed and renegotiations that might change the substance of the contract itself. Also, the quality audit process of a contract can be influenced to favour the winner of the procurement, changing standards or metrics for performance, quality or requirements. Similar to the proposed questions for the contracting stage, (Caillaud & Lambert-Mogiliansky, 2019) exemplifies questions to be answered when analysing this stage of the procurement, these questions are synthesised in Table 9:

#	Question
1	Are there inconsistencies in reported turnover or number of staff?
2	Is the winning company listed in the local Chamber of Commerce?
3	Does the awarded contract include items not previously contained in the bid specifications?
4	Are there changes in the scope of the project or the project costs after the award?
5	Are bids submitted after the admission deadline still accepted?
6	What was the total number of offers received?

Table 9 Questions to identify corruption in the monitoring stage. Source (Caillaud & Lambert-Mogiliansky, 2019, p. 252)

In this final stage, there are many possibilities for corruption to occur. If the public entity fails to perform analysis and keep track of the progress, the winner of the procurement process can start doing changes on the project for its benefit. (Kenny & Musatova, 2011)

It is important to compare the scope of the project proposed in the begging to what has been delivered. It is also imperative to have an independent entity controlling and been responsible for the audit of the procurement execution to avoid that negligences or frauds occur in the audit process. (European Anti-Fraud Office, 2011).

With this brief description of corruption in the public procurement process and how to prevent it, the next section discusses corruption in Brazilian public administration for further understanding of the problem in the country.

4.5 Corruption in the Brazilian public administration

Corruption in Brazil have endemic characteristics; it manifests in all the segments of the society, and it is connected to the culture of the country. (SILVA, 2001). Corruption its insert in a wider context and the combat against it demand long term measures. (Rausch & Soares, 2010). It occurs when there is a tacit acceptance of it among in society.

According to the Corruption Perceptions Index reported by Transparency International (Transparency International , 2018) Brazil is the 96th least corrupt nation out of 175 countries. Compared to other BRICS countries, Brazil is only better than Russia, which is on the 135th position on the rank. Overall Public perception of corruption in the country is high as well; the country ranks in the 79th place in terms of public perception of corruption, having the same score as China and India.

The corruption skins in Brazil are estimated to cost annually approximately 1.35% to 5% of the country Gross Domestic Product - GDP, (Mota, 2017). With a large proportion of these corruptions and frauds happens in the procurement processes. Brazil, at least before 2015, did not have a strong tradition in enforcing the law against white-collar corruption. The situation improved after the Lava Jato criminal investigation that led to the high profile apprehension of politicians and businessman in the country.

Corruption is not new in the country. There have been many instances of corruption cases that resulted in no punishment for the involved. It is estimated that out of 100 corruption cases in Brazil, approximately 97 end up with no conviction. (Transparency International, 2016). One of the causes of is a highly bureaucratic judicial system that enables those with the resources to perpetuate processes by using lawyers to delay the stages until the

process expire or dismissed by using legal arguments against the procedures rather them the content of the prosecution.

Even though the legal framework of the country demands internal control measures from entities of the public administration. (Fortini & Shermam, 2017). Many of these entities do not have any functional control in place as their position in the organisational structure does not allow it actually to perform a control function. In a report made by the Federal Audit Court (Tribunal de Contas da União – TCU) in 2014 about the governance initiatives in the country and their developments revealed that most of the initiatives were not fulfilled or were being developed in a much slower pace them expected.

It is possible to notice that the problem of corruption is spread through all the administration and culture in Brazil. Some actions were taken in the last decade to further develop the public governance in the country, but still many of this initiatives are not fully implemented, enabling for the problem of systemic corruption to still occur inside the administration in all its branches and levels. In order to understand how the corruption problem affects the procurement processes, the next section will discuss the problem of corruption in the procurement processes in further detail.

4.5.1 Corruption in Brazilian public procurement processes

Regarding the corruption in Brazilian procurement processes, the frauds and corruption can occur in all the phases of the procurement process. It can start with a fake procurement process where the winning company for that service or product was previously created to gather money for elections, this form been common for smaller municipalities and remote areas for small value procurement process.

 Another common form of corruption in the procurement processes in the country is the manipulation of the procurement rules. It happens especially for price adjustments frauds after the end of the procurement process by using legal artefacts previously established in the procurement call to get more money from the public administration budget for the benefit of the involved ones.

As the law that regulates the procurement processes Law 8.666/93 (Brasil, 1993) allows for price adjustments after the end of the procurement process due to non-predicted factors such as economic changes corrupt agents and companies take advantage of this

law to perform their corruption skins. Another form of fraud is the fake competition. In the e-procurement, this fraud was lowered but still can be found in some procurement processes. This fraud happens when the companies competing for the procurement simulates a competition when in reality they have agreed among them a final price and the winner of the process.

According to Mendes (Mendes, 2014), the two most common frauds in the Brazilian public procurement. The first form is the overestimation of prices, especially for construction works. In these cases, the price that the public administration pays for the product or service is higher than the market average without any plausible explanation for this difference. The other form mentioned by Mendes is the payment for services and products that are not executed or delivered.

It is possible to notice that still even with the e-procurement processes frauds and corruption happens in the procurement processes held in the Brazilian public administration. This corruption skin reinforces the need for controls over the procurement processes, both internal and external, as well as transparency in all the phases. The transparency aspect is done mainly by the transparency portal, which is better described in the next section.

4.6 The state of Paraná and its transparency portal

The state of Paraná is the 5th largest GDP in Brazil with a total of R$ 421.375 Billion, approx. 90 Billion EUR. (Instituto Brasileiro de Geografia e Estatistica - IBGE, 219). The main drivers of the state economy are the agriculture and industry. Located in the south region of Brazil the state has approx. 11.4 million habitants. (Instituto Brasileiro de Geografia e Estatistica - IBGE, 219). Figure 5 shows the state of Paraná in the Brazilian Map:

Figure 5 State of Paraná in Brazil.

The state of Paraná offers a transparency portal where is it possible to access the financial data of the state as well as data from current and previous public procurement processes. The portal aims to fulfil the requirements of the Federal Law 12.527/2011 (Brasil, 2011) and the State decreed 10.285/2014 (Decreto 10285 - 25 de Fevereiro de 2014), both established to enhance OGD and transparency in the public sector.

According to the transparency portal (Paraná, 2020) of the state, it enables the user to find information regarding govern Government structure, budget, fiscal responsibility, bids, contracts, equity and other data that show how and where public money used. Still, according to the portal "is possible to explore various forms of queries and interactive glossaries, designed to organise the chosen data" (Paraná, 2020).

The portal also enables surveys regarding remuneration for executive branch employees, income and expenses also include interactive graphics. The Transparency Portal allows to monitor and inspect the use of public resources. Thus, society has at its disposal tools to exercise social control over the actions of the State Government. (Paraná, 2020). The portal is accessible in the URL www.transparencia.pr.gov.br and its available only in the Portuguese language. Figure 6 shows the landing page of the portal.
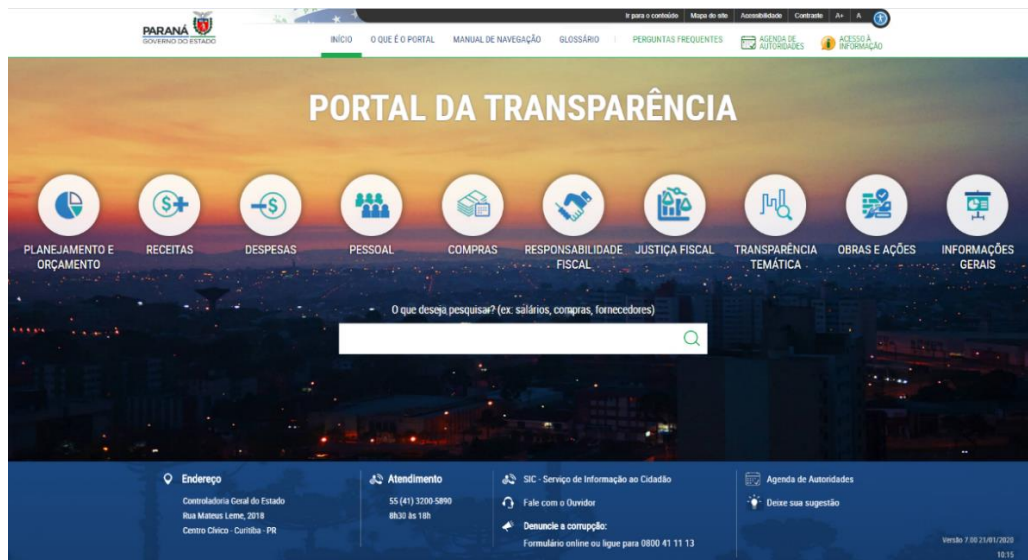
Figure 6. Landing page of the Transparency Portal of the State of Paraná.

Source: (Paraná, 2020). Available on: <www.transparencia.pr.gov.br>

In the portal, it is possible to search for planning and budget, incomes, expenses, personnel, public procurement, fiscal responsibility, economic justice, transparency themes, constructions and actions and other general information.

4.6.1 Data available for download

Regarding the data available for download in the .csv format for the procurement processes, it is possible to select the date from 2002. When selected the year, the files will come in a .zip format here inside the package there are sheets separated by type varying from companies contracted, items, contracts, lots and others. Figure 7 exemplifies the files in the .zip packaged download for the procurement data for the year of 2020.

Name	Size	Packed	Type	Modified	CRC32
..			File folder		
TB_ADESAO_ATA_SRP-2020.csv	90	69	Microsoft Excel Co...	05/04/2020 05:14	C30C8D13
TB_ALTERACOES_ATA_SRP-2020.csv	114	87	Microsoft Excel Co...	05/04/2020 05:14	4F80B3B1
TB_CONTRATOS-2020.csv	1.675	393	Microsoft Excel Co...	05/04/2020 05:14	C6E95700
TB_EMPRESAS_PARTICIPANTES-2020.csv	7.961	2.301	Microsoft Excel Co...	05/04/2020 05:14	6C30DD57
TB_ITENS-2020.csv	695.320	110.092	Microsoft Excel Co...	05/04/2020 05:14	A00A5E01
TB_LICITACOES-2020.csv	74.225	20.264	Microsoft Excel Co...	05/04/2020 05:14	0A34620D
TB_LOTES-2020.csv	136.848	33.282	Microsoft Excel Co...	05/04/2020 05:14	7F16D5AD
TB_ORGAOS_PARTICIPANTES-2020.csv	2.124.073	129.788	Microsoft Excel Co...	05/04/2020 05:14	A069E566
TB_PUBLICIDADE-2020.csv	15.690	1.711	Microsoft Excel Co...	05/04/2020 05:14	CF0908DD

Figure 7 Files in the package for 2020 procurement data. Source: The author.

Even though the data is available for manual download, it is still possible to extract data directly from the website by using an API. The portal offers both methods for the data to be extracted. Appendix 1 exemplifies the code used for API integration.

4.6.2 Portal features

The analysis focus of the features is to understand the resources available for the citizen to consult in the portal. In the transparency portal of the state of Paraná, the following features are available to be consulted by the user, as shown in table 10:

#	Feature	Description
1	Search tab	Search tab enabling searches by keywords in the website as a whole.
2	Government Spending	Consultation about government spending including subtopics
3	Government Revenues	Consultation about government revenues including subtopics
4	Covenants	Consultation about covernants
5	Civil servants	Consultation about civil servants including subtopics
6	Procurement processes	Consultation about procurement processes including subtopics
7	Fiscal responsibility	Consultation about fiscal responsibility topics including subtopics
8	Fiscal justice	Under construction
9	Actions and constructions	Consultation about the public construction projects including subtopics
10	General information	Consultation about the legal, graphs and other subtopics
11	What is the portal	Offers information about the portal itself
12	Manual	A manual on how to use the portal
13	Glossary	Glossary with all the technical terms used in the portal
14	Calendar	Access to the professional calendar of public authorities
15	Access to information	A form for the citizen can submit a request for information. This right to request is based by the federal Law 12.527/2011.
16	Frequently Asked Questions - FAQ	This section offer answers to common questions about the portal.
17	Report corruption	A form that enables the report of corruption in the public administration by the citizen
18	Suggestion box	Allow the citizen to leave suggestions for further development of the website
19	Support	Form to submit requests or ask for help regarding the use of the portal

Table 10 Features of the transparency portal of the State of Paraná. Source: Author

The transparency portal offers specific features for understanding it and learn how to use it. It offers data from different sectors of the public administration not only accounting but participation and regulations as well. In each of the features listed in table 10, there are subtopics and sublinks for further search in the database available.

It is not necessary an authentication or login access to the portal and its topics. The website offers accessibility features for disabled users. Until the conclusion of this research, the website was in its 7.00 version. Next chapter discusses the citizen awareness of the portal in further detail.

4.7 Citizen awareness, trust and use of the Transparency portal

In order to better understand citizen awareness and use of transparency portal as well their awareness and opinion on transparency initiatives, a questionnaire was distributed among citizens of the state of Paraná. The methodology aspected is better described in section 3. This chapter focuses on the results of the questionnaire; the full version of it translated from Portuguese to English can be found in appendix 2.

The questionnaire consisted of 12 questions aimed to understand the awareness of the citizen about the transparency portal of the State of Paraná, usage of the portal, trust on the data and perception regarding OGD and transparency to enhance the control of the state. The complete results are shown in appendix 2.

Regarding the results, the question regarding the age of the respondents showed that the majority of responders were aged 18 to 25 years old, representing 28.3% of the total. The second larger group, with 26.5% of the total is the group aged 45 to 60 years old. Other age groups were represented as 21.2% for ages 25 to 35 years old, 17.7% ages 36 to 45 years old, 3.5% less than 18 years old and 2.7% more than 60 years old. It can be assumed with the age groups results that the questionnaire was distributed and received answers from different age groups enabling the analysis of the answers to not be biased by the age of the repliers.

The second question asked was regarding the main occupation of the repliers. The majority, 48.7% answered that they work in the private sector, followed by 24.8%

declaring as been working for the public sector, followed by 21.2% been students and 5.3% unemployed. Having the majority of the repliers been from workers of the private sector enables the analysis to understand better the relationship of the citizens with the transparency portal without the risk of having biased answers from a majority of replies been from public sector workers. Public sector workers are usually more aware of the state laws and regulations as they are subjected to them, including the transparency laws.

The third question was about the respondent connection to the State of Paraná. In this question, 84,1% replied that they have a connection to the state. The other 15.9% replied not having, and these last ones were skipped to question 13 as they did not make sense to ask them specific questions regarding the transparency portal of a State that they do not have connections.

Question 4 aimed to understand the use of the portal of those that are connected to the state of Paraná. From the repliers, 54% of them replied that they have never used the transparency portal. These respondents were redirected to question 10 and 11 to understand the knowledge on the transparency portal. For 44.2% of repliers that used the transparency portal, questions 5 to 9 were presented to understand their use of the portal.

Question 5 aimed to understand the frequency of use of transparency portal among those that have used the portal as filtered in question 4. For the repliers, 88.5% of them uses the portal for occasional consults. 7.7% make use of the portal monthly, and 3.8% make weekly consultations. None of the repliers answered daily consultations to the portal. This answer shows that the majority of the repliers make casual use of the portal not having a consistent schedule or routine to check or monitor it.

Question 6 aimed to understand the reason of the repliers for using the transparency portal. From the answers, 40.4% declared that they use the portal only for curiosity, not having a defined finality for their researches on the portal. 32.7% replied that they access the portal for citizenship reasons, to check what is happening in the state. 21.7% replied that they access the portal for professional reasons, their work benefits from the pieces of information available in the portal. 5.8% replied that they access the portal for academic reasons; their studies requires accessing information in the portal.

The replies on question 6. shows that the majority of the repliers still do not use the transparency portal as a tool to perform their citizenship controlling the activities of the

state. The repliers that use the transparency portal for professional means exemplifies that the information available can be used both for citizen control over the state activities as well as professional activities. The repliers that stated they use the transparency for citizenship means, even though they are not the majority still represents a large proportion of the respondents. It shows that control over the state activities is being performed by the citizens by the transparency portal.

Question 7 aimed to understand the perception of the repliers over the use of the information's available in the transparency portal to help in the prevention and combat of corruption in the public administration. For this question, the majority 78.8% answered that they believe that the information available in the portal helps in the prevention and combat of corruption, and 21.2% answered that they do not believe that the information available helps in the prevention and combat of corruption. This result shows that even though not all of the repliers are using the portal for citizenship means they still believe that it is a useful tool in the prevention and fight against corrupt

In question 8, it was asked if the repliers believed that efforts towards OGD and transparency are useful for the development of the state. In this question, 96.2% of the repliers answered that believe that OGD and higher transparency are useful for the development of the state. 3.8% of the repliers answered that they do not believe that these efforts help in the development of the state. This result shows that transparency and OGD efforts are perceived as something positive for the development of the state.

Question 9 aimed to understand the trust in the information available on the transparency portal among those that use it. 55.8% of the repliers answered that they trust in the information available in the portal, and 44.2% answered that they have doubts about the data available in the portal. This result shows that even though transparency is perceived as something good, a large percentage of the repliers have doubts about the legitimacy of the data available. This result shows that not only transparency efforts are necessary but as well as education about them, so the citizens understand where the data come from and how to double-check it.

Question 10 aimed to understand the knowledge of the transparency portal for those that answered that they never used the transparency portal in question 4. 73.8% of the repliers answered that they have already heard of the transparency portal and 26.2% replied that

they have never heard about the transparency portal. This result shows that even though the majority of the repliers declared never used the portal, they still were aware of it. As a large percentage of the repliers do not know about the transparency portal; this demonstrates that efforts for its publicity are still needed so the state can have more people at least aware of the transparency portal.

Question 11 followed question 10, aiming the same repliers of that question. In this question, it aimed to understand the reason why the repliers have never used the transparency portal. Confirming the results of question 10, 25.4% of the repliers answered that they have never heard about the transparency portal. 13.6% replied that they do not know how to use the portal and what to search there. 11.9% replied that they do not believe it is something useful for them. 49.06% replied the reason as "other" and describe the reason. Among these answers, the most common replies were related to lack of time, lack of interest and "I never needed to use it".

This shows that even though a large percentage were not aware of the transparency portal, the majority stated other reasons for not using, reinforcing the need for better marketing and teaching of the transparency portal for the citizens. As quite many replies were on the line of no knowledge on how to use the portal, lack of interest, and not seeing a reason to use it. These results confirm the need for better education about the portal usage and existence is needed to increase the citizen usage of it.

Question 12 was made to all repliers regardless of their connection with the state of Paraná or not. The question aimed to understand if the repliers believed that higher transparency and access to information are useful for the development of the state. 100% of the repliers stated that they believe that these efforts of transparency and access to information are useful to the development of the state. This result confirms that transparency is perceived as something positive for the overall development of the state amount the repliers.

Overal the questionnaire showed that still a large percentage of the population has no knowledge of the portal or use it without a specific reason for that. The questionnaire also showed that among those that use the portal, a large percentage do not trust the data available on it. As a control mechanism, such results are not positive for the transparency portal usage as a citizenship tool. Next section will discuss the control mechanics of the state of Paraná in further details.

4.8 Control mechanisms in Brazil and the State of Paraná

In Brazil, any action of the public administration is conditioned to principles expressed in article 37 of the constitution. (Brasil, 1988). The controlling of public administration and its agents is regulated by a series of laws, normative and regulations.

In the Brazilian public administration, the control is divided into internal and external categories. Internal control is understood as the one made by the entity that is also responsible for acting. (Di Pietro, 2012). External control is understood as the form of control developed by a public entity that is not in the same branch as the audited one.

The internal controls in the country follow the docket 473 of the Superior Federal Tribunal of Brazil; this docket allowed the public administration to cancel acts that might be prejudicial or corrupted as long as they do not interfere with already acquired rights. However, in all cases a judicial review is necessary.

Internal control for the Brazilian public administration is understood as any form of control developed by the public entity itself for its activities. (Di Pietro, 2012). This control is an interest of the public entity itself so it can continue its activities following the regulations and legal expectations. (Ungaro, 2014). It is expected that the high hierarchy of the entity leads the organisation following the rules and ensuring that mechanisms are being put in place to monitor and control it.

External controls in the Brazilian public administration can be distinguished in three main categories, judiciary control, parliamentary control and the control performed by the audit courts. The judiciary control established on article 5 of the constitution allows the judiciary power to monitor and audit acts from the executive and legislative power as well as the public administration and its entities as a whole.

The parliamentary control is executed in two different approaches the direct and indirect. The direct control is when the parliament or legislative houses in case of the state-level matters, can perform direct control over the acts of the executive power. A common way that this control is executed is by the formation of parliamentary committees of inquiry (*Comissões Parlamentares de Inquérito* – CPI's), widely used in the Brazilian public administration for investigations and auditing processes especially when there is political capital involved.

The indirect parliamentary control is developed by the parliament or legislative houses, in case of state-level matters, with the help of the audit courts. The Brazilian constitution gives the parliament the attribute to judge the fiscal reports of the executive chiefs after the audit court verdict. The parliament can also require audit courts to perform auditing processes and inspections. The parliament also has the power, after the audit court investigation, to stop public contracts and expenditures that might be harmful to the wheel being of the public administration.

The control made by the audit court is the financial, accountant, budgetary, patrimonial and operational control over the public administration and its entities. The audit court, both in federal and state-level, is considered an arm of the legislative power that is responsible for the operational activities of the public administration. In these courts, all the expenditures of the public administration. Including procurement processes expenditure are controlled.

5 Discussion

This chapter aims to finalise the research stage with discussions on the findings from the case study having the framework as the bases for the discussion. These discussions will enable the research questions to be answered, along with discussions aiming to achieve the research objective.

5.1 Summary of findings

During the case study development, it was found that the Brazilian public administration is well integrated with ICT solutions in its processes. The wide use of e-procurement in the country procurement processes confirmed this use of ICT in its daily processes. For a continental country like Brazil, the use of such technologies in its procurement processes represents more than just a way to make the public administration more efficient but a way to bring control and more opportunities to find suppliers for remote areas that would not have it without this technologies.

The federative structure of the country that heavily mainstem the States legal framework and administration homogenous enabled the analysis made on one State of the country to be valid as a learning outcome for the other states of the federation. Section 4.1 of the case study revealed the complexity of country history and public administration. The country has a long and rich history that is relatively unknown for most of those outside Latin America. Its unique cultural formation born from the Portuguese heritage given by the Kings of Portugal, Brazil and Algarves and enriched by the native's wisdom and immigrants cultural diversity defined the bases of modern Brazil. A country made independent already with an old complex bureaucratic; this shows that the process to transform the country, even with the implementation of democratic governmental systems, is not easy, even 197 years from its independence the country still struggles to make its public administration more efficient and free of corruption and problems.

Brazil besides been a complex and bureaucratic country, is surprisingly developed in OGD initiatives. The efforts made enabled the country to figure among the most developed countries in OGD initiatives and development. Initiatives as the transparency portal discussed in further detail in section 4.6 exemplify the efforts to make the actions of the state more transparent to the citizen. These efforts aimed to enhance citizen control

over the public administration by giving them the tools and accessibility to have access to data from different sectors including the procurement processes discussed in section 4.3

Regarding the public procurement processes analysed in section 4.3, it is possible to verify that the country has a robust public procurement legal framework with many different modalities for different needs. The principles described as guidelines for the development of the procurement processes shows the efforts of the policymakers and jurists to create a good framework for it. The wide use of e-procurement solutions also reinforces the efforts of the Brazilian public administration to modernise itself enabling a higher level of control from the citizen as this e-procurement processes are considered to be more transparent and accessible.

The corruption detection described in section 4.4 synthesised the main characteristics of how this problem shows and can be avoided in the procurement processes. This section was important to understand the corruption problem in the procurement process and was used in the development of the answers for the research questions and conclusions. It was possible to see in this section that corruption in procurement processes is not something that can happen in only a specific stage of the processes but in all the stages and even in the procurement process as a whole.

Still, on the line of understanding corruption, section 4.5 described in further details the problem of corruption in Brazil and together with section 4.5.1 the specifics of corruption in procurement processes in the country. It was possible to notice with the findings that the corruption problem in the country is not something new and it is present in all the government branches. The volume of public money that is lost in the corruption and fraud skins is considerable, and even with the recent OGD developments, the country still struggles with this corruption problem. It can be assumed that one of the roots of this corruption problem might be related to the low number of convictions for this kind of crime in the country, but further studies would be necessary to prove this causal relationship.

Section 4.6 and its subsections 4.6.1 and 4.6.2 brought to light the transparency portal of the State of Paraná; as described in chapter 3. The state was chosen, among other reason for its innovative vein and economic importance. The transparency portal research

brought findings showing that the state followed the best practices for OGD as described in the framework in chapter 2 during the development of its transparency portal. It can be concluded when taking into account the findings that the portal enables the citizen to perform control over the state activities in special its budgetary ones, satisfactorily.

The questionnaire findings described in section 4.7 showed that even though the transparency portal is available for the citizen to execute its control function over the public administration activities just a small percentage of the repliers stated that they use the portal for this finality. Another interesting fact was that a large percentage was unaware of the transparency portal or have never used it even knowing about its existence. Further research needs to be done to understand this relationship of the citizen and the transparency portal and why it is not fully used or known by the citizens.

Even though the portal is not being fully used by the citizens to control the state activities, still a large percentage of repliers agreed that transparency and efforts to increase OGD are positive for the development of the state. It is interesting the dichotomy in the citizen behaviour towards the transparency and control tools offered by the state and their opinion on it. The questionnaire results showed as well that the trust in the data available on the portal is not unanimous; further research would be needed to understand why this mistrust of the data available in the portal.

Section 4.8 concluded the case study analysis phase by bringing to light what are the control mechanisms in Brazil and the state of Paraná. This section proved to be useful in the understanding of how the Brazilian public administration and its states control the activities. It was possible to conclude in this section that the country has a complex framework to deal with controlling, but regardless of its complexity, the corruption problem still occurs. This fact to be further understood would require further research and studies to understand better what are the flaws of these controls. These findings reinforce the need for having the citizen performing its duties as the third form of control along with the internal and external state controls to reinforce the controlling process of the public administration and its activities.

With the previously mentioned in this section, the research question can be answered. It can be stated that the overall situation of the OGD in the state of Paraná is satisfactory, but the data and tools available are not being used in its full potential. The citizens could

use this data and tools to exercise their civic duty. However, it is not the case at least for the majority of the repliers from the questionnaire, with the data available and more citizens checking it locally and especially small corruption attempts could be avoided even before they were attempted in the procurement processes. Future studies can be developed on this thematic so the state could have a better understanding of how to put the citizen to use the OGD advancements that the country and more specific to this research the State of Paraná achieved with their transparency tools.

6 Conclusion

This research was developed in a moment that Brazil is passing through a process of uncertainties, lack of financial resources and reforms. In the same time, the citizen's overall tolerance to corruption seems to be getting lower and more actions from the state to be transparency, and corruption-free are expected.

This study covered just a small fraction of the public administration, governance and its technologies research field. The research universe of the public administration and e-governance studies is much larger, enabling future studies to be developed on the same thematic enhancing, even more, the knowledge available in the field.

The choice of an exploratory case study methodology and qualitative methods enabled for an overview and analysis involving different aspects from OGP to corruption in procurement processes and controls over the public administration. The framework gave the bases for the analysis of each of the proposed topics during the case study development. Research questions and objectives proposed in this research were achieved in the framework of the developed study and can be found in chapter 5.

The choice made to add different topics in the same case study allowed for an overview of different aspects in a unique perspective that combined can be seen as part of the same system, the public administration and citizenship. Corruption and control mechanisms are important topics in the discussion of the uses of OGD and transparency initiatives. The citizen ends up being the key common element among all these topics. This research showed the importance of citizen participation in the public administration controlling to avoid the problems related to corruption and helping in the construction of better democratic societies.

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Appendix 1 – Integration with Transparency portal – List of procurement processes example

```
EndPont      ws/licitacoes/listarlicitacoes
Method GET
Mandatory parameters:
<<datapublicacao>> = Publish date. ex: 01/01/2017
Return       One JSON with the list of procurement processes

Requisition
http://www.transparencia.pr.gov.br/pte/ws/licitacoes/listarlicitacoes?datapub
licacao=<<datapublicacao>>

Retorno - HTTP 200 OK
{
   "retorno": true,
   "mensagem": "Operação realizada com sucesso.",
   "quantidade": 1,
   "listaLicitacoes": [
      {
          "modalidade": "Pregão Eletrônico",
          "num_ano_edital": "4/2017",
          "situacao": "Homologado",
          "objetivo": "Contratação de pessoa jurídica para fornecimento
upgrade tecnológico para a solução de armazenamento de HIGH-END",
          "orgao_responsavel": "CELEPAR - Companhia de Tecnologia da
Informação e Comunicação do Paraná",
          "registro_preco": "NÃO",
          "criterio_julgamento": "Menor Preço",
          "valor_maximo_inicial": "649.966,89",
          "valor_homologado": "649.950,00",
          "data_abertura": "20/01/2017",
          "data_homologacao": "08/02/2017",
          "local_disputa": "",
          "protocolo": "14.399.691-3",
          "composicao_processo": [
             {
                 "numero_lote": 1,
                 "caracteristica_lote": "Contratação de pessoa jurídica
para fornecimento upgrade tecnológico para a solução de armazenamento de
HIGH-END",
                 "situacao_lote": "Homologado",
                 "valor_maximo_inicial_lote": "649.966,89",
                 "valor_finalizado": "649.950,00",
                 "economicidade": "0,00%",
                 "empresa_vencedora": "06.241.557/0001-09 - INGRAM MICRO
TECNOLOGIA E INFORMÁTICA",
                 "listaItem": [
                    {
```

```
                            "item": "208.39590 Serviço de instalação,
configuração e ativação ao equipamento storage IBM DS8870, UNID. DE MEDIDA:
Unitário",
                            "quantidade": 1,
                            "valor_unitario_maximo_inicial": "70.069,00",
                            "valor_unitario_finalizado": "70.950,43",
                            "orgaos_participantes": [
                                {
                                    "orgao_participante": "Órgão Participante
1"
                                }
                            ]
                        }
                    ],
                    "listaEmpresaParticipante": [
                        {
                            "empresa_participante": "06.241.557/0001-09 -
INGRAM MICRO TECNOLOGIA E INFORMÁTICA",
                            "classificacao": "1"
                        }
                    ]
                }
            ],
            "listaPublicacao": [
                {
                    "veiculo_publicacao": "Diário Oficial do Estado",
                    "numEdicao": 9858,
                    "data_publicacao": "05/01/2017"
                }
            ],
            "listaOrgaoAderente": [
                {
                    "orgao_aderente": Órgão Aderente 1,
                    "listaCarona": [
                        {
                            "lote": "Lote 1",
                            "item": "Item 1",
                            "quantidade": 1,
                            "valor": "10.000,00"
                        }
                    ]
                }
            ],
            "listaRenegocicacaoLote": [
                {
                    "numero_lote": "Número Lote 1",
                    "item": "Item 1",
                    "valor_renegociado": "10.000,00",
                    "fornecedor": Fornecedor 1,
                    "data_alteracao": "13/09/2016",
                    "protocolo": "14.399.691-3"
```

```
            }
        ],
        "listaAnexoEdital": [
            {
                "arquivo": "EditalPE64-2016.pdf",
                "tipo": "Edital"
            }
        ],
        "listaContrato": [
            {
                "contrato": "433/2017(CELEPAR - Companhia de Tecnologia da
Informação e Comunicação do Paraná)"
            }
        ]
    }
  ]
}
```
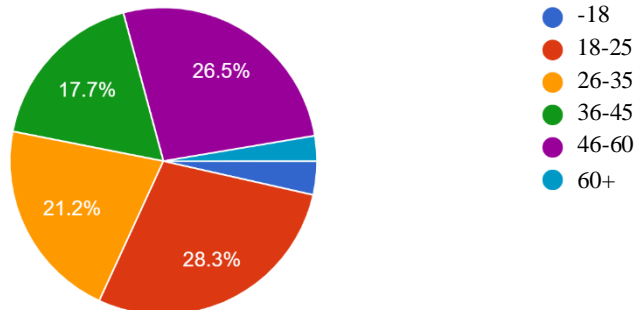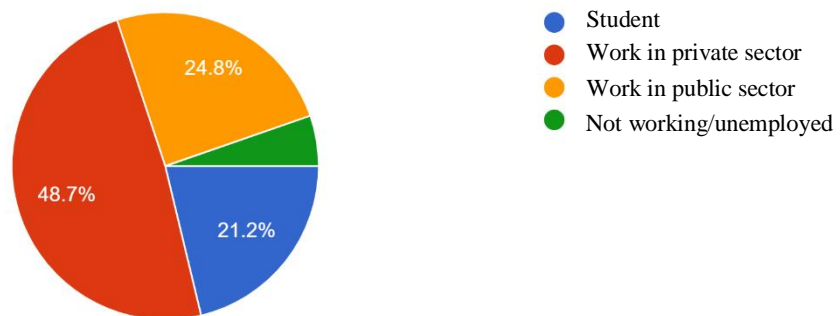
Code extracted from

http://www.transparencia.pr.gov.br/pte/pages/informacoes/webservices/webservices_lici

tacoes.jsf?windowId=d58
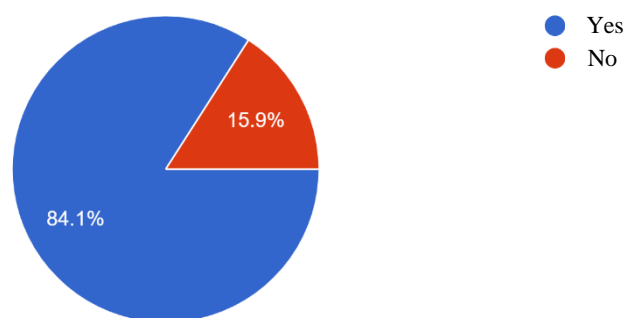
Appendix 2 - Questionnaire results
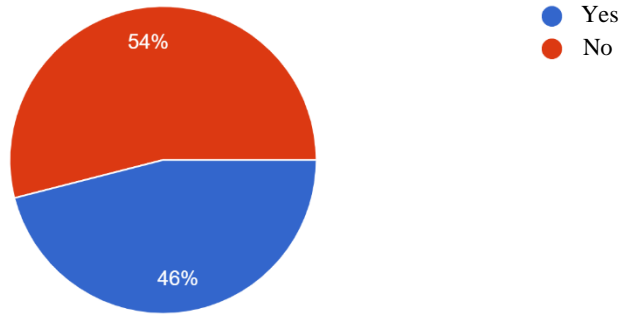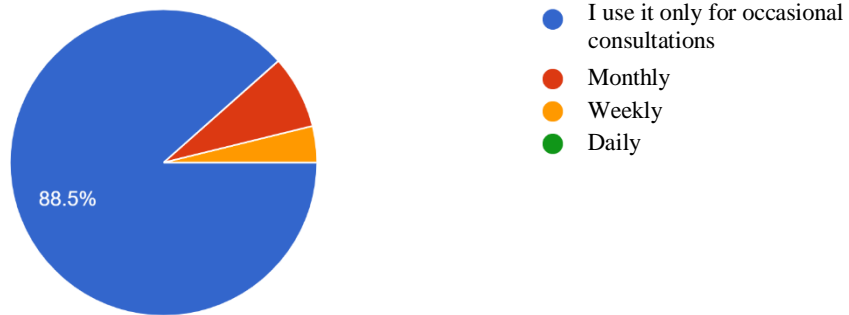
Q1. Specify your age group

Legend:
- -18
- 18-25
- 26-35
- 36-45
- 46-60
- 60+

Values: 26.5%, 17.7%, 21.2%, 28.3%

Q2. What is your main occupation?

Legend:
- Student
- Work in private sector
- Work in public sector
- Not working/unemployed

Values: 24.8%, 48.7%, 21.2%

Q3. Do you live or have work/familiar connection with the state of Paraná?

Legend:
- Yes
- No

Values: 15.9%, 84.1%

Q4. Have you ever used the transparency portal of the state of Paraná?

Legend:
- Yes
- No

54%
46%

Q5. What is the frequency of your usage of the portal?

Legend:
- I use it only for occasional consultations
- Monthly
- Weekly
- Daily

88.5%

Q6. What is your main interest in the portal?

Legend:
- Professional. My work requires or benefits from the data available there
- Academic. My studies require or benefits from the data available there
- Citizenship. I use the portal to monitor what is happening in my state.
- Curiosity. I use the portal to check random information without a specific reason

40.4%
32.7%
21.2%
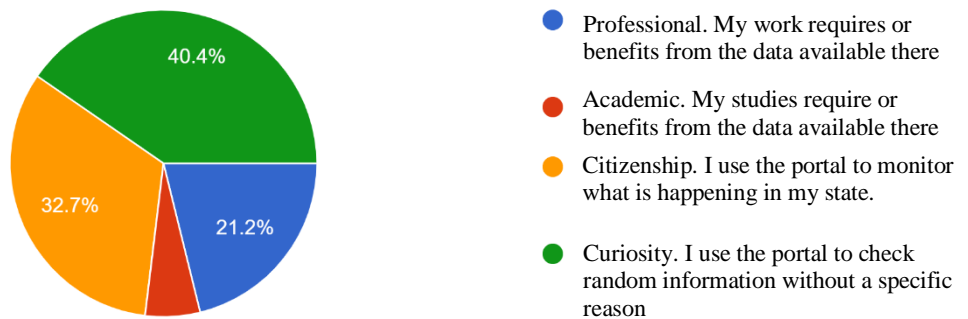
Q7. Do you believe that the information on the portal helps to fight corruption?
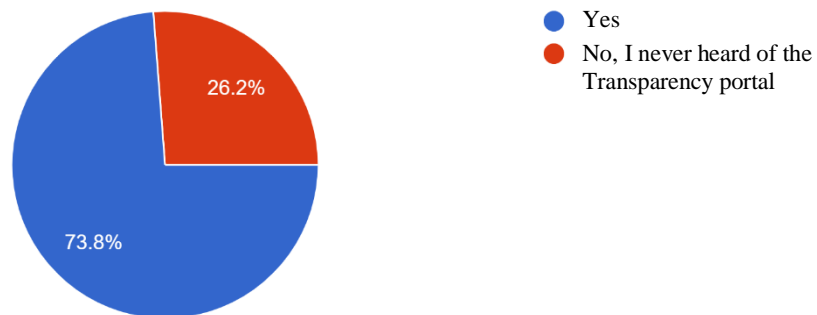

Legend:
- No
- Yes

78.8%
21.2%
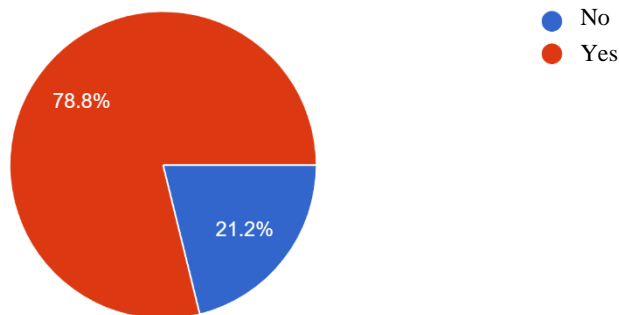
Q8. Do you believe that efforts for greater transparency and access to information are useful for the development of the State?

- Yes
- No

96.2%
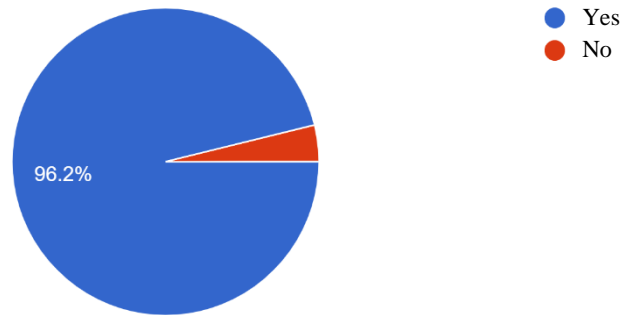
Q9. Do you trust the information presented there on the portal?

- No, I have doubts on the data presented
- Yes, I trust in the data presented

55.8%

44.2%
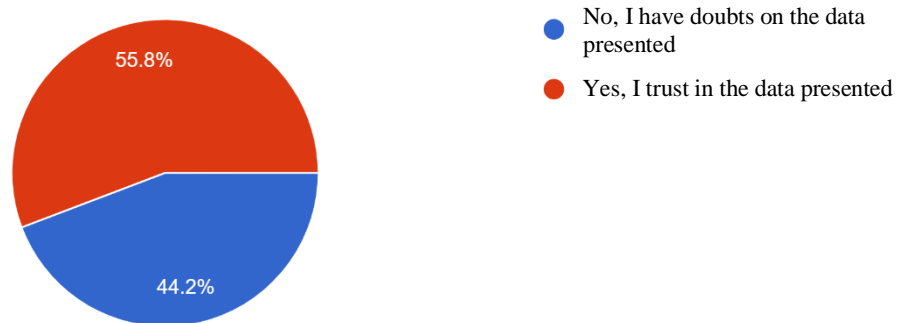
Q10. Have you ever heard of the Transparency Portal?

- Yes
- No, I never heard of the Transparency portal

26.2%

73.8%

Q11. For what reason you have never used the transparency portal?

- I don't know what is the Transparency portal
- I don't know how to use it and what to search there
- I don't believe is useful for me
- Other, specify.

25%

14%

12%

49%

Q12. Do you believe that efforts for greater transparency and access to information are useful for the development of the State?
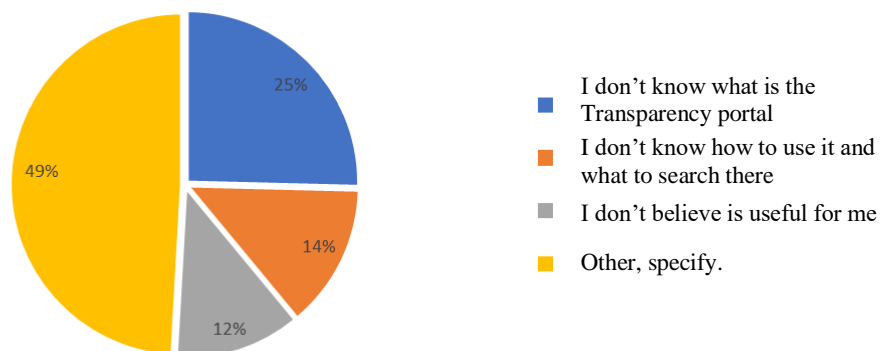

- ● Yes
- ● No

100%