



**AALBORG
UNIVERSITET**



AALBORG UNIVERSITET
STUDENTERRAPPORT

DEPARTMENT OF PLANNING
REDSBURGGADE 14
DK-9000 AALBORG
MASTER THESIS GROUP 9

The Case Study of the "*MetroBus Mondego*"

A questionable case of Sustainable Infrastructures

Master Thesis

3. June 2024

Written by Diogo Rafael Silva Baptista

10. Semester, Techno-Anthropology

Aalborg University, Department of Planning, Rendsburggade 14, DK-9000 Aalborg Denmark

<http://plan.aau.dk>

Cover photo: Master Thesis Diogo Baptista

Copyright © Aalborg University 2024

The content of the report is freely available, but publication (with source indication) may only take place by agreement with the authors.



AALBORG UNIVERSITET
STUDENTERRAPPORT

Department of Planning
Rendsburggade 14, 9000 Aalborg
DK-9000 Aalborg
<http://plan.aau.dk>

Title:

The Case Study of the "MetroBus Mondego"

Subtitle:

A questionable case of Sustainable Infrastructures

Theme:

Master Thesis

Project Period:

Master Thesis - Spring 2024

Project Group:

Master Thesis Group 9

Participants:

Diogo Rafael Silva Baptista

Supervisor:

Lars Bo Henriksen

Copies:

1

Page Numbers: 67

Regular pages: 65

Date of Completion:

3. June 2024

Abstract:

Background: The MetroBus Mondego has been approved and it is so close to be concluded, but there was a lot of controversy surrounding the process of building the platforms where the vehicles are going to circulate, regarding the sustainability, the sustainable values, conceptualization of the terms sustainability and human values.

Methods: I conducted my fieldwork with interviews, via Microsoft Teams, with the major responsible for the MetroBus Mondego, two citizens that representatives of environmentalist groups and citizen that does not have direct access to the MetroBus, but have been directly affected by it. I was not able to be present physically on site during the fieldwork, but I was able to collect information with people that are somehow connected to the MetroBus.

Results: Accordingly to the empirical data gathered during the fieldwork period, I could point out that there were some lack of consideration for some the sustainable values, mainly regarding the Environmental Sustainability, but also some points associated with the Economical and Social Sustainability. There were also a lot of conflicts between citizens and the Municipality and planners regarding the human "Values" and the lack of "Communication" about the "Facts", which includes ethical and aesthetics considerations, from the Municipality.

Conclusion: After the analysis and, subsequently, discussion of the empirical I have deducted the existence of lack of transparency and lack of consideration in certain points and values of sustainability during the management and planing of the building process of the infrastructure of the *MetroBus Mondego*. Afterwards, it was mentioned that there is a need for evaluating the numbers and functionality of the final product to see if it is actually sustainable.

DIOGO RAFAEL SILVA BAPTISTA

dbapti22@student.aau.dk

Table of Content

1	Initial Problem	2
2	Problem Analysis	4
2.1	Mondego Metrobus Project	4
2.2	Municipalities, besides the capital district	7
2.3	What could have happened if this administration went forward with this?	8
2.4	General perception	8
2.4.1	Public transportation also being affected	10
2.5	Field of Investigation - Setting	10
2.6	Literature Search	11
2.7	Delimitation and problem statement	11
2.8	Problem Statement	12
3	Method	13
3.1	Access to the field	13
3.2	Positioning	14
3.3	Interviews	15
3.3.1	Semi-structured interviews	16
3.4	Data handling	16
3.4.1	Transcription of the Interviews	16
3.4.2	Coding	17
3.4.3	Informants	18
3.5	Limitations of Methods	19
4	Theory	21
4.1	Post-Phenomenology	21
4.2	Conceptualization	23
4.2.1	How can we perceived the reality?	23
4.2.2	Language games	25

5	Analysis	26
5.1	Understanding the concept of Sustainability	26
5.1.1	What is Sustainability?	27
5.1.2	What influence have sustainability in this project?	32
5.1.3	What are the costs of the building process of the infrastructure?	36
5.2	Perspective on the potential threats of the MetroBus Mondego, to the city planning and environment	40
5.2.1	How many trees were cut down?	41
5.2.2	Was there any citizens being expropriated from their houses?	42
5.3	Political game behind this project	44
5.3.1	Was there any interaction between citizens and the municipality/planners?	44
5.3.2	Logic of the municipality	48
5.4	Summarization of the Chapter	50
6	Discussion	52
6.1	Sustainability and sustainable project	52
6.1.1	Can projects, in general, be sustainable?	54
6.1.2	Is sustainability a concept or a field of research/work?	55
6.2	Secret Political Game	57
6.2.1	Where is the transparency?	58
6.3	Is the MetroBus the one true choice?	59
6.3.1	Are the citizens going to use the MetroBus?	61
6.4	Biases on this project	62
7	Conclusion	63
8	Future Work	65
	Bibliography	66

Introduction

On the past four years, the city of Coimbra, located on the Beira Litoral (Coastal Beira) region of Portugal, and the smaller municipalities in the surroundings of Miranda do Corvo, Lousã and Serpins, have been a target of an abrupt change of their original plan. This means that a lot of their parts were changed because of the introduction into those locations of what is called an innovative and sustainable public transportation system, designated by MetroBus.

The MetroBus Mondego, which affects the regions around the Mondego River, have been the centre of a lot of controversy, specially in the way of how the citizens and some local media see this project and the building process of the platforms and infrastructures, where the vehicles are going to circulate. First of all, there was a need of re-qualifying the old railroad, but also of alter the original plan of the city of Coimbra. There was a need to put down trees and buildings, besides the fact that the roads and accesses to the cars and inhabitants to certain places were blocked for long periods of time, causing a lot disruption of the daily lives of the inhabitants.

During the execution of this project, I am going to dive into this kind of disruptions, but also question the sustainable background of the project, focusing more on the sustainability of the process. This happens in the view of the fact that the project of the MetroBus Mondego is not a finished product yet.

According to the events that have been transpiring along the past three to four years, due to the decisions of planning team of the Municipality and from the Infrastructures of Portugal, S.A., whom are deemed responsible for the planing and execution of the project of the MetroBus Mondego. There are certain decisions that are being questioned by some of the inhabitants that live within the city of Coimbra and citizens that do not have direct access to the MetroBus, but are being indirectly, or directly affected by the building process.

Other point relevant, there are relatively high number of citizens that are also concerned with the environmental implications of the MetroBus. But also a lot of their complains are concerning the lack of political consistency and transparency from the people that are in charge of taking the decisions about the building process of the infrastructure of the MetroBus.

Chapter 1

Initial Problem

In modern times, there is a need to adapt the way person uses transports, towards a more sustainable way. One of the main points is what kind of transports that each individual, or a family, uses. It is common knowledge that the using public transports is more efficient and sustainable in their own right. But also raises some questions, mainly the question of kind of infrastructures are needed for this type of public transport, or the type of fuel.

One of the key observations that I have with my time that I have been spending around Denmark, in comparison to my home country, Portugal, is that the Infrastructures are better developed in a more sustainable way. One of such cases is the public transports.

The type of public that I am going to be focusing is the Metrobus, also known as MetroMini. A Metrobus is defined by [Council \(2019\)](#) as a bus, usually that moved by electricity, in an system that is design for the urban rapid transit, that could potentially extend to other urban locations near by the main urban area.

This could lead to a vast quantity of questions, related to sustainability and infrastructures, without questioning the purpose, but yes the process of planning and construct the infrastructures needed.

In the specific case of this project, in my hometown of Coimbra, located in the Beira Litoral region, is having a huge project related to the construction of public transport of this kind. Which is a project that is trying to use the old railroads of the city and the municipalities, on the surroundings, to establish a web of transportation of MetroBus.

As a former inhabitant of the city, this seemed as an interesting project, but along the way of the constructions, there were some problems related the planning of this infrastructure. There are problems mainly with people being relocated, because the planner needed that space to build a path to obstruct the main path way of the cars, but that was no real, anyways the path for the cars was, and still is blocked and, besides that, the people needed to be relocated, in this case people who were living for decades in that same buildings, and also people who were working in stores on that same buildings.

Another key observation is the fact the planners and constructions sites to create path for the metro bus passed through some green areas, that creates the dilemma of green sustainability, which they needed to cut trees that were on that green site for generations, and near by an historical park of the city. Which goes against some of the points of not only green sustainability, but also goes against the public opinion and the public notion of aesthetics.

The second problem that is apparent, not only as a former inhabitant, but also as friend from people that are living in the city, that has a problem with the traffic. In a lot of the constructing sites, does not

allow people that are driving to pass through some street, creating even bigger traffic lines and, also, does not allow people, whom are walking, to pass through a longer path. This creates an unpopular opinion about the aspect of the project.

It is relevant to mention that, in certain parts of the constructions, including the parks near by the river, downtown, some of the construction workers sadly lost their lives.

There are a fair amount of problems that are raised, from my own perspective, but moreover is important to notice, how the people that are living in the city, and in the surroundings of the city, being affected by this project and their opinion about it. Besides their opinion, how the planners see this project and if they see it as a sustainable project.

There are some questions that need to be answered, specially regarding sustainability. Not only the sustainability of the construction of the MetroBus, but also if in the future the results are sustainable in terms of usage, if people are really willing to use it and if it is accessible to everyone.

Chapter 2

Problem Analysis

This chapter is going to be to contextualize the background of the Project, meanwhile bringing up important facts and perspectives that are going to be also analyzed *in posthumous* chapters as the analysis and discussion. A lot of this topics are important to be brought earlier on to have a background elucidation of the Project MetroBus Mondego.

2.1 Mondego Metrobus Project

The Project MetroBus Mondego is a project that was aligned and planned with the previous administration of the municipality. Only starting the construction effectively with the new administration, after the municipal elections, back in 2021.

The project has the goal, after some deliberation from the Infraestruturas de Portugal, S.A. (Infraestruturas de Portugal, S.A.), along with the previous administration, of constructing and reuse the old railroad of the train the used passed inside the city until the municipalities around Coimbra. The majority of the municipalities are within the same district. Meanwhile, the original plan was to reclassify and better the condition to use the railroad, that was not used for 13 years, for a trains like it was done before. The next picture shows how they expect to reconstruct the old railroad, which is already on the process of being built:



Figure 2.1: How the new way for the MetroBus Mondego "railroad" is projected to be
[Admin \(2020\)](#)

The Project, according to the official webpage of Infraestruturas de Portugal, S.A., this project has values related to sustainability, environmentalism and comfort. Extending the line of this Metrobus

for 48 kilometers, connecting the municipalities of Serpins, Lousã, Miranda do Corvo and the city of Coimbra. (Investimentos 2022)

The next picture perfectly shows which locations the MetroBus is being driving though:



Figure 2.2: Where does it pass?
Investimentos (2022)

It's also important to focus on it's perception, and how people that perceive the project. According to the Infrastructure Association S.A., the project is described as:

- "Promote the sustainable mobility, through the implementation of an attractive and competitive mobility service, operated by electric vehicles, leading to modal transfer to a mode of transportation that is more energy efficient and with lower greenhouse gas emissions.";
- "Enhance the inter-modality of the transportation system in the region of Coimbra, creating conditions for physical, ticketing, and tariff integration";
- "Promote the connection of the municipalities of Lousã and Miranda do Corvo to the urban center of Coimbra without transfers, with excellent safety and reliability conditions, reinforcing the economic and social integration of the territory."

(Investimentos 2022)

This brief description of the infrastructure shows that the planners and the administration of the municipality believe in the fact that is project is futurist and sustainable, by itself and at its fullest.

They show this, by instead of using trains, the planners have decided to construct a new path for an electrical bus, calling it "MetroBus Mondego". This lead to a series of plans to take out the metal and wooden stacks that belonged to a the train and reconstruct, and build an infrastructure that made possible for the electric bus to pass on the line of the train, even demolishing some buildings where some people lived and had businesses on.

Other parts of the city were affected, such as the Dom Manuel de Braga park, located in the Emídio Navarro Avenue, which is one of the oldest and most emblematic parks of the city, during the month of August of the year 2022. Some the trees that were located there, were centuries old and were part not only of panoramic view of the park and location, but were also part of the story of the city.

OS PLÁTANOS

O Metrobus, mais tarde Mobilidade Ligeira de Superfície, teve os seus planos iniciais em 1990, portanto há cerca de 31 anos. Desde que me conheço sempre apreciei os majestosos plátanos da Avenida Emídio Navarro. Já existiam há muito, talvez séculos, antes de se iniciarem os planos para o Metro Mondego, embora estes já tenham barbas . Não seria natural que fossem levados em conta na definição do trajeto da Mobilidade Ligeira de Superfície para que não deixassem de emprestar tão grande beleza aquele tão visitado local ?

Coimbra tem sido fértil em não tornar conhecido o seu fabuloso passado histórico. Se os plátanos forem abatidos será mais um golpe em algo tão apreciado desde há centenas de anos.



Figure 2.3: Sadness and disapproval of citizens about the trees with centuries in that location, published on Facebook (Teixeira 2022).

Other sites of the city were also affected in terms of the panoramic views and in terms of ways of transit, not only for people that enjoy to walk, but also people that use a car, or public transports as a way of personal transport.



Figure 2.4: Rage from the citizens about the trees with centuries in that location, published on Facebook (Teixeira 2022).

In early 2022, there were projected to be putted down almost 663 trees in total, according to some sources. Which it showed the discontentment of the environmentalists and some of the citizens, showed in the previous pictures.

This could, for sure, lead to a great discontentment from the inhabitants from the regions and buildings that were affected by this project. Besides the fact that the ecological groups expressed their rage towards this project, in the local papers, intensively questioning of the full sustainability concept, behind the MetroBus Mondego project. After this manifestation about the cutting of trees, the municipality showed that they are willing to re-plant trees, three times the value that they had cut, in the areas affected, but could be potentially avoided if the planning was better executed.

2.2 Municipalities, besides the capital district

There are more Municipalities that have decided to join the project, and have been affected by this project. The majority of them are smaller municipalities, and smaller in terms of area and population wise. This means that a lot of them have a more forest density and more nature in their surroundings. Because of that nature plus the fact that this railroad, like it was mentioned in a prior section that wasn't used for a long period of time, that connected those municipalities to the city. This allowed the growth of ecosystems in that area where the trains operated.

This project, that has the goal revitalized the old railroad, plus this fact to switch the rails, it destroyed a lot of the ecosystems that were created, even cutting along the way, a total of 663 trees that were expected to be putted down, showing the lack consistency in terms of sustainable urbanization and environmentalism, according to Furtado (2022).

2.3 What could have happened if this administration went forward with this?

First thing first, this project was signed by the previous administration of the municipality, which was formed by the Socialist Party, back in the year 2020. Which was the year before the municipal elections, at the national level, including the autonomous regions of Azores and Madeira.

The deal, according to the [Investimentos \(2022\)](#), the monetary investment of the municipality, including expenses were about 61 510 133,32 €, which the municipality used about to pay some of this expenses with the approved crowded funds about 43.200.779,75 €, and the rest was financed by the municipality itself.

After this agreement, there were the elections, where the Social-Democratic Party won the elections with a majority, which made possible to elect a Social-Democratic President. At some point there was a possibility up in the table to get off this deal, but because a monetary compensation was needed, in the order of the 100.000.000€, which is about almost the double of the expenses that they would and will have with the project.

The information concerning this values was not explicit. This means that the values that were shown in the website of the MetroBus were not very clear and gives the idea that those are the values for the whole infrastructures, including the vehicles.

2.4 General perception

Since the beginning of the constructions, the planners and the municipality, had a vision to re-qualify not only the old railroads, that hadn't been used for about 13 years, but also destroy buildings and certain paths nearby urbanization's, where people live. That created a lot of difficulties of access not only to people that were, and still are, living in certain parts of the city, but also almost imposed an relocation from the people that were living in the buildings that were destroyed, when the majority were senior citizens. One of the examples is the next picture that shows a platform for the MetroBus to pass underneath the building that was reconstructed.



Figure 2.5: Projection of the restructured area, after demolishing buildings (of Coimbra 2022).

Also its important to realize that several local businesses that were relocated or were shut down because of this project, such as:

- Shoe Makers;
- jewelries;
- tailors;
- local drug stores;

The majority of these stores were here for generations, that were there when my grandfather and father arrived from Africa, back in decade of the 70's, in the 20th century.

On other hand, there was a project that I was included, when I was in doing my bachelor's, called "À Baixa", which is a project that envision to re-qualify the Downtown part of the city, because it the region that was "dying", because a lot of people left, or died, with the main reason being the fact that the majority of the inhabitants were senior citizens.

But with this re-qualification, that began back in 2014, there was lot of the local markets and people was coming back to this part, and some older people was starting to get to their renewed houses. This potentially helped with the demise of this project and this project stopped because of the metrobus project.

Meanwhile, a lot of the constructions happened simultaneously, as a result of this a lot of the roads and streets weren't accessible to cars, or even by foot. This means a lot of people took other paths causing a lot of traffic and huge traffic lines, which took a long time to get from a place to another for a lot of people. On average a person took about 15 minutes to get from the Vale das Flores (Valley of the FLoweres), which is a region of the town, to the hospital, without a lot traffic. Right now, because of the

traffic, people tend to take 30 to 45 minutes to get to the hospital. This also could be a huge problem to first aid ambulances that is trying to assist a person, or in case of an accident where people are injured or needs urgent care.

2.4.1 Public transportation also being affected

The majority of the university students do not possess a car or even a bicycle. In the specific case of the bicycle, there are not any kind of bicycle driveways in the city because it would need a lot of constructions and it would congest the traffic even more. Also the city it's built on a hill so it's not sustainable to have it. But in this case, students rely a lot on public transports, in this case transports which is the main transport of the people, besides cars. As it was mentioned earlier, there is a lot of traffic, and the buses are always behind schedule, which is going to not be so beneficial for the students who want to get on time for their classes. Either they pay for a Uber, or they go by foot, which is are both bad options, because they live far from the university department where they have classes and they have to expend a lot of money on going back and forth.

This also affects other people that also need to use the public transports to their respective jobs, and have families to take care of, and they need their jobs so they need to wake up even earlier than expected just to take a bus to be on time for their jobs, and not get stuck on the traffic.

2.5 Field of Investigation - Setting

It is important to notice, for me as a active researcher, that isn't possible to travel back and forth to Coimbra, which is my hometown and Aalborg. It would take a long time and a lot of monetary resources. This happens for the reason that one location is in Portugal and other is in Denmark.

It would take at least almost a day of travelling and several hundreds of euros just to travel.

This means that my approach needs to be different in terms of contacting my informants, in Portugal. As it was stated earlier, I will need to contact the Municipality and, if it is possible to contact the Portuguese entity responsible for the infrastructure for this type of projects would be perfect. But also it is important, as an anthropologist to have the perspective of the inhabitants of the city that were directly, or indirectly, by the project that is here referred. The opinion of the citizens are important to establish a comparison between the perspective of the planners and the people that could potentially can use the MetroBus in the future and if it is practical to use it.

A point that is relevant is that the administration now in the municipality of Coimbra, is different from the administration that accepted this project, in 2020. That is one of the game changers, that also raises some questions regarding the team of planners and designers, if the team is the same or the planners were changed after the administration. Or even if the project planners were send by the Infrastructures Association.

2.6 Literature Search

The literature search for this specific case study, is really based on news from papers that have published their own opinion about the MetroBus. Actually at some point, the project heavily criticized by the local press, because of several work accidents related to the workers that were building the infrastructures and the areas surrounding the infrastructures. I needed to relay on the local papers and Facebook posts that were made about the popular opinion.

In terms of evidences, investments, funding and projections about the projects, I needed to search about pages about the project, specifically related with this project. On this specific case, there were three main sources, in terms of web pages and information's related to project, and how people that planned it:

- The Metro Mondego webpage;
- The Municipality of Coimbra, also known as CMC;
- The Infrastructures of Portugal, S.A.

Consequently, the data that I obtained is from entities that are responsible for the planning of the territory, but if it is to get even deeper in this case and try reach out for the other municipalities, the information related to it are in their respective websites of the municipalities.

Besides this first approach and contextualization of the project, there is a need of contextualization on *"What is the definition of sustainability"* and *"What is a infrastructure?"*, as product of that *"What is a sustainable infrastructure?"*, this type of questions are going to be analyzed, in further of chapters. But none of less important questions to do a search on online library, such as Google Scholar and library from Aalborg University and search for material.

The majority of the materials, by materials I mean articles, books, project, etc. is literature that I had in my possession before. This happens because what I needed is within the knowledge that obtained in previous semesters, from lectures, at Aalborg University (AAU). That knowledge, that I obtained previously, fits within this project is being conducted, but, as always, I can not just be inside the zone of comfort.

2.7 Delimitation and problem statement

The outlined areas, specifically sustainability, which enhances a wide spectrum of areas in modern academical and non-academical societies, at the moment is a common goal for scholars, municipalities, even leadership group of countries.

The focus of this case study is to question and conclude if the process of building the infrastructure of MetroBus Mondego is in fact a sustainable or not as an whole. This process is taking place since November of 2020 to the present, but had previously a deadline of inauguration on very last day of the year 2023. Of course, as good habit of the people of Portugal, the deadline was postponed an additional

half year, 6 months to be exact. The purpose of this case study it is not to question the integrity of the project, but yes to explore the perspectives of both the planners and people behind this project and the inhabitants of the region where the infrastructures are being built.

From this point I already established a communication with the people from the entity which is responsible for the building of the infrastructure and planning it. Besides them, I also established contact with the municipality, which is the one the needed to approve the funds to be paid for the structural changes in the city, as well as the regions that are being affected by the constructions of the infrastructures. Of course, the contacts can not finish here, because the critical mass of the population of Coimbra are university students, whom lives in the town 10 out of 12 months in the city. The students that come from all-around of the country and world, that could potentially be affected by this. So I tried to contact the Academical Association, that represents the students, but also the ecological section group, which is group within the Academical Association.

2.8 Problem Statement

After a deliberation and consideration for the facts shown during the present chapter and the initial problem, I became more aware that are some differences in terms of the sustainability of the infrastructure that is being built, which appears to be sustainable result wise, meanwhile could not be sustainable in terms of building it. Which is one of my questions.

So my Problem Statement is ultimately divided into two Research Questions:

"How sustainable is the infrastructure of the MetroBus Mondego?"

"What are differences between the inhabitants and the planners, relatively to the sustainability of the MetroBus Mondego?"

Chapter 3

Method

This chapter will present the methodical approach chosen regarding how I collected and treated the data that I obtained for this project. The methodical approach was chosen based on the insights the collected data could bring and the observation that we had in the Municipality of Coimbra, specially the team responsible for the planning and implementation of the Metrobus, but also people that were affected by the process of construction of this project. Meanwhile I was entering the field, I had in my mind the sustainable values, regarding the construction and implementation of the infrastructures regarding the Metrobus Mondego. This could be deemed as wrong, in terms pre-conceived notions, but there is a need to have an idea of what a person is going to, before entering the field.

3.1 Access to the field

The thematic of sustainability prompted my interest last semester, when I began my internship in September of 2023. It is in fact one of subjects that is being approached around of the world, specially related to the Sustainability of Resources. Also I was inspired by the fact that my hometown was developing, and still is a developing a MetroBus on the city, but also some municipalities that have a railroad that connected those to the district capital. It was clear for the planners and the municipalities, for an extended period of time that the old railroad needed to be re-qualified, to have a better connection between smaller municipalities in the surroundings of the bigger municipality, which is a city.

This happened for the reason of the inhabitants of the smaller municipalities have their jobs in Coimbra, and always took between 30 to 45 minutes to get to their jobs by their own cars, a lot of people spend above 40 euros of fuel in their cars per week. So the municipalities and the Infrastructures of Portugal, S.A. try to find a more economical and more sustainable solution for the inhabitants of the region, in this case the MetroBus Mondego, which guide by a electrical bus, in the re-qualified railroads.

Here the main keywords are the municipalities in the surroundings, but also this started to bring up some questions about the population in the city, during the process of construction. The reason behind it is that the people that are mainly affected by the construction are the ones the are living in the city, because a lot of this train rails passed in the middle of the city and also was need to create new paths for these electrical buses to pass.

After some investigation, I have started to contact people that are responsible for the planning process and construction of the MetroBus, in this case the municipality of Coimbra, to try figure out what entity I needed to contact specifically to obtain answers to my answers related to the sustainability of the project. In the end I have started to talk with the President of the Council of Administration of the

MetroBus Mondego, who is an Civil Engineer and is responsible for the administrative and approval of all of the paper work and plans for this project. In my line of thinking, I also needed to talk with people that represented in some sort of way, the people that are living in the city, to analyze their opinion about the sustainability, to know how the process of constructions of this infrastructures had affected their daily lives and also, to know what they expect in the near future, when this project is finish are they willing to use it on the daily basis, but also if they have the same opinion about the sustainability regarding the MetroBus. One of the people that represents a critical mass of the population, being the university students, so I contacted the president of Academical Association of Coimbra, who is the maximum entity that represents the students, because he was elected by democratically. In this case makes sense to contact him, because the students represents at least 30 to 40 percent of the city population. There was an attempt to contact the Ecological Student Group, within the Academical Association, but there was not any response from their part, of any sort.

It is also important to have the clear idea that the population isn't only represented by the Academical Association, so there is also a need to contact the an association, or entity, that speaks for the inhabitants of the city, if not the citizens themselves.

3.2 Positioning

While entering the field, I choose not to choose a specific theoretical approach. This means that I will let my observation and field material reveal it for itself and adjust a analytical lens for itself. The reason behind this is not restrict my work and myself, and not have any type of pre-concept and pre-conceived notion affect my writing and my perspective, meanwhile interviewing my informants. Nevertheless, I understand and know how I wanted to position myself in the field and while I am on the field.

When I interviewed the President of the Council of Administration, who is my gatekeeper on this project, there could potentially be different perspectives and a shock of opinion. This happens for the simple fact that I am a former resident of the city and used to see all the town as it was and hadn't the mindset to change how it was. Also, I was a frequent walker in the town, I was used to see, what it was appealing to me, a certain specific type of panoramic view that was appealing for me and the people that would do the same, in this case people that used to live in the town for decades. As a result of this, there is some biases from my side, but at same time as an anthropologist I need to "**undress**" those potential biases, that could impact the project negatively.

There is a necessity for me, as observational individual, to be open minded to change of the panoramic view that I am so used to see. Consequently, hear the people that are directly involved in the project, and those whom are directly and indirectly affected or not by it.

3.3 Interviews

During the process of writing this project, and to obtain a better empirical, I used Interviews as a methodology, to answer the questions that I have regarding the MetroBus and, most importantly the respond the best way possible to my research questions.

The interviews that were conducted by me, were done with the representative and planner of the MetroBus Mondego, who is the President of the Council of Planners of the MetroBus Mondego; The President of the Academical Association of Coimbra, which represents 25 thousand students, besides the 10 thousand students from the Polytechnics Institutes that are independent from the University of Coimbra and the Academical Association. This represents 25 percent of the city, from the 140 thousand inhabitants from the city. Two citizens that are near by the MetroBus stops and 1 citizen that is not close to the terminals of the MetroBus. This happens for the reason to compare the access to the transport, because it looks more towards from the outside to the inside of the city.

All of the interviews were held online, because it was not possible to go back in forth to Portugal and Denmark, as the fact that it would be extremely expensive to me as person. It is also relevant to mentioned that was used a recording device, formally set up, only with the consent of the informants. My informant, who is an important person within the planners, he described me how was the evaluation, their perspective of sustainability, how the investments, the money needed and money spent in the infrastructures. Specially how the planning within the city was really planned, regarding the expropriation of houses and putting down trees really happened, because some information was not very clear on the Infrastructures of Portugal, S.A. was not very clear. Also how the process of evaluation of the planning process was done before and during the building of the infrastructures for the "BTR" (Bus of Rapid Transit). Besides this, what were their projections of users and how sustainable this system of public transportation could be potentially, in the medium and long term.

The intention of the interviews with the President of Academical Association, one citizen and Association of Climate Activists that are openly against the MetroBus, is to have a better perspective of people who either represent a good portion of the population, and citizens that are closer to the terminals or are not too close to the terminals, and doesn't have direct access to the terminals. The aim is, therefore, to understand the point of view of the managers. By adopting this type of approach, it is made possible for me to illuminate the multiple aspects and experiences either from the planners and citizens, that are living within the city area, have during the process of building process, and also what they expect from the final product. (Tanggård and Brinkmann 2020)

In my interview guide, first of all are in my native tongue, which is portuguese, because the people that are being interviewed don't feel comfortable to speak in english. Second, my interview guides, for every single informant were designed to focus on their opinion and experiences and perspectives on the project of the MetroBus. The reason behind this is to acknowledge the reality from a person's point of view, as well as find meaning in the person's experience (Tanggård and Brinkmann 2020).

3.3.1 Semi-structured interviews

During the structuring of the interview guide, it was taken into consideration the profile of the informants and what they are for the city and to the project. This type of interview gives to the interviews, in this specific case me, and the interviewees, in this case the informants, the freedom needed to develop certain topics that can be important and relevant for this project, without following the order of the questions, that are on the interview guide to the letter, give the opportunity to adjust the questions to the situation and timing of the interview. Each individual that was interviewed have their respective professional and personal background and, therefore, they have different kind of positions regarding MetroBus, specially if it is sustainable, the accessibility and if it is worth it for every inhabitant to use it or not, which is really important to have in this type of project. This was taken into account during the interviews and it will be brought up during the coding and analysis of the interviews, as well as in the chapter of the discussion of the results. Because of that, the interview guide is customized for each individual's role in the project, incorporating open-ended questions. My objective is to encourage an exploratory approach that encourages the discovery of different types of insights regarding the Infrastructures and the Sustainability of the same Infrastructures of the MetroBus. (Creswell and Creswell 2014)

3.4 Data handling

In this section, we describe the various processes we used to handle the empirical data from the interviews the were done during the execution of this project. This includes transcribing the interviews and coding the material. Empirical evidence for the chapter of the analysis will consist of responses given by the informants.

3.4.1 Transcription of the Interviews

During the interviews, as it was mentioned in previous sections of this chapter, it was used a recording device, with the device of the informants that were interviewed. After the process of interviewing the informants, I went through the process of transcription of the interviews, to guarantee that the interviews are coherent and readable. To make sure that this two qualities and, necessary, guidelines are followed, I based myself in [Tanggaard and Brinkmann \(2020\)](#) book, and established a criteria that are specific, and allowed me to show that the interviews are coherent, during the transcription process. During this process, for instances, the interjections like "oh", "uhm", and similar expressions, were omitted. Additionally, all of the interviews were held in Portuguese, this helped me to gain and obtain a better understanding of what the informants were trying to say and transmit to me. Also allowed me to analyze better what they were trying to say, and consequently, meanwhile writing and using the statements of the informants I will translate to English in the most correct way possible, in terms of grammar and synthesis. This happens to have the original and correct meaning of the sentences. This means that there is a need to keep true to what the informants have said during their respective interviews, so consequently, the translation and transcription are as close to the original as possible, according to [Tanggaard and Brinkmann \(2020\)](#).

3.4.2 Coding

I have decided to code the three interviews transcriptions. From my perspective, coding is a process where its possible to organize, interpret and structure my observations of the interviews. This happens because I wanted to have a different representation of the central themes, concepts and ideas, that were possible to be identified in the interviews and, consequently, the transcriptions, to analyze and discuss in posthumous sections and chapters, after I highlighted them (Delve 2022). The *codes* that were chosen based on themes that were relevant to analyze and to have an understanding of what is the conceptualization of certain definitions, from the people that are being classified as informants of the project. This have the reason that people of different backgrounds have different opinions and perspectives on certain points, like sustainability related to the project of the MetroBus Mondego. This happens, for the reason that people are on opposite side of the spectrum of the sustainability related to the MetroBus Project. The codes, that I defined, are assigned colors and applied to corresponding lines in transcriptions. These codes are then copied to a different document, to give easier access to the lines that were transcribed. The codes of that I used in the interviews are following:

- **What is the meaning of sustainability?**

Conceptualizing sustainability is one of the major points of this project, because a perspective of one individual, or a group of individuals, might not be the same for other individual, or group of individuals. It depends on the atmosphere where those individuals were shaped knowledge wise, also having the impact of the language game behind it. For the simple reason of the in one language could have one meaning and another other meaning, just have an example.

- **What is the perception of the project MetroBus Mondego?**

Within the codes that are being presented, this could be the one that is more general, being also more subjective, because involves not only the professional perspectives, but, somehow, shows the personal perspective on the project. Discovers the personal tendencies of the people and towards type of sustainability they are leaning on. Also, what they think about this project is affecting in terms of planning.

- **What are the costs?**

This code is following the same line of thinking, not only, in terms of economical costs, but also at what cost is this needed to be built. The people being expropriated, trees being putted down. Which, consequently were replanted. Putting in a simple manner, at what cost is this MetroBus is being built.

- **What is the purpose of the MetroBus?**

There are also other codes that have necessity to have an understanding. Why this idea emerged? Or where it came from? To have more realistic idea of the purpose of it. To have prospective into the future, if really it is worth it, not only for the population where the biggest changes are occurring, but also in other places.

- **What are the biggest challenges of the MetroBus?**

This code seems, at the first glimpse, a code straight what of the interview for the planners, but also is an interesting point for the people that are living in the region that are being affected by the constructions. They probably have faced, and are still facing, some challenges regarding changing their daily routines, but also people who work at commercial places.

These codes were decided with a theory in my mind. This happens since this case study have a lot concepts involved regarding the MetroBus Mondego. Concepts that are going to be analyzed and discussed in further chapters of this project.

3.4.3 Informants

During the fieldwork, I have four different informants, that have access to. The informants have different backgrounds and affect or are being affected by the MetroBus Mondego.

The informants that were interviewed are:

1. President of the MetroBus Mondego;

This informant is the person who is responsible to manage all of the operations regarding the MetroBus, in my hometown of Coimbra. Having a Bachelor's degree in Civil Engineering and a post-graduation related to technology.

- **Interviewed on d.20/03/2024**

2. President of the ClimAção Centro;

This person is one of the responsible members of one of the informal climatic group that criticise the project of MetroBus Mondego, questioning its environmental impact. This informant is interested in climatic and environmental themes, but is an english teacher.

- **Interviewed on d.09/04/2024**

3. Vice-President of the ClimAção Centro;

This interviewee is the second in charge of one of the major association that criticise the MetroBus Mondego. Who is a Software Engineer, with a particular interest in sustainable infrastructures and climatic changes.

- **Interviewed on d.09/04/2024**

4. Citizen of Coimbra

This inhabitant of Coimbra, is one of the people that does not have direct access to the MetroBus Mondego. Who has a background as Software Engineer, but also expressed his discontentment publicly.

- **Interviewed on d.01/05/2024**

As expected, I have according to GDPR legislation, I gave the possibility to the informants , that were interviewed, to become anonymous throughout the process of my project in view of the fact of their right to privacy of their data.

It's also relevant to mention that, also, I am going to use relevant data that was done on the 9.Semester, specially regarding statements from informants that were used in on that project by [Baptista \(2023\)](#). The rules of the GDPR were also used in this case, as it previously stated the informants have the right to become anonymous.

The people that were interview and stated in the project of [Baptista \(2023\)](#) were:

1. PhD Student working at the Game4Green;

This person works in the Digital Transformation Research Group and, consequently, in the Game4Green Project, while is doing the her PhD Thesis with heavy emphasis in Behavioural Anthropology and Computer Science

- Interviewed on 13/10/2023

2. Caretaker of the Digital Transformation Research Group;

This informant is a secretary by training, but also has Digital Transformation and Data and Computer Science back on her PhD, so has a good understanding of the concepts that are inserted in the project of Game4Green

- Interviewed on 20/11/2023

3. Head of Studies of the Department of Informatics of Roskilde University;

This informant, who is my contact person within the Research is Computer Informatics, Computer Science and Digital Transformation specialist by training and is a teacher at the Roskilde University and is the leader of the Task Force of the Empirical Data and Literature Group.

- Interviewed on 22/11/2023

[\(Baptista 2023\)](#)

All of this informants are people that work at Roskilde University, they cemented themselves as academical researchers, which in this case is important to have better understanding concerning certain points of the concept and fieldwork of sustainability ([Baptista 2023](#)).

3.5 Limitations of Methods

Every type of methodology have their own limitations and challenges, specially regarding the contact of the people that are living in the city and the smaller municipalities surrounding the city.

At first instance, the biggest challenge was trying to talk and communicate with the President of the Academical Association because he is an position that needs to be in every activity related to the students and also students. It was really difficult to do it, but unfortunately it was not possible to interview him and the President of Ecological Group of the Academical Association. Interviewing them it would be a good option, because having one of the biggest representatives of one of the majorities of the city population, like it was mentioned before that corresponds to 25 percent of the population and how the sustainable it is and, in the future, this project can be helpful and sustainable, and how the constructions are affecting the life and will affect the life of the students, it could be really helpful for

my project. But also it is important to obtain the opinion from the other citizens, that actually lives and do their life in the city and the surroundings.

Other major limitation, it is the fact that I have not much margin of maneuver in terms of going to the sites, at this moment, and it will be even more difficult to have an interview physically, which in the majority of the cases are not as comfortable to do a online interview, as for example a Face-to-face interview, which is a limitation by itself, and being of the rules of interviewing, as method, is to leave the informant to be comfortable during the interview. This happens, because the majority of the population in the Region of Coimbra, and in Portugal generally, is that the its inhabitants are older people and don't feel as comfortable to do online interviews. This is due to the fact that they do not have a deep understanding, or any understanding at all about technology, in the majority of the cases.

Chapter 4

Theory

This chapter introduces the theoretical framework that will be used throughout the analysis of the empirical data that was collected during the fieldwork. It is important to know that this project, as it was mentioned before, it has a lot of concepts that have the need to be deconstructed and conceptualized.

4.1 Post-Phenomenology

As a relatively new approach to me, post-phenomenology has always intrigued me as a scientific approach, but nonetheless is an approach worth of a section in the present chapter. Post-phenomenology, from my point of view, can be considered a theory, somehow generalized for projects that have a deep technological understanding.

In this approach, technologies, in general, are perceived as mediators in terms of the relations between humans and their respective worlds. Instead of being considered extensions of the humans or being as an opponent to the humans, they need to be recognized as a way for that connections, between the humans and technologies, with the world.

Post-phenomenology indicates that technologies are an instrument, almost like a *"insightful cain"*, meaning that helps formulate human perceptions and actions, but also the human experiences and actions. One of the major authors, that helps to deconstruct the post-phenomenology approach, Don Ihde, in his book [Ihde \(2009\)](#), addresses the approach to technology as an examination of multiple categories of mutual relations between the human beings, technologies, and the world. This perspective its not exclusive to the digital world, can also be applied for the cases in the physical world, the *"real world"*, here is where the notion of the modern infrastructure, or technological infrastructure have a foot print of the post-phenomenological perspective. In the modern world, the subject of sustainability, or this field of research has a huge impact from the technological developments, where are prime examples from this relationships between humans and technologies, the types of bridges that are being picked in this section.

The investigation, that is exemplified in [Ihde \(2009\)](#), the author pictures and demonstrates the courses of action which technologies have a predominant task in the human-world relationship, differing from being *"personified"* and being *"read"* to be more *"interchanged with"* and being *"in the framework/background"*. In terms of personal, or embodiment, experiences, technologies, that somehow are very connected to sustainable infrastructure, because in modern society we almost can't disconnect them, have the ability of forming a unity with a human being or vice versa to establish a relation with the world. There are some humans and technologies layouts that are more personal and more intimate

than the kind of relation mentioned before, while others have a more powerful, in terms of context that influence this type of relationship (Baptista *et al.* 2023).

In the case of the designers, in the case of this particular project the planners of the infrastructures that are going to be needed to sustain the technology behind it, do not solely design products or in this case the final product which is the paths where the Bus Rapid Transit, but also project human practices and experiences as well. Ihde (2009) defines that products, of any sort, that need a design and a planning project, do not only have to be functional, interactive and have aesthetic qualities, but also be mediators of the human lives that have an imminent contact. This made the planning and the designing of the technologies and, consequently, the infrastructures as an activity that has an high levels of responsibility. Specifically, in terms of technology of any sort, will be a tool to help to shape the human actions and experiences and will, accordingly, have an impact that can be understood in ethical terms. As a consequence, alongside with functionality, interaction, and aesthetics, reconciliation (or mediation) has a primary place in the conceptual foundation that unconditionally and clearly guides design activities. Consequently, it deals with one of the highest debatable, ethically wise, themes in the modern times, in the so called *Western Culture*, which is defined as human autonomy. This can not, or should not, take the free will of the human beings, which can be translate there is no reason to giving up on human freedom, the mediation theory of Verbeek (2015) conveys the fact that technologies constantly mediates practices and experiences in modern times. Instead of searching for self-determination against the so called powers of technology, Ihde (2009), to answer this contrast, proposes that we, as researchers to seek to develop responsible ways of mediation. Normally, the people that deeply involved with technology such as: users, designers/planners/developers and policy makers are almost obligated, or must be entitled to read, design and facilitate technological and infrastructural mediation's, in order to be able to deal in a critical, innovative, and productive process with powers that remains unseen otherwise (Baptista *et al.* 2023).

The majority of these concerns were also present in a different project, that I took part in the 8th semester of the Masters Degree, in Baptista *et al.* (2023), because of the ethical concerns behind the institution of the HipGuard, so I believe there is a lot of similarities regarding the ethical aspects behind both of these projects. Along with this ethical similarity, there is some conflict between stakeholders and lack of consideration of the "Reality".

In this specific case of the MetroBus Mondego, the focus of the project is different, but also the project of the MetroBus by itself. I am more focus on how the people and potential users are affected, how the planners conceptualise not only the technology of MetroBus, but also its infrastructure that is being built, as well as the practices that are being taken, from both sides (Verbeek 2015).

4.2 Conceptualization

One of the points that is essential to understand the upcoming chapters is the point of conceptualization. Which is one of the central points of the post-phenomenology perspective mentioned earlier.

The perception of a concept is an integral part of this project, specially regarding the concept of sustainability. Not every single individual or community has the same definition or conceptualises a word, such as sustainability, the same way.

During my search for a reason for people not having the same basis for sustainability, because it can be defined as far as a *"Buzzword"*, I came across with the two different works from Bo Henriksen about conceptualization, [Henriksen \(2004\)](#) and [Henriksen \(2016\)](#). Here it is mentioned that social science that are focused on the changes of the social settings of a community have the requirement of having a theory and methods that can back up all the changes, and describe those and make the actual reader understand why they are happening. These theories and methods should capture the character of the process that is taking form.

According to [Henriksen \(2016\)](#), concepts are considered to be a form of knowledge and capabilities, which can put into words a description and, as consequence, make people understand the realities that those words having putted on and life words. Meanwhile, the terms conceptualisation and the conceptualising methods are tools that might be useful to create useful concepts. This process can be done in multiple ways, according to [Henriksen \(2016\)](#).

4.2.1 How can we perceived the reality?

One of the major questions that I always brought up to me is the concept of sustainability. This can be triggering for a lot of communities, since the scientific community, which as a norm uses the english as base to communicate between them and other scientific communities abroad of their own space that they are inserted on. By this I mean, according to [Henriksen \(2016\)](#), concepts and its definition can vary according to the *"reality"* and *"context"* that are being used into. As I was mentioning before, there is differences in the meanings, but in some cases are similar, in the case of the english version *"Sustainability"* and the portuguese version *"Sustentabilidade"* does not exist to much of meaning difference as result. In the meantime, the german word for sustainability (*"Nachhaltigkeit"*), means prolonged effect, which it is not too different of the french definition of sustainability, which mean durability and durable (French: *"durabilité"* and *"durable"*); and the danish word of sustainability (*"Bæredygtighed"*) means take care of what already exists. So there is a different approach for the different realities. Also is important to take into account that reality might be the way how an actor, user, designer, society or community perceives the world ([Henriksen 2016](#)).

Reality have four points that are essential to have in mind meanwhile mentioning:

1. Facts

Are considered to be mundane realities, artefacts, chronicled facts, what is, what is stated, what as been mentioned, what the people want and the actions of the people. One example can be

the Treaty of Kyoto, Japan of 1997. Where a treaty was sign regarding the emissions of gases and sustainability. Facts can be regarded as present and past, that have been registered, via text, pictures, etc.

2. Logic

it is a key characteristic of a fact to have certain logical way of explanation and understanding. Without this logic, the reality that is being presented would not make any scientific, or barely, any sense at all. Would be considered casual, emotional and disproof of options. Logic is used when developers, social scientist, planners want to create some cohesion between facts, concepts and abstractions. It's possible to divide the concept of logic into four types: Material, formal, social and subjective. All of them are, to a certain extent, connected to a action, or a "reality" of our world, regarding techno-social sciences, making them inter-connected, like a web of meanings as Max Weber explained.

3. Values

This constituent of reality can be describe as what a individual finds important, not only to their personal agenda, but also to their professional/academic vision. Values are representing how the people distinguish facts and logic, by attributing a value, or a meaning to a certain extent, to the reality. Being considered one of the main focus to the certain investigations, into the world.

4. Communication

Communication is an essential part of the reality, for the reason that without it there would only be silence between the members that constitutes a society. With this in mind scientific communities would not be able share with other partners their vision into the world and reality. This point scrutinize the relations between human beings, being one of the most relevant is the dimension of the moral and ethical values.

(Henriksen 2004)

This last remark, brings the understanding that the reality can be conceived as the worldview that makes it possible for the actor to comprehend and act in his, so called world and do what he thinks its the most correct and what he wants from his view (Henriksen (2016) in Henriksen (2004)). The reason behind this is as Lars Bo describes it, that reality and the understanding of it, depends from what is called in german "*Virkelighed*", the worldview, understanding and act. Which is one of the most important tasks of the social science(Henriksen 2016).

4.2.2 Language games

Language, as it is possible to observe in previous is fundamental part of the Conceptualization and Conceptualizing method. In the western civilization, mainly in the scientific community, the majority of the scientific terms, or terms used in general, have either a etymology that was originated from the Old Greek, or either from the Latin. It can be considered a critical point to understand the upbringing, or the origin, of a name or term that classifies certain objects and/or actions. But as we developed, a lot of the languages decided to adapt some of the words into their own vocabulary, which as consequence could give somehow, a different kind of meaning to the original version of the term in question.

According to [Henriksen \(2016\)](#), language is described as speculative and dialectical. Speculative being referred as the stable character of language. The term speculation, after a brief analytical thinking and search from Bo Henriksen, mentioning the work of [Kestenbaum \(1992\)](#), becomes part of a question and answer, where there is a speculation, which means asking questions about the circumstances of the world and realities. This, is considered by [Kestenbaum \(1992\)](#) in [Henriksen \(2016\)](#), as a hermeneutic experience with its question and logical answer.

An author that mentions the hermeneutic experience, not only simply regarding a single hermeneutic experience, but yet a double hermeneutic experience, a double meaning in a more simplistic way to put it is Anthony Giddens, in his work *"Hermeneutics and social theory"*, he mentioned the wink of one eye, potentially, could have a double meaning, depending on who was directed to and what are the really intentions behind it. This can perfectly suits in terms of words and usage of language, that is it can be referred as language games, depends on the hermeneutics, or as [Giddens \(1982\)](#) refers as the perspective behind the meaning and the speculation of the people that are present in that moment.

This hermeneutic experience, as it was mention previously, can affect the perspective of sustainability, if it is being inserted into a process of constructing an infrastructure and also its goal, or if it is just a goal that, the planners/developers that are building and using certain products, want to achieve.

Besides what it was mentioned previously, there is the perspective of the lifeworld, that is important to the understanding of the language games. [Henriksen \(2016\)](#) mentions that language games are an integral part of the lifeworlds perspective, because we can not separate one from another. Language tells us a story, from a certain a dialect perspective, a story from the behind and the meaning of a concept, a lifeworld as it is possibly be said. As it was mentioned before, the case of of *"Sustainability"* it has a different meaning in every language such as Danish, English and Portuguese ([Henriksen 2016](#)).

Chapter 5

Analysis

This chapter of my project aims to set forth a exhaustive investigation of the empirical knowledge that was collected during the fieldwork time frame and analyze it. The purpose of this chapter is show the prominent trends, patterns and relevant insights related to the MetroBus Mondego, from my informants, whom are important pieces to this part of the project. This chapter, is going to be written with theories that are mentioned previously, mainly because they are adjacent. It is important to not confuse them, but yes to have in mind that they are considered to work combined for a better understanding of the present chapter. This chapter is going to be divided in three different sections:

1. Understanding the concept of sustainability;
2. Perspective on the potential threats of the MetroBus Mondego, to the city planning and environment;
3. Political game behind this project;

These sections, that are going to be developed through this chapter, have originated from questions, that were directed to the informants of this project, and answers that were giving by the same during the interviews. In the case of this project are presented as codes and themes. As it was mentioned before, my intention towards this division is to accentuate the point of views and insights obtained from the people that were interviewed, related to the questions that I had in the beginning of this project.

5.1 Understanding the concept of Sustainability

The definition of the concept of *Sustainability* could be argued from a multitude of perspectives and points of view of the *Reality*, depending with who are we talking with, as always. This happens due to the fact that people have different experiences, both professional and personal. This could play a role in how a person defines the concept of *Sustainability*. Meanwhile, I have some general idea of what it is, the informants have their particular way of putting them into words and define it. This happens because of each individual "*reality*" and "*perspective*" on it. This means there is no consensual definition on what sustainability is. This could be observed in all of the interviews, it becomes evident that defining the term *sustainability* is very subjective, it depends heavily on the experiences (academical or personal), and opinions of the community, or some cases individual persons.

In this part of this chapter, I am going to explore the beliefs and opinions of the informants, and assess to the empirical data that was collected, regarding the concept of sustainability, and how was defined, how it influences the project, if the process of the project is perceived as sustainable. Another point that could potentially be crucial is the type of vehicles that are going to be used in the future, if they match the sustainability standards of the sustainability of both the planners and the citizens.

5.1.1 What is Sustainability?

In this part of the analysis, I am going to be exploring the insights from the informants, specially regarding this concept that is really hard to defined. This happens for the reason there is no consensual definition of Sustainability, having an huge influence of the hermeneutics of reality of the people. One of the points to be emphasized, during this section is the fact that, during the theory regarding Conceptualization, from [Henriksen \(2016\)](#), the topics of *Reality* and *Values*, plays a role into the definition of sustainability.

For me, there is three perspectives, on this specific case. But there is a fourth part that could help understand the point of view on the definition of the concept of sustainability. The perspective of the research group, mentioned during my own work in [Baptista \(2023\)](#), during the 3rd semester of the Master's Degree. Here it was essential to understand how the concept of sustainability works.

During this time, I started to understand better the meaning of sustainability, but also it depends on the background of the people that were working in this Research Group.

It is important to understand the background, or where the term sustainability originates from. The Head of Studies of the Research Group at Roskilde University, who was an informant at [Baptista \(2023\)](#), explained me where it was originated this concept:

"I wanna say 1972, but you'll have to check it better by Gro Brundtland which was back in the days, the Norwegian prime minister. And she was the one who began discussing sustainability and the importance of kind of the thinking of CO2 emission and the environment. The importance that in the political agenda. So she was one of those who started talking about this and trying to push for it long ago. It's only now that we're kind of seeing more and more initiatives and organizations are working towards it. And there's a little bit more political kind of engagement to these initiatives, etc. So it has taken quite some years before it has even worked. In reality. I think the popular understanding of sustainability is CO2 emission and the environmental aspect of it. That is at least what the people typically would assume sustainability means."

- **Head of Studies of the Department of Informatics of Roskilde University** in [Baptista \(2023\)](#)

It is apparent that the concept of sustainability originated from the political field, more related to the emissions of CO2. Regarding the industrialization of the western world, putting in sort of worried state the westerns countries in terms on how to lower those emissions. She also states that a lot of

people today still believes that sustainability is regarding only this environmental themes. Which is still what a lot of people, to this very day, that defined themselves as environmentalist and citizens that are worried about the future of planet, still believe is the definition of sustainability:

"What I'm asking about sustainability, it's obvious to us, the issue of sustainability has to do above all with the environment, it has to do with biodiversity in the city, it has to do with climate issues, because what the Metro, so we haven't talked about this here yet, here, with all these cuts in rims that we're going to have or that Metro has provided, we, in the future are going to have a lot of heat islands in this city, heat islands, and those heat islands will only be mitigated in the next 30 or 40 years when those trees actually grow. So that's what we're focusing on, the biodiversity of the trees that have been lost, the heat islands. That's the focus, biodiversity, the birds that have been lost, heat islands, carbon footprint. But obviously we don't look at things in isolation."

- Co-Founder of the Environmentalist Group ClimAção 2

This statement by one of the founders of the environmentalist group, which is composed of concerned citizens, shows that people still think that sustainability is mostly related to the environment.

In contrast, from a perspective more related to technology-related research groups, the Head of the Studies, who is a very tech savvy person, added to her own definition of sustainability goes beyond that:

"[...]for me, sustainability means not only CO2, it at times made me might mean long term. So thinking a bit more long term about, for example, with the project management, there are discussions about the words of SHCI and Digital sustainability. In that setting, it means reuse and long term. How to design projects that may be or elements of projects may be used, how tools and some elements and specific types of components in a project can be reused. So that's a form of sustainability we use. And another element is how to think in terms of kind of long term. So how to ensure that projects are have long term effects or that have the projects results, maybe may have long term impact on the users. And this comes, for example, within csw computer sport and corporate work, I feel there are a lot of discussions on sustainable research projects there."

- Head of Studies of the Department of Informatics of Roskilde University in Baptista (2023)

As it is possible to observe that the concept of sustainability developed through time and had could be observed as field of study, giving birth to other niche and specific technological fields of studies. Besides this, there is a concern that technology will help people to understand the concept of Sustainability, as Ihde (2009) that uses the fact of technology might be used as the "*Insightful cain*" needed formulate global human perception of this concept and actions related to this concept. That is why people such as the Head of Studies, who are tech savvy and work within the technological research field, have such an point of view on *Sustainability* needs technology to be developed, in modern times.

Meanwhile, an PhD student that was working directly with the Head of Studies of the Department of Informatics of Roskilde University, that just finished the Master's Degree, and was just starting her PhD Degree. Her own vision of sustainability, in modern times is:

"...sustainability as a word has become a *"buzzword"* that I'm kind of. I'm a little iffy about it when it's used in general conversation and in public discourse, in commercials and in the media, because it's my experience that a lot of people don't really understand what sustainability as a word means."

- PhD Student at Research Group in [Baptista \(2023\)](#)

As the PhD Student states, there is a tendency to see that people use sustainability as fashionable word, or a *"buzzword"*, to use as a commodity, to attract all of the people, but not everyone is able to understand what it really means. But by her own academical point of view sustainability is:

"Sustainability to me is it has all of these strings and connections to the green agenda and to the environmental agenda, and wanting to help the environment and wanting to be more environmentally sustainable, but sustainability is not in and of itself about the green agenda. So if you ask me, you can create a company that is sustainable without this company being in any way environment differently. And you can also create a company that is violence and friendly without it being sustainable at all. So sustainability to me is the ability to create something that will be able to support itself, that by virtue of existing is producing what it needs for itself and can then use what it is producing to keep itself going. And that is basically at the point where it is in. Okay? I guess when you scale it down and you don't consider what it needs to put out, it is basically just having something that is capable of producing enough that it can keep itself alive. That is sustainability in an organism."

- PhD Student at Research Group in [Baptista \(2023\)](#)

It is clear that the PhD student has a definition, or in this specific case a perspective on sustainability there is more related to manage the resources that someone, or some identity has to keeping it alive, having a more relatable to the german definition of sustainability. This will of course go to the point of the concept of *"Lifeworlds"* and *"Language Games"*. This concepts will have the influence of what the *"Reality"* is of people, such as the PhD student and the Head of Studies at Roskilde University.

This perspective of a Research Group, that is used to work within sustainability has a very specific definition of what it is, but they agree upon a definition of this concept and what it can include. The specific use of *"buzzword"* shows that it was mentioned earlier, but there is a notion behind it that is more connected with resources, but can have many more factors that can affect the fact if a project, or artifact, is or is not considered to be sustainable. It looks like a more expandable concept that can be affected by numerous areas, but also might affect other areas, such as planning, or even businesses. Such thorough definition, which resulted of a common technological savy opinion, commonly built within this small community, but also they shared between them, in some points, their one interpretation of

the *"Reality"*, which the upbringing comes from sharing the same core *"Values"* and *"Logic"*, having a healthy discussion of the *"Facts"*, which are negotiable. In the meantime, being the tech savvy people as they are, they do not question and share the core *"Values"* and *"Fact"* that sustainability, nowadays, needs technology to be developed.

Meanwhile, the project of the MetroBus Mondego has two perspectives, at the maximum three perspectives that can judge the sustainability of a project, the citizens, the environmentalist groups, that are formed by citizens that are worried by the structure of the city the environmental handicaps that this project might impact on the city of Coimbra, and the planners of the project of MetroBus Mondego.

The President of the MetroBus Mondego has a very clear definition of sustainability, and how this concept plays a role in the project that is responsible for:

"Sustainability can be seen in many dimensions. Sustainability can be seen in many dimensions. There's social sustainability, where the project makes a relevant contribution, for example, that public transport is a system that contributes much more to social cohesion, that can be used by any citizen with much easier access and much less intrusive from an urban point of view, because they don't require the provision of space for parking and they don't require as much circulation space either, so from a social point of view they are more sustainable because they contribute to greater social cohesion, to greater integration between the different layers of the population, between the different citizen groups. There's also the question of environmental sustainability, which is obviously much more sustainable. Mobility by public transport, in particular using electric vehicle systems, insofar as both greenhouse gas emissions and pollutant emissions are much lower than with an engine-powered vehicle, and therefore, in this sense, because it is public transport, it is much more efficient from an environmental point of view, it is much less aggressive, if you like, from an environmental point of view and it is much more environmentally friendly, it's much more efficient from an environmental point of view, it's much less aggressive, if you like, from an environmental point of view and it's much more environmentally friendly because, as well as being public transport, it's a public transport system with electric traction vehicles, which are therefore more efficient and have much lower emissions of pollutants and greenhouse gases. In addition, there's the question of economic sustainability. economic sustainability I think it's still at the moment, at There aren't any yet. only when we start operating will some figures come in. We'll be able to have positive certainty about some of the figures. It's not my quest, but in any case what is a given on a global scale is that public transport, from an economic point of view, is also more sustainable. What does that mean? This means that mobility costs in societies that use public transport more intensively are much lower than those in which mobility is essentially supported by individual transport vehicles. In other words, cities that have a higher percentage of public transport, that have a modal split more

favourable to public transport, to be strict, have lower mobility costs, substantially lower, than those in which mobility is essentially supported by private transport. Finally, perhaps the easiest case to present is the comparison between two American cities such as Los Angeles and New York, where the former is essentially more supported by individual transport. It has much higher transport and mobility costs than New York. It has similar populations, at least of the same order of magnitude, but in fact it's just a paradigm to demonstrate what has been scientifically or technically sufficiently or abundantly demonstrated. This is to talk about economic sustainability too, of course."

- President of the MetroBus Mondego

This extensive statement made by the President of the MetroBus Mondego shows how well he has mind all the variables that can affect the sustainability of a project as a whole. For a planner like, who has background in Civil Engineering, he has a clear and elaborate definition of how a project, such as the MetroBus Mondego could be sustainable and which points can be affected by such as:

- economy
for example, selling tickets
- social
how accessible is the project/product to the public and how its affect their life
- environmental
how its affect the environment as whole, on that region.

It seems a more complete version of the definition of sustainability, not focusing in just one point, clearly showing that parameters of the United Nations has a huge influence on planning, in the countries that are members of the European Union.

We could observe where the perspective of everyone regarding the concept of sustainability. One of the main points that is observed is that the community of researchers can potentially observe sustainability, or to achieve sustainability we need to use technology achieve it, just as a "*technological cain*" to achieve it, as Ihde (2009) suggested it. Taking into account the users, or the potential users of any kind of artifact in the future, so the ethical concerns regarding people are still taking into consideration.

On the other hand, there is a more global/general point of view from the MetroBus President and citizen, living outside of the city of Coimbra, regarding all the point of what constitutes a society and how a project might affect it, in terms of sustainability.

However the citizens, that are part of the environmentalist group, take a more specific approach towards sustainability, being worried about the ethical approach of the project, regarding the environment. Which can also can include the aesthetic perspective in this case when regarding the green environment within the city of Coimbra. This can be seen that their *Values* and their perspective on the *Facts* can be centered on the green agenda of a project like the MetroBus Mondego.

5.1.2 What influence have sustainability in this project?

It is important to understand sustainability, from all of the people that are included, or affected indirectly by the project of the MetroBus. One of the people that were affected, and is still being affected by this project is a citizen that lives outside of the city, and zones where the infrastructures of the MetroBus are being built, but he needs to pass by certain parts within the city to go to his working space. He states that sustainability for him, is:

"Is it being able to fulfill, or suppress, what the population needs without generations to come, the environment or anything else being affected.[...] Trying to maintain the ratio between needs and costs and the future, keeping everything together without any problems for either party."

- Citizen, that lives in the surroundings of the city

This citizen of the region has a definition of sustainability that almost match the definition of the ones mentioned previously, but putted in a more simplistic and better understanding for him and everyone else. But also explains a lot about the population, because this a definition that we have learned through the years at school. This shows the importance that sustainability has multiple approaches and that "*Reality*", regarding the conceptualization of sustainability depends on the cultural and academic environment that we are inserted on. This is the why is so important to understand everyone's perspective on this matter.

Besides this, it is possible to observe that there is a two different perspectives on this project of the MetroBus. There is the perspective of the sustainability as final product, as goal, which the artifact, more specifically all the part included, the infrastructure and the vehicles that are going to be used are deemed as sustainable, but also there is the perspective of sustainability needs to be included in the process. There is a pattern, and can be seen in the previous part of the project, that is for sure conflict of these two perspectives.

In relation to the project is important to have the perspective not only of the citizens that are being affected by the building process on the city, but also the one that needs to go, from other points of the district, to the city because of their work. On their behalf, the citizen interviewed, explained his perspective on sustainability within the project of the MetroBus Mondego:

"It depends. If we think of the project as a final product, I see sustainability as the ability of the final product, of the infrastructure, to satisfy the needs of the population without this having repercussions for the next ones. But then there are other fields, such as economics, the environment, but that's it as far as the final project is concerned, I'd say."

- Citizen, that lives in the surroundings of the city

Meanwhile analyzing this statement of the citizen, he states that sustainability we could watch it from an final goal of project. This means that we could only see if the MetroBus is clearly sustainable,

as a final product when it is already circulating. Potentially, this disregards to an certain extent, the process of building the platforms and infrastructures for the MetroBus to circulate on its driving lanes.

In conversation with the environmentalist group co-founders, that defined their issue of sustainability more correlated to the environment on general, they stated in the beginning of the interview:

"We were even the Co-Founder of ClimAção 1, which tells me if I'm saying otherwise that our idea was to bring positive proposals for making an energy transition and in that sense, at the beginning we were fighting for plans to combat climate change aimed at reducing the carbon footprint, in this case in the centre, particularly in Coimbra, because most of the people in the group are from Coimbra and in a way our entry into this fight against the Mondego metro was, yes, a little against nature, because in principle one of the things we always defended was effective public transport. Public transport that served, let's say, the city of Coimbra in a different way from what existed. We really got into this fight later because of the issue of trees. That's really also where we came in today, after being part of this fight. We have a completely different perspective, even on the MetroBus itself."

- Co-founder of the environmentalist ClimAção 2

Their early statements showed that in the beginning of the project they were actually really looking forward to see this project moving on, for the simple reason that they defended, and still do, that the region, and as consequence the city, needs a form of public transports more efficient. Only after few months into the building process and observing the process of putting down the trees, actually they starting to think that potentially, during the process of building this infrastructure was doing bad actions for the environment. They start, after that to take actions.

Besides this, the environmentalist group stated during their meetings that they had a lot analysis of the plant of the city, by stating:

"What I'm asking about sustainability, it's obvious to us, the issue of sustainability has to do above all with the environment, it has to do with biodiversity in the city, it has to do with climate issues, because what the Metro, so we haven't talked about this here yet, here, with all these cuts in rims that we're going to have or that Metro has provided, we, in the future are going to have a lot of heat islands in this city, heat islands, and those heat islands will only be mitigated in the next 30 or 40 years when those trees actually grow. So that's what we're focusing on, the biodiversity of the trees that have been lost, the heat islands. That's the focus, biodiversity, the birds that have been lost, heat islands, carbon footprint. But obviously we don't look at things in isolation."

- Co-founder of the environmentalist group ClimAção 2

As it is possible to observe, there is a big emphasis on the environmental theme, in the conversation with worried citizens. From this perception of reality, the reader and me, as a writer, this line brings

up the fact that points out that the way the MetroBus that is built right now is not environmentally sustainable by destroying the green spaces. But, besides the green spaces they explained:

"There's a line that goes towards Solum and from Solum goes to Lousã, and there's another line that, from Baixa, diverges towards the university hospital and returns. These two lines are not connected. This means that, for example, if you want to go to the university hospital, the whole Solum area is 1.5 or 2 kilometres away in a straight line. If they decide, if the people who live in that student area decide to take the MetroBus to the hospital, they're going to travel around 8 kilometres. For most people, the gain they could have is because the MetroBus line is more reliable and is served by a greater number of buses. In fact, it's four times the real distance and therefore no longer compensates. So I have the greatest doubts about the functionality of the line, just as I have the greatest doubts about the functionality of the line when it serves as a bus, that's what it's all about. We're talking about a sophisticated bus complemented by a heavy engineering system, but it's still a bus. When it goes to Lousã."

- Co-founder of the environmentalist group ClimAção 2

This shows the perception of the citizens, in a lot of the cases, the citizens will take more kilometers and pay more, than use their own cars. Which, potentially might not be sustainable for the users, in the future. Other problem, considering the environmentalist perspective, regarding the infrastructures of the MetroBus is the carbon foot print:

"[...]there are the carbon footprint issues, which nobody talks about, because unfortunately the issue, and the mayor himself makes this speech, the carbon footprint issue has only been discussed in terms of the cutting down of hoops. But the cutting down of rims, in terms of the carbon footprint, may still be the least harmful aspect. At the moment, because of Metro Mondego in Coimbra, we have kilometres of concrete walls and every tonne of concrete adds 600 kilos of carbon to the city. I'd like to see these carbon accounts, which have never been presented to the city, not to mention the tar - 30, or so, kilometres of tar laid, 30 or more kilometres of tar laid. The question of what they did to the land and then, of course, the question of the birds."

- Co-founder of the environmentalist group ClimAção 2

During the construction, the machinery and the concrete its going to impact negatively the environment, because of the excessive CO2 emissions, accordingly to this very pro-environmental citizens. This helps to go straight to other point, that is relevant to analyze, brought up the citizen, that lives out of the city and does not have direct access to the MetroBus:

"Traffic first. Then there's no turning back. Neither with Covid nor with so much traffic after Covid. When Covid ended, I don't think there was so much traffic after Covid. When

Covid ended, people started going to work in person. There wasn't as much traffic after that as there is now, that's all. Then there's also the issue of noise, there are always machines working and so on. But perhaps from what I've experienced personally would be the traffic. Then you're in one place, there are four or five of you, then there are endless queues. Now I'm really seeing what real traffic is like, yes, exactly."

- Citizen, that lives in the surroundings of the city

This statement of the citizen reveals that for him the biggest issue is traffic, or transit for a better comprehension, which as consequence could potentially be bad for the citizens in general, because they need to drive and stay for a lot of time waiting for the transit to move. In accordance to the environmentalist perspective, this could add another environmental problem, because add up more emissions.

All of this conditions, mentioned by the informants could bring up that are sustainability problems, according to them. Specially this last remark, by the citizen left me wondering, if there were some building sites, for sure there were couple of people that were, and still are, being affected by the process of the construction. While interviewing the citizen, he stated:

"They closed the whole place down with the works and I believe that the (business) establishments that are located there have suffered as a result of the works and the metro process, because it ends up driving people away. Those who want to go there have to go there on purpose and it's because they know they want to go there and maybe they lose a lot of those who were going down there and who even saw, look, here's a fixed establishment for me to go into. Maybe they even end up losing out because people were able to go there or to another side of the square or somewhere else, and I believe that they have suffered, that they have suffered even more than possible in terms of quantity, maybe even more than realized."

- Citizen, that lives in the surroundings of the city

This could be a problem for the local markets and businesses, which will affect their selling stock, activities and be less sustainable for the owners of those establishment, during that period of time, meanwhile the road is blocked and people don't have direct access to that establishment. In some cases, people don't want to go around or take a longer way to reach out for that establishment. So this could be a problem for the economical sustainability, as consequence of process of construction of the MetroBus. Which could, probably, lead up to some stores, bars and businesses in general to close.

Carrying on with this perspective of the economical sustainability, there were a lot of questions that were left to be answered, mainly regarding the cost of the infrastructures of the MetroBus. Which is also an important factor to evaluate the sustainability of the project as whole and could potentially dictate the future of it, in terms of usage rate and prices for the users.

During this section it is possible to analyze every perspective about sustainability, which represents their point of view on *Reality*, regarding sustainability and, as a consequence we can see their core

Values regarding the MetroBus, on the case of the citizens that are part of the of environmentalist group and the President of the MetroBus. In the case of the Citizen living outside of the city of Coimbra, it is not clear yet his clear vision on the MetroBus, but explained some *Facts*, related to his perspective of this project.

5.1.3 What are the costs of the building process of the infrastructure?

One of the first thoughts that I had, during the execution of this project, was "*How much did it cost the infrastructure?*". That was one of the points that I wanted to approach, specially with the President of the MetroBus. This is due to the fact that I did, previously to enter the field, a research about the costs of the infrastructure in the website of the Portugal Infrastructures, S.A. . After the my research I was a bit confused about the values so during the interview with the President of the MetroBus he explained me:

"[...] in terms of infrastructure there are only two lines, in terms of operation there will be three because direct connections are planned between the various ends of the network, which means an investment of around 170 million euros which, with price revisions and extra work, leads to around 200 million euros and which is expected to be in operation by the end of this year."

- President of the MetroBus Mondego

So just the prize of the platforms, where the MetroBus is going to circulate costed about 200 million euros, including the payment that are working on those lines. After this simplified explanation, I confronted the President of this project with the values of the website of the Infrastructure of Portugal in which he explained me in more detail as:

"[...]so what it has to do with basic infrastructure, namely with the systems, so with the roads, with the dedicated channel for the system, etc. Who is making this investment? It's the technical systems, also the stations, it's IP that's making this investment and the technical systems, also the stations, it's IP that's doing these works and then transferring these assets to the management of Metro Mondego. So that's around 120 million euros, of which around 60, then there's data from the Operational Program for Sustainability and Efficiency in the Use of Resources POSUR. Then there's a second component which is vehicles and charging systems, which is 34 million euros, plus another component which is equipment and workshops. So, from the collection station fund, this is now going to be financed by the Sustainable 2030 Program, to the tune of around 38 million euros. So, roughly speaking, there is around 100 million euros worth of Community co-funding for the project at this stage. I don't know if that's clear."

- President of the MetroBus Mondego

Only after I understand the bureaucracy that was needed and where the funds for the systems, from the explanation of the President I, finally, understood where the were applied. This could go against

the democratization of the data about a certain process, in this case the people who are also supporting this projects, through the payment of the taxes. It seems more like a moral and ethical duty from the Infrastructures of Portugal, S.A. and the Municipality explain all of the process at once, and not just explain through the time, in the websites or local news journals.

There is not just a need to pay those infrastructures, however also there is a need to pay the infrastructures and the people who work on the building process of this platforms, but also the vehicles and, as consequence, the people that are driving those vehicles. He also explained me how the system of the MetroBus works and where it operated:

"Here we have a *BRT*, therefore a Bus Rapid Transit, therefore a system in a dedicated channel with road vehicles, above all by successive interactions, in other words. The solution was initially planned to be light rail.[...]Well, it's a project to build a *BRT* system, so a Bus Rapid Transit system, to build a *BRT* system, so a bus rapid transit system, here in the Coimbra region, to serve the councils of Lousã, Miranda do Corvo and Coimbra, which takes partial advantage, to a large extent, of the infrastructure, the canal of the Lousã line, but also, finally, integrates a new connection between the upper part and the lower part. So it's in the IDM and the paediatric theme, it's a system that will be operated by battery-electric vehicles, battery-electric articulated vehicles, all electric articulated vehicles and batteries. In numerical terms, it's perhaps worth mentioning that it will be operated on three lines, so between Serpins and the Paediatric Hospital, between the Paediatric Hospital and the current Coimbra B link, between Coimbra B and Serpins."

- President of the MetroBus Mondego

From this statement, as it is possible to see, the system for the this kind of public transport is what is called *Bus Rapid Transit*, or *BRT* for short. In opposition to the light transit bus, which usually present itself as totally electrical car, this classification that is going to be used in the project is a must to be full electrical system. Meanwhile, the light bus does not, necessarily, must be electrical, could be potentially used by a diesel, or gasoline bus. Taking the advantage, to a larger scale for the infrastructure that is being built in the smaller municipalities, operating in all of the three lines, since the furthest point, like Serpins, which the beginning of one of the lines, until the Train Station of Coimbra-B.

In contrast the project, with a light rail bus that was presented in 2011, and was analyzed at that time was declined and rejected, as the President of the MetroBus Mondego explained:

"The light rail solution was suspended in 2011, even before the Troika, for various reasons. The government suspended this investment and, at a later stage, it was planned that this light rail project would be financed by the regional program. It was to be financed by the regional program, but what happened was that in the evaluation, in the economic or financial feasibility study, it was concluded that the project was not economically viable, not financially, economically, in other words, the amount of investment, which is around 600 million

euros, was not compensated in terms of economic advantages, therefore environmental, social and also financial, and therefore had a negative rate of return and it was therefore necessary to study alternatives. Between 2015 and 2018, as was the mistake, or between 2015 and 2017, a series of studies were carried out, particularly by the REC, the National Civil Engineering Laboratory, on what technological alternatives could be pursued, which led to this solution of a BRT, therefore a Bus Rapid Transit, which is basically a very, very demanding system, because it is a light rail system, therefore a light metro, but operated by road vehicles that have a lower capacity, but have a mode of operation very similar to the light metro. The issue of capacity was not a problem, as the capacity of these vehicles is compatible with the estimated levels of demand. It's compatible, it's not vastly superior to the estimated levels of demand."

- President of the MetroBus Mondego

It is possible to observe that the project of the MetroBus Mondego is already an alternative, that seems more sustainable economically, because is cheaper generally.

Meanwhile, still talking about the methods of transportation, people are going to use it, because this could potentially help the people that are living in the smaller municipalities, on the surroundings of the biggest metropolis of the region, to get their respective jobs, without needing to use their personal vehicle.

During the interview with the citizen, he explained his own personal opinion regarding the usage of the MetroBus Mondego:

"I think so. Even if it's because of tiredness, I think so. Even if it's because I'm tired. I think so, because I think it's going to become unfeasible or very difficult to travel in your personal vehicle. I think it's going to be very annoying and people are going to end up joining because it's, even if it's less painful because of compared to the personal vehicle, even if it's because. Then there will already be people who will use it because they already use public transport, so they'll join in anyway. Now there are going to be a lot of people, in my opinion, who are going to join in, if only because they're tired. In the early days they'll continue to use the car, but then they'll realize that it's going to be very complicated and they'll end up taking the MetroBus, which will be fine. It raises another issue, which is outsiders. Maybe I'm not going to say the majority, but many of the people who work in Coimbra are outsiders. It's going to be a question of: "I have to take the MetroBus, where am I going to leave my car? If there's no point in leaving the car, what am I going to use the MetroBus for, I'm going to leave the car there in a ditch to catch the MetroBus. I'm not going to ride mine, I'm going to have to put up with waiting in traffic and the hassle." But it goes a bit past that. "

- Citizen, that lives in the surroundings of the city

This remark shows that the citizens are going to use the MetroBus, but specially for the ones that do not have any solution or do not want to have worries of driving their personal vehicles and putting their cars in a parking lot. The citizens are going to use this Public Transportation of pure tiredness of always searching for a space to park it and not paying for that space. Which can be a considerable amount of *Facts* that were not taking into account during the public discussion and the design of the plan of the infrastructure of the MetroBus. This could be also a starting point of the questioning of true intentions of the MetroBus, because in some cases could not benefit the people, meanwhile the goal it is to benefit the mobility of the inhabitants and citizens that are working and living in the city of Coimbra.

The citizen explained that how the parking spacing works in Coimbra:

"You have to pay first, you have to leave home early, you have to pay for the bus, you have to wait for the bus, in other words, you're dependent on the timetable and that's it, and you have to pay for the MetroBus, and that's for people who live in Coimbra or in the Coimbra region, for example. In your case, in my case, unless I had the free MetroBus, I don't think it would be worth it at all, because I'd have the same wear and tear from here to, for example, the Old Station. I'd have to pay for petrol and wear and tear on the car, then I'd have to pay for the metro, then I'd get there. Now what? In 2019, that's when I started paying more attention to the Old Station. There used to be two, three cars parked there at the most. Now it's all full. You can't find a space in the car park outside the Old Station, which now no longer has a car park inside. You can't find a space, you'd have to leave your car somewhere and pay for it. Then I can't find a parking space, I'd have to leave my car somewhere and pay for it. Then you think, but if I'm already driving here, I'm still going to pay for the metro, I'm still going to pay for the car park. I won't, I'll carry on, I'll drive my car to work. "

- Citizen, that lives in the surroundings of the city

This shows that in a lot of the cases from people that might not have direct access to the MetroBus, and still have to take their cars. Then they have to still pay the parking lot spaces. Also, in the case of the people that do not want to use the car, they will need to pay for a bus and then the MetroBus and wake up earlier. As a tendency that people like to enjoy comfort, instead of waking up earlier and been clustered and have more expenses.

According to some citizens, there was no necessity to do a MetroBus, because not only of the cost, but also the development of the city did not accompany to modern world. On this specific case, one of the founders of the ClimAção group explained:

"Exactly, it's something that doesn't affect them on a day-to-day basis, they don't want to know. There are cities where this is more evident, there are others where it's less evident. In Coimbra, I think it's still quite evident. To understand Metro Mondego is also to understand

the city and the region. Metro Mondego is a project that's been stuck, how shall I put it? It's been in the works for over 20 years and has stopped several times, for economic reasons, for many reasons, and at the moment it's being implemented, at least that's how it looks to me personally: it's a retrograde project. In the way it's being done, it's a project that could perfectly well, without any conditions, have been implemented in the 1990s, early 2000s, but which today I would say has great, great readings, not only in the heavy-handed way it's being implemented, but also in the way it's disregarded, how disconnected, in fact, from the way the city has evolved. The city has grown a lot in areas like Polo 2 and the Hospital, for example, which doesn't have a metro and is a place that has a lot of people and a lot of traffic. Let's just say that the metro ends up passing through places where there is already a lot of public transport."

- **Co-founder of the environmentalist group ClimAção 1**

This will give a lot of problems, regarding the cost to the municipality and to rehabilitate the railroads. Also could be a problem for the people, specially how much money people need to expend into public transport. Besides all of this problematic of the costs either for the municipality and specially the citizens when they are going to use the metro, there are certain aspects of the project and perspectives to be analyzed. Specially, regarding the potential threats of the MetroBus in the communities, the city planning and the general environment of the region.

5.2 Perspective on the potential threats of the MetroBus Mondego, to the city planning and environment

During the interviews, either with the representatives of the environmentalist group and the citizens, were based on the potential risks that this project could potentially do in the future to the city of the Coimbra and, also, in the municipalities that are going to host the MetroBus. Some of those concerns, from the citizens, are rising, not only now, but since the inception of the project. This happens some of the actions of the planners are putting in cause the personal mobility of the citizens, giving them limited options. Apart from this concern, there is also two points, regarding Environmental and Social Sustainability.

One of those preoccupation is the fact that a large of trees were putted down, like it was mentioned in the Initial Problem Chapter. The second concern, mentioned was if there was any expropriation of citizens. Which means that if any citizen lost their house, or properties in the space where the Metro is being built. On those buildings, also were "*the home*" to some small businesses as far as I remember, as a former inhabitant of Coimbra.

5.2.1 How many trees were cut down?

During my research, before I entered the fieldwork, I came across with a local news article that the process of building the infrastructure of the MetroBus Mondego was expecting to cut down around 663 trees. At first sight, this was worrying, not only for me, but also a lot of local citizens showed their disapproval on the social media. So I have decided to confront the President of the MetroBus Mondego with this fact and explained that:

"During the work on the Mondego Metro, the MetroBus, it was slightly lower because there had been some recent interactions with the City Council in order not to remove some trees whose removal had been requested by the municipality and in other places as well. But that's the overall figure, more or less, a little less than that to be precise. So, yes, the provision of a channel in a place suitable for the system forced the removal or uprooting of several hundred trees, which is close to 600. What we have agreed on is that, point 1, within the scope of the project, a greater number of trees will be planted directly in the project, but in the contracts that are currently being carried out, and we are carrying out various other interventions to ensure that at the end of this process, for every tree that has been cut down or uprooted, at least three trees will be planted. And at least three trees will be planted. In other words, we are working on various projects to ensure that, in the end, there will be at least 1,800 trees planted as part of the various initiatives we are developing, that are in the canal's area of intervention and that no alternative solutions have been found to save these trees, so it has become necessary to uproot them. In many situations, trees are being planted next to them or in nearby locations to ensure that the end result is favorable to the city and not unfavorable to the city in terms of coverage of the urban fabric. "

- President of the MetroBus Mondego

This statement by the MetroBus President shows that there is in fact a great number of trees that were cut down, but they are willing to re-plant in a three times bigger than the one they originally they have cut down. This process replanting the trees it will take not monetary resources, but also it will take some time to be in a good environmental space.

In contrast the Co-founders of the environmentalist group explained:

" It needs to be spent, because I think this was all badly approved, it was all done on the fly, it will have been scrutinised by various bodies and I don't think any of them were competent, none of them, neither the CCDR nor the municipal infrastructure. This is true on several levels. On an environmental level, it's more than obvious that the design was made without taking into account what is the green structure chart for the city of Coimbra, which offers trees in the city, there, in two or three places in Coimbra, which is what it is, and then even the places where it isn't, which really doesn't understand why they had to sacrifice that number of trees, because there are plenty of alternative spaces for the MetroBus line to pass

through. "

-Co-founder of the environmentalist group ClimAção 2

This declaration of the environmentalists, in together with their perspective of sustainability and respective consequences of the deforestation of the city, stated on 5.1.1, is that there was no need to cut off the trees, because a lot of them were placed there of a reason when could be found a new solution without putting at cause the green plant of the city. This could potentially have severe consequences for the town, besides the fact that is a need spend more resources to replant the trees. This shows a clear disruption of their *Values* and they deemed as unethical, from their sustainable point of view, which can be defined as a more environmental sustainability point of view, and does not fit aesthetically into the green plant of the city.

During the interview with them, they mentioned the example of a similar problem that happened in another city, in the North of Portugal with a different outcome.

"[...]they reproduce this system of slaughter, this hard engineering everywhere. They're doing the same thing in Porto. But it's curious and worth looking into. The mayor of Porto recently tried to stop the work when he found out about Portugal's infrastructure and cut down I don't know how many mature areas in Porto's city centre. [...] Porto City Council is opposed to felling the trees as part of the Metro Bus project and it was a really ugly argument. I think he threatened to withdraw the building license if the situation wasn't reviewed, etc. Here in Coimbra, not here in Coimbra, IP (Infrastructure of Portugal) and the City Council have held each other's hands, defending each other."

- Co-founder of the environmentalist group ClimAção 2

As it is possible to observe, this group heavily criticize the fact that all of the entities involved in the process of building and insert the MetroBus Mondego have been really badly managed, comparing this process of putting down trees as "*system of slaughter*" from an environmental point of view.

This always has been one of the major threats during the realization of the project of the MetroBus Mondego. Apart from this, there is one other question that I had during the interviews, and even before that, considering the fact that there was the need to tore down some buildings, in the downtown part of the city of Coimbra, and in the centre of the city.

5.2.2 Was there any citizens being expropriated from their houses?

When I watched the plan for the construction of the MetroBus and the part that was going to be re-qualified Downtown Coimbra, for the very first time, I had a special concern with the people that are living on that area. Not only the people that are living there, but also the businesses that are living, just like I explained in previous chapters of this project. Once again, I have confronted with the possibility of people lost their houses because of the MetroBus and then he explained:

"That happened in 2005. I can't tell you right now because I wasn't around at the time.

This happened from 2005 onwards, between 2005 and I think 2005 and 2011. Perhaps these

expropriations were obviously carried out within the legal framework in force and in compliance with the legislation in force. Specifically, what happened, I can't tell you because I didn't witness it, but if you need any additional information, I can look for it later and provide it without any problem. But I don't have much information about it because, well, I got here a lot later. Yes, of course. I don't have that information, but I do know that it was a relatively demanding expropriation process because it required the expropriation of a number of plots. Part of the area had already been demolished, had already been vacant, so to speak, for a long time and was as unknown as the vote below, which was that area over there, the area where the Citizens' Centre is now. The rest doesn't have to be expropriated, but I can't give you many. What I do know are the contracts that are still in force for some commercial plots, in which an expropriation agreement was made, in which the companies that were there, so the commercial establishments that were there, will return to where they are, in the new premises that have therefore been built and were also entitled, in addition, to a surprise."

- President of the MetroBus Mondego

This declaration reveals that the process of "*expropriation*", which is the legal term for taking a property from his respective owner, in this specific case the houses from the citizens started when this project was about to take place long time ago, but it was back then stopped as it was mentioned in the 5.1.3, by the same person, because the estimated costs were too high for the time, as he explained that on the next statement:

"The light rail solution was suspended in 2011, even before the Troika, for various reasons, the government suspended this investment and, at a later stage, it was planned that this light rail project would be financed by the regional program. It was to be financed by the regional program, but what happened was that in the evaluation, in the economic or financial feasibility study, it was concluded that the project was not economically viable, not financially, economically, in other words, the amount of investment, which is around 600 million euros, was not compensated in terms of economic advantages, therefore environmental, social and also financial, and therefore had a negative rate of return and it was therefore necessary to study alternatives....]"

- President of the MetroBus Mondego

Which is possible to observe that the was way more, expensive back then. It also very important to see, on the remark before this last one, that the some of the businesses that were present on those same buildings, that were tear down, were relocated to other areas/buildings with the possibility to come back to the those re-qualified buildings. In such cases, from the perspective from the business owners, possibly that would be always a problem to move their materials and always paying moving companies to take their things back in forth, which is a lot of money that is going to be spend and a

necessity to have a logistic with planners to showed them how they want the store and so on. Besides the fact that the ethical and moral, because people could be losing their respective homes, which is putting the inhabitants in a certain precarious situation without any solution, in such short notice.

Besides this, depending right now where the businesses are located, as it was mentioned by the Citizen, in 5.1.3, that in a lot of the cases that businesses are could potentially being suffering because of the roads that are being blocked by the constructions sites, which also can have an effect on their own economy and people that are owning those establishments, in the present and near future.

It is possible to see a trend here, during the analysis, but there is also a point that it needs its own section, specially that regards the relations between the citizens and the Municipality and the entities responsible for the planning and the building process of the MetroBus. In this case, there are *Ethical* concerns and aspects that are going to be explored, but also other important aspect as the possibility of the negotiations of the *Facts*, which could be possible with a Public Discussion, between planners, Municipality and more inhabitants involved. This would be important to align the *Values* of every party involved, not only in terms of the planning but also in terms of sustainable values.

It is important to present and explore this part, because the relations between this parts that are being influenced and/or are influencing the project is one of parts that is anthropological as we can get. Also is one of the most important parts to exemplify how the process of approving a project works in Portugal.

5.3 Political game behind this project

During the interviews with my informants, specially with people that are inserted into the environmentalist group, and my research prior to the fieldwork, have noticed a special concern related about the interaction between the inhabitants of the city and the the City Council of Coimbra and the planners responsible for the process of inserting the MetroBus Mondego into the region.

On this section, I will be exploring the concerns from all part involved that have this concerns and why some of the previous, and actual, "*conflicts*" exist about the MetroBus Mondego exist. Particularly, related to the point of the Conceptualization theory, from Henriksen (2016), called *Logic*.

5.3.1 Was there any interaction between citizens and the municipality/planners?

As a topic to be analysed, this could be somehow be a controversial one, it could be debatable if it should be in the discussion or here. This happens for the reason that has lot of democratic processes and *Ethical* concerns, regarding the projects that they presented, present now and are going to present in the future. In this case there could be in place the discussion, or negotiations, of the *Facts*, *Values* that are agreed upon and the *Logic* of the whole project concerning the infrastructure and the mobility of the MetroBus. But also, something that Ihde (2009) have in consideration which the *Aesthetics* and the utility of the technologies and planing to have a process and final product which are totally sustainable.

Apart from that, there is some points that we could be in mind during a good relationship between an entity that was democratically elected by the people and the population as whole, which is communication is key to have a establish a good relationship with everyone. In this special case, as far as it

was mentioned by the President from the MetroBus Mondego there was a consultancy conference, or in portuguese "*Assembleia de Consultadoria dos Cidadãos*", to gather the perspective of the citizens.

" The Municipality had a public consultation phase in which people were able to comment on the project. As part of this, both technical documents and a non-technical summary of the project were made available, so there was a public consultation phase on the various components of this intervention. A phase of public consultation on the various components of this intervention. So this happened, as is required of any project of this size that is subject to an environmental impact assessment process. In addition, there have been various assessments that have made it possible to estimate the demand that we imagine this system will have, which is in the region of 13 million passengers a year. These are the estimates we're working with and which have been evaluated by an independent consultant. In fact, there was more than one assessment by an independent consultant, in fact, there was more than one assessment by independent consultants in order to be able to estimate the demand."

- President of the MetroBus Mondego

The President here stated that the Municipality in collaboration with the company and an independent consultants made a public consultation, during the phase of consultation, to share their thoughts on the project and planning that was made by them. Which can be conceived, by the inhabitants or citizens that vote for him, as a contradiction and turn against him, making a lot of criticism to his person. He stated that they shared the information, including the funds appliance, environmental impact of the project and the number prospects of passengers of the MetroBus in a year. He didn't developed too much on the conditions of this public consultation, neither when it was. Which intrigued me, because I wanted to know who were the actual representatives of the people during this process. This actually, for my point of view a clear fact that there was a little bit lack of consideration for the ethical values and there was something that was being putted under the rug.

On the other hand, the citizens representing the environmentalist group, they have a different perspective on this point, specially related to the transparency of the project.

"The project did have a public discussion, as it should have, but there was no real public discussion. It was a profonymous public discussion. There was an opening in the process and a minority, a minority of minorities, gave in to the process even because the information was not practically available. A minority of minorities may have given in to the process Even because the information was not practically available. I know architects who looked at the project and had difficulty interpreting the maps. [...] There were no processes to involve the population. Environmental groups weren't consulted, they weren't even called to debate. There was no organized debate in the city around the issue of the MetroBus. There were no online 3D maps for people to visualize the future routes. There was no

model displayed in the municipal hall so that ordinary citizens could see the project and form an informed opinion. I'd even like to give an example, the example of a Biologist. The biologist who lives on Avenida Emídio Navarro and it was she, in fact, who launched this bird issue. It was she who, let's say, was the first person in Coimbra to react visibly, both on social media and in the newspapers, against Metro Mondego, and her story is nothing short of caricatured. She learnt that the century-old plane tree that was practically in front of her house was going to be felled. So she went online to do some research, went to the Metro Mondego website and saw the photos and the materials on display. The next day she approached the person who had given her the information and said look, I went to check and you're wrong. I looked at the map and the plane tree is there. And the person insisted and told her: "Look, Biologist, it could be on the map, it could be seen here". It could be there on the map, it could be seen, in fact. It might even look like a plane tree, but I can assure you it's not. So, after she consulted other elements again, she realized that she was being misled. The material provided by Metro Mondego misleads people, but it's not just Metro Mondego. At the moment it is, but it's not just Metro Mondego. At the moment the new gymnastics pavilion is being built in Coimbra and one of the residents came from contact years ago and she went to the open for, in particular, a centenary cork oak tree, and in the communication she wrote to us, she told us that the cork oak had been felled when in the project it remained. It was exactly the same question. In the project there is a photo of a tree, an adult tree. In the Photoshop. [...] This is to say that there is the figure of public discussion, but it's not done in the terms in which it should be done and we add intentionally that they don't want to discuss these things with society, it's the specialists who have the capacity to consult and visualize and understand those materials and the population is left out. And if I said at the beginning that I naively thought, well, better this than nothing, I think it also has to do with the fact that it wasn't called for public discussion and this passed us by a little bit, although to say that the climate didn't exist yet when the public discussion was held, at the time the pandemic hit."

- Co-founder of the environmentalist group ClimAção 2

It is apparent, in this statement of the ClimAção environmentalist group, the lack of communication and their frustration about the municipality towards the people and the environmentalist groups. At some point, they said that one of the people that is inserted into the group is living in the avenue where one of the most emblematic and oldest trees of the city was put down and they told that the tree was going to be right there. Regarding the public discussion, the vast majority of the population was not warned about it, specially the environmentalist groups, or even the citizens, in general. Contradicting the President of the MetroBus Mondego. Is important to mention that during this statement that, they also mentioned:

"I remember the current mayor, being an opposition councilor, at the time, and publicly

complaining about the concealment of data, the concealment of elements."

- Co-founder of the environmentalist group ClimAção 2

This shows exactly a lack of *Logic* from the current management of the municipality, because of the there are a lot of conflicts of *Values*. This could be shown as the starting point of conflict of interests between all of the people involved on this kind of projects, and people that are going to be, possibly in the future, users of the MetroBus. This also could, possibly lead to some speculation of the fact if the *Values* of certain people change, disrupting their sense of *Logic*, which can lead their demise of their ethical and moral way of thinking, which can lead to more conflicts.

Which is also shown by the next statement from this group:

"This is to say that there is the figure of public discussion, but it's not done in the terms in which it should be done and we add intentionally that they don't want to discuss these things with society, it's the specialists who have the capacity to consult and visualize and understand those materials and the population is left out. And if I said at the beginning that I naively thought, well, better this than nothing, I think it also has to do with the fact that it wasn't called for public discussion and this passed us by a little bit, although to say that the climate didn't exist yet when the public discussion was held, at the time the pandemic hit."

- Co-founder of the environmentalist group ClimAção 2

Here, as is possible to see, this type of public consultation was done during the early stages of the pandemic of COVID-19. But, also exacerbate the fact of the lack of *Transparency* of the municipality towards its inhabitants and citizens. Which it means the lack of *Logic* and *Communication*, but also lack of values. This is clear contrast of the ethical considerations, from the Municipality, which is evident by one of the statements of the Co-founder of the environmentalist group. This goes against what I consider ethical "*Values*", having a clear disruption of the "*Logic*", because they had the "*Facts*" that they possess as non negotiable, being considered the absolute truth and what the people wanted without consulting the inhabitants. Meanwhile [Henriksen \(2016\)](#) states that, in any case of project, such as the Project of the MetroBus Mondego, the "*Facts*" are always negotiable.

"It seems that political power shies away from participation, it's not used to justifying itself, nor does it want to do so. And the university itself, which is up there and disconnected from society, from the discussion taking place in the city and doesn't take part in decisions, there it is. It would be a place where there are people with the capacity to analyze all these projects and with the capacity to do them, to have a very long-term vision of the future and to create a city. It is, but we don't see it because of a lack of interest, a lack of social articulation and this ends up affecting the university negatively, in my opinion, because it's not a university that's consequential in people's lives."

- Co-founder of the environmentalist group ClimAção 1

This even more evident that there is the problem between the people and the planners plus municipality. The reason behind this is because of the citizens think that there is a kind of "*Secret Game*" from the municipality. This conflict originates from the lack "*Communication*" between all the parts interested in the project, which it can be perceived as lack of alignment of the core of *Values* of both parts, which in this case there is and could start raising some ethical considerations and questioning the ethical agenda from the Municipality. This could be important to the MetroBus Mondego and specially for the citizens from all the municipalities, where the infrastructure is being built, by finding a better solutions to certain aspects of the project. This is where the *Facts* can be negotiable and discussed, between all the parts that are, in interested, contributing to a more democratic process, with ethical and aesthetical considerations from the populations accepting all the point of views and aligning their *Values* towards common goal and a "*greater good*", in sort of speak.

5.3.2 Logic of the municipality

During the previous part, I have noticed and mentioned the lack of logic, as consequence of the conflict of *Value* and lack of *Communication*, from the interviews and statements from the informants.

One of the things that I think that have noticed from the interviews is that the people or citizens already have some ideas that could be relevant for the project. Those are legitimate ideas that, like it was mentioned in a prior part, could be proposed during the public discussion.

One of such ideas came from the citizen that is living in the surroundings of the city, where states:

"Almost, yes, and perhaps it would even be justified, for example, in Figueira da Foz, yes, because you have a much larger population in Figueira than you do in all the others where the metro is being built now. Because then it wouldn't just be Figueira. It would be Figueira, it would be Maiorca, it would be Montemor, it would be everything from there to Coimbra. Maybe in total you'd have a much larger mass, a much larger proportional mass to join this, the metro, than the people from Lousã, Miranda do Corvo and so on. Because we don't want them to be smaller towns, more isolated, maybe a bit and probably with older people."

- **Citizen, that lives in the surroundings of the city**

As can see, not only here but also in other statements from this citizen, specially regarding the biggest mass of population, would do make sense, because of the amount of users that are going to use the MetroBus. This is one of the reasons that could be associated with the negotiations of the *Facts*, this means that every fact could be discussed to constitute a better logical thinking for everyone to understand and can agree upon it. This *Logic* and the result of this discussion, needs to have good *Communication* for the understanding of everyone and not achieve a conflict of interests like it happened in this case. Specially regarding the transparency, which result from lack of ethical considerations and might create a lot of conflicts, because of conflict of *Values*. He also mentioned the fact of the old train that needed to be stopped of being used because of the lack of users, as he explains:

"There was still time. I don't believe they've started work there, because I really don't see any point in going there. I don't see those places, those locations of people who are wronging it, everything that's going to happen there. I could be wrong, and I hope I'm wrong, but it's going to be a bit abandoned, because that's what I was saying. If they've done away with the train there, what are they going to do with the metro? If they've done away with the train there, what are they going to do with it? What for? To finish it in two, three or five years' time? I thought I was throwing money away. I'm not saying that they should do it to Figueira, or Montemor, or wherever, or to Cantanhede, but look, I hadn't even thought of Cantanhede, even for Cantanhede it made more sense to go there. "

- Citizen, that lives in the surroundings of the city

When he speaking about the locations, he was referring to the smaller municipalities of Lousã, Miranda do Corvo and Serpins. Which are relatively smaller compared to Cantanhede, Mira and Figueira da Foz. Is also important to mention that from Figueira da Foz to Coimbra, or vice-versa, there is another Municipality, called Montemor-o-Velho (the translation is the Old Montemor, the Young Montemor is located in a southern region of Portugal), which is larger than the smaller ones, which is where the citizen that I interviewed is currently living on. He also mentioned that the train was really abandoned and were not many people using it to go to Coimbra, from the smaller Municipalities.

This could be seemed, as a lack of logic in terms of values from the planners and the municipality. Which lacked to have practical solutions to this case. One of such solutions was provided by the citizen.

" I think that part of the route could have been replaced by more buses and more routes. I think that the cost they've had in infrastructure from the Coimbra exit to there, that maybe if they went to rehabilitate the railway line, maybe they'd even spend less if they did it all over again than having to fix what's been done and which is old. I think they'd save more on buying buses and making more routes than making all that infrastructure up there, 40 kilometers or 30 kilometers of infrastructure up there. "

- Citizen, that lives in the surroundings of the city

This statement has its own logic and, potentially, could be a different approach to the fact of having to spend the funds giving, for example. It could be also a solution for the problem that was mentioned by the environmentalist citizens, on the subsection 5.1.3, by investing in renewing the type of buses that are being used being more environmentally sustainable.

On this specific case, there is a lot clash and backlash from this project, specially regarding the values of conceptualization, such as *Logic*, *Values* and *Facts*, which resulted in a lack of *Communication*. This lack of communication resulted into a certain amount of disagreements between citizens and municipality, specially because of the contradictions of all of the points mentioned before.

It is possible to argue that are two sides to the this tale, two different perspectives that have a lot of disagreements specially regarding the planning of the construction of this infrastructures, called the MetroBus Mondego.

5.4 Summarization of the Chapter

In this chapter, as I believe it was obvious there is a constant conflict between perspectives. This clearly begins in the early stages of the Analysis, when I exploited the perspective of sustainability of my informants, it is clear that there is no consensus of what sustainability is. To be fair, there is no consensual definition of the concept of sustainability, globally.

Accordingly to the analysis there is a conflict of *Values*, mainly because there is the feeling from the citizens that are positioned with the environmentalist group strongly contradict the President of the MetroBus, by stating that there was not any Public Discussion between the entities responsible for the MetroBus and the citizens that they knew about. This is clear sign of lack of transparency, which is ethically and morally incorrect. This is also against the democratization of a process of building, because the project is for the citizens. Without, actually gathering the general opinion of the citizens, could potentially lead to a wave of discontent from the inhabitant Besides this, there is the observation from [Henriksen \(2016\)](#) that *Facts* can be negotiable. Negotiable in the sense that, for example in this specific case of the MetroBus, if it could be avoided the process of putting down trees and the process of creating access to every business that were blocked for a long period of time, would be better by discussing with all parts involved, in this case Business owners and environmentalist groups. But also, studying alternatives, instead of just thinking about the smaller municipalities, creating alternatives that could be Sustainable in all three counts, as the President of the MetroBus stated: Social, Environmentally and Economically.

The citizen made a statement, during the 5.1.2, that the project could be approached in two ways: the process be sustainable or the seeing a project to obtain a final project that is sustainable. And this is where the biggest issue of conflict stands. The environmentalist groups are in favor of the process of building the infrastructure for the MetroBus being sustainable, to create a sustainable product. Meanwhile, the planners see the final product as the pinnacle of sustainability.

There was also a problem, mentioned by the citizens, that there were a lot of trees that were cut down during the process of building the infrastructures for the circulation of the MetroBus, which in first place goes against the *Values* and principles of the environmental sustainability, and against the moral code of the environmentalist group, but will also will go against the original aesthetics of the city of Coimbra, which the majority of the inhabitants of city supported and enjoyed. Which might be a downgrade, for the reason of the MetroBus, or the main objective, besides being useful and comfortable for the citizens, it does not need to alter aesthetics of the city but yet be useful and sustainable, by helping preserve what it is the is the global plant of the city, specially the green plant.

As it was mentioned before and, consequently, it is going to be discussed in the subsequent chapter of the discussion there is a numerous quantity of conflicts not only regarding the information available publicly (Lacking the "*Communication*" of the "*Facts*") and also a lack of sharing the information about public discussions, according to the Co-Founders of the Environmentalist Group, lacking the "*Communication*" skills to do it.

It was also possible to analyse other points from the Environmentalist Group, specially regarding the "*Logic*" from the Municipality, and people who are responsible in charge for the Municipality, but also the planners, during the entirety of the process. During the next chapter, all of the points mentioned here, not only in this section, but also during the whole chapter, are going to be discussed from a different perspective and different critic eye.

Chapter 6

Discussion

This chapter explores the potential implications that can be further drawn from the diverse findings presented in the previous chapter. And discuss the potential perspectives in question, not putting in question the reality from the informants. The project of the MetroBus Mondego touches a lot of points with thin lines and need to be discussed without disrupting the lens of the analysis.

6.1 Sustainability and sustainable project

The definition of sustainability, as it is apparent during the last chapter of the present project, is a concept that does not presents itself clearly. This means there is no consensual definition of what sustainability means.

This, so called, concept depends on certain points of theory that was presented earlier. Specially regarding the conceptualization of the *"reality"*. The meaning of this is, the society, categorically the community where people are inserted on.

As it was possible to see during the analysis of the interviews, "common people", or people that are part of environmentalist groups, formed by environmentally worried citizens, tend to define, or perceive the *"reality"*, in this particular case the *"hermeneutic"* of sustainability connected to the environment, more or so defined as Green Sustainability. Meanwhile, there are two other perspectives that is worth take an observation on it.

There is the case of the community of the Research Groups, who present the definition of sustainability as a *"Buzzword"*, which means that the term of sustainability is, in modern times, a fashionable word to be used(Baptista 2023). It was, also, during this time that I have learned that the first time that the term of *"Sustainability"* was first introduced in a political context, in 1972, by the then Prime-Minister of Norway during the first United Nations Conference about Human Environment (Baptista 2023). But the activities and sustainable actions/ warnings, according to Dhanani (2022), were originated during the middle of the XX century, because of the incident of the air pollution that killed 12.000 people in the year of 1952, in the region of Great London, in the United Kingdom, decades after the industrial revolution. So, this kind of events started to happen more frequently, when during the 1970's started, what it is called today the *"Sustainability Explosion"* (Dhanani 2022). Which made the common citizens today to mention the sustainability has more relatable to the environment and action environmentally friendly. Which is not wrong, but also debatable on the methods of how to be this way and the other factors that are being affected by it, such as the resources/money, which tends to be related

to "*Economical Sustainability*" and measures that affect people in way for them not to suffer to much damage monetarily and securing the rights.

In the perspective of the President of the MetroBus Mondego, which is included in a category of planners/developers/engineers, has a point of view really adjacent to the definition of sustainability of the United Nations, which they rely on the 17 sustainable values/goals created by them. But on this case he divides the definition of sustainability into three parts/concepts related to it:

- *Environmental Sustainability*;
- *Economical Sustainability*;
- *Social Sustainability*

He refers to them as where the project of the MetroBus is sustainable, into all the accounts of sustainability. Due to the the fact that there is a connection between these three definitions, where tells us their respective definitions in the section 5.1. Which, on my point of view is not inherently wrong. The reason for that is, as a Techno-Anthropologist, I believe that to achieve the full potential of sustainability there is a need to satisfy all of the necessities that are within this tri-partite definition of sustainability.

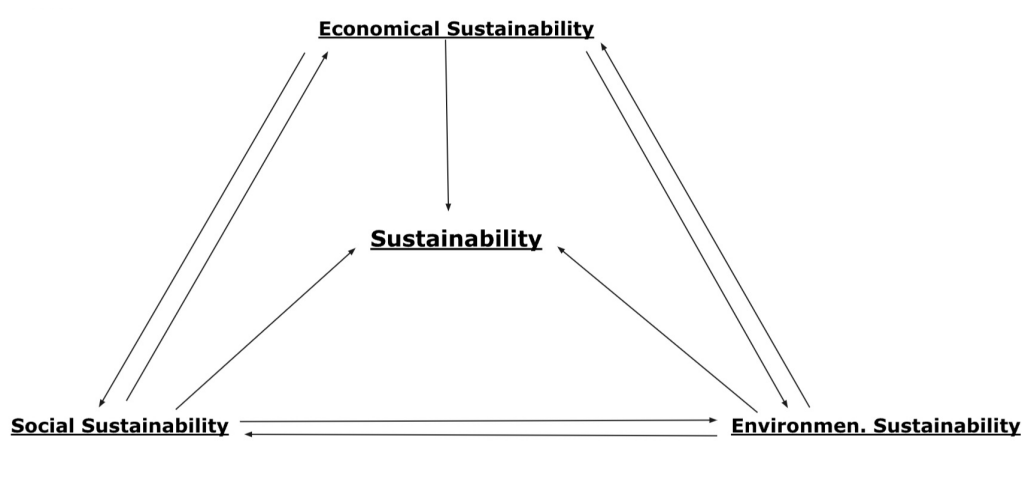


Figure 6.1: My own point of view of the concept of Sustainability and relationship between concepts within it.

As it is possible to observe on the image 6.1, I believe that the general perspective on sustainability belongs to a web of meanings, which I think it does not make sense without the other three definitions of sustainability, already established by the United Nations and, also explained by the President of the MetroBus Mondego. This means, almost identically to the concept of culture of Weber (1978), I believe that sustainability came a long way since its inception depending on other factors than just the environment, the economy/resources or the social factors. The global definition of this concept depends on all of this factors, but also on how it is possible to balance them to achieve not only a final

product, but also the process of achieving that final has also in mind all of those factors. Which leads me to the next point of discussion.

6.1.1 Can projects, in general, be sustainable?

This point of discussion invites everyone, not just me as writer, but all of the researchers to take a look at the history of projects that are working towards sustainability, specially regarding Smart Cities and, recently, Smart Rurals. It's been a trend, since 2005 until 2021, rising exponentially not only on the planners community, but specially on the Scientific Research Community worldwide (Collins *et al.* 2021). To illustrate better this argument of mine, Collins *et al.* (2021) made a graphic to better support it.

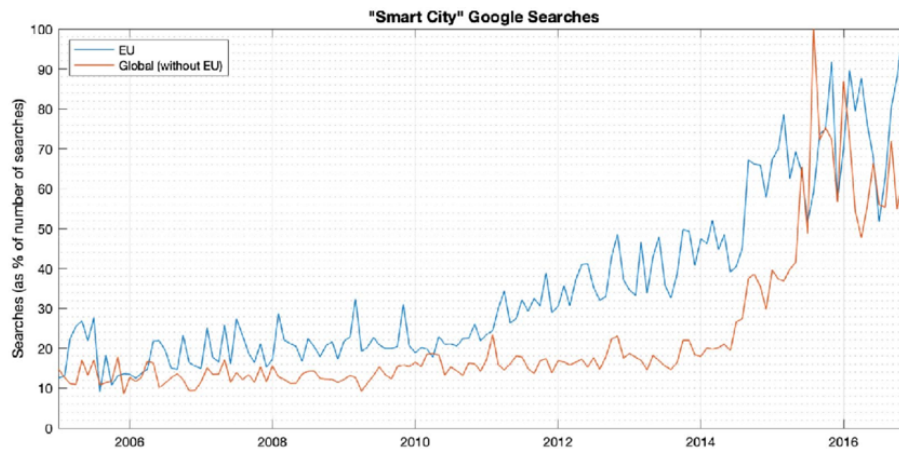


Figure 6.2: Interest in the "Smart City" concept, around the world and in the European Union (Collins *et al.* 2021).

As it is possible to confirm my alibi, the graphic, 6.2, suggests that there is a trend on the Global Research Community of the cities turning into a more sustainable and intelligent places to live, obeying to all of the rules of sustainability and the values of sustainability declared by the U.N.. This classification of cities, and now, rural places, are heavily impacted and dependent, by technology and the projects surrounding the city infrastructures to change it. Which goes straight to the point of this part of this project about "If it is possible for a project to be sustainable?".

This question, potentially could be a Master's Thesis Project by itself, but it is important to mention it, for the reason of being relevant to the explanation and understanding of the present project.

During my internship, on the previous semester, according to one of my informants at the Roskilde University Digital Transformation Research Group, she stated:

"The one would be where the important thing is that you that would actually be the division that, as I mentioned, my interest is in where you utilize technology for sustainable processes, sustain sustainable behavior for to change your way of life, to change to to support your decision making and so forth towards a sustainable decisions of behavior.[...] So technology helps and supports that. That would be where my interests was. The other

would be, where you look at. That would be. When you look at the match reality or the the products or be a service, but it could be could be the hardware could also be the software where you look at how to optimize it to should be more sustainable in the sense that emitting less energy or less, whatever co two or what not."

- **Digital Transformation Caretaker in Baptista (2023)**

As we can see, according to this informant in Baptista (2023), sustainability, in modern days needs technology to help develop this concept into projects. Which could be seen that happening in projects that have the intention to change cities and its infrastructures into a more sustainable and smarter/ technological to use. One of those examples, as far as I am concerned is the case of the MetroBus Mondego, that is being built in my hometown of Coimbra and the smaller municipalities in the surroundings.

Nevertheless, one of the biggest remarks from the informants in Baptista (2023), this being off the record while we were discussing the project and I was questioning some parts of the project of Game4Green was that in the majority of the projects that has sustainability as a concept base and, also, as a finality do not have to be, in terms of process of development and construction, to be sustainable. This statement, by two of my informants back then, is a statement that is still with me until this day and explains me partially what is happening in the MetroBus project. This could be debatable, if a project doesn't need to be sustainable to achieve sustainability, or product that is sustainable. On the other hand, there are cases of projects that have as goal to produce a sustainable artifact/product that need to find, if possible, an alternative sustainable solution to create a sustainable process to achieve that same goal.

The last point, but certainly not the least is the fact during the entirety of the project there is been an approach towards of sustainability as concept, but as I was in a Research Group, at Roskilde University, I caught up to another perspective. In this case, there is the possibility to approach sustainability as a Research Field, or as a main part of a niche of a technological research field.

6.1.2 Is sustainability a concept or a field of research/work?

During the entirety of the present academical year I was gifted with a multitude of perspectives about sustainability, but there was one that not only surprised yet also intrigued. Which is the perspective of sustainability as a Research Field. This means sustainability is the main concept of a field of investigation, but also all the search activities of the group are surrounding this concept and concepts around it.

One of the primarily examples could be the theoretical approach of Sustainable Interactive Design, or SID for short, which can explains how a Design of an Artifact could interact with sustainability. In this case, we can see it as the main part as environmental sustainability which is debatable, but nonetheless is related to sustainability (Blevis 2007).

On the third semester of my Masters Degree, during the internship I have learned of two areas that use technology to create products, or to help create products that have a sustainable background. Those fields of studies are designated as: *Sustainable Digitalization* and *Digital Sustainability*.

Both of those fields have heavy technological processes that they work with, by having sustainability in mind. But in a lot of cases it's easy to confuse both of them and their goals.

According to [Sacco et al. \(2021\)](#), the definition or, in this specific case, the goal of Sustainable Digitalization is the middle ground between two main concepts: Sustainability (with a huge emphasis on the report of Brundtland of 1972, at UN embassy in 1972) and Digitalization. In this case, Sustainable Digitalization is the Research Field where there is a need to find the best Digital processes and how can technology may be useful and have an positive impact for the environment, sustainability wise. Mainly focusing on the process of creating a less invasive process towards the environment and the social structures (Environmental and Social Sustainabilities) ([Sacco et al. 2021](#)).

[Sacco et al. \(2021\)](#), during his book classified the multiple technological fields into two categories: the digitalization ones and the sustainability related ones. Explain that there is a possibility to generate a positive relationship between those. This accentuated his definition of this particular field that the digitalization processes, in this cases, have the duty to be impactful, in a positive way towards sustainability.

On the other hand, Digital Sustainability is described by [Wut et al. \(2021\)](#) as second-order construct that consist in four major dimensions:

- content;
- preservation;
- promotion;
- technology;

([Wut et al. 2021](#))

[Wut et al. \(2021\)](#) during his study has made his study in the business environment, more specifically into a technological company near by his area of living. This means that there is a global modern perception of sustainability from the 145 employees that he interviewed. Stating that there is an agreement that Digital Sustainability plays a major role in empowering the durability of the information availability and knowledge transfer inside of an organization ([Wut et al. 2021](#)). His data allowed him to conclude that Digital Sustainability is a manifestation of the availability, preservation, promotion and technological aspect of digital content in the business world [Wut et al. \(2021\)](#).

As it is possible to observe, and still is a bit debatable, due to the fact that in the scientific/research community what is a fact today could be tomorrow contradicted by a different study, that sustainability plays, in this scientific fields and in the modern world a major role. As is it plausible to see here it passed already the barrier of just being a trivial concept, asserted itself into the scientific community as concept but also a player into the recently created scientific areas. In a lot of cases, could potentially be defined as scientific area that is being explored and will be developed for many years to come.

6.2 Secret Political Game

In this part of the discussion it will be approached the conflicts of the *"Facts"* and *"Values"* between the Municipality and the citizens, specially the citizens whom are representing the environmentalist group.

The first sign that I have seen of this conflict was when I have searched about the values of the infrastructure and then confronted the President of the Administration of the MetroBus Mondego Project, because there was no explanation attached to the values of money that were being applied to the project, only the amount of money that would be applied, but there was no further explanation about it. Only after, there was a better explanation from the President of the Administration. Also, only recently they would be some publications on the local news of how much costed the vehicles that will be conducted in the infrastructures built.

In second, while I was interviewing the citizens that are part of the environmentalist group, I asked them if there was any kind of public discussion, or audience with the municipality and/or the planners of the MetroBus Project. Which they replied that there was no public discussion that the environmentalist or the representative of the citizens heard about, completely contradicting the statement of the President of the MetroBus Mondego who stated that there was a public discussion. The citizens explained me that if there was any kind of public discussion about the project was made during the first glimpses of the pandemic with a really restricted number of people in a phone call, or even a online meeting, that was barely publicized. This actually goes to the point of the conflicting of *"Values"* that [Henriksen \(2016\)](#) mentioned in his article, and that was mentioned in the theory chapter. Also failing in the point of *"Communication"*, because this shows that the municipality, failed to communicate with their inhabitants about the public discussion, by not sharing the *"Facts"* about it ([Henriksen 2016](#)).

The data about this matter, clearly suggests me to assume that there was lack of *Transparency* from the municipality and the planners towards the inhabitants of the city. Specially considering the fact that the actual Mayor of the Municipality, that was elected democratically in 2021 changed his public opinion. When he was a councilor, prior to the Municipal Elections in 2021, he publicly expressed his opinion against the project of the MetroBus Mondego. Following the elections, in 2021, he clearly changed his tone towards the MetroBus Mondego stating that he was pro-MetroBus. All of this information, that was shared by this citizens make me raised a lot of questions, nonetheless they expressed to me that, from their point of view, the major concern for the municipality is to have the public investment funds from the central government. This could have some ethical implications and concerns, mainly related to the *Transparency* controversy, from the Municipality and planners actions point of view. Besides this, there is also the controversy of the *Logic* in terms of changing the opinions about the project.

This leads me to believe that there is, in the political community, nowadays, a *"Secret Game"* behind the scenes that I can not and do not understand. The reason for that is, from the start there is a lot of interests, specially monetary interests from the political community, instead of focusing on the interests

of the population. In this specific case, there is a clear conflict of interests, between two parts. Which is evident that there is a question related to the transparency from the municipality, according to the citizens, but probably there was a misunderstanding from any point, during the planning of the project, because the plant from the MetroBus Mondego was already planned since late 2019, or since the early months of 2020.

6.2.1 Where is the transparency?

Before even start, or continue, to discuss the matter of the transparency of this interesting case of the MetroBus Mondego, there is a urge for me to define the meaning of the term of transparency and how could potentially be applied on this cases. Because there is clearly, according to the data, the lack of political transparency.

During the theory's chapter, it was explained that the perception of *Reality*, accordingly to [Henriksen \(2016\)](#), is important to define and, consequently, to have a better understanding and apply it into a context, in the best way possible. So have decided to search for a the best definition possible of transparency, from my perspective of "*Reality*". Hopefully, for everyone that is reading this project understand from where this definition comes from and why I choose it.

According to [Hanna and Wigmore \(2022\)](#), transparency, from the political and business governance spectrum, means quality of being easily seen through, in other words, is usually referred to as being open and honest about the aspects that are being discussed between parts interested in a certain theme. On this particular case is interesting to say the least. It is interesting because both parts contradict themselves, having two people who are representing a group of citizens that worried about the environment and the green plant of the city of Coimbra. But also about the democracy of the consideration of project that they could potentially help to build something better.

It is worrying that in fact didn't happened a general public discussion, because from the data obtained the public discussion was with a really restricted number of citizens. Possibly from citizens that they shared the public discussion, it looked that they (the municipality) wanted to hide something from the rest of the inhabitants. Actually, in a lot of the investments made in infrastructures are associated with the taxes paid by the citizens to the state. In all of the projects where the public entities that are directly involved, they will use the money/investment from the taxes (which are paid by the taxpayers). It would be only fair, as social measure and, also be socially sustainable for the citizens to have direct access to the information of a project where everyone is being affected, to know what is going on. Not only mentioning the fact that the public discussion didn't included a lot of the entities that could help, but also citizens. This case should be applicable in all democratic states. In all fairness, the mayors of the municipalities and the people from the parish councils were elected in a democratic systems, so therefor they represent the people. But, as it was mentioned before, the information was not shared about the public discussion, neither the information about the project. If the information was let out public only on their social media or local journals, which could raise some problems, because not everyone have access to local journals or the social media. One of the reasons for that is the fact

that the some of the locations that the infrastructure was being built, the population is relatively older than some other parts.

The lack of sharing publicly the information, it is categorized as a lack of transparency, which goes against some of the *Values* and *Facts*. Having as a consequence a great misunderstanding, which resulted from the lack of *Communication* between both of the stakeholders.

In this case, I believe that the municipalities, planners and citizens are stakeholders of the MetroBus Mondego Project. The Municipalities, because of the fact they will always have the investment. When speaking of investment is about social and economical investment. The planners because they will have a return of the investment that they did and always have a fair share of the revenue. The citizens, not only in the city, but also the smaller municipalities affected by it, because they can be potential users of the MetroBus.

6.3 Is the MetroBus the one true choice?

During the entirety of this project it is been clear that the main theme is MetroBus Project, in the Coimbra Region. But there is still a question that was highly debated during the interviews with the informants: *"Was there any alternative to the MetroBus Mondego?"*.

From what I can analyze from the data gathered and from the interviews, it is suggestive that this project might have positive impact to the region. Specially regarding the investments that are going to be made by other companies. Besides this, other people could consider to go live to the smaller municipalities such as Lousã and Miranda do Corvo, because the pricing of the houses is lower than in the city of Coimbra. This could be an incentive to the smaller municipalities to grow in population and to grow in terms of economy and social prosperity. At same time, this could return to one of the initial problems that I have mentioned earlier in this project which is the fact that this project was planned and executed thinking mainly on the municipalities with a less density in terms of population. This could be a problem to the inhabitants of the city of Coimbra that, as it is possible to see in the interviews, they could feel a bit disregarded and that they were not consulted to give their own opinion about the project and the felt about it.

The second point that needs to be raised in this part of the project is the fact that the fact if the MetroBus could, potentially, be planned towards other population sites, for example Cantanhede, Mira, Figueira da Foz and, passing by the municipality of Montermor-o-Velho (Montemor-the-Old). This four municipalities, in total, have a population of 135.320 inhabitants, which is almost the total of inhabitants that the city of Coimbra has, by itself (dos Santos 2021). Meanwhile, the municipalities where the MetroBus is being built have total of 25.819 inhabitants of that area (dos Santos 2021). This data of the Census of the population, done in 2021, shows a great disparity of population between this areas of the region. It is important to mention that this happens for the reason that all of the three biggest municipalities are close to the sea, case in point Figueira da Foz and Mira. So there is even more reason for people to use it, in this case the biggest one during the summer is to go to the beach and enjoy the nice portuguese weather. Some people from the city of Coimbra even own a property in

the Municipality of Figueira da Foz, so if they wanted to spend there a week without driving and get stuck in the car traffic, would be nice to have another option of public transportation. If the MetroBus Mondego was done in this region instead of the smaller municipalities could be a bigger investment, but at same time the return from the investment could be bigger, besides the fact the usage rate the MetroBus could be bigger, because of the population is substantially bigger than the municipalities where project is built right now. In terms of the, old railroad, it could be also revitalized into a cycle lane, because of the tendencies of the people nowadays is towards being healthier and more sustainable for the environment, for their own economies and could be a way of having a different approach for the tourism of the region. In all fairness, there are already trains towards the municipality of Figueira da Foz, Mira and some parts of Montemor-o-Velho. Also some public transports, such as buses, to Cantanhede, so could be an overstatement if there was any kind of transportation to those bigger municipalities.

The third and the last point, but certainly not the least, there was suggestion from the all of the three citizens that were interviewed of extent the schedule and the routes of the buses that already existed. Instead of paying for the infrastructure of the MetroBus. Also, changing the crew of the buses from Diesel or Gasoline, which are classified as fossil fuels, for electric buses such as the *BRT*, or the *Light Transit* bus, that they presented for the MetroBus Mondego. This could be, from my point of view, more sustainable in all three counts:

1. *Economically*

The extension of the schedule and of the routes of the buses, possibly, only needed the investment of new type of buses and the needed to have incentives for the bus drivers that showed their availability to drive the buses on the routes designed;

2. *Environmentally*

There was no need to cut down an abysmal number of trees, and replant the trees, and destroy all the recently created ecosystems that were living in the old railroad, avoiding the creation of spaces with a lot of heat, meanwhile the recently planted trees that are growing.

3. *Socially*

Some people already use the bus and usually don't like to change their routines and get out of their comfort zones. Also they prefer to pay the same price than a price that could be higher than going by bus on their usual route. With different routes they could stay on the same stop and go for the location they want without abdicating their personal comfort and preference.

For the last count, there would be a need to do a population study about the overall preference, but from what the citizens that were interviewed, and as person that lived in the region close by those smaller municipalities, there would be a bigger preferences for this route. Nonetheless, there would be the need to do a population study to achieve a concrete conclusion, without generalizing.

As the citizens, that were interviewed, said there was need to have an investment and the plans were already made for that specific region, so this the project that could potentially have a positive impact in the future, but right now, during the process of building the infrastructure is not giving a good image to the inhabitants of the city.

6.3.1 Are the citizens going to use the MetroBus?

This part of the project is more dedicated to the chapter of Future Work, but, nevertheless, is an important part of this chapter.

The first aspect that deserves to be mentioned is the fact that not everyone in the city of Coimbra, neither the inhabitants of more isolated villages of the smaller municipalities have direct access to the MetroBus. On those particular cases, a lot of the people will need to get into a bus in the direction of the stops of the MetroBus, or, in the cases of people on those small villages they need to take their on personal vehicle and only then take the MetroBus to their destination. In some cases, specially regarding the people that has to use their personal transport, they also need to find a parking space that they do not pay, or simple words it is for free. I, personally, still do not know what is the amount of money of a ticket for the MetroBus or, even if they will put together the tickets of bus plus the MetroBus together in somehow promotion for the people that don't have direct access to it, for the people that are living within the city.

The second aspect that I find relevant is the fact that some people, like the citizen that I interviewed that lives in a village located between Figueira da Foz and Coimbra needs to use his personal transport vehicle, in this case a car or a motorcycle. If he wanted to use a public transportation to go to Coimbra, where he works, he needed to wake up earlier and catch at least two buses to get to town and then use another one within the city to get to his job. Not everyone has that kind of mental and economical availability to catch at least 2 buses to go to their jobs. A lot of people need, but when a person has a car, of course she, him or they/ them, would prefer to go on their personal vehicles.

It was interesting to say the least, when he explained the fact that now it is really complicated to get a free parking space for cars. If he wanted to use the the MetroBus, he would need to pay for the parking space close the station and then pay for a ticket of the MetroBus. This might not be sustainable at all for the population, in terms of economy and socially. So the only free car parking spaces are near by his job place. This example of the reality of the citizen that lives without direct access to the MetroBus could be the reality of many other citizens, living in the same conditions.

This kind of projects sometimes are not considerate of every single person, living within the region where the MetroBus is inserted on. This could lead to a series of question regarding the global sustainability of the process and the if really the end goal of the construction of this infrastructure is really sustainable at all. Of course, certainly we will only if it is really worth it the monetary and time investments into the building process of building the platforms for the MetroBus to travel on and if there is any return of the investment later on, in the future, within the first year could give clear idea of the artifact, if he is really worth it.

6.4 Biases on this project

In a research/academical project of any kind there is always going to be a biases, from the writer/researcher that is conducting the research. The case of this project is no different, until the data suggests something different or if the data contradict the alibi of the researcher. This project has the particularity of me being a former inhabitant of the region and the city of Coimbra. I was a inhabitant of the municipality of Penela, which is 15 min by car until the municipality of Lousã and 10 min, by car, until the municipality of Miranda do Corvo.

It would be unnatural, if someone like me, did not have those kind of tendencies, but also my own opinion on the project of the MetroBus Mondego. The reason behind this is, when the project of the MetroBus started in late 2020, I was still a inhabitant of the city of Coimbra, and saw all the transformation that the city went through between 2020 and 2022. So I started, since then, to formulate my own opinion about the project and the decisions of the municipality regarding the planing process of it. So I can say, as a way of expressing my own experience of my *"Reality"*, specially as an Anthropologist and future Techno-Anthropologist, that the process of *"undress"* my own clothes of the pre-conceived notions and prejudice was difficult, but it is not impossible to do it.

When mentioning this process of the *"undress"* my own clothes of the pre-conceived notions and prejudice, I was thinking, or seeing my self as *"Blank Slate"*, as the theory of *"Blank Slate"*, or *"Tabula Rasa"*, of John Locke, where a person needs to be in the perspective of Slate that is completely blank, just like a human baby. This means that a person did not formulated, or developed, their own way of thinking about a certain subject, but also is suggested by the environment and/or culture that a person is inserted on to the develop that opinion about the *"Reality"* and *"Facts"* and align their *"Values"* with the community that includes that person (Locke 2022).

As it was being mentioned earlier, I have the consciousness of the fact that my opinion could be shaped by my previous experiences within the environment and the people surrounding me that were agreeing or disagreeing with the project of the MetroBus Mondego. It, also, takes a bit of guilt the fact that usually I was a avid user of the public transportation system, in Coimbra. This fact also could contribute to the fact my opinion was being shaped by the environment caused by the Municipal Transportation Services of Coimbra (SMTUC).

In summary, as it was stated earlier in this part of the project, it is hard to be in a blank slate state, but also as an Anthropologist, and future Techno-Anthropologist, not let our previous experiences regarding a project that we had contact previously preventing us from gathering all the useful data to reach a certain conclusion, even if the data, or empirical data, in particular cases like this one, refutes our visions about the process of building or develop a certain infrastructure, or technological artifact.

Chapter 7

Conclusion

In this project I have investigated the building process of the infrastructure, where the *Bus Rapid Transit* vehicles of the MetroBus Mondego are going to circulate, with the goal of answering to the Problem Statements that I proposed:

"How sustainable is the infrastructure of the MetroBus Mondego?"

"What are differences between the inhabitants and the planners, relatively to the sustainability of the MetroBus Mondego?"

During the project, I have decided to focus my attention to the building process of the infrastructure, rather than the final product itself. The justification for that is because the final product it is not finished yet, so it would be rather difficult to have access to the final product. I would need to wait a couple months longer to have access to the final product and still have to wait have the proper data regarding the usage rate of this type of System of Public Transportation.

Regarding the first part of the problem statement, there are clearly some flaws, from my point of view, in terms of sustainability regarding the infrastructure. During the process of building, there was need to put down around 663 trees, the data suggested that the number of trees was less than expected, around 600 trees. With the compromise of planting three times of the total of trees that were putted down. So on this count, regarding the Environmental Sustainability, the 1.800 trees that are going to be replanted, they will need care and will take years to actual be at same size of the trees that were putted down. This is without counting the fact there will be needed resources to plant those trees. So it slightly affects the Economical and Social Sustainability.

Regarding the people, focusing more on the Social Sustainability, gladly this project did not take on residents during the duration of the building process. Before that, when the prior projects that failed to advance, with similar goals, there was a need to expropriate people, according to the data. But there were parts of the process of planning of the MetroBus, such as the public discussion that were not advertise, so there was an exclusion, from the citizens of the city of Coimbra, as the data suggested. From what I have observed from the data, the citizens had possibilities that are different from has been built since 2020. In a lot of cases, taking into account the population masses in other municipalities, that are bigger in terms of population, guaranteeing a bigger usage rate, in terms of amount of user. Or, instead of having the need of rehabilitate the old railroad, which needed some funds from the taxes and funds from European Union, those funds could be useful to extent the bus routes, that already existed previously, to those smaller municipalities.

Besides the fact that some of the businesses suffered with the direct access to them were blocked, so definitely the local business owners suffered, so the local economy also endured a lot problems.

The empirical data, also suggested that the project of the MetroBus, from the planners perspective is sustainable as final product. Meanwhile, the citizens have a different perspective, suggesting that the process of constructing the infrastructure for the MetroBus was not sustainable environmentally and not sustainable socially, so consequently, it is not sustainable at all, because the sustainability of the project is questionable. This does not mean that the opinion of the citizens will change when the final product is presented, in the near future.

So it is possible that the global process of creation of the infrastructure for the MetroBus Mondego was not sustainable. Just like my colleagues from the Research Group at Roskilde University, in Baptista (2023), once said: "The process of creating a sustainable product/artifact, doesn't necessarily needs to be sustainable to achieve a sustainable goal."

Besides the fact, there was, somehow, negligence towards the sustainable practices during the process of building the infrastructures and platforms for the vehicles of the MetroBus (*Bus Rapid Transit*) to circulate, there was also certain ethical concerns related to the project and how certain aspects were conducted, such as the *Transparency* towards the population of the city of Coimbra, which is related to the negotiations of the *Facts* and the lack of *Communication*, but also there was some lack of consistency of the *Logic* of the municipality and the planners.

Chapter 8

Future Work

At last but, certainly not the least, on this chapter there will be my perspective and prospective for the future, if there was an opportunity to observe and analyze, not only the numbers, in terms of usage rate of the MetroBus Mondego, but also the if the global perception of the citizens about the this public transportation method, has changed. The main goal is, in a more simplistic way, to observe and analyze this project, in the near future I would need to get into the my hometown and analyse how many people would use it. Not only in the city, but also in the other lines and terminals of the MetroBus, as in Serpins, Miranda do Corvo and Lousã.

I would never know the true result of the product, but only when it is finished I could truly conclude, accordingly to the empirical data gathered, if this project is worth it of the investment or if it is truly sustainable. At same time I believe that there was no need to sacrifice so much physical resources for it.

Besides my on-site observation of the MetroBus, I would need to have access to the numbers of the MetroBus. What I mean by this is the fact that I would need to have a the number of passengers per month and year, per location, the price of the tickets and passes per month and daily, to see if its truly worth it all of the money spent and sacrifices made. I would need to do a survey or an opinion pool to observe the perspective of the people and re-interview the environmentalist group and different citizens to see if they changed their opinions from now until then.

Only after this long process, I could eventually take my conclusions, based out of the empirical data, at least after year of usage of this public transport method, by the inhabitants of the region.

Bibliography

- Admin, 2020 “metrobus” do mondego avança em coimbra. Last access d. 11/03/2024.
- Baptista, D., 2023 The beginning of the design of a digital card game. the perspective of a techno-anthropologist in a participatory design project. Technical report, Aalborg University.
- Baptista, D., I. Clasen, and V. Plesner, 2023 The facilitation of the hipguard. the facilitation of the hip-guard as an assistive technology in a public organization. Technical report, Aalborg University.
- Blevins, E., 2007 Sustainable interaction design: invention & disposal, renewal & reuse. I *Proceedings of the SIGCHI conference on Human factors in computing systems*, s. 503–512.
- Collins, A., A. Cox, and G. Torrissi, 2021 Searching for a smart city: A bibliographic analysis of ‘public facing’ eu smart city projects. *Tijdschrift voor economische en sociale geografie* **112**.
- Council, B. C., 2019 Metrobus. Last access d. 08/03/2024 Link: <https://www.bristol.gov.uk/residents/streets-travel/transport-plans-and-projects/metrobus-bus-rapid-transit-brt>.
- Creswell, J. W. and J. D. Creswell, 2014 *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications Inc, Last accessed on 09/10/2022.
- Delve, 2022 The essential guide to coding qualitative data. Last accessed d.02/04/2024, Link: <https://delvetool.com/guide>.
- Dhanani, R., 2022 A brief history of sustainability. Last access d. 09/05/2024 Link: <https://thesustainableagency.com/blog/the-history-of-sustainability/>.
- dos Santos, F. F. M., 2021 Resultados dos censos 2021. Last access d.18/05/2024 Link: <https://www.pordata.pt/censos/resultados/emdestaque-portugal-1075>.
- Furtado, F., 2022 Metrobus e uma política de arborização insuficiente. Last access d. 28/02/2024 Link: <https://coimbracolectiva.pt/historias/metrobus-e-uma-politica-de-arborizacao-insuficiente/fbclid=IwAR29xJia9pMlidaASyMIHSmOoJlsDQFZ5RqMGRGgY1EmqlixKQ7TZuwr0w>.
- Giddens, A., 1982 Hermeneutics and social theory. Profiles and critiques in social theory s. 1–17.
- Hanna, K. T. and I. Wigmore, 2022 What is transparency? Last access d. 17/05/2024 Link: <https://www.techtarget.com/whatis/definition/transparency>.
- Henriksen, L. B., 2004 *Dimensions of change: conceptualising reality in organisational research*. Copenhagen Business School Press DK.
- Henriksen, L. B., 2016 Change, concepts and the conceptualising method. *Proceedings of pragmatic constructivism* **6**: 29–33.
- Ihde, D., 2009 *Postphenomenology and technoscience: The Peking university lectures*. Suny Press, Last accessed on d.08/04/2024.

- Investimentos, E. F. G., 2022 Sistema de mobilidade do mondego - totalidade da infraestrutura em fase de construção. Last access d. 29/02/2024 Link: <https://www.infraestruturasdeportugal.pt/pt-pt/sistema-de-mobilidade-do-mondego-totalidade-da-infraestrutura-em-fase-de-construcao>.
- Kestenbaum, V., 1992 " meaning on the model of truth": Dewey and gadamer on habit and vorurteil. *The Journal of Speculative Philosophy* s. 25–66.
- Locke, J., 2022 *An Essay Concerning Human Understanding. Volume One*, volume 1. Lindhardt og Ringhof.
- of Coimbra, M., 2022 A câmara municipal (cm) de coimbra aprovou, na sua reunião de hoje, uma proposta de alteração ao projeto do sistema de mobilidade do mondego (smm), no troço alto de s. joão – portagem. Last access d. 11/03/2024 Link: <https://www.coimbra.pt/2022/05/cm-coimbra-propoe-alteracao-do-projeto-do-metrobus-na-rua-general-humberto-delgado/>.
- Sacco, P., E. R. Gargano, and A. Cornella, 2021 Sustainable digitalization: A systematic literature review to identify how to make digitalization more sustainable. I *International TRIZ Future Conference*, s. 14–29, Springer.
- Tanggaard, L. and S. Brinkmann, 2020 Interviewet: Samtalen som forskningsmetode. I *Kvalitative metoder: En grundbog*, s. 33–64, Hans Reitzels Forlag.
- Tanggård, L. and S. Brinkmann, 2020 Interviewet: Samtalen som forskningsmetode. I *Kvalitative metoder - en grundbog*, redigeret af S. Brinkmann and L. Tanggård, chapter 1, Hans Reitzels Forlag, 3. udgave.
- Texeira, A., 2022 Os plátanos. Last access d. 20/03/2024 Link: <https://www.facebook.com/apolino.teixeira>.
- Verbeek, P.-P., 2015 Beyond interaction: A short introduction to mediation theory. *Interactions (ACM)* **22**: 26–31.
- Weber, M., 1978 *Economy and society: An outline of interpretive sociology*, volume 1. University of California press.
- Wut, T. M., D. Lee, W. M. Ip, and S. W. Lee, 2021 Digital sustainability in the organization: Scale development and validation. *Sustainability* **13**: 3530.