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Circular economy in Africa: How could this model contribute to a socio-economic recovery, especially in urban cities? The case of Madagascar

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Academic Year: 2019-2020
Master [120] en sciences de gestion, à finalité spécialisée

AKNOWLEDGEMENTS

First and foremost, my sincere gratitude goes out to my thesis supervisor, Professor Vincent Truyens who closely accompanied me all along the process. I came to him with an idea in my mind and he helped me turning it into something even more meaningful. I do not doubt that he was the perfect supervisor for me, always advising me to go further in my thinking while keeping my feet on the ground. It was a real pleasure collaborating with him.

Then, I would like to acknowledge all interviewees who found the time to answer my questions. This thesis would not have had the same value without them.

This accomplishment would also not have been possible without the support of my friends all along my academic years and during the realisation of this thesis especially. I would like to express my gratitude to five of them in particular. Firstly, I would like to thank Bénédicte Vandooren for reading my master thesis and giving me very insightful comments. I am also grateful to my dear friend Adrien Chiroux who read a considerable part of this work and helped me get through this adventure. Then, I would like to thank Justine Deloof, Marc Issia Amoundala, and Gaëtan Chiroux for showing me the same support in athletics as in my studies.

My last words will go to three people who are particularly dear to me: my parents and my little brother. Thank you for always believing in me more than I believe in myself; for inspiring me; and for always reminding me where I came from, who I am, and who I would like to become.

Thank you,

Heurjonie Lembi Bonheur.

ABSTRACT

This master thesis investigates how the model of circular economy could bring socio-economic recovery in Malagasy urban cities. The main reason explaining the choice of this topic was the lack of literature regarding circular economy activities in Madagascar. Therefore, this thesis aims to fill the gaps.

The literature review helped us defining the notion of circular economy, the notion of socio-economic recovery, and the potential link between the two terms. This led us to dress four sub-questions to answer our research question: 1) How is circular economy perceived in Malagasy urban cities? (SQ1), 2) How does circular economy contribute to inclusive growth[1] in Malagasy urban cities? (SQ2), 3) Which opportunities to take in the future? (SQ3), 4) How does/will COVID-19 influence circular economy in Malagasy urban cities? (SQ4).

Regarding SQ1, circular economy in Malagasy urban cities is mainly done in the informal sector and citizens practicing it usually do it as a way to survive. Furthermore, public authorities have not built any structure enabling and encouraging circular practices. Concerning SQ2, formal circular economy activities in Malagasy urban cities influence positively some indicators of: 1) SDG 1 (No poverty), 2) SDG 3 (Good Health and Well-being), 3) SDG 4 (Quality education), 4) SDG 8 (Decent work & Economic growth), and 5) SDG 10 (Reduced inequalities). In regard to the opportunities (SQ3), it was discussed that a system of performance economy could be developed in the telecommunication industry (e.g. phones, laptops, desktops, etc.). Concerning COVID-19 (SQ4), the Government seems to see the importance of consuming what the country produces locally.

From this observation, it is believed that Malagasy urban cities have a long path to go to build a formal circular economy that leads to a socio-economic recovery. The Government should thus lead by example and support private sectors and social structures (e.g. families, social circles, etc.) in the adoption of this model.

[1] A growth that is beneficial to every citizen in a society, both in the lower and higher strata. (Raneri & Ramos, 2013)

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LIST OF ABBREVIATIONS

ACEA	African Circular Economy Alliance
ACEN	African Circular Economy Network
ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie
AfDB	African Development Bank
APM	Association Progrès du Management
C2C	Cradle-to-Cradle
CEO	Chief Executive Officer
COI	Commission de l'Océan Indien
COVID-19	Coronavirus 2019
EEE	Electrical and Electronic Equipment
EMF	Ellen MacArthur Foundation
EU	European Union
GDP	Gross Domestic Product
GRET	Groupe de recherche et d'échange technologique
HDI	Human Development Index
HSQE	Health, Safety, Quality, Environment
ICT	Information and Communication Technology
MFA	Material Flow Analysis
MSW	Municipal Solid Waste
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PESTEL	Political, Economic, Sociological, Technological, Environmental, Legal
PPP	Parity Purchasing Power
R&D	Research & Development
RSE	Responsabilité Socétiale des Entreprises
SAMVA	Service Autonome de Maintenance de la Ville d'Antananarivo
SDG	Sustainable Development Goals
SME	Small and Medium-sized Enterprise
SMTP	Société Malgache de Transformation Plastique
S.P.A.H	Société de Production d'Articles Hygiéniques

SWOT	Strengths, Weaknesses, Opportunities, Threats
UNEP	United Nations Environmental Programme
USD	United States Dollar
WEEE	Waste Electrical & Electronic Equipment

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INTRODUCTION

"The New African City will not be able to live up to the expectations of all its inhabitants if it does not seriously consider its challenges but also the reserve of growth lurking within it: green growth is surely one of the keys to its future" [Translation mine]
(Cheikh Lahlou, 2017)

For decades, African countries have adopted the same path as developed countries by entering the race for economic growth. The golden rule is to adopt a linear economy model that consists in extracting raw materials to manufacture goods that will be then consumed and disposed of. Throughout the years, it was realised that economic growth did not help Africa fully tackle its socio-economic issues. The term "green growth" thus appeared. The latter is based on the green economy, which is defined as "*one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities*" (UNEP, 2011, p. 2). Although Africa is home of the world's fastest-growing economies, the continent still presents some issues: high level of poverty, high and increasing young population, significant unemployment rate, and rapid urbanisation leading to significant amounts of waste in cities (Adegoke, 2020; Déclic & Deloitte, 2017).

"Africans will have to define their own success model, and the circular economy 2.0 could be one of the options" [Translation mine] (Lemille, 2017)

Today, experts and institutions are discussing about turning those issues into opportunities by adopting circular economy. This paradigm consists in using waste as a resource and changes the traditional economic model. According to the literature, the reuse of waste has always been embedded in traditional African practices. Nonetheless, the quest for a westernised model has deflected the continent from its roots. The question still remains as follows: How could the model of circular economy answer to African socio-economic issues? Little research provides concrete examples due to the lack of studies on the field. The institutionalisation of circular economy in Africa is still in its embryonic phase. This explains the interest to explore the topic in this thesis.

Each country has its own socio-economic context and is at a different step in the institutionalisation of circular economy. Hence, it was decided to focus on only one

country. The African Circular Economy Network (ACEN) represented the starting point of our research. ACEN was created in 2016 and represents one of the first organisations promoting circular activities at the continent scale with approximately 30 member countries. This platform encourages the share of best practices between countries.

This thesis aims to look for new information and some opportunities with regards to circular economy in an African country. The choice of Madagascar was first motivated by knowing people working for the Non-Governmental Organisation (NGO) "Graine de Vie", which is committed to environment protection and reforestation in Madagascar. While making some research on the Malagasy context, it became evident to focus on this country. In fact, Madagascar is considered as a member of the ACEN, but documentation does not provide any information regarding the country. Next to that, the capital city of Madagascar, Antananarivo, is known as one of the dirtiest cities in the world considering the high amount of waste. In response to that, several actors in the country are adopting Corporate Social Responsibility (CSR) approaches and green economy practices to diminish and manage waste. Furthermore, since the election of President Andry Rajoelina, the Government has taken some actions to promote the local economy and environment protection. In fact, in January 2020, a reforestation plan was launched to plant 60 million trees in one year. In April 2020, the President presented the COVID-Organics to the world. This is a beverage made from Malagasy plants and that could cure people from coronavirus (COVID-19). This medicine has been distributed in several African countries. In June 2020, the President announced the launch of the second Malagasy car brand named Gasycar. All these factors explain the interest in Madagascar in this thesis. Moreover, Madagascar is one of the poorest countries in the world (The World Bank, 2019a). This makes therefore sense to assess the contribution of circular economy to a socio-economic recovery in the country.

From all these factors, it seems that Madagascar could adopt this model on a larger scale. Yet, it is necessary to first evaluate how this model is perceived on the field, how it is done, and how it brings socio-economic benefits. To narrow our research, we decided to focus on Malagasy urban cities (e.g. Antananarivo, Fianarantsoa, Mahajanga, etc.). Three reasons explain this choice: 1) high rural exodus, 2) waste generation mostly happens in urban areas, 3) most of local circular economy actors are located in urban cities. Considering that circular economy highly promotes a more local economy, it was decided to only focus on local actors doing it as their main activity. Although the focus is on local activities, circular

economy and its implications will be assessed in a territorial perspective. The research question is presented as follows:

Circular economy in Africa: How could this model contribute to a socio-economic recovery, especially in urban cities? The case of Madagascar

To answer this question, the thesis follows a funnel-shaped structure. The first step of this funnel presents a literature review. It will give a presentation of circular economy in general and the notion of socio-economic recovery. The potential link between the two concepts will then be explained. This literature review will help in the building of sub-questions and research lines to answer the research question. The second step of this funnel aims at understanding the African circular economy. The purpose of this step is to get insights from experts and use those insights while assessing Malagasy urban cities. The final step will analyse how the latter is adopting the model, what it brings, and which new opportunities to take. After that, the status of Malagasy urban cities will be discussed and we will provide recommendations to build an inclusive circular economy. The thesis will end with a conclusion, a presentation of limitations, and an invitation for further research.

Prior to engaging in the literature review, it is necessary to take some comments into account. Firstly, the focus of this thesis is circular economy. Therefore, the notion of sustainable development (e.g. Corporate Social Responsibility (CSR), green economy, etc.) is not treated to the fullest. It is noted that the Malagasy Government and lots of actors are delivering remarkable work on this topic. Circular economy is just a part of this and the conclusions presented in this thesis only concern this model. Secondly, the literature review has been built with the aim of understanding the circular paradigm in a territorial perspective and its macro implications. Many other definitions, concepts, indicators, processes, theories, challenges, and benefits exist. The focus was to build a literature review that helps answer the research question. Thirdly, this work has been done by a student who has never been in Madagascar. This explains the choice to adopt a qualitative approach and exchange with some Malagasy actors in order to understand the field. The choice of this country was motivated by the desire to bring something new on the table and maybe open the floor to the real actors in the field. This document remains a master thesis adopting an academic methodology based on an academic literature, scientific articles, news articles, reports, and interviews to analyse a societal topic. Finally, this thesis has been written

during the COVID-19 crisis. Therefore, one of the biggest difficulties in the realisation of this work was to find a considerable number of key actors to help in the process.

For comprehension reasons, we would like to inform that the notion of circular economy is seen as a general term in this thesis. Therefore, we will only use articles such as “the” or “a” when talking about specific cases of circular economy (e.g. the African circular economy, an inclusive circular economy, a circular economy that is, etc.).

PART I: LITERATURE REVIEW

CHAPTER 1: CIRCULAR ECONOMY

This chapter is the first step of the funnel. The aim is to provide a general description of circular economy. The following topics will be discussed: 1) linear economy and its limits, 2) definitions of circular economy, and 3) schools of thought and approaches.

1. LINEAR ECONOMY AND LIMITS

1.1 Linear economy

For centuries, the world has been ruled by a linear economic system, namely linear economy. This system is divided into the following steps: “take - make – use - dispose”. In other words, raw materials are extracted to manufacture new products. Subsequently, those products are distributed to the consumers who consume them until disposing of them (Vickers & Chasan, 2019).

Linear economy relies on the assumption that natural resources are abundant and cheap. However, throughout the years, people have realised that the world is reaching its limits. The concept of linear economy can be traced down to the 19th century with the transition from an agricultural to an industrial society (Bongaarts, 2009). This transition is called the industrial revolution. It was brought through the influx of new inventions. In response to this societal shift, the world population, such as the demand, gradually increased. Considering that natural resources were valued at lower prices, industries began to extract as many resources as possible in order to meet the growing demand. This has gradually caused pollution, climate change, and resource scarcity (Bongaarts, 2009; Cornwall, 2000; Sariatli, 2017).

The international questioning on linear economy limits began in 1972 when “The Club of Rome” commissioned a report called “The Limits to Growth”, also known as the “Meadows Report”. The aim of this report was to raise awareness about the dangerous effects of economic and demographic growth on the planet (Meadows, Meadows, Randers, & Behrens III, 1972). Later, in 1987, the World Commission on Environment and Development (WCED) published

the Brundtland Report. While "The Limits to Growth" emphasized the collapse of the world due to the way societies consume and produce, the WCED introduced the concept of sustainable development. The latter is defined as "a *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED, 1987). This report explained how sustainable development could be achieved. The report pointed out three principles: planet, people, and profit. Every action taken should take into account the respect of the environment, the search for economic growth and opportunities, and people's wellbeing (Mensah, 2019). Unlike "The Limits to Growth", the Brundtland Report does not identify economic development as a danger, but as a pillar to build a more sustainable world.

1.2 Towards a new paradigm

Besides the raise of awareness about linear economy limits, institutions were also looking for more sustainable economic models. The notion of circular economy thus appeared around 1970 (The Ellen MacArthur Foundation [EMF], 2017a). It is based on Lavoisier's principle *"Nothing is lost, nothing is created, everything is transformed"* (Truyens, 2018). Wastes become new resources. Added to the environment and resource scarcity, other factors explain the transition to this new paradigm.

Firstly, the population is consuming faster than the world is producing. According to the law of supply and demand, raw materials prices are increasing in order to balance the situation. This surge in price concerns metal and agricultural products. In fact, price volatility was higher during the last decade than any decade in the 20th century (EMF, 2013).

Secondly, various international and national policies have appeared thanks to the rise of public awareness towards sustainability (e.g. EU Circular Economy Action Plan, Circular economy law of People's Republic in China 2008, etc.). The objective is to promote circular economy between and within countries (Bonet, Petit, & Lancini, 2014).

According to Ken Webster in his book *The Circular Economy: A Wealth of Flows* (2015), information and communication technology (ICT) favours the transition to circular economy. An example given in his book is the sharing economy, which process is easier and faster with ICT. Moreover, consumers and sellers benefit from lower transaction costs (Webster, 2015).

Nevertheless, technology is not a panacea and should be monitored at a closer loop (Bihouix, 2019). For centuries, human beings have been triggered to go beyond their limits in everything they realise. Technology supports humankind in this quest and is expected to do even more such as improving humanity and restoring environmental damages. This is called the Cornucopian utopias. Yet, one should not forget that high technology leads to environmental and social damages (Bihouix, 2019). An alternative is low-tech, which corresponds to a lower level of technology that offers available, simple, resilient, and sustainable solutions (Bihouix & Leveque, 2019). From going to work by bike to the manufacturing of solar ovens, low-tech exists in different forms (Maurer, 2017).

Furthermore, several theories promote sustainability worldwide. An example is the Doughnut Economics developed by Kate Raworth around 2012. This theory explains the "humanity's 21st century challenge" (Raworth, 2017). Humanity has to ensure that everyone meets their initial needs without exceeding the planet's capacities. This theory is illustrated with a doughnut-shaped diagram given in Figure 1 below. It is a disk built with two dark green circles and a central hole. On the one hand, the inner circle represents the social foundation, which consists of the basic daily needs that enable people to live. The inside of this circle corresponds to the area where people fall short of their daily needs, namely "shortfall". On the other hand, the outer circle corresponds to the ecological ceiling, which represents the ecological boundaries to respect. Should those boundaries be crossed, it would lead to environmental catastrophes, namely "overshoot". The aim of the Doughnut economics is to reach a balance between meeting social needs and respecting the planet's life-supporting systems. This balance is called dynamic. It corresponds to the light green space between the two rings. Currently, the balance is not reached. The red areas highlighted in Figure 1 show on which indicators humanity is falling. Now, it should be mentioned that millions of people live below this social foundation, especially in Madagascar, and four of the planetary boundaries have been exceeded. According to Raworth (2017), a new sustainable economic system is required to reach and stay in balance. It is alleged that circular economy could be the answer (Raworth, 2017).

Finally, it is important to remember that the world population is still expected to grow. As reported by the United Nations (2019), the growth would amount to 25% between 2019 and 2050 (United Nations, 2019). In Madagascar, this growth is estimated at 50% between 2015 and 2030 (World Bank Group, 2015). Consequently, natural resources consumption would be even more significant.

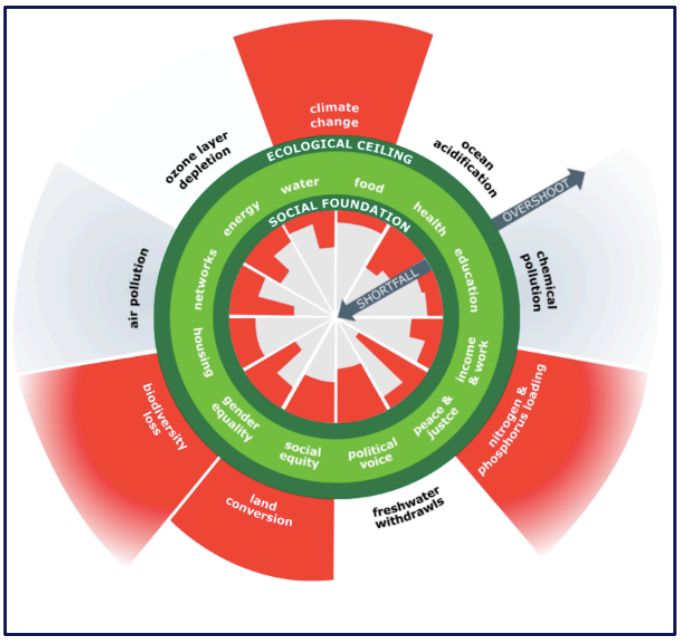

Figure 1: Doughnut of social and planetary boundaries (Source: Raworth, 2017)

All these factors explain why circular economy is becoming increasingly popular and needed. It started with a simple alarm for the sake of the world and became years later a model coveted worldwide. Although circular economy has always been based on Lavoisier's principle, the concept itself evolved through years. In fact, the notion is defined differently depending on schools of thought, benefits it gives, and dimensions it covers. This will be further developed in the following section.

2. DEFINITIONS

Circular economy does not have a specific date of birth. The concept consists in practices applied to modern economic activities and industrial mechanisms. It can be applied to industries (e.g. food industry, fashion industry, car industry, farming, etc.), steps of a company's value chain (e.g. manufacturing, procurement, logistics, service, etc.), and a territory (e.g. country, region, community, etc.). Hence, this model is defined differently from one author to another, or even from one case to another. However, its fundamentals are deep-rooted (EMF, 2017a). The aim of this section is to present different definitions of circular economy and to confront them with each other. The definitions are divided into three categories: benefits perspective, system perspective, and territorial as well as macroeconomic

perspective. Those definitions will be considered in the construction of research lines while assessing how the circular model is perceived and what it brings in Malagasy urban cities.

2.1 Benefits perspective

2.1.1 European Commission

"In a circular economy, the value of products and materials is maintained for as long as possible. Waste and the use of resources are minimised, and when a product reaches the end of its life, it is used again to create further value. This can bring major economic benefits, contributing to innovation, growth, and job creation." (European Commission, 2019).

The European Union (EU) considers circular economy as one of its sustainable growth strategies (European Commission, 2020). In other words, it is considered here as a branch of sustainable development. Compared to the Brundtland Report published in 1987 which claimed that "profit" was a pillar to reach a sustainable world, the European Commission's definition alleges that sustainability, which is represented through circular economy, can lead to "*major economic benefits*" (European Commission, 2019). A cyclic relation between the economy and sustainability can thus be observed. In fact, an economy organised in a more sustainable approach would contribute to sustainability which would subsequently contribute to the economy. The European Commission also uses the term "value". On the one hand, value is kept for a longer time in the economic system; on the other hand, additional value is created by reusing a product at the end of its life (European Commission, 2019).

2.1.2 Buttin and Saffré

"Circular economy is a large scope vision that could bring considerable innovation to people from a county, a city, or a neighbourhood in the purpose of saving the environment and making an economy grow. In a far-reaching approach, this concept brings more wealth, safety, and well-being to the population by creating new relations between citizens and their environment." [Translation mine] (Buttin & Saffré, 2016, p. VIII)

In addition to economic benefits, Buttin and Saffré (2016) mention social and environmental ones. Furthermore, these authors consider circular economy as a structure in which economic players are interacting with their environment. This definition thus perfectly incorporates each pillar of sustainable development explained in the Brundtland Report: profit, people, and planet.

2.2 System perspective

2.2.1 Remy Le Moigne

"The circular economy is a production and trading system taking into account, from the time of their conception, the durability and recycling of the products or their components so that they can become again either reusable objects or new raw materials, with the objective of improving the efficiency of the use of resource." [Translation mine] (Le Moigne, 2014, p. 32)

While the two previous definitions focused on the product's end of life and on the benefits of circular economy, Le Moigne (2014) highlights the whole process from the beginning to the end of the loop. This definition points out the "think in systems" principle proposed by Ken Webster, Head of Innovation at the Ellen MacArthur Foundation (EMF). By "thinking in systems", Webster (2015) explains that the whole system is considered and not only a part of it. This system is an interconnection between several parts where one part has an influence on one another and vice versa. Conversely, those parts influence the whole system. By considering all those connections, a more flexible and resilient system is built (Webster, 2015).

This principle of "thinking in systems" evokes the term "eco-design". It involves integrating the environment at each step of a product life-cycle (ADEME&VOUS, 2012). Design is indeed considered as an important part of the product life-cycle. Tackara argues that *"80% of the environmental impact of a product, a service, or a system is generated at the design stage"* [Translation mine] (cited in Buttin & Saffré, 2016, p. 66). Design is considered as a strategic discipline that takes into account the conception of tangible (e.g. products, illustrations, signs, etc.) and intangible solutions (e.g. services, systems, processes, etc.). It stimulates circular economy and "*enables to rethink the world in order to transform it in a good way*" [Translation mine] (Buttin & Saffré, 2016, p. XVII).

In his definition, Le Moigne (2014) mentions the term "recycling" as a criterion when evaluating the possibility to reuse a product or its components. Yet, Walter Stahel, also known as the circular economy's father, claims that the aim of this concept is to avoid waste being dismantled, disposed of, or even recycled (European Commission, 2014). According to Eurostat (2014), recycling consists in reprocessing the waste into raw materials that will then be used for the manufacturing of a product. However, this process requires a certain amount of energy and does not involve recovery of energy. Recycling is less sustainable than reusing, which consists in exploiting the waste without any transformations in order to remanufacture

the same product or to build a new one (ADEME&VOUS, 2012). Stahel argues that reusing should be prioritised over recycling (European Commission, 2014).

2.2.2 The Ellen MacArthur Foundation (EMF)

"A circular economy aims to redefine growth while focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resource and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution, keep products and materials in use, and regenerate natural system." (EMF, 2017b*).*

The EMF also emphasises the fact that circular economy is a system as a whole. In regard to the mentioned principles, the foundation claims that the circular model is based on the idea of designing without hurting the environment. This brings us back to the notion of eco-design developed earlier. Moreover, by keeping products and materials in use, the EMF refers to the idea of preserving resources value by using them continuously. The third principle states that circular economy promotes the use of renewable resources (e.g. renewable energy instead of fossil fuels) in order to not only protect the environment, but also to make it better (EMF, 2017b).

The last two principles refer to the Circular Economy System Diagram presented in Figure 2. Circular economy is a cyclic system based on two types of materials: biological materials (green cycles on the left side) and technical materials (blue cycles on the right side). Biological materials consist in materials that can re-enter the natural world after being used repeatedly. This process is called cascades as shown in the diagram (principle 3: regenerate natural systems). The technical materials refer to elements such as metals, plastics, and synthetic chemicals that cannot return to the natural world. Those materials re-enter the system continuously through practices such as sharing, product life extension, reusing, remanufacturing, or recycling (principle 2: keep products and materials in use). The foundation claims that this cycling system helps create a long-term resilient economy (EMF, 2017b).

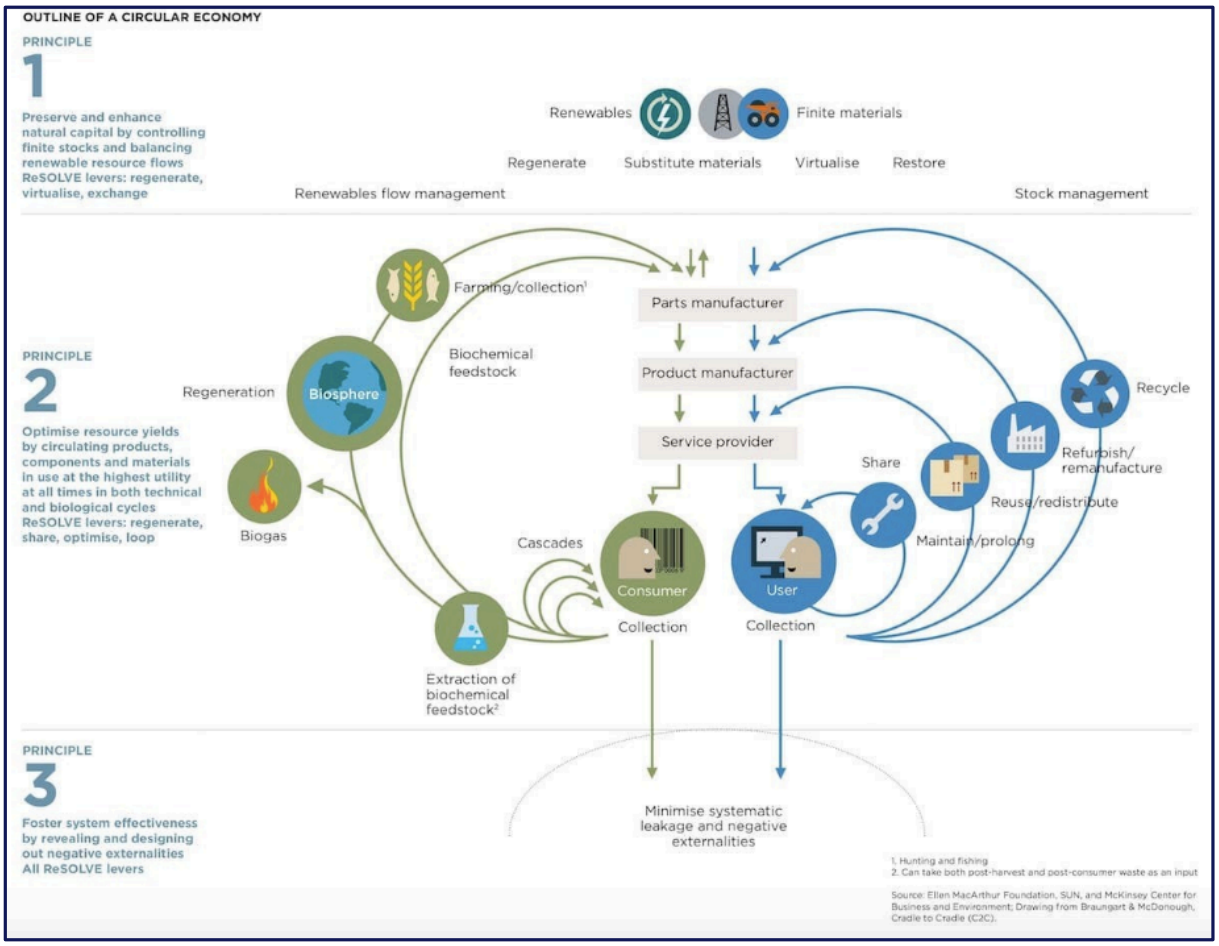

Figure 2: The circular economy system diagram (Source: EMF, 2015, p. 24)

2.3 Territorial and macroeconomic perspective

"Circular economy is a principle, or an organization strategy which distinctiveness, compared to classical environment management policies (recycling, depollution, energetic efficiency, clean technologies, etc.), derived from its capacity to combine sectorial and transversal approaches in an integrative process" [Translation mine]
(Lévy & Aurez, 2014, p. 17).

By "Organization Strategy", it is meant a strategy concerning territorial planning (Lévy & Aurez, 2014). In the previous definitions, circular economy was seen as a whole system, but on the basis of only one particular business line (cf. Point 2.2). Here, it is presented as a whole territorial system in which there are connexions between several industries and economic agents (e.g. public authorities, consumers, and companies). Territorial planning requires an analysis of the incoming and outgoing flows of materials and energy occurring in an area. In addition, the authors mention the necessity to analyse supply and demand in the territory in order to identify opportunities of decentralised cooperation (Lévy & Aurez, 2014).

Lévy and Aurez (2014) also highlight the importance of people in eco-design. Although companies integrate the environment at each step of the product life-cycle, there is still a risk that consumers do not behave accordingly. To fully close the loop, companies can integrate services all along the product life and persuade consumers to contribute to the effectiveness of this service (Lévy & Aurez, 2014).

Levillain and Bonet Fernandez (2014) also focused on the macroeconomic perspective in their paper "Économie Circulaire: Quel Cadre Réglementaire en France?": they believe that circular economy requires a regulatory framework that will lead each economic agent (e.g. public authorities, companies, and consumers) to its adoption.

2.4 Conclusion

As it has been demonstrated in this section, circular economy is a sustainable economic model organised in a closed loop, but open to the environment in a systemic perspective. It brings several types of economic agents from different sectors around a same objective. This objective involves minimising the energy consumption and waste generation at each step of a product life-cycle, a service, a process, or a network. The circular economy paradigm operates on different levels: product, companies, network, and policies (Geng, Sarkis, & Bleischwitz, 2019). Moreover, it aims to bring economic, social, and environmental benefits.

What differentiates the circular paradigm to the linear one are the notions of efficiency and effectiveness. Efficiency consists in doing things right while effectiveness means doing the right thing (Webster, 2015). Linear economy has always been built in an efficiency perspective which has led economic agents to act according to their own interests. According to Adam Smith (1977) with his theory of the Invisible Hand, this behaviour creates social benefits. Yet, it is a short-term vision of the market function and it does not take into account negative externalities. That is to say that the linear model is not holistic (Hiwaki, 2011). The circular model makes the difference by considering not only the profit, but also the people and the planet. It adopts both an efficient and effective approach.

3. SCHOOLS OF THOUGHT/APPROACHES

Circular economy is built on several schools of thought and approaches (EMF, 2017a). They are the sources of various definitions. The purpose of this section is to connect the definitions and principles developed above with the various schools of thought. Information provided in this section will help assess where Malagasy urban cities stand in terms of circular economy and which new opportunities can be considered in the future.

3.1 Performance economy

This concept was built by the architect and industrial analyst, Walter Stahel, around 1970. As previously mentioned, Stahel is seen as the circular economy's father (cf. Point 2.2.1). In 1976, together with Genevieve Reday in their research report "The Potential for Substituting Manpower for Energy", they introduced a new economic model organised as a closed loop. The idea was to found a model that would break the classical industrial paradigm and propose a more environmental-friendly approach. In 1982, Stahel founded the Product Life Institute in Geneva with the purpose of developing practices that would contribute to economic growth while using as few resources as possible. The institute had several ambitions: product-life extension, waste prevention, resources consumption minimisation, job creation, economic competitiveness, and promotion of local Small and Medium-sized Enterprises (SME) (Webster, 2015).

In his book *The Circular Economy – A User's Guide* (2019), Stahel evokes the importance of selling services instead of products. By selling a service, underutilization is avoided and companies are encouraged to build longer-lasting products. This belief was identified as "functional service economy" and then later incorporated in a more general concept called "performance economy" (EMF, 2017a). This consists in several types of technical and commercial innovations leading to better use of goods. The first type is longer utilisation. Companies such as Philips adopted this approach by selling the light performance (e.g. intensity of the light) instead of fittings. This way people only pay for what they use and Philips offers longer-lasting fittings in order to provide the best customer experience (Phipps, 2018). The second type is a more intensive use of goods. This corresponds to the "share economy". Companies such as Uber, Airbnb, and Lyft disrupted the world by offering platforms to private individuals on which they agree to share an asset or a service (Alton, 2016). In short, the longer a product stays in the economy, the better (Stahel, 2019).

Furthermore, Stahel is a promoter of labour force. Nowadays, governments tax salaries and wages, which represents additional costs for companies. Consequently, the latter goes for automation and mechanisation both using a significant amount of energy. Stahel introduces the term “sustainable taxation” which involves taxing non-renewable resources only. In his book, he defines human labour as a renewable resource because it is not depleted while being used. Consequently, sustainable taxation is in favour of labour force (Stahel, 2019).

As a summary, it can be observed that the benefits perspective that some circular economy definitions incorporate comes from the concept of performance economy. Stahel was seeking for social, environmental, and economic benefits in his studies.

3.2 Cradle-to-Cradle (C2C)

Stahel coined the term “Cradle-to-Cradle” (C2C), in the late 70s (Making It Magazine, 2013). However, it is Michael Braungart, a German chemist and visionary, together with Bill McDonough, an American architect, who built the concept and its fundamentals. They call “nutrients” all materials involved in industrial and commercial processes. Those nutrients are classified in two categories: biological and technical ones. Biological nutrients are the ones that return back to the natural world while technical nutrients are reinjected into industrial or commercial processes (Braungart, McDonough, & Bollinger, 2006).

C2C is built on three main fundamentals. Firstly, waste is considered as food. The notion of waste is therefore excluded. All products and materials are conceived with the purpose of reusing their components in a biological or technical process. Secondly, C2C promotes the generation of power through renewable energy. Nowadays, companies try to adopt an eco-efficient approach by reducing the amount of energy used during industrial and commercial processes. However, C2C proposes that companies opt for an eco-effective approach by using renewable sources offered by the sun. An example is the use of solar panels for home electricity. Thirdly, diversity is celebrated. By diversity, it is meant that the C2C concept takes into account cultural, social, and bio-diversity. Operations and stakeholders are led with respect to human beings and natural systems. By integrating all these aspects in the system, the latter would be more resilient to any changes and pressure (McDonough & Braungart, 2013).

A connection between the C2C and the definition of circular economy given by the EMF can be observed. They both consider design as a decisive step in a circular economic approach. Additionally, they have a common interest for the distinction between biological and technical materials. Finally, the EMF also stresses the importance of shifting to renewable energy.

3.3 Biomimicry

Biomimicry was first promoted by Janine Benyus in *Biomimicry: Innovation Inspired by Nature*" (1997). This design concept consists in analyses of nature's designs and processes in order to mimic them. The idea is to innovate while being inspired by the nature. Biomimicry is based on three key principles: nature as a model, nature as a measure, and nature as a mentor.

The first principle, nature as a model, simply involves observing and studying nature's model in order to create innovative designs, processes, and strategies to solve human problems. An example is the company Interface with its carpet tiles "TacTiles". The design is inspired by the fingers of a gecko (a little reptile) that can be easily fixed and removed from a surface. By using this technique inspired by nature's observation, the company avoids using adhesive and glue to fix the carpet tiles (Buttin & Saffré, 2016).

The second principle, nature as a measure, insists on the use of ecological standards to evaluate how sustainable an innovation is (e.g. total amount of carbon dioxide emission produced, total amount of recycling, etc.) (Lévy & Aurez, 2014).

Finally, the third principle, nature as a mentor, relies on the fact that human beings should not only extract from the nature but also learn from it. There are three learnings. Firstly, the waste of ones are the resources of others. This logic will be further developed in the next point. Secondly, if one living being ends up in a situation of excess, a collaboration and redistribution process will occur in order to return to a balanced ecosystem. Finally, local interactions are favoured in an ecosystem, that leads to cooperation between the different living beings in the environment (EMF, 2017a).

The notion of ecosystem sends us back to the definition of Buttin and Saffré which explained that circular economy creates "*new relations between citizens and their environment"* (cf. Point 2.1.2) (Buttin & Saffré, 2016).

3.4 Industrial ecology

According to Webster, industrial ecology is "*the study of material and energy flows through industrial systems*" (2015, p. 58). It consists in analysing flows of materials and energy in a territory. From this analysis, a closed loop process based on connections between different operators is created. These connections are built on the logic that waste from one operator is resources for another operator (Webster, 2015).

Industrial ecology relies on territorial planning and can be implemented on three different levels: company, industrial zone, and region (Bonet, Petit, & Lancini, 2014). The earliest example of the industrial ecology principle is Kalundborg in Denmark. It is an eco-industrial park where waste from one company is bought as a resource by another company in a closed loop (Sönnichsen & Jesper, 2018).

It can be observed the concept inspires itself from the design of nature: the waste of ones are the resources for others (Sönnichsen & Jesper, 2018). Furthermore, industrial ecology relies on a territorial view of circular economy presented by Lévy and Aurez. In fact, this concept is based on coordination and shared territorial planning between several economic agents.

3.5 Blue Economy

The Blue Economy is a movement that presents several innovative business cases worldwide that inspire themselves from nature's ecosystems. It has been launched by the Belgian businessman and former CEO of Ecover, Gunter Pauli. All innovative solutions are built according to the local environment with its physical and ecological characteristics. The Blue Economy shows how a sustainable process can be economically viable (Pauli, 2010).

In his book, "10 years, 100 innovations, 100 million jobs" (2010), Pauli uses the term "cascade" to refer to the multiple revenue streams that can be generated with only one innovation. This is what makes sustainable innovations attractive for businesses. An example is coffee waste that makes mushrooms grow. From the farm to the cup, coffee generates a type of waste called ligno-cellulose. Not only ligno-cellulose makes mushrooms grow, but it also makes them bloom faster. This represents a game changer for both farmers and consumers in respect of the planet (See Appendix 1). Another example is tomato skins used as ultraviolet radiation protection. This was developed by the Belgian professor Jean Pol Vigneron, together with the

American professor Andrew Parker in 1994. Waste generated by the production of tomato sauce and ketchup is used to manufacture sun protections. This created 2000 jobs (Pauli, 2010).

Next, Pauli also claims that society will go from scarcity to abundance by using resources that are locally available (2010). This book is seen as a response to the report "The Limits to Growth" which claimed that society will go from abundance to scarcity through the use of non-local resources (Meadows, Meadows, Randers, & Behrens III, 1972).

Finally, Pauli travels worldwide in order to promote sustainable development and to inspire various entrepreneurs. In his journey, he attended a workshop organised by the Association Progrès du Management (APM) in Mauritius in 2018 (APM, 2018). APM is an association bringing several international French-speaking entrepreneurs altogether to talk about ways to make their business more sustainable. Various Malagasy entrepreneurs were present and exchanged with the Belgian businessman. Furthermore, Pauli has also inspired projects such as Make the Choice Madagascar. This is a movement giving the chance to 100 young Malagasies to be trained in order to develop their own sustainable business model (Make the Choice Madagascar, n.d). That is to say that awareness about sustainable businesses is gradually developing in Madagascar. This opens the door for us to analyse how this awareness is or can be turned into opportunities for socio-economic recovery. Pauli has also some long-term circular economy projects in the country.

4. CIRCULAR ECONOMY AND COVID-19

In regard to the current sanitary crisis, we judged relevant to add a section explaining the impact of the latter on circular economy in the world. The above statement about the ability of circular economy to build a resilient economy has been confirmed during this sanitary crisis (cf. Points 2.2.1, 2.2.2, and 3.2). The model seems to be the answer. In the health industry, sterilization agents are used in order to disinfect masks and make them reusable. In the US, ventilator makers have been asked to make repair resources accessible to support hospitals in need. Moreover, Amsterdam is adopting the Doughnut Economics approach and a circular economy strategy in order to recover from the crisis (Kechichian & Mahmoud, 2020) (Blériot, 2020).

5. CONCLUSION

The purpose of this chapter was to explain circular economy and its implications through definitions, and schools of thought. The information reviewed in this chapter will be used to build some research lines to answer the following research question:

Circular economy in Africa: How could this model contribute to a socio-economic recovery, especially in urban cities?

The case of Madagascar.

CHAPTER 2: CIRCULAR ECONOMY IN A TERRITORIAL PERSPECTIVE

This thesis studies the circular model through a territorial approach. Hence, this chapter will address this perspective in further details. The following topics will be tackled: 1) circular economy indicators, 2) Material Flow Analysis (MFA), 3) circular economy enablers, and 4) challenges in the implementation of circular economy.

1. INDICATORS

Indicators enable a nation to continuously track the circularity of its economy. As an example, the Service de l'Observation et des Statistiques (SOeS) (2017) dressed a list of ten indicators in order to measure the circularity of the French economy. The indicators are: 1) domestic material consumption per capita, 2) material productivity, 3) holders of ecolabels, 4) number of industrial and territorial ecology projects, 5) carpooling frequency, 6) food waste, 7) household expenditure on product maintenance and repair, 8) evolution of tonnage of landfill waste, 9) incorporation of recycled raw materials into production processes, and 10) job creation thanks to circular economy. Table 1 lists those indicators with their respective description (SOeS, 2017).

Table 1: Indicators for circular economy tracking (Source: SeOs, 2017)

INDICATORS		DESCRIPTION
1	**DOMESTIC MATERIAL CONSUMPTION PER CAPITA (TON/CAPITA)**	This indicator records the quantity actually consumed in the country. It corresponds to the inflows and outflows of raw materials and manufactured goods in a national economy. This indicator is not relevant for countries that produce a high amount of raw materials.
2	**MATERIAL PRODUCTIVITY (USD/KG)**	This indicator assesses the transition to a more economical economic system. It corresponds to the ratio of the Gross Domestic Product (GDP) to domestic material consumption.
3	**HOLDERS OF ECOLABELS (N)**	This indicator is proper to France because the country is distributing ecolabels. Ecolabels are distributed to companies producing goods that have fewer impacts at all stages of their lives on the environment.
4	**NUMBER OF INDUSTRIAL AND TERRITORIAL ECOLOGY PROJECTS (N)**	This indicator computes the number of industrial and territorial ecology projects running in a country.
5	**CARPOOLING FREQUENCY (%)**	This indicator assesses the carpooling frequency among a country's population.

6	**FOOD WASTE (KG/CAPITA)**	This indicator computes the amount of food that is lost, discarded, or degraded at a stage in the food chain.
7	**HOUSEHOLD EXPENDITURE ON PRODUCT MAINTENANCE AND REPAIR (USD/CAPITA)**	This indicator computes the amount of money that a country's population spends in the maintenance or repair of a product.
8	**EVOLUTION OF TONNAGE OF LANDFILLED WASTE (TON)**	This indicator computes the amount of waste that is admitted to storage facilities.
9	**INCORPORATION OF RECYCLING RAW MATERIALS INTO PRODUCTION PROCESSES (%)**	This indicator computes the share of waste recovered in the form of material that will be reused in the economy.
10	**JOB CREATION THANKS TO CIRCULAR ECONOMY**	This indicator computes the share of a nation's jobs that is created thanks to circular economy.

2. MATERIAL FLOWS ANALYSIS (MFA)

As mentioned above, circular economy applied in a territory requires observing the incoming and outgoing flow of materials and energy occurring in an area (cf. Chap. 1, Point 2.3) (Lévy & Aurez, 2014). This process is called Material Flow Analysis (MFA) and is considered as tool when a nation, region, city, or even a company leapfrogs to the circular paradigm (Aurez & Georgeault, 2016).

Countries and local collectivities use an MFA in order to establish a circular economy model adapted to their scale. It assesses the material flows entering the territory (imports of products and waste, extractions) and leaving (waste generation, exports of products, and various emissions) (EpE & INEC, 2018). This tool studies the territorial metabolism, to identify the materials necessary to the operation of its socio-economic system, and to assess the impacts on the biosphere as well as the resources efficiency. It is the basis of several concepts: life-cycle analysis, eco-design analysis, and industrial ecology (Aurez & Georgeault, 2016).

An MFA is presented as a black box with flows entering and leaving the box. Some of the flows leave the box to then enter it again. An illustration is given in Figure 3. An MFA is based on five main principles (Aurez & Georgeault, 2016):

- Quantification of the flows is expressed in mass units only;
- Geographical territory is limited;
- Flows are limited to human activities;

- Water data are excluded;
- Capacity to disaggregate the flows in order to make analysis and propose action plans.

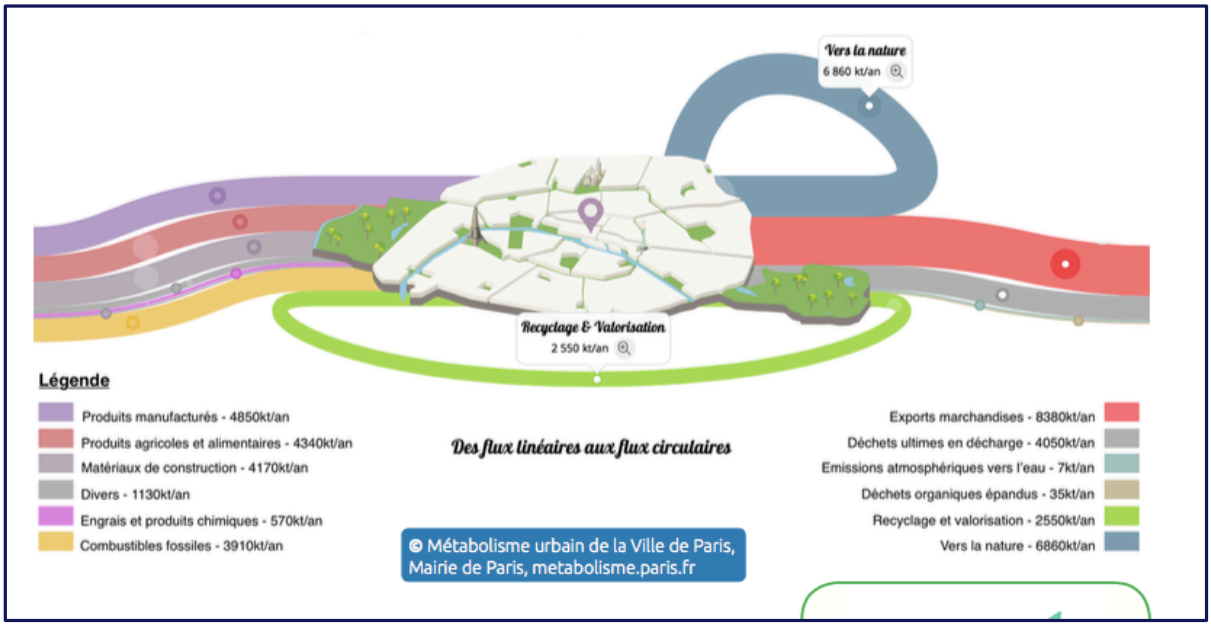

Figure 3: MFA of Paris (in French) (Source: EpE & INEC, 2018, p. 27)

3. ENABLERS

According to the EMF (2017c), public authorities, popular opinion leaders, and educational institutions have a major role in the implementation of circular economy in a market. Several enablers can help those actors in this mission.

Firstly, collaboration enables different agents to exchange knowledge and to create partnerships. Collaboration helps public and private sectors work together in order to take new initiatives. An example is the international platform "Économie.circulaire.org". This platform brings together French, Quebeckers, and Swiss actors sharing their experience, knowledge, and tools with regards to circular economy (SPW, n.d).

Secondly, incentives would encourage stakeholders to adopt a more cyclic behaviour. There are two types of incentives: financial incentives and non-financial incentives. On the one hand, the end of labour taxation, proposed by Stahel, is an example of a financial incentive (cf. Chap.

1, Point 3.1) (Stahel, 2019). On the other hand, increasing the visibility of a company practicing circular activities is a non-financial incentive (Aurez & Georgeault, 2016).

Thirdly, international environmental rules should be provided in order to encourage the implementation of circular economy (EMF, 2017c). For example, the EU sets up environmental rules applicable in member countries. In 2018, the European Commission launched an action plan called "Environmental Compliance Assurance" in order to help governments encourage, control, and ensure compliance with the regulation (European Commission, 2018).

Furthermore, public authorities should lead by example (EMF, 2017c). That is to say that not only do they encourage other economic agents to adopt a circular approach, but they also adopt it themselves. An example is the Scottish Government which buys computers with modular design for their activities. Those computers are manufactured with components that can be reusable (Renema, Van Herk, & Guerin, 2019).

Finally, the adoption of circular economy requires a lot of investment costs. Therefore, the EMF claims that public authorities should give access to several financial means to encourage stakeholders to adopt this model (EMF, 2017c). An example is the introduction of complementary currencies in order to finance the transition to circular economy. Aglietta argues that those currencies are used in a small geographical space and would be dedicated to stimulate the local economy (cited in Aurez & Georgeault, 2016, pp. 323-324).

4. CHALLENGES

Although circular economy appears like the new economic paradigm that would help solve environmental, social, and economic issues, adopting the model implies several challenges and obstacles. We classified them into five categories.

4.1 Culture

Firstly, circular economy is an economic strategy that leads to a more sustainable world. Yet, sustainable development is a socio-cultural term. Its meaning depends on countries, people, and social groups. As a reminder, sustainable development is the ability to meet today's needs without compromising tomorrow's ones (cf. Chap. 1, Point 1.1) (WCED, 1987). From one

culture to another, different actions would be adopted to build a more sustainable future (Lévy & Aurez, 2014).

Secondly, a circular economy model cannot be exported or imported from one nation to another or one community to another. It is adapted to cultural specificities. For instance, it has been observed that the domestic waste sorting model adopted in European countries cannot be transposed in China. In fact, in Scandinavia, the waste is sorted into ten categories. In France and Germany, it is sorted in four categories. However, based on a survey made among the Chinese population, it has been concluded that a waste sorting model in two categories is the best option (Lévy & Aurez, 2014).

4.2 Companies

Firstly, there are initial costs to consider while adopting a circular business model. It requires investments in infrastructures, assets, and the workforce. For instance, companies are led to retrain their staff in order for them to be qualified for the new business model. Those investments are made in the short term while benefits may only appear in the long term. This can thus represent a brake for companies (Preston, 2012).

Secondly, adopting a circular economy approach may lead to risks. Circular economy involves the collaboration between companies from different industries. Consequently, a company highly depends on another one financially and operationally. For instance, in the eco-industrial park of Kalundborg (cf. Chap. 1, Point 3.4), if one company experiences problems in its business, the other one, which usually buys waste from the first company, may experience supply problems. The reverse effect is also possible with firms overconsuming or overproducing (McManus & Gibbs, 2008; Schriller & Penn, 2014).

Finally, circular economy implies innovation in products, services, processes, networks, logistics, and even commercial offers. To catch the trend, companies invest in research and development (R&D). Some of them can get insights directly from different partners such as companies from other industries, universities, scientists, etc. This represents considerable costs (Aurez & Georgeault, 2016).

4.3 Stakeholders

Firstly, it has been confirmed that economic and financial benefits from adopting a circular economy approach appear in the long term. Yet, shareholders usually invest in a company in a short-term perspective. They want to see the results within less than one year. Hence, Webster highlights the necessity to convince those shareholders to adopt a longer-term perspective by showing them visible opportunities (Webster, 2015).

Secondly, in most of the cases, companies are engaged in a long-term relationship with their suppliers and partners from the same industry or a different one. Hence, it can be difficult for them to shift to a circular model. In some cases, shifting implies internal changes for suppliers and partners. Otherwise, the company would be led to conduct long negotiations potentially leading to high costs (Preston, 2012).

4.4 Politics

Firstly, as mentioned above by Stahel (2019), public authorities still tax the use of renewable sources such as labour (cf. Chap. 1, Point 3.1). There should be a shift to "sustainable taxation" in order to take negative externalities into account (Stahel, 2019).

Secondly, public subsidies are given to companies for extracting natural resources. Consequently, raw materials are exploited at lower prices and a considerable amount of energy is used in an excessive way. By excluding those subsidies, raw materials will be valued at higher prices and companies will consider opting for secondary resources obtained with a circular model (Preston, 2012).

4.5 Regulation

Some regulatory measures are going in the opposite direction than promoting circular economy by preventing access to secondary materials. The latter is used to manufacture new products. The reasons are mainly related to safety and security (Roussel, 2017).

Furthermore, the adoption of circular economy models requires changes in terms of financial accounting. The latter has to be designed in the objective of a better use of resources and for circularity (SPF Economie, P.M.E, Classes moyennes et Energie, 2017). For example, Xerox shifted to a circular business model. The company does not sell photocopiers anymore. Now,

customers pay for the use of photocopiers, and tariffs are based on the number of copies. This leads to significant consumption of tangible capital assets. This implies a change in the accounting and tax system (Aurez & Georgeault, 2019).

5. CONCLUSION OF THE CHAPTER

The aim of this chapter was to understand the steps and information to take into account while analysing circular economy at a territorial level. This will help in the empirical part of this thesis. Some indicators will indeed be used to assess the current performance of circular economy activities in Malagasy urban cities. The MFA will help spot key industries or activities for new circular economy opportunities. Through enablers, the favourable conditions for the implementation of a circular model will be assessed in urban cities. Additionally, a reminder of challenges is always necessary to adopt critical thinking all along the exploratory phase.

CHAPTER 3: SOCIO-ECONOMIC RECOVERY

After having covered the topic of circular economy, it is time to focus on the second variable of the research question: socio-economic recovery. Hence, the present chapter will discuss: 1) economic growth and its limits, 2) inclusive growth, and 3) Sustainable Development Goals (SDGs).

1. ECONOMIC GROWTH AND LIMITS

During our first reflexion on the research question, the term "economic growth" was considered. After some research, it has been shown that this notion does not completely go in line with the objectives of this thesis.

Economic growth refers to an increase in a nation's wealth over a period of time (Cornwall, 2000). This increase in wealth corresponds to a rise in the production of goods and services. The Gross Domestic Product (GDP) is the most common indicator to measure economic growth (Roser, 2013)

For years, economic growth has been considered as an approach that fully benefits to societies (Cornwall, 2000). However, as years went by, new theories appeared to challenge this approach. Some theories analysed the relation between economic growth, poverty, and inequality (Ranieri & Almeida Ramos, 2013). On the one hand, there was the trade-off theory that explained the existence of a reverse link between growth and equity. The more economic growth, the less income equality. That is to say that economic growth benefits to some people and not to the whole society (Krongkaew & Kakwani, 2003). On the other hand, the trickle-down theory was developed. This theory claims that people living in the lower strata of society benefit from the enrichment of the higher strata of society (Gupta, 2000). In other words, rich people contribute to the economy through their consumption and investment. This will help develop the job market that to answer this consumption and investment trend (Amadeo, 2020). It can be observed that the trickle-down theory was a way to justify how the reverse relation between growth and inequality still benefits the whole society.

2. INCLUSIVE GROWTH

It is in the second half of the 20th century that the world will experience a shift to a new way of reflexion called development thinking. The latter appeared in developing countries when they felt that the trade-off and trickle-down concepts were not working for them. In fact, with economic growth, developing countries saw not only inequality increasing, but also poverty remaining at high rates, or sometimes intensifying. Therefore, a new concept appeared, named "inclusive growth" (Ranieri & Almeida Ramos, 2013).

2.1 Explanation

Klasen says that "*inclusive growth is arguably more general […] it wants growth to benefit all stripes of society, including the poor, the near-poor, middle income groups, and even the rich […]*" (cited in Ranieri & Almeida Ramos, 2013). In other words, inclusive growth is a growth that is beneficial to both the higher and lower strata of society. This concept does not only contribute to a nation's wealth, but also to the wellbeing of every citizen by creating new economic and non-economic opportunities to which everybody will have equally access (Ranieri & Almeida Ramos, 2013).

2.2 Indicators

In 2018, the Organisation for Economic Co-operation and Development (OECD) developed a policy framework for inclusive growth with the aim of fighting the rise in inequality in the member countries. During the 2017 Ministerial Council Meeting, a table of indicators was developed. The report (2018) points out that this table of indicators is scalable. Additional indicators can be added in order to take into account more issues (OECD, 2018). This is information to keep in mind while moving to the Malagasy case.

The table of indicators drawn during the OECD Council Meeting at Ministerial level consists of four categories (OECD, 2018, p. 26):

- *Growth and ensuring equitable sharing of benefits from growth:* The objective of this category is to check if the economy and the standard of living are increasing for each population group.
- *Inclusive and well-functioning markets:* The objective of this category is to assess the efficiency and equity of the products and labour markets. The emphasis is put on productivity and inclusiveness.

- *Equal opportunities and foundations of future prosperity:* The objective of this category is to assess the distribution of non-economic benefits to the population. By non-economic benefits, it is meant health, education, life quality in terms of the environment, etc.
- *Governance:* The objective of this category is to assess the efficiency and responsiveness of public authorities.

Each category consists of several indicators. Table 2 presents an exhaustive list of those indicators. A detailed description can be found in Appendix 2.

Table 2: Indicators of inclusive growth (Source: OECD, 2018, pp. 27-28).

GROWTH AND EQUITABLE SHARING OF THE FRUITS OF GROWTH	INCLUSIVE AND EFFICIENT MARKET	EQUAL OPPORTUNITIES AND FOUNDATIONS FOR FUTURE PROSPERITY	GOVERNANCE
1. GDP per capita growth (%) 2. Median income growth and level (%; USD PPP) 3. S80/20 share of income (ratio) 4. Bottom 40% wealth share and top 10% wealth share (% of household net wealth) 5. Life expectancy (number of years) 6. Mortality from outdoor air pollution (deaths per million inhabitants) 7. Relative poverty rate (%)	1. Annual labour productivity growth and level (%; USD PPP) 2. Employment-to-population ratio (%) 3. Earnings dispersion (inter-decile ratio) 4. Female wage gap (%) 5. Involuntary part-time employment (%) 6. Digital access (businesses using cloud computing services) (%) 7. Share of SME loans in total business loans (%)	1. Variation in science performance explained by students' socio-economic status (%) 2. Correlation of earnings outcomes across generations (coefficient) 3. Childcare enrolment rate (children aged 0-2) (%) 4. Young people neither in employment nor in education & training (18-24) (%) 5. Share of adults who score below Level 1 in both literacy and numeracy (%) 6. Regional life expectancy gap (% difference) 7. Resilient students (%)	1. Confidence in government (%) 2. Voter turnout (%) 3. Female political participation (%)

3. SUSTAINABLE DEVELOPMENT GOALS (SDGs)

3.1 SDGs and inclusive growth

The notion of inclusive and economic growth is also used by the United Nations in its action plan "Transforming Our World: The 2030 Agenda for Sustainable Development". This plan was adopted by 193 countries, including Madagascar, on the 25th of September 2015. The aim is to eradicate poverty, protect the planet, and ensure that people live in peace and prosperity. In other words, this is linked to the three pillars of sustainable development explained earlier (cf. Chap. 1, Point 1.1): people, profit, and planet. The action plan consists of 169 targets classified in 17 goals. They are listed in Figure 4. Inclusive growth is part of SDG 8 which aim is to "*promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*" (United Nations, 2020).

Figure 4: 2030 Sustainable Development Goals (Source: United Nations, 2019, p. 40)

3.2 SDGs and circular economy

As mentioned earlier, circular economy is a strategy to build a more sustainable world (cf. Chap. 1, Point 1.2). According to the literature, it is closely linked to SDG 12, namely Responsible Consumption and Production (Schroeder, Anggraeni, & Weber, 2018). SDG 12 is connected to 14 other SDGs as illustrated in Figure 5. Each goal is represented with a broad circle having a particular colour. The small circles correspond to targets which colours are the same as the goal under which they are classified. SDG 12 can be linked to other SDGs via some

of their targets. For instance, SDG 12 is connected to SDG 6 via target 6.4, namely "*by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity*" (Le Blanc, 2015, p. 3).

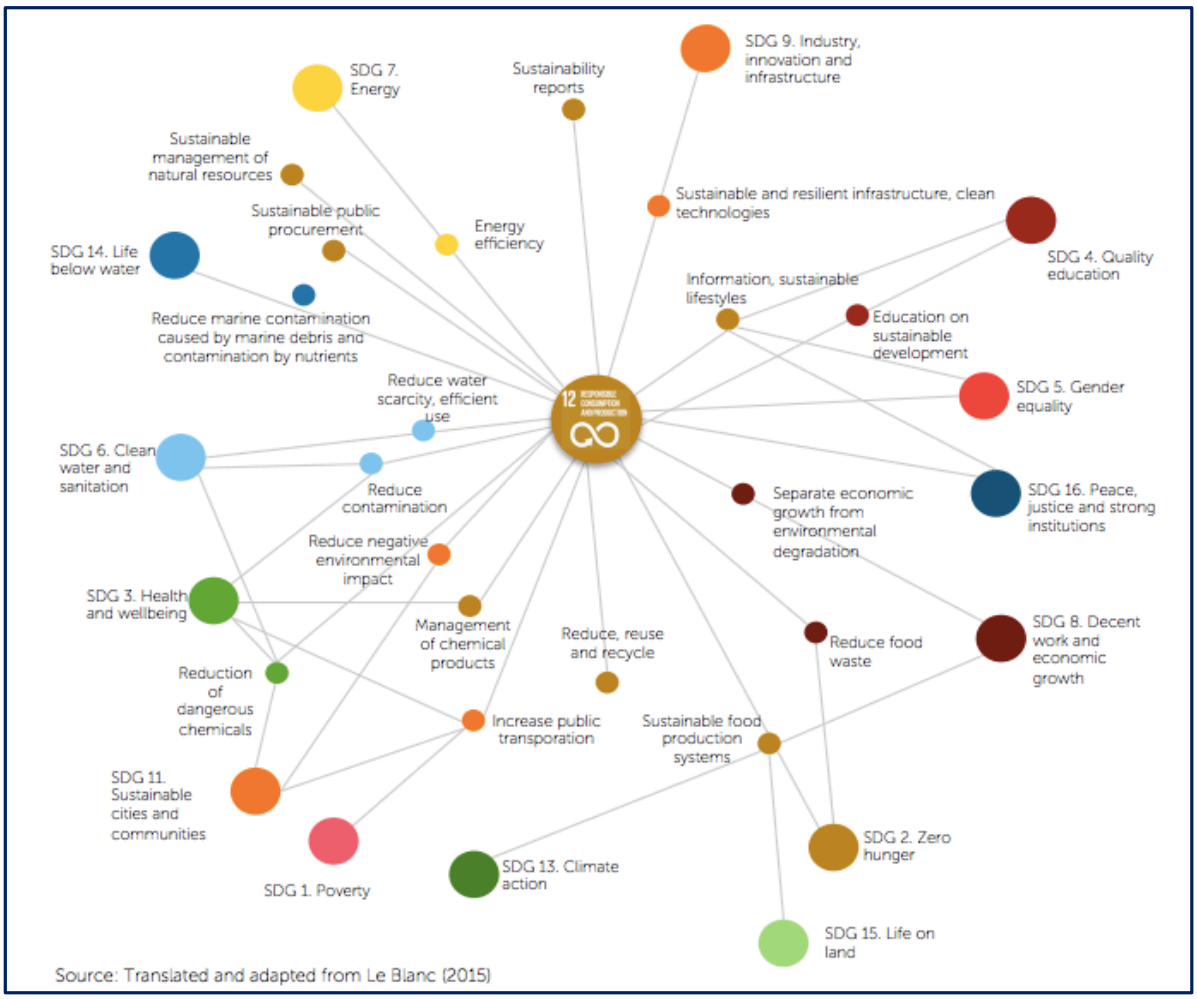

Figure 5: Links between SDG 12 (Responsible consumption and production) and 14 other SDGs (Source: Melo, Villa, Naranjo, & Zenteno, 2015, p. 14)

A same observation has been made for circular economy itself. It is said that a country or a business can have an influence on several other SDGs by adopting the circular model. According to the literature, circular economy has a direct influence on SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 14 (Life Below Water and Life on Land). Yet, its link with SDG 1 (No poverty), SDG 3 (Good Health and Well-being) highly depends on how socially inclusive the model is. Furthermore, its link with SDG 5 (Gender equality), SDG 4 (Quality education), SDG 8 (Decent work & Economic growth), SDG 10 (Reduced inequalities), and SDG 17 (Partnerships for the Goals) has still to be explored (See

Appendix 3). For long, the circular economy literature has always been adapted to industrialised and high consumption societies. Therefore, its social dimensions have been diminished in favour of economic and environmental dimensions. This represents an opportunity for this thesis to explore how circular economy is linked to some SDGs in Malagasy urban cities (Schröder, Lemille, & Desmond, 2020).

However, Schröder, Lemille and Desmond discuss the potential influence of circular economy on SDG 3, SDG 4, and SDG 8 through its relation with the Human Development Index (HDI) (Schröder, Lemille, & Desmond, 2020). This index measures the performance of a nation in human development through three measures: life expectancy, education, and income per capita. Life expectancy estimates the length of life in a territory. Education assesses the level of access to knowledge in a territory. Income per capita determines if people enjoy an income that enable them to answer their consumption needs and have a decent standard of living. It is said there is a possibility that circular economy answers to those three measures (See Appendix 4). Firstly, circularity lead to a decrease of pollution, which then lead to a healthier life for citizens. Secondly, the model requires training of employees, which contributes to the education index. Finally, through circular economy, people have access to lower priced and quality goods. This answers to "*citizen consumption needs and well-being*" (Schröder, Lemille, & Desmond, 2020).

The literature goes even further by proposing a framework that links circular economy to human development objectives. The framework, shown in Figure 6, is an adaption of the circular economy model proposed by the EMF (cf. Chap. 1, Point 2.2.2). Apart from the biological and technical cycle, this model also includes four loops that are essential to maintain the relation between circular economy and human development. In other words, it shows how to ensure to build an inclusive circular economy. The emphasis is put on the national and international macroeconomic policies to build a system that is favourable to *"equitable and inclusive societies and circular economies"* (Schröder, Lemille, & Desmond, 2020, p. 6). This

system also includes inclusive business models, community initiatives, and sustainable lifestyles and livelihoods (Schröder, Lemille, & Desmond, 2020).

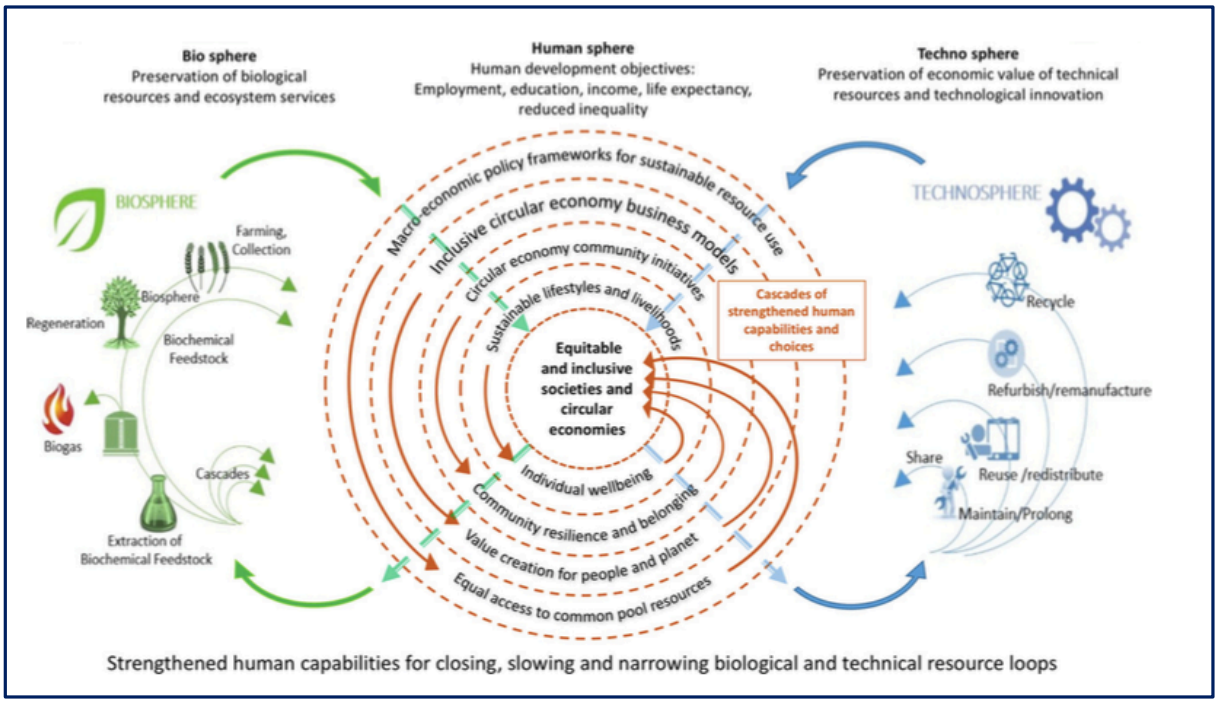

Figure 6: Framework for a Human Development-focused Circular Economy (Source: Schröder, Lemille, & Desmond, 2020, p. 6)

4. CONCLUSION

The aim of this chapter was to explain in further details what was meant by socio-economic recovery. This opened the door to the notion of inclusive growth and some indicators. Then, it was discussed that inclusive growth was linked to the notion of SDGs. Finally, literature proposes a relation between circular economy and the notion of inclusive growth through several SDGs. Based on this information, we will build a table of indicators to assess the contribution of circular economy to inclusive growth in Malagasy urban cities.

CHAPTER 4: ECONOMIC AND SOCIAL BENEFITS OF CIRCULAR ECONOMY

In the first chapter of this thesis, some economic and social benefits have been briefly mentioned. The present chapter will go further by discussing concrete examples and figures of economic and social benefits that are brought or would be brought by the circular model. Considering that circular economy is addressed at a territorial level in the research question, only macroeconomic benefits will be discussed. Most of the benefits presented below are retrieved from the EMF literature and are applicable to the European market. Those figures have been used by several other international organisations such as the European Commission, the McKinsey Center for Business and Environment, the Collaborating Centre on Sustainable Consumption and Production, etc.

1. ECONOMIC BENEFITS

After reviewing the literature, four macroeconomic benefits from the adoption of a circular economy model were identified.

Firstly, circular economy influences the job market. This model creates new economic activities such as remanufacturing, redistributing, maintaining, repairing, functional economy (service-based economy), innovation, etc. Those activities will require a considerable number of workers for new kinds of jobs (EMF, 2015). This trend is already visible in numerous countries. For instance, the US have the largest remanufacturing market in the world. Between 2009 and 2011, the sector experienced a 15% growth and created 14 000 jobs (Parker et al., 2015).

Secondly, circular economy would enable material cost savings. Industries would use secondary materials such as spare parts, which are cheaper than primary materials, to manufacture their products. According to the EMF (2017d), sectors such as mobile phones and washing machines are expected to experience annual cost savings of approximately USD 630 billion. The figures are even bigger in the fast-moving consumer goods sector, with USD 700 billion (EMF, 2017d).

Thirdly, according to the EMF (2015), circular economy stimulates creative thinking. This mindset leads to more innovation. By having a more innovative economy, a nation could experience more opportunities and an increase in its technological development rate (EMF, 2015).

Finally, circular economy could bring economic growth. As mentioned before, economic growth corresponds to the increase of a nation's production of goods and services (Cornwall, 2000). This growth would be explained by "*increased revenues from emerging circular activities, and lower cost of production through the more utilisation of inputs*" (EMF, 2017d). According to studies conducted by the EMF (2015), the European GDP is expected to grow by 11% by 2030 and 27% by 2050 in a circular scenario. Those figures are higher than the ones in the current development scenario, 4% and 15% respectively. That means that not only would circular economy lead to an economic growth, but it would also be more performant than our current linear economy.

2. SOCIAL BENEFITS

After reviewing the literature, four social benefits from the adoption of a circular economy model were identified.

Firstly, circular economy would make the cost of living cheaper. In other words, people afford goods and services at lower prices than in the linear economic model. The EMF (2015) estimates the potential decrease in costs in three sectors by 2050: food, mobility, and the built environment (See Appendix 5). Regarding the food industry, people would have access to a healthy, resilient, and regenerative food system (EMF, 2015). To produce food, several changes would be made compared to the traditional production system such as minimisation in the use of pesticides and fertilisers, the arrival of urban and peri-urban farmers located nearby their consumers, etc. Based on those factors, the EMF (2015) estimates the food cost per person to decrease by approximately 30%. In the mobility industry, people would have access to different mobility products and services such as car-sharing services. Using a car as a service is cheaper than owning one. The Foundation (2015) estimates the cost per average passenger-km to decrease by approximately 80%. The built environment corresponds to the creation of new spaces such as green infrastructure, durable buildings, closed energy loops, etc. The cost per square meter for households is expected to decrease by 30% (EMF, 2015).

Secondly, circular economy could lead to an increase in household disposable income. This is due to the decrease in the costs of goods as well as services and to the increase in productivity. According to the EMF (2015), households are expected to experience a growth of 18% in their disposable income by 2030, and 44% by 2050.

Thirdly, as mentioned above, circular economy activities create more high-skilled jobs. This represents an opportunity for people to develop new skills and capabilities (European Commission, 2014). The EMF (2015) argues that circular activities would offset the expected decrease in the number of skilled jobs.

Finally, thanks to the minimisation in the use of harmful materials in the food industry, people's health would be improved. The elimination of pesticides and antimicrobial resistance in the food industry could reduce healthcare costs by USD 550 billion worldwide and save a considerable number of lives (EMF, 2015).

3. CONCLUSION

The aim of this chapter was to deliver explicit numbers on the positive inputs that circular economy brings and could bring to a territory. This helps collect a first reflexion regarding its possible contribution to the Malagasy economy in urban cities.

CONCLUSION OF THE LITERATURE REVIEW

The first step of this funnel-shaped thesis came to its end. It consisted of a general explanation of circular economy, socio-economic recovery, and the potential relation between the two. Before going to the empirical phase, it is necessary to first explain the methodology adopted in order to answer the research question.

PART II: METHODOLOGY

Research question

Circular economy in Africa: How could this model contribute to a socio-economic recovery, especially in urban cities? The case of Madagascar.

The adopted methodology to answer this research question involves three steps: 1) construction of research lines based on extensive review of the literature, 2) first exploratory phase to understand what to consider while assessing circular economy in an African country, 3) second exploratory phase to assess circular economy in Malagasy urban cities.

CHAPTER 1: SUB-QUESTIONS AND RESEARCH LINES

The aim of this thesis is fourfold: 1) assess how circular economy is perceived in Malagasy urban cities, 2) assess how circular economy enables a socio-economic recovery in Malagasy urban cities, 3) highlight some new opportunities regarding circular economy, and 4) propose a list of observations and recommendations for the Malagasy actors. To structure this quest, we decided to first draw a set of sub-questions. Each of them consists of research lines. The conceptual framework is illustrated in Figure 7 (See Page 40).

1. SUB-QUESTION 1: HOW IS CIRCULAR ECONOMY PERCEIVED?

This sub-question aims to evaluate if the conditions given in the literature are met in Malagasy urban cities for the implementation and the success of circular economy. We will then discuss approaches to adopt. Three research lines have been dressed to answer this sub-question:

R1: Awareness and actions for circular economy is increasing among public authorities
R2: Awareness about circular economy is increasing among companies
R3: Awareness about circular economy is increasing among citizens

Those research lines have been built from the definition given by Lévy and Aurez (cf. Part I, Chap. 1, Point 2.3) (2014). They define the circular model as a territorial planning where

several economic agents work together. It requires coordination between actors from several levels (Lévy & Aurez, 2014).

Regarding public authorities, Levillain and Bonet Fernandez (2014) highlight the importance of a regulatory framework in order to promote circular economy. Stahel (2019) also explains the role of governments to tax negative externalities to influence companies' activities. The EMF (2017c) goes further by suggesting several enablers that will help public authorities implement a system favourable to the circular economy paradigm: collaboration between stakeholders, lead by example, rethinking incentives, and access to financing. This belief is also shared by Schröder, Lemille, and Desmond (2020) who explain that favourable macroeconomic policies are needed to have an inclusive circular economy.

Furthermore, Schröder, Lemille, and Desmond (2020) explain that firms should adopt an inclusive circular business model that takes into account human development (Schröder, Lemille, & Desmond, 2020). However, from the literature review, it is observed that companies experience barriers for the adoption of this business model (cf. Part I, Chap. 2, Point 4). Therefore, we would assess how companies in Malagasy urban cities perceive circular economy.

Finally, Lévy and Aurez (2014) explain the importance of citizens' behaviour. They say that the loop cannot be fully closed if citizens do not adopt a circular behaviour (Lévy & Aurez, 2014). This is also a vision that is shared by Schröder, Lemille, and Desmond (2020) in their Human Development-focused Circular Economy framework presented in the literature review (cf. Part I, Chap. 3, Point 3.2).

2. SUB-QUESTION 2: HOW DOES CIRCULAR ECONOMY CONTRIBUTE TO INCLUSIVE GROWTH?

This sub-question aims to identify which benefits circular activities bring to Malagasy urban cities.

R1: Circular economy leads to good health and well-being (SDG 3)
R2: Circular economy enables access to quality education (SDG 4)
R3: Circular economy enables decent job and economic growth (SDG 8)

The literature proposes that circular economy influences the three dimensions of HDI namely life expectancy, education, and income per capita. This also links circular economy to three SDGs: SDG 3, SDG 4, and SDG 8. The circular model could lead to: 1) SDG 3 through the decrease in pollution, 2) SDG 4 by bringing new knowledge to employees, 3) SDG 8 through access to lower-priced goods (EMF, 2015; Schröder, Lemille, & Desmond, 2020).

The definitions provided by the European Commission (2019) as well as Buttin and Saffré (2016) also highlight the contribution of circular economy to growth, job creation, wealth, safety and well-being of the citizens (cf. Part I, Chap. 1, Point 2.1). This is also a vision that is shared by the EMF which goes further by providing actual figures. The Foundation (2015) expects a higher GDP growth in a scenario of circular economy than the one in a linear economy scenario, respectively 11% and 4% by 2030. It also argues an increase of 18% in disposable income by 2030 (cf. Part I, Chap. 4, Point 1). Those figures are relative to Europe. Yet, a link can be seen between the findings from the EMF and the assumptions of Schröder, Lemille, and Desmond in their work.

From all this information, we decided to dress this table of indicators (Table 3) that will help us assess how circular practices bring inclusive growth in Malagasy urban cities. It should be noted that this table consists of inclusive growth indicators (cf. Part I, Chap. 3, Point 2.2) that are classified under the SDG they are linked to.

Table 3: Table of indicators – phase 1 (Based on: United Nations, 2020; OECD, 2018, pp. 27-28)

SDG 3 GOOD HEALTH AND WELL-BEING	**SDG 4** QUALITY EDUCATION	**SDG 8** DECENT WORK AND ECONOMIC GROWTH
1. Mortality from outdoor air pollution 2. Life expectancy	1. Skills & knowledge	1. GDP per capita 2. Median income 3. Employment rate

3. SUB-QUESTION 3: WHICH OPPORTUNITIES TO TAKE IN THE FUTURE?

This sub-question aims to identify concrete opportunities of new activities that would boost the development of circular economy in Malagasy urban cities. The research lines for this question will be developed through an analysis of the Malagasy urban territory, an MFA, and discussion with interviewees.

4. SUB-QUESTION 4: HOW DOES/WILL COVID-19 INFLUENCE CIRCULAR ECONOMY?

As explained in the literature review, COVID-19 influences the way Western countries perceive the circular paradigm (cf. Part I, Chap. 1, Point 4). Circular economy is seen as the model that would help countries recover from the economic crisis (Kechichian & Mahmoud, 2020). Hence, this sub-question aims to observe if this is also the case for Malagasy urban cities.

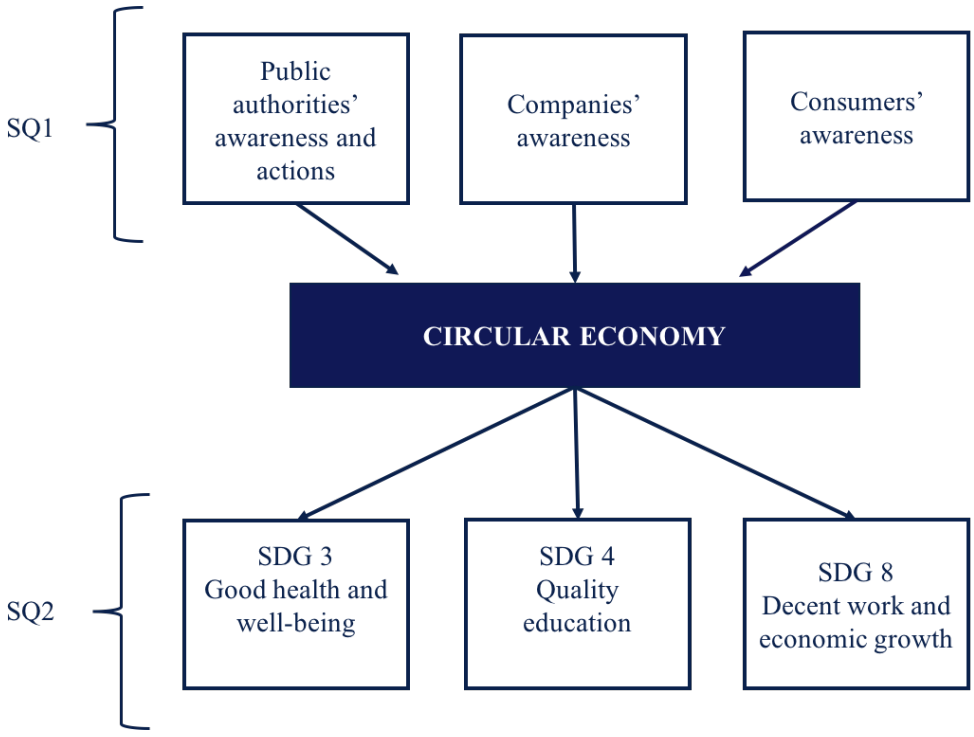

Figure 7:Conceptual framework – phase 1 (Based on the literature review)

CHAPTER 2: QUALITATIVE APPROACH

The methodology is based on the guidance of Miles and Huberman *Qualitative Data Analysis: A Methods Sourcebook* (2014) and Creswell *Educational research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (2012). According to Creswell (2012), a qualitative approach is adopted when little literature provides information on the chosen subject, and when variables are unclear. It is therefore required to get insights from interviewees by exploration. This master thesis is confronted with a lack of literature and current quantitative data regarding circular economy practices and waste management in Malagasy urban cities. Furthermore, as previously explained, sustainable development is a socio-cultural term (cf. Part I, Chap. 2, Point 4.1). This implies exchanging with key actors about their experience and opinions on the subject. According to Miles and Huberman (2014), a qualitative approach requires a structured plan. This plan can be presented in the form of a conceptual framework. The latter highlights different variables or factors that will be explored during the interviews. For our empirical phase, there will be two conceptual frameworks in Figure 7 and Figure 9 (See Page 40 and Page 57).

To answer the research question correctly, we will analyse circular economy in Africa before deep diving in Malagasy urban cities. Considering that this thesis studies a territory, we decided to first discuss with experts in the African circular economy in order to refine our research lines and adopt the right approaches while exploring Malagasy urban cities. For each phase, we conducted individual semi-structured interviews. This type of interview involves selecting topics to cover before discussing with interviewees. Semi-structured interviews enable interviewers to intervene in the discussion if necessary. The aim is to guide the interviewees while having a conversation. Considering the geographical distance, those interviews were conducted through Skype, Teams, WhatsApp, WebEx, and Zoom in June and July.

1. EXPLORATORY PHASE 1: CIRCULAR ECONOMY IN AFRICA

The main selection criteria of the interviewees were: having some experience in the African circular economy and having some knowledge or any contact with Madagascar. The interview guideline can be found in Appendix 6. Two experts helped in this process.

Thierry Tene is an associate and director at Afrique RSE[2] (Responsabilité Sociétale des Entreprises). It is a consulting, expertise, audit, and training firm which tackles topics such as Corporate Social Responsibility (CSR) and sustainable development in Africa. He is also in charge of the magazine "Les Dirigeantes" which promotes senior executive women. He wrote and still writes several articles about waste management and its implications in Africa. He also took part in a CSR conference in Madagascar in 2016.

Alexandre Lemille is the co-founder of the ACEN. It is an organisation founded in 2016, with about 30 African member countries reunited with the objective of promoting circular activities in Africa. He had the opportunity to discuss in the past with the ACEN representative of Madagascar. He is currently the Deputy CEO of Anthesis Group. He has worked in circular economy for 10 years and invested in the Ellen MacArthur Foundation in its debut with his former employer, Cisco Systems. He is also a lecturer at Science Po which is a French university specialised in social sciences.

2. EXPLORATORY PHASE 2: CIRCULAR ECONOMY IN MALAGASY URBAN CITIES

Three profiles were selected:1) experts, 2) managers of social enterprises[3] and associations active in circular economy, and 3) managers of firms active in circular economy. Those interviewees have been chosen according to their link with circular economy in the Malagasy context. The interview guidelines can be found in Appendix 14 and 15.

2.1 Experts

Experts were chosen in order to understand the socio-economic environment of Malagasy urban cities. They also help understand if actions are being taken at a national or international level for the implementation.

Erik Winter Reed is a specialist in natural resources management at the World Bank. He is in charge of the environment, natural resources, and the Blue Economy portfolio. He is currently

[2] Responsabilité Sociale des Entreprises (RSE) means Corporate Social Responsibility in English.
[3] A social enterprise is not only an NGO but a company doing lucrative activities in order to generate profits that will benefit the society and the environment (Barone, 2020).

living in Madagascar. As requested, his comments will be presented under his name and not the World Bank.

Karl Bertil Akesson is the young CEO of Groupe Akesson, operating in the mining and agricultural sector. This group is known for its actions in order to promote inclusive growth in Madagascar. Since 2017, he has been appointed honorary president of the NGO Graine de vie. Furthermore, in 2019, he was appointed Honorary Consul of Sweden in Madagascar. Akesson is also an economist and a promoter of Blue Economy in Madagascar. He works in collaboration with Gunter Pauli (cf. Part I, Chap. 1, Point 3.5).

2.2 Companies, social enterprises, and associations

Although managers of companies and associations have been chosen in this sample, the focus of this study remains territorial. Therefore, actors are asked about the macro atmosphere and how their activities enable inclusive growth in Malagasy urban cities. We believe that their experiences enable us to have a good representation of the way circular economy is perceived in urban cities. To get a very diversified illustration, actors operating in different industries have been contacted. Among them, five managers answered the request positively. This enables us to get insights from the following industries: organic waste, plastic, textile, paper and cardboard, and Electrical and Electronic Equipment (EEE).

Nirina Rajaonary is the founder of Société de Production d'Articles Hygiéniques (S.P.A.H) located in Antananarivo. This company manufactures toilet paper from paper and cardboard waste. They are the leader in the Malagasy toilet paper market and would like to expand to other products such as paper towels and handkerchiefs.

Sitraka Razanakoto is the president of the association Fakotory located in the capital city Antananarivo. They promote zero-waste in Madagascar through several activities such as concerts, protests, waste management projects, etc. They are also active in the recycling and valorisation of textile waste from which they create jobs for the population.

Luc Ronssin is the co-founder of the social enterprise Le Relais located in Fianarantsoa. This enterprise promotes the reintegration of highly marginalised citizens through job creation. It operates in six activities: recycling of textile, valorisation of the collected textile into clothes,

car manufacturing (Karenjy), waste management, tourism, and support of farmers in rice farming.

Mihajasoa Andriamiadana is the founder of Madacompost, a limited liability company operating in waste management and valorisation in Majahanga. The company also did some pilot projects in several Malagasy cities. They also produce compost and fuel from organic waste and turn plastic waste into building materials. Andriamiadana is also the ACEN representative of Madagascar.

Théo Gallart is the founder of Valomada, a startup located in Antananarivo. They operate in the collection and recycling of hazardous waste[4] such as WEEE (Waste of Electrical and Electronic Equipment). This consists of computers, mobile phones, printers, screens, cameras, etc.

[4] Hazardous waste are "*those which, by their nature or quantitity may constitute a threat to human health and /or the environment*" [Translation mine] (Ministère de l'Environnement, de l'Ecologie, de la Mer et des Forêts, 2015).

PART III: EMPIRICAL PHASE

CHAPTER 1: PHASE 1 – CIRCULAR ECONOMY IN AFRICA

1. INTRODUCTION

For years, awareness towards sustainable development has increased in Africa. It began with the notion of inclusive growth in the second half of the 20th century and went to the birth of several sustainable policies (Ranieri & Almeida Ramos, 2013; Jambeck et al., 2018). Governments begin to believe that a circular economy model could be the answer for Africa (Déclic & Deloitte, 2017). Several factors are in favour for the transition to circular economy in this continent.

1.1 Cultural factor

Although Africa is still ruled in a linear economic model, social and economic collaborations are in the DNA of billions of citizens (Lemille, 2017). Several practices are deep-rooted such as the moderate use of raw materials, the reuse of goods, and the tontine[5] (Diaco, 2019).

1.2 Waste factor

According to the United Nations Environment Programme (UNEP) (2018), there are socio-economic opportunities regarding waste management in Africa. In 2012, about 125 billion tons of Municipal Solid Waste (MSW) were generated in the continent. Among those, up to 80% can be recycled, but only 4% are. This 4% is approximately worth USD 318.6 million. If at least 50% of this waste was recovered, it would create approximately USD 4 billion (UNEP, 2018).

[5] This notion has been first defined by the Polish sociologist Zygmunt Bauman as an "*association of members of a clan, family, neighbours or individuals, who invest in goods or services for the benefit of all, and on a rotating basis*" (Fritzner, 2009)

1.3 Environmental factor

The large majority of the African countries has an ecological footprint that is below the desirable international threshold of 1.8 global hectares per capita. In other words, in one year, they are consuming less than what their biological environment can produce. This represents an important asset compared to Europe, America, and Asia that have overcome this threshold by far. It is easier for Africa to maintain this low footprint while adopting a new economic model (Déclic & Deloitte, 2017).

1.4 Institutionalisation of circular economy.

According to the literature, it is believed that governments have a big role to play for the transition to circular economy (Desmond & Asamba, 2019). However, few African governments are institutionalising the model.

The first initiative with regards to the promotion of circular economy at the continent scale began in 2016 with the ACEN. It is an organisation regrouping today approximately 100 specialists from 30 African countries. Madagascar is considered as a member of this network. The purpose is to raise awareness towards circular economy in the public, private, and non-profit sector. ACEN creates platforms on several social networks in order to enable members to share best practices (European Union, 2019).

In 2017, the African Circular Economy Alliance (ACEA) was born through collaboration between three countries: Rwanda, Nigeria, and South Africa. This alliance promotes the adoption of circular economy policies by African governments. It is a partner of the ACEN (Desmond & Asamba, 2019). However, Madagascar is not a member of this alliance.

Some countries implement circular economy at a regulatory scale. In 2016, Kenya launched the Nationally Appropriate Mitigation Action (NAMA) - Circular Economy Municipal Solid Waste Management Approach for Urban Areas. This policy aims to collect waste and conduct it to recycling points instead of landfills. In South Africa, REDISA, operating in tyre-manufacturing, works closely with the South African Government to implement circular economy at a national scale. The company has been closed for legal reasons but is expected to return soon (Desmond & Asamba, 2019).

2. ANALYSIS OF INTERVIEWS

After contextualising circular economy in Africa, interviews with experts have been conducted to get more insights on the topic and pieces of advice for the Malagasy territory. Thierry Tene and Alexandre Lemille whose functions are reminded in Table 4 are the interviewees of this first exploratory phase. The transcriptions of the interviews can be found in Appendix 7 and 8.

Table 4: Interviewees – phase 1 (Based on: Appendix 7-8)

NAME	FUNCTION
Thierry Tene	Associate and director of Afrique RSE. It is a consulting, expertise, audit, and training firm which tackles topics such as Corporate Social Responsibility (CSR) and sustainable development in Africa. He attended a CSR conference in Madagascar years ago and has explored a lot in the country.
Alexandre Lemille	Co-founder of the ACEN. It is an organisation founded in 2016, with about 30 African member countries reunited with the objective of promoting circular activities in Africa. He had the opportunity to discuss in the past with the ACEN representative of Madagascar.

2.1 SQ1: How is circular economy perceived?

2.1.1 Public authorities awareness and actions

Awareness towards circular economy is increasing among African public authorities, especially with regards to waste management. However, as previously mentioned structuration remains difficult (cf. Part III, Chap. 1, Point 1.4). Tene (2020) tells about a circular economy conference he attended in Cameroon. After this conference, he realised that no strong initiatives were taken in order to boost the model. To change the situation, the African Development Bank (AfDB) will launch a program to help African governments to pass laws for the implementation of circular economy at the end of the year 2020. After passing laws, the program will also help companies and start-up financially. It is not yet known if Madagascar is on the list (Lemille, 2020).

The biggest challenge in the structuration of circular economy in Africa is the significant number of waste pickers. The latter directly goes to landfill sites to collect waste. This situation is explained by the lack of structure in waste management. Considering that no waste sorting system is adopting upstream, all forms of waste (reusable and non-reusable) are landfilled. That gives room for informal waste pickers to start their business. Some of them earn a lot, which thus explains their reluctance to enter the formal private sector.

In regard to the role of the states, both Tene and Lemille (2020) believe that laws should be passed to encourage the recycling and valorisation of waste. A solution is to formalise informal waste pickers. So that waste management and valorisation are structured. However, Tene strongly believes that this solution should come from companies by convincing informal actors about the financial benefits behind a formal circular economy. He adds that it should be assessed how the Malagasy regulation regarding waste management gives room for companies to act (Tene, 2020).

2.1.2 Companies awareness

It was asked to interviewees how to raise awareness towards circular economy among the private sector. Tene (2020) explains that Madagascar consists of two economic zones: free trade zones and country-oriented zones. On the one hand, free trade zones are areas where companies produce goods that will be exported to foreign countries. On the other hand, country-oriented zones are areas where companies manufacture goods for local consumption. This subdivision is also present at a city scale. Companies operating in free trade zones care about their image due to their demanding international customers. Therefore, non-financial incentives[6] would have a significant impact and it is already done in some cases. In regard to local-oriented companies, non-financial sanctions do not seem to be the right approach. Tene insists on the fact that legislation should be rigorous. Since the poverty rate is high in Madagascar, the factor price is significant. Those incentives should be as strong as what companies earn, so that the impact is bigger. Those comments have been made from his personal view. Yet, he insists on the fact that it is necessary to select the type of zones on which to focus before interviewing Malagasy actors and observe in those zones (Tene, 2020).

2.1.3 Citizens awareness

"There is awareness-raising, sanction, and solution." [Translation mine] (Tene, 2020)

While Lemille (2020) claims that circular economy is embedded in African's DNA, Tene (2020) highlights that circular practices are mainly done by the lower strata with the aim of surviving. He says that all Africans should realise how worth their waste is and how this can

[6] For example, increasing the visibility of a company practicing circular economy activities (Aurez & Georgeault, 2016).

contribute to the country's economy. That is how the model could be adopted on a bigger scale (Tene, 2020).

While discussing solutions to change this culture, it was clearly stated that awareness-raising was not enough. Tene (2020) invokes the notions of solution and sanction regarding waste management and the consumption of circular products. Awareness-raising without proposing any alternatives is not optimal. By proposing solutions, the population will realise that waste is actually gold and that it is essential to manage it. Another strategy is sanctions (e.g. taxes in waste management). It should be analysed on the Malagasy urban field which approach is the best.

2.2 SQ2: How does circular economy contribute to inclusive growth?

"How are we going to redesign an economy that meets people's needs? It's not rooted in the circular economy." [Translation mine] (Lemille, 2020)

Both Lemille and Tene (2020) explain that the circular model contributes to inclusive growth, but it should be monitored. Lemille points out that circular economy activities can be classified in two categories. The first category is called non-inclusive where all the benefits go to one company only. For instance, Apple invites its consumers to return their damaged phones. Those phones will be dissembled by robots in China, which does not create value for the whole society. Everything is earned by one company. The second category is called open-source where components will be accessible to everybody and jobs can be created. It should be ensured that Madagascar uses the open-source circular economy. A way to do that would be for the Malagasy Government to buy only modular telecommunication items in which components are accessible to the society for any other purpose (Lemille, 2020).

Tene (2020) claims that circular economy activities can lead to non-decent jobs. In this case, the model is not inclusive. The consultant goes further by explaining that in order to assess if circular activities are fully inclusive, the Malagasy socio-economic issues in urban cities, including externalities and inequalities, should first be analysed. He also advised to decide how far in the country sociology this thesis wants to go. It is necessary to dress key indicators and keep a close eye on them as "*if waiting for milk to boil*" [Translation mine] (Tene, 2020).

2.3 SQ3: Which opportunities to take in the future?

Both experts have dressed some key information that would be taken for the next exploratory phase. Firstly, Tene (2020) talks about the performance economy which involves the use of the product of the product itself. He gives the example of 10L water bottles that became successful in Africa. The idea is to make people pay for drinking water by reducing the amount of plastic used in the bottle. Consequently, the price of a 10L bottle is lower than the equivalent in 1.5L bottles. Secondly, Lemille (2020) highlights that the use of a complementary currency can help build an inclusive economy. Finally, both experts claim the importance of the EEE industry for developing countries. Tene gives the example of WEEE in Ghana that is full of gold but still treated by informal actors. Next to that, Lemille explains the potential of modular telecommunication items for Madagascar (cf. Part III, Chap. 1, Point 2.2).

2.4 SQ4: How does/will COVID-19 influence circular economy?

Both experts believe that COVID-19 will have an impact on circular economy in Africa and thus Madagascar. On the one hand, Lemille (2020) thinks that changes will come from the influence of Western countries. On the other hand, Tene (2020) is persuaded that the closure of borders will lead actors to valorise at a local scale. He ads that he has not analysed the Malagasy situation yet. Therefore, it would be interesting to analyse if this is really the case.

3. CONCLUSION & FUTURE STEPS

In regard to the first sub-question, it should be chosen which type of activities to focus on: international or local commerce. Considering that the focus of this thesis is on the local Malagasy economy, the second type type will be analysed. Then, the notions of awareness-raising, sanction, and solution for Malagasy citizens to adopt a circular behaviour will be discussed. Lemille (2020) also highlights that he has not received any news from Madagascar for several years. This thus emphasizes the exploratory purpose of this thesis. Considering the second sub-question, we will select socio-economic issues in Malagasy urban cities. After that, we will evaluate how circular economy activities help fight them. In regard to opportunities, an MFA will be dressed in order to evaluate on which industry a performance economy or any another circular activity can be applied. Furthermore, the idea of complementary currency will be discussed with interviewees. The presence of WEEE in Malagasy urban cities and its significance will also be investigated.

CHAPTER 2: PHASE 2 – CIRCULAR ECONOMY IN MALAGASY URBAN CITIES

1. CONTEXT

The Republic of Madagascar is an African island nation located in the Indian Ocean. It is a former French colony which explains that the two official national languages are Malagasy and French. The current President is Andry Rajoelina, elected in December 2018 (France Diplomatie, 2020). Currently, approximately 35% of the population lives in cities (Worldometer, 2020). This figure increased compared to the previous years and is expected to increase in the coming years with the high rural exodus. People are leaving rural areas because of the degradation of agricultural activities, insecurity, and poverty. It is the capital city, Antananarivo, which is under high migratory pressure (Bezain, 2017). Antananarivo is one of the six biggest urban cities in Madagascar with Toamasina, Antsirabe, Fianarantsoa, Mahajanga, and Toliara (Andriamiadana, 2020; Worldometer, 2020) (See Appendix 9).

1.1 PESTEL analysis

A PESTEL (Political, Economic, Sociological, Technological, Environmental, Legal) analysis of Madagascar is dressed in Table 5. The aim is to highlight key socio-economic issues and trends on which to focus. The text version of this analysis can be found in Appendix 10. Most of the given information is on the country scale, but this can be transposed to urban cities.

Table 5: PESTEL analysis of Madagascar (Source mentioned in table)

POLITICAL	▪ High level of corruption: ranked 158th out of 180 countries (Transparency International, 2020); ▪ Continual political crises preventing from stable growth (World Bank Group, 2015).
ECONOMICAL	▪ Out of the 10 lowest GDP per capita in the world in 2018 (The World Bank Data, 2020a); ▪ One of the highest unemployment rates in the world (LINFO.RE, 2015): - 6 out of 10 unemployed people are women; - 3 out of 4 unemployed people are below 30. ▪ Difficulties for the young population between 15 and 24 to enter the job market (LINFO.RE, 2015);

	▪ High dependence on imports: 80% (Stocker, Razafimanantsoa Harivelo, Desponts, & Lalaina, 2019); ▪ Economic crisis due to COVID-19 (Verneau, 2020).
SOCIAL	▪ Young population: 60% under 24 in 2018 (The World Bank, 2020b); ▪ Ranked 144th out of 191 countries in life expectancy (Worldometer, 2020); ▪ 75% of the population living with less than USD 1.90 per day (The World Bank, 2019a); • Ranked 162 out of 189 countries in HDI in 2018 (UNDP, 2019); ▪ Low level of enrolment to school (The World Bank, 2020b); - Secondary school: 36%; - Higher education: 5%. ▪ Several categories of marginalised people (Coquelin, 2007); - Elderly; - Single mothers; - Informal waste pickers; - Ex-convicts; - Disabled people.
TECHNOLOGICAL	▪ Evolve in new ICT (ICT.IO, 2018); ▪ 22nd fastest high-speed internet in the world in 2018 (Trujillo, 2018); ▪ Low internet penetration: 14% (Hootsuite, 2020); ▪ Annual growth of 11% in the number of internet users, which represents 394 000 more people (Hootsuite, 2020); ▪ Among the population using web service, 54% use phones and 45% use laptops or desktops (Hootsuite, 2020); ▪ 164% increase in laptop and desktop users between 2018 and 2019 (Hootsuite, 2020); ▪ Increase in the number of cybercafés in the biggest cities (UNCTAD, 2018).
ENVIRONMENTAL	▪ 20% of deaths caused by the exposition to pollution (UNICEF, 2019); ▪ Antananarivo considered as the dirtiest city in Africa and the third worldwide (Fahranarison, 2018); ▪ 875 tons of household and assimilated waste produced daily in Antananarivo in 2014 (Lecointre, Breselec, & Pierrat, 2015).
LEGAL	• Four subdivisions in Madagascar: 1) provinces, 2) regions, 3) commune/city, 4) fokontany [7] (Friedrich-Ebert-Stiftung, 2014); • Three decentralised territorial communities: 1) provinces, 2) regions, 3) commune/city (Friedrich-Ebert-Stiftung, 2014).

[7] A fokontany is a subdivision of a commune which is a decentralized territorial community. A fokontany does not have that title, but participates in the development program of communes (Friedrich-Ebert-Stiftung, 2014)

From this PESTEL analysis, nine key socio-economic issues will be selected to assess how inclusive circular economy is/should be: 1) low GDP per capita, 2) high unemployment rate, 3) high young unemployment rate, 4) gender inequality in employment, 5) high poverty rate, 6) low life expectancy, 7) high mortality due to pollution, 8) low level of education, 9) high exclusion of elderly, single mothers, informal waste pickers, ex-convicts, and disabled people.

1.2 Material Flow Analysis (MFA)

The MFA aims to highlight some key trends to answer the following sub-question: Which opportunities to take in the future?. We will follow the guidelines of Lévy and Aurez (2014). We will spot the materials necessary to the Malagasy socio-economic system.

We chose to focus on Antananarivo to build this MFA for two reasons. Firstly, the imports and exports data are presented at a national level (See Appendix 11). Considering that Antananarivo is the economic capital city, a large part of the Malagasy wealth is created in this city. Furthermore, in 2006, it was estimated that 90% of the Malagasy free trade zones were located in Antananarivo (Fournet-Guérin, 2007). Secondly, the only waste data found at a city scale were the ones of Antananarivo (See Appendix 12). We encountered two limits in the construction of this MFA. Firstly, the inflows and outflows data are from 2015. Therefore, documents published by the World Bank helped verify that the data presented below were still relevant. Secondly, data are presented in million USD, except for waste. The MFA is illustrated in Figure 8.

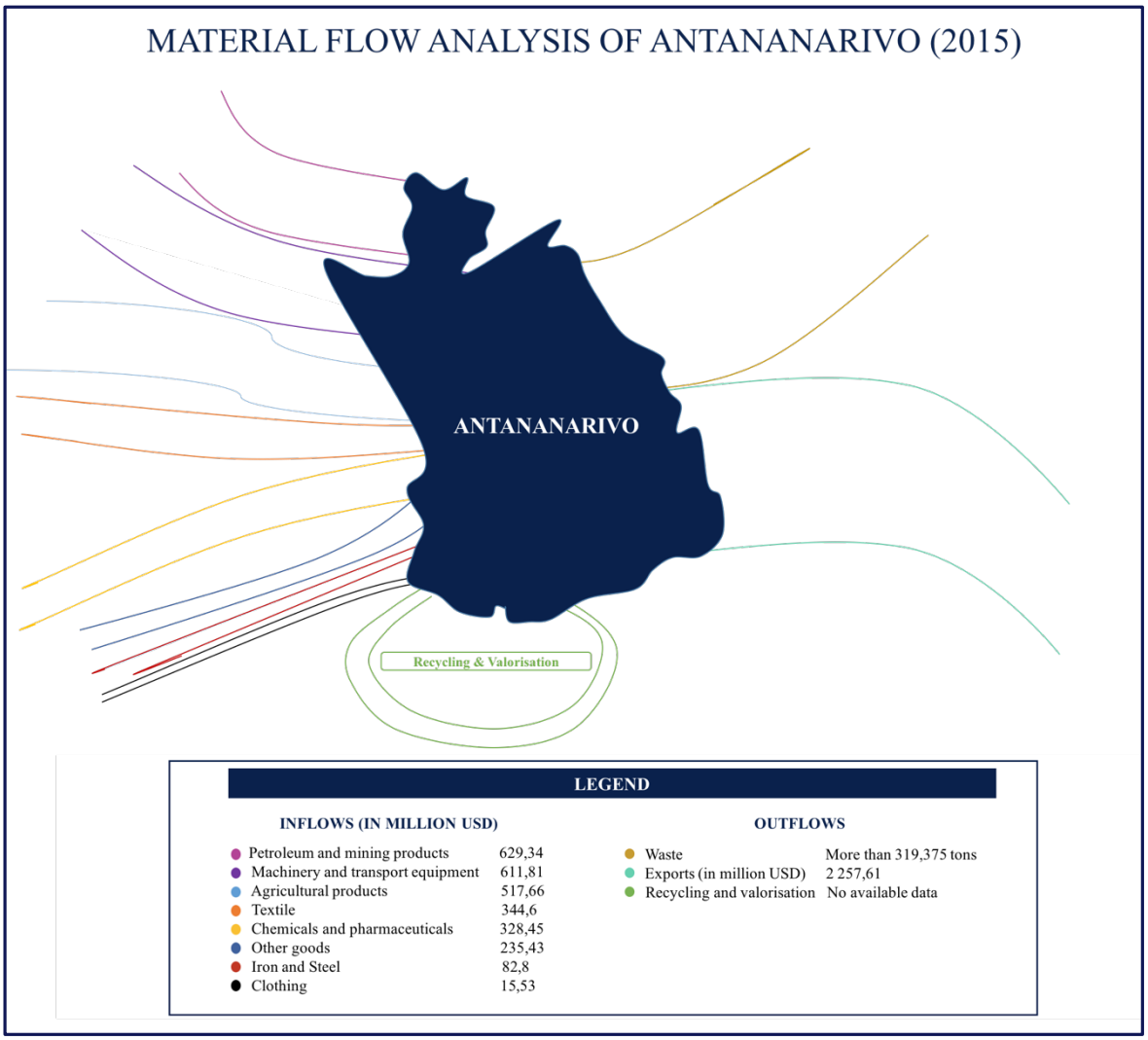

Figure 8: MFA of Antananarivo (2015)
(Based on: Perspective Monde, 2019, 2424mg, 2019; Institut Français de Madagascar, 2019; Lecointre, Breselec & Pierrat, 2015, pp.26, 28-29)

In regard to inflows, machinery and transport equipment represents the second largest category of inflows. This consists of computer equipment, office equipment, telecommunication equipment, integrated circuits, electronic components, automobile, and parts. This number was even higher in 2017, which made equipment goods become the first largest category of imports (Direction Générale du Trésor, 2018).

Regarding outflows namely exports and waste, Madagascar is not a big exporter of machinery and transport equipment. We consequently assume that most of the imports are for local consumption. Furthermore, WEEE is expected to grow regarding that the Government is investing in several projects for the development of the country. A part of these investments is

for the tertiary sector, which is currently the driver of growth in the country (Stocker et al., 2019). Moreover, since June, the President has launched a plan called "Plan Marshall post COVID-19" involving investments in infrastructure for education, health, sport, housing, public work, etc.(Savana, 2020). The main problem with the increase of WEEE is that it is harmful and not enough treated in urban cities. According to the Malagasy law on WEEE management (2015), producers of EEE have to pay a contribution on each item imported or created. This contribution is used for the collection and treatment of WEEE. However, there are no further details about specific public actors for the treatment part. Therefore, several initiatives exist from private actors, but there is still a lack of coordination and structure (Institut Français de Madagascar, 2019).

No accurate figures have been found with regards to recycling and valorisation activities, but a list of actors has been dressed in Appendix 13. From this research, a trend can be observed for the revalorisation of organic, plastic, and textile waste (Institut Français de Madagascar, 2019).

Out of those three key trends, a link can be assumed between the high level of imports in machinery & transport equipment and the increasing WEEE in Malagasy urban cities. This will be considered while refining research lines in the following section.

2. REFINED RESEARCH LINES

Sub-questions

SQ1: How is circular economy perceived?
SQ2: How does circular economy contribute to inclusive growth?
SQ3: Which opportunities to take in the future?
SQ4: How does/will COVID-19 influence circular economy?

Based on the first exploratory phase, the PESTEL analysis, and the MFA, research lines will be refined before engaging with the Malagasy actors.

In regard to SQ1, the lines of research will remain the same. Questions will be relative to the Government's awareness and actions regarding the circular model, the waste legislation, and financial aids.

Regarding the research lines for SQ2, nine key trends were selected to assess how inclusive the Malagasy circular economy is: 1) low GDP per capita, 2) high unemployment rate, 3) high young unemployment rate, 4) gender inequality in employment, 5) high poverty rate, 6) low life expectancy, 7) mortality due to pollution, 8) low level of education, 9) high exclusion of elderly, single mothers, informal waste pickers, ex-convicts, and disabled people. Those trends are classified into SDGs in Table 6. This research line will be tested differently according to the interviewees' profile. On the one hand, experts will be asked how they perceive circular economy to be inclusive. On the other hand, managers will be asked how their activities contribute to inclusive growth in urban cities.

Table 6: Table of indicators – phase 2

(Based on: United Nations, 2020; OECD, 2018, pp. 27-28; PESTEL analysis)

SDG 1 NO POVERTY	**SDG 3** GOOD HEALTH AND WELL-BEING	**SDG 4** QUALITY EDUCATION	**SDG 8** DECENT WORK AND ECONOMIC GROWTH	**SDG 10** REDUCED INEQUALITIES
1. Poverty rate	1. Mortality from outdoor air pollution 2. Life expectancy	1. Skills & Knowledge	1. GDP per capita* 2. Median income (disposable income)* 3. Employment rate 4. Young unemployment rate	1. Elderly 2. Women* 3. Informal waste pickers 4. Ex-convicts 5. Disabled people

*GDP per capita will be analysed as a measure of the decent standard of living and disposable income will be analysed in terms of its amount and its accessibility.
*Women include marginalised single mothers and unemployed women.

Concerning SQ3, a first focus will be placed on performance economy in the telecommunication equipment industry. This is explained by five observations: 1) evolve in the New ICT industry, 2) increase in the number of phone, laptop, and desktop owners, 3) increase in telecommunication equipment imports, 4) absence of structuration in WEEE, and 5) lack of performance economy initiatives. This idea will be further developed while collecting comments from interviews. A second focus will be placed on a potential introduction of a complementary currency, inspired by Lemille.

Regarding SQ4, it will be asked how COVID-19 changes consumption habits and if this can be the starting point for a bigger consideration of circular economy.

The interview guidelines and transcriptions can be found from Appendix 14 to Appendix 22. The refined conceptual framework can be found in Figure 9.

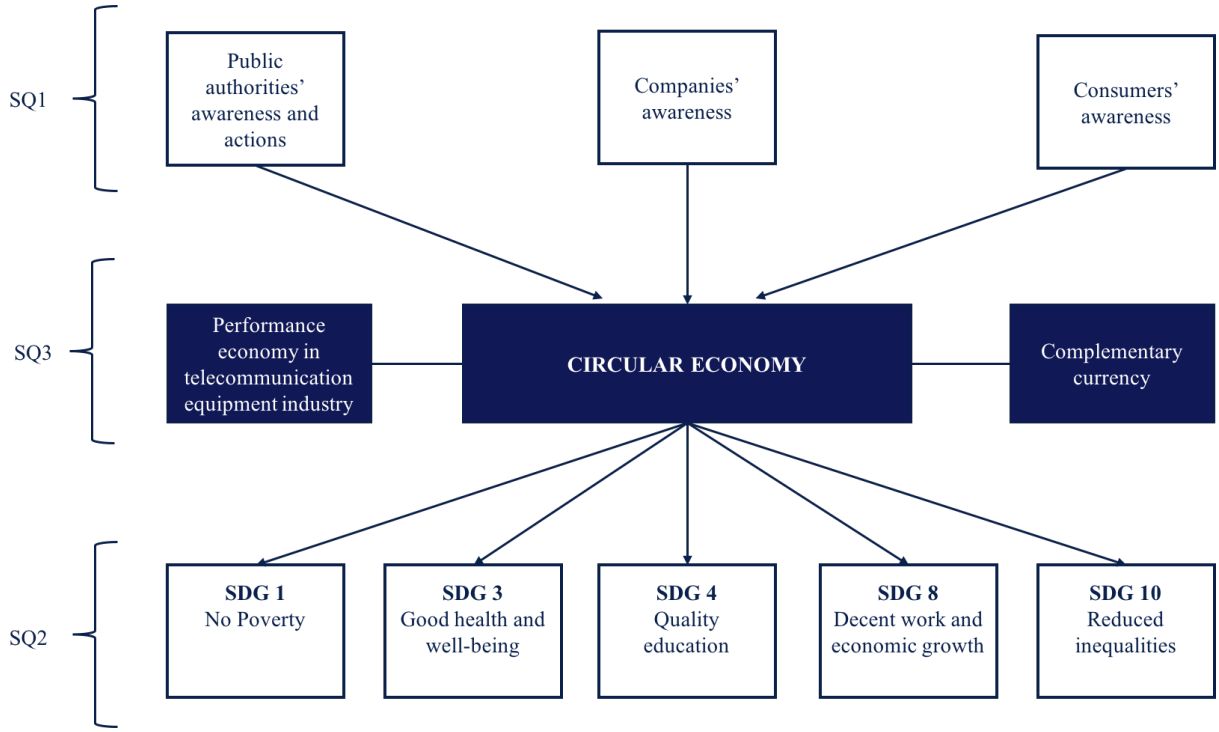

Figure 9: Conceptual framework – phase 2
(Based on: Literature review; MFA; Exploratory Phase 1)

3. ANALYSIS

This section will present the results of the discussions conducted with seven Malagasy actors. A reminder of their name and function is presented in Table 7. Although some results will be presented through graphs, the approach of this thesis remains qualitative. Those graphs are used in order to facilitate the interpretation and discussion of results.

Table 7: Interviewees – phase 2 (Based on: Appendix 16-22)

Name	Function
Erik Winter Reed	Specialist in natural resources management at the World Bank.
Karl Bertil Akesson	CEO of Groupe Akesson operating in the mining and agricultural sector. He is also a promoter of the Blue Economy in Madagascar.
Nirina Rajaonary	Founder of S.P.A.H located in Antananarivo. They manufacture toilet papers from paper and cardboard waste.
Sitraka Razanakoto	President of the association Fakotory promoting zero-waste in Madagascar located in Antananarivo. They also operate in textile valorisation.
Luc Ronssin	Co-founder of the social company Le Relais located in Fianarantsoa. They operate in six activities: recycling of textile, valorisation of the collected textile into clothes, car manufacturing (Karenjy), waste management, tourism, and support of farmers in rice farming.
Mihajasoa Andriamiadana	Founder of Madacompost, a limited liability company operating in waste management and valorisation in Majahanga. They are also active in the valorisation of organic and plastic waste. Andriamiadana is also the ACEN representative of Madagascar.
Théo Gallart	Founder of Valomada, a startup located in Antananarivo, operating in the collection and recycling of hazardous waste such as WEEE.

Knowing that a sample of seven people seems low, we used information from two documents to support and illustrate our analysis:

- Workshop "Déchets: Quelles Solutions pour nos Villes Malgaches", organised on the 18th and 19th of November 2019;
- Report "Valorisation des Déchets Fermentescibles à Antananarivo" from the Projet ORVA2D, took place in 2015 in Antananarivo.

3.1 SQ1: How is circular economy perceived?

3.1.1 Public authorities awareness and actions

"We are currently in the awareness phase, why not in the confirmation phase of our traditional practices?" [Translation mine] (Akesson, 2020)

Akesson mentions that the Commission de l'Océan Indien (COI) which launched the first circular economy forum called "Eco.Actions" in December 2019. The COI is an intergovernmental organisation created from the association of five countries namely Union of Comores, France associated to La Réunion, Madagascar, Mauritius, and Seychelles (Commission de l'Océean Indien, 2018). The aim of the Eco.Action forum was to discuss the circular economy model because it is seen an opportunity in there. Public institutions, professionals, entrepreneurs, non-public actors, and students were present (Akesson notes, 2020). Next to that, Winter Reed explains that circular economy is still new for the World Bank. The group is beginning the first researches and projects on the topic (Winter Reed, 2020).

Managers confirm the absence of legislation with regards to circular economy. None of the them received any form of help at a national or international scale. Today, the priority is economic growth and global development. The Government therefore focuses on the most vulnerable branches of the society.

Regarding waste management, the regulatory framework is managed at the cities scale. It highlights responsibilities, financial measures, and sanctions. However, it is not well respected and not clear with regards to responsibilities and financial measures (Institut Français de Madagascar, 2019). Another problem is the lack of structure as previously explained by Tene (cf. Part III, Chap. 1, Point 2.1.1). Waste management consists of three steps in urban cities: pre-collection, collection and transport, and treatment and valorisation. The pre-collection involves collecting domestic waste at the fokontany[8] scale and put it in dumpsters located at key points. Depending on the cities, it is made by private institutions called RF2, organisations, groups of fokontany's inhabitants, or even informal pickers. The collection step involves transporting waste from dumpsters to landfill sites. Usually, the commune or an organisation related to the commune is in charge of it. In Antananarivo, this is the role of the Service

[8] A fokontany is a subdivision of a commune which is a decentralized territorial community. A fokontany does not have that title, but participates in the development program of communes (Friedrich-Ebert-Stiftung, 2014)

Autonome de Maintenance de la Ville d'Antananarivo (SAMVA). The priority remains the cleanliness of cities. Once waste is landfilled or brought out of the city, no actor from public authorities takes care of the treatment and valorisation. This leads to the emergence of informal pickers. Hence, several businesses intervene in several steps of waste management such as Madacompost in Mahajanga and Le Relais in Fianarantsoa to bring structure. The success of circular economy depends on waste management and structuration as Tene previously pointed out (cf. Part III, Chap. 1, Point 2.1.1). Considering that legislation is not clear with regards to responsibilities, companies have a lot of room to develop circular activities (Institut Français de Madagascar, 2019).

It was asked to interviewees about the necessity to adopt a legislative framework incentivising circular activities. Most of the respondents answered positively. However, the main problem lies in the Government's instability. Gallart (2020) goes further by saying that: "*90% of the economy is informal. A legislative framework is good, but that's not going to get things done*" [Translation mine]. Akesson (2020) highlights that Madagascar receives funds from funders. Those funders can influence the Malagasy legislative system by setting conditions to the access of funds.

3.1.2 Companies awareness

Few companies in the formal sector really adopt a circular business model in urban cities (e.g. S.P.A.H, Adonis, SMTP (Société Malgache de Transformation Plastique), Fakofia, etc.). Numerous companies begin to incorporate CSR practices, but some respondents claim that this is mainly greenwashing. Next to that, the social enterprise philosophy is also growing in Malagasy urban cities. There are also waste management workshops organised that enable actors to exchange on the topic. Some of them keep contact in order to work together (Razanakoto, 2020).

Circular economy is mainly done in the informal sector. In some cases, informal actors earn a considerable amount of money and refuse to go formal because of taxes. Some formal companies work with them. For instance, SMTP manufactures products from recycled materials such as Low-density polyethylene (LDPE) which is sold by informal waste pickers. Valomada adopts the same method, but for WEEE.

"It is not necessary to control or sanction those operating in the informal sector. The key would be to focus on incentive messages" [Translation mine] (Razanakoto, 2020)

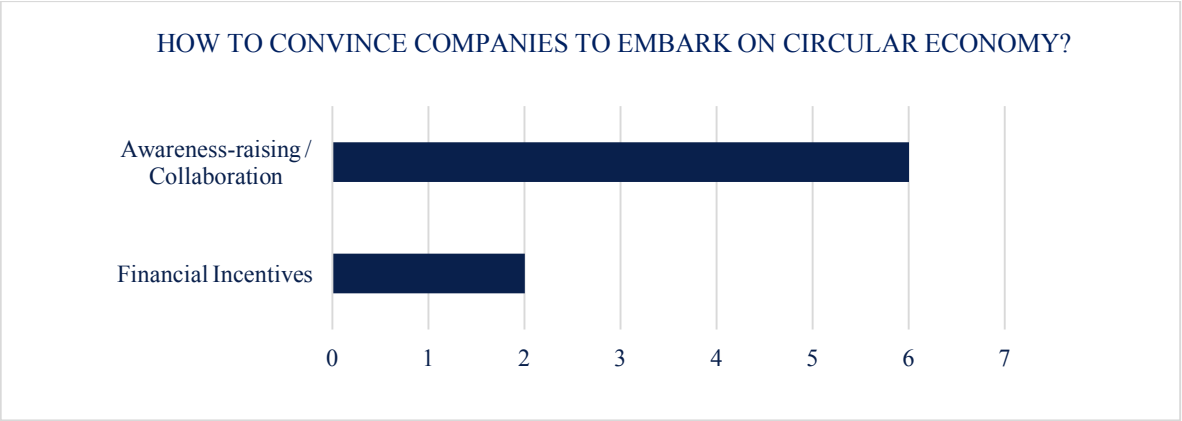

Figure 10: How to convince companies to embark on circular economy? (Based on: Appendix 16-22)

It was asked to interviewees how companies should be incentivised to adopt a circular model. Figure 10 shows the results for two options: awareness-raising/collaboration and financial incentives. Few respondents mentioned financial incentives as a solution to incentivise companies. Winter Reed (2020) goes further in his thinking by explaining that a too complex system is not optimal for Malagasy urban cities. Awareness-raising and collaboration represent the most chosen methods among interviewees for both formal and informal companies. This should involve making companies aware of the economic, social, and environmental benefits of circular economy. Ronssin (2020) explains the importance of making things for a good reason. Therefore, he suggests that financial incentives can be used, but as a way to open the door to awareness-raising and exchange. Both Razanakoto and Andriamiadana (2020) explain that the notion of circular economy is not well known in Madagascar. It is something that is talked about, but companies do not know its real benefits. Furthermore, Razanakoto (2020) explains that only 20 to 25% of private sector is formal. It is thus important to share with informal actors who are the real representatives of the Malagasy economy. Workshops are reduced to formal companies, which means that the topic is only discussed with 20 to 25% of the Malagasy economy. Informal companies should also be invited to workshops and conferences (Razanakoto, 2020).

3.1.3 Citizens

"From an early age, we have never been taught the importance of waste (e.g. recycling, reuse, etc.). We did not have this education. It is not rooted in urban culture." [Translation mine] (Razanakoto, 2020)

It is mainly in rural areas that the concept of reuse is embedded. Cities highly depend on imports, especially on cheap Chinese products. However, more people begin to be aware of the importance of waste management and local products. It starts mainly from the middle-class, but the problem remains the low purchasing power and also the lack of structures to sort waste (Andriamiadana, 2020). Three examples can be highlighted to explain that citizens are willing to participate, but structuration and affordability are needed. Firstly, Fakotory launched a project in one fokontany in Antananarivo. It involved setting up recycling bins at several points and encourage people to throw their waste in those bins. This was a success. Yet, once the waste was collected, it was mixed again and taken landfill. Secondly, Andriamiadana (2020) explains that some people, who do not own any house, still financially contribute to waste pre-collection. For example, some sentinels living in a part of the landlord's house pay for their waste to be collected. Regarding consumption, Gallart (2020) believes that if citizens had the choice between a product issued from circular economy and an imported product at the same price, they would go for the first one.

"As soon as it takes a little more effort, the potential for success is low. Hence, solutions should be as simple as what people do on the field" [Translation mine] (Winter Reed, 2020)

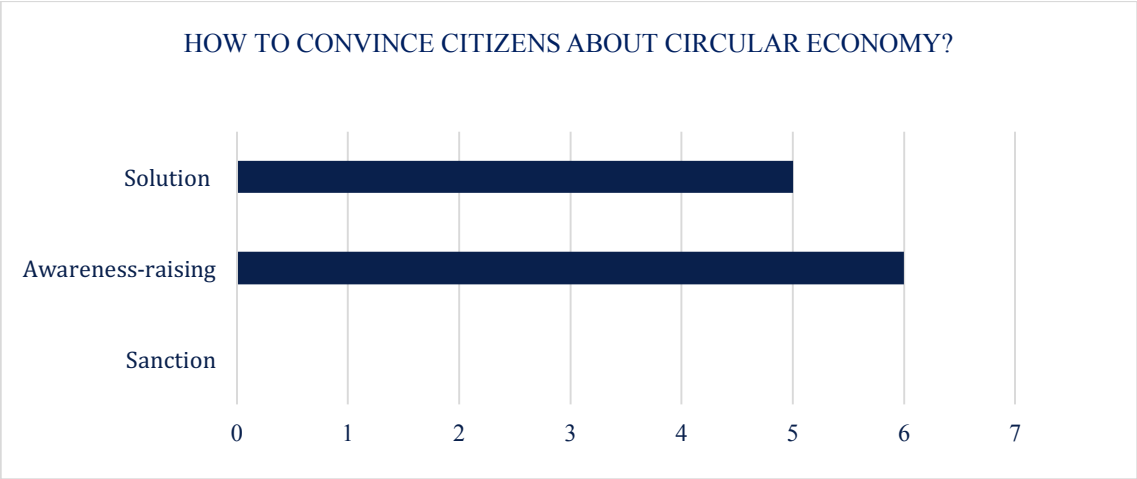

Figure 11: How to convince citizens about circular economy? (Based one: Appendix 16-22)

It was asked to interviewees which solutions should be adopted in order to convince the population in urban cities to adopt a circular lifestyle. As shown in Figure 11, most of them highlight the importance of awareness-raising and solutions. The population is willing to contribute as long as processes are accessible and simple. That is to say that solution should be given together with awareness-raising. An example is S.P.A.H which offers toilet paper at an affordable price to a population whose purchasing power is low. After proposing a solution, S.P.A.H then shares its activity with consumers and invites children from school in their factory. They develop their image through word of mouth. "*Transparency brings trust*" [Translation mine] (Rajaonary, 2020*)*.

None of the respondents believes in sanction. The Malagasy legislation has already incorporated sanctions for the non-respect of waste management regulation, but this is not well applied (Institut Français de Madagascar, 2019). An example given to explain that sanction does not work in urban cities is COVID-19. At the beginning of the quarantine, the Malagasy Government decided to prohibit all activities starting from 12pm. Considering that people live from day to day, this rule was not well received (Razanakoto, 2020). The same situation is observed with the use of masks. In Antananarivo, it is still difficult. In Fianarantsoa, the process was successful thanks to awareness-raising coming from the private sector, namely Le Relais (Ronssin, 2020). That shows that proximity is key.

3.1.4 Which path to prioritise?

"I will say that we must support the private sector because it is the engine of growth and the main actor for the reduction of unemployment in the creation of decent and sustainable jobs" [Translation mine] (Akesson, 2020)

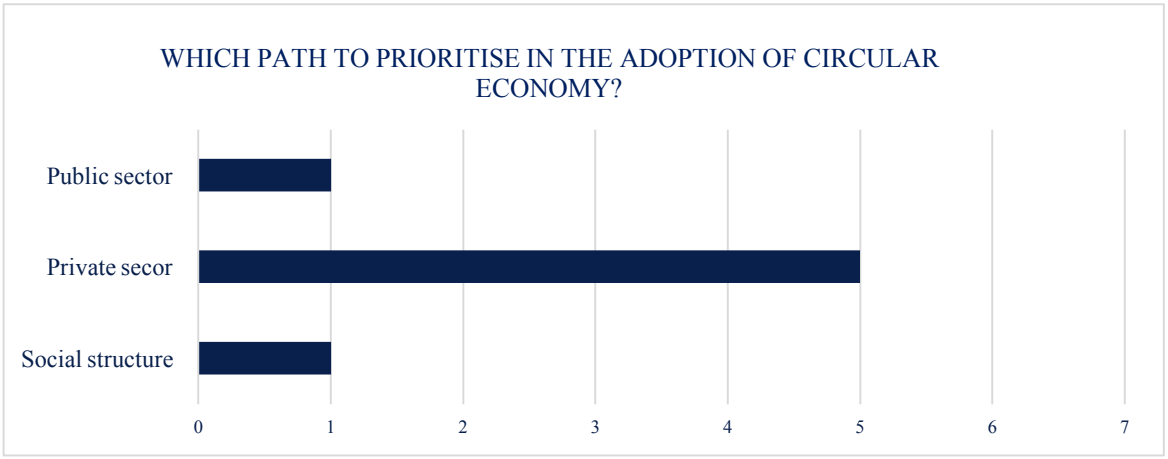

Figure 12: Which path to prioritise in the adoption of circular economy? (Based on: Appendix 16-22)

As shown in Figure 12, most of the interviewees highlight the importance of the private sector in the implementation of the circular economy in urban cities. Theoretically, public authorities and legislation are the principal actors, but interviewees believe that real actions come and will come from companies and organisations. Rajaonary (2020) adds that companies work by mimicry: If one succeeds, the other ones will try to do the same.

Ronssin (2020) also mentions the importance of social structures such as families, social circles, churches, neighbourhood leaders, wise men, etc. According to him, companies are Western systems that have been imported to Africa years ago. It is time to focus on the traditional Malagasy structures. The idea is to not only convince people about the circular economy, but also about the circular lifestyle (Ronssin, 2020).

3.2 SQ2: How does circular economy contribute to inclusive growth?

As explained earlier, circular economy brings inclusive growth if it responds to key socio-economic issues (cf. Part III, Chap. 1, Point 2.2.). Five SDGs have been selected to test the inclusiveness of circular activities in urban cities. Those SDGs consist of several indicators reminded in Table 8. The present sub-question will be answered by explaining how Fakotory,

Le Relais, S.P.A.H, Madacompost, and Valomada activities contribute to inclusive growth. Regarding that this thesis does not include international-oriented companies, Group Akesson will not be analysed. Yet, a transcription of the interview with the manager can be found in Appendix 19 accompanied with his notes (See Appendix C.1).

Table 8: Table of indicators – phase 2
(Based on: United Nations, 2020; OECD, 2018, pp. 27-28; PESTEL analysis)

SDG 1 NO POVERTY	**SDG 3** GOOD HEALTH AND WELL-BEING	**SDG 4** QUALITY EDUCATION	**SDG 8** DECENT WORK AND ECONOMIC GROWTH	**SDG 10** REDUCED INEQUALITIES
1. Poverty rate	1. Mortality due to outdoor pollution 2. Life expectancy	1. Skills & Knowledge	1. GDP per capita* 2. Median income (disposable income)* 3. Employment rate 4. Young unemployment rate	1. Elderly 2. Women 3. Informal waste pickers 4. Ex-convicts 5. Disabled people

*GDP per capita will be analysed as a measure of the decent standard of living and disposable income will be analysed in terms of its amount and its accessibility.
*Women include marginalised single mothers and unemployed women.

3.2.1 SDG 1: It reduces poverty

Altogether, it is assumed that the five businesses enable poverty alleviation. They employ people living in extreme poverty such as women, inhabitants of rural areas, homeless people, and waste pickers. Companies offer a salary that help those people in their everyday life and that will support their families. That helps reduce the number of people in urban cities living below the poverty line.

3.2.2 SDG 3: It leads to good health and well-being

In total, 4 out of 5 organisations directly contribute to the decrease in mortality due to pollution and to the increase in life expectancy consequently. Thanks to their waste management and treatment activities, Madacompost and Le Relais help decrease the amount of waste that is dumped in landfill sites in Mahajanga and Fianarantsoa. The two organisations are also active in composting, which hinders the fermentation of organic waste. This reduces the propagation of CO^2 and methane. Additionally, S.P.A.H collects more than 1000 tons of paper waste and 500 tons of cardboard waste which are normally burned in open landfills (Black Carbon).

Finally, Valomada internalises the treatment of hazardous waste that is harmful to the population and informal waste pickers especially. Considering that 20% of deaths in Madagascar are caused by the exposition to pollution, it is believed that those activities contribute to health and well-being in urban cities (UNICEF, 2019).

3.2.3 SDG 4: It enables access to quality education

The five businesses help their employees develop new skills and knowledge:

- S.P.A.H employs people from rural areas and inserts them in the industrial sector. Those people also work part-time in agriculture. They are trained for the utilisation and optimisation of machines. They hence adopt a logic towards efficiency that helps them in their agricultural activities (Rajaonary, 2020).

- Fakotory trains women in the valorisation of textile waste into clothes. The association also helps those women develop their business skills. So that, they can become their own manager in the future (Razanakoto, 2020).

- Le Relais finances several activities from the recycling and valorisation of textile waste: car manufacturing, tourism, and farmers support in rice farming. Therefore, their employees acquire knowledge and competence proper to those industries (Ronssin, 2020).

- Madacompost offers its employees the opportunity to participate in studies and research with regards to waste management. Those employees also develop their communication skills by exchanging with key partners (Andriamiadana, 2020).

- Valomada organises a one-month training for 30 to 40 interns. They are taught about the composition of WEEE in order to identify harmful materials during theoretical sessions. Additionally, they follow practical sessions in which they learn about dismantling and the reuse of some materials for other activities. The company also helps its interns to acquire valuable experience in the information economy (Gallart, 2020; Valomada, 2020).

3.2.4 SDG 8: It enables access to decent work and economic growth

Firstly, in terms of disposable income, the five organisations offer a stable revenue. Before being employed by Madacompost, waste pickers earned an income that was unstable and highly dependent on their ability to resell the waste that they collected: Finding regular customers could be difficult. Furthermore, in the case of employees also living from agriculture, their revenues highly depended on uncertain weather conditions. Therefore, working for S.P.A.H gives them income security. According to the literature, people would have access to goods at a lower price thanks to the circular model, which increases their disposable income (EMF, 2015). This still need to be explored in the case of Malagasy urban cities. Except for S.P.A.H which offers low-priced toilet papers, some actors still experience competition from imported goods that are more affordable.

Secondly, all five organisations contribute to employment in Malagasy urban cities:

- S.P.A.H employs more than 80 people (Rajaonary, 2020);
- Fakotory employs 6 workers and expects to hire 10 more in the following months (Razanakoto, 2020);
- Le Relais hires 500 collaborators (Ronssin, 2020);
- Madacompost employs 35 people permanently and 20 to 50 people daily depending on the company's needs (Andriamiadana, 2020);
- Valomada has also workers in Antananarivo and hires at least 3 people from the 30 to 40 interns they had during the one-month training (Gallart, 2020).

Thirdly, GDP per capita is an indicator used to measure the average standard of living. Thanks to circular economy activities, employees have access to an income that enables them to invest in their consumption. Rajaonary (2020) gives the example of an employee who, thanks to the salary earned from his work at the factory, was able to buy a motor pump to improve his crop yield.

Regarding that Tene previously explained that circular economy activities could lead to non-decent jobs (cf. Part III, Chap. 1, Point 2.2), and based on the interviewees' testimony, we saw an opportunity to analyse job decency. Madacompost ensures that their employees have access to protective equipment and a social security coverage. Employees at S.P.A.H are trained in

HSQE (Health, Safety, Quality, Environment). They learn methods to adopt in order to work safely. Valomada also ensures that its employees have access to helmets, gloves, and protective footwear for their work (Valomada, 2020).

In regard to young unemployment, not enough information was collected to dress proper conclusions. It is observed that once interviewees talk about inclusive growth, they directly mention women, waste pickers, rural areas inhabitants, and homeless people. Next to that, Valomada (2020) claims that they engage *"young people motivated to regain a work dynamic"* [Translation mine]. Luc Ronssin (2020) considers young people as essential for the promotion of circular economy and says that they are active in the social enterprises philosophy. Fakotory also encourages the participation of young people in projects and training. Youth are thus included in the process, but accurate statements proving their employment were not given.

3.2.5 SDG 10: It reduces inequality

As mentioned above, circular economy does benefit to women and waste pickers who are formalised. In fact, 70% of S.P.A.H employees are women (Rajaonary, 2020). Le Relais also employs ex-convicts once they finish their sentence. Valomada ensures to give training and jobs in priority to people in employment difficulty. To do so, they work with an association called Graine de Bitume.

Even if analyses are primarily focused on urban cities, it is observed that circular economy can reduce inequalities that the rural population is facing. The key is to set up an industrial part of the company in rural areas as S.P.A.H did. With regards to elderly and disabled people, not enough information was collected to draw proper conclusions.

3.3 SQ3: Which opportunities to take in the future?

3.3.1 Performance economy in the telecommunication equipment industry

As mentioned earlier, the motivation behind this idea was twofold: reduce the high dependence on telecommunication equipment imports and decrease WEEE. The initial proposition was to invite consumers to pay for the use of a phone, a laptop, or a desktop instead of the product itself.

This proposition was refined through discussions with interviewees who highlighted several points. Firstly, eco-design is important. Therefore, the performance economy also depends on countries exporting telecommunication devices. Secondly, the consumers' willingness to pay for a service instead of a product has to be assessed. Thirdly, as Winter Reed says (2020): The solution has to be simple and cheap. An example of a simple process that works in Malagasy urban cities is the container deposit system with glass bottles.

All of those comments were taken into account in order to build a refined proposition. We propose telecommunication companies to adopt a container deposit system with items such as phones, laptops, and computers. Thus, consumers do not pay for a contract but still pay for the item. Once done with it, they can return the product in exchange of money. This could structure the circulation of WEEE. Some interviewees believe that this solution would be optimal because the consumer is incentivised to return the product. Gallart (2020) argues that telecommunication companies such as Telma and Orange are thinking to adopt this business model. Yet, the main challenge relies on the structural changes that those companies could encountered.

3.3.2 Complementary currency

The majority of the interviewees says that it is possible to set up a system for complementary currency in Malagasy urban cities. However, the benefits still remain questionable. To fully embark citizens on this process, it is necessary to show the real financial benefits of using this currency (Razanakoto, 2020). If the setup is too complex compared to the potential benefits, this will not work. Ronssin (2020) claims that "*As long as the currency does not represent the labour input, it will remain a figure like any other regardless of its form*" [Translation mine].

3.4 SQ4: How does/will COVID-19 influence circular economy?

Currently, a lot of businesses are suffering from COVID-19, especially tourism. Borders are not fully closed in order to enable the importation of merchandise. Currently, the population is trying to survive the economic crisis. Therefore, the reflexion on the importance of local products is not a priority.

At the governmental scale, reflexion is beginning. The President invited local businesses and actors to discuss about the importance of producing what they consume. According to him, the high dependence on imports has to stop (Rajaonary, 2020). Only 3 out of 7 interviewees strongly believe in the probability that COVID-19 will lead to higher adoption of circular economy.

PART IV: DISCUSSION & CONCLUSION

CHAPTER 1: DISCUSSION

This chapter will provide a summary of key points that were discussed in the second exploratory phase. Some points will be confronted to the literature. We will also take the time to explain how to organise the Malagasy urban circular economy in order to contribute to a socio-economic recovery. Some recommendations will then be given.

1. STATUS OF MALAGASY URBAN CITIES IN TERMS OF CIRCULAR ECONOMY

We dressed a SWOT analysis to summarise the key information retrieved from discussions with the interviewees in Table 9.

Table 9: SWOT analysis of circular economy in Malagasy urban cities
(Based on: Empirical phase 1 and 2)

S	▪ Collaboration between formal companies thanks to workshops; ▪ Lots of formal activities regarding the valorisation of organic waste; ▪ Lots of formal activities regarding the recycling of plastic, textile, and paper/cardboard waste; ▪ Formal circular economy activities bring inclusive growth.
W	▪ CSR is seen as greenwashing; ▪ Lack of initiatives from the Government regarding circular economy; ▪ Waste management law is unclear and not respected; ▪ Few actors in the treatment of WEEE; ▪ Lack of knowledge regarding circular economy among the urban population; ▪ Some companies do not know about the financial benefits of circular economy; ▪ Madagascar is not a member of the ACEA.
O	▪ Circular economy mainly done by informal actors (could also be a threat); ▪ Education is key: schools; ▪ People are willing to participate as long as the process is simple and affordable; ▪ Youth is involved in the promotion of circular economy and social enterprises; ▪ Government gradually promotes local economy (ex: COVID-Organics, two national car brands, meeting with local actors to explain the importance of consuming what they produce, etc.) ▪ Power of funders; ▪ Waste management workshops; ▪ Social structures (families, social circles, churches, fokontany's leaders, wise men, etc.); ▪ Companies act by mimicry; ▪ Launch of the Circular Economy Law Program by the AfDB; ▪ Growing New ICT market; ▪ Potential in low tech for Madagascar;

	▪ Beginning of researches and projects regarding circular economy by the World Bank; ▪ Madagascar is a member of the ACEN; ▪ Growing philosophy of social enterprises.
T	▪ High rural exodus leading to increase of waste in urban cities; ▪ Informal actors do not trust the private sector; ▪ Formal sector only represents 20 to 25% of the Malagasy economy; ▪ Government prioritises economic development instead of sustainable development; ▪ Population lives in extreme poverty and is price sensitive; ▪ Presence of lobbies.

The main observation that can be drawn is that the circular model is adopted in formal and informal sectors. However, most of the circular economy actors are in the informal sector. Besides, it is observed that the reuse of waste among citizens is considered more as a way to survive than a lifestyle. Furthermore, structures enabling the good implementation of this model are missing. Circular economy and its opportunities are still not clearly exposed and shared with the private sector and the population. Razanakoto (2020) claims that: "*We hear about circular economy […] on TV and in official speeches, but it's not a priority here"* [Translation mine]. Circular economy is still at a low awareness-raising phase. The model is still reduced to waste management and recycling in Malagasy urban cities. The real actors remain the private and non-governmental local sectors.

According to the literature, the implementation of circular economy at a bigger scale requires a favourable policy framework. Most of the interviewees claim that governmental actions are required, but not at the same level as the literature suggests. A circular economy model - based on financial and non-financial incentives, complementary currency, sanctions, etc. - does not seem to be the right approach for Malagasy urban cities. Everything relies on collaboration, awareness-raising actions, and affordable alternatives.

Today, in Malagasy urban cities, formal circular economy activities contribute to several indicators of inclusive growth. Those activities have three objectives: 1) reinserting the most vulnerable people (e.g. women, homeless people, former convicts, former waste pickers, rural inhabitants, etc.) with decent jobs, 2) offering knowledge and training, and 3) making a better environment that leads to good health and well-being. In regard to citizens, they are willing to collaborate as soon as affordable solutions are presented and the stakes are explained. It is thus important to not hurt the process by implementing an aggressive macro-model. The Malagasy Government tends to delegate power to cities, but initiatives should be first taken by the central

state (Andriamiadana, 2020). In other words, the Government should lead by example and support the private sector. This can also help public authorities gain the population's trust.

It is believed that Malagasy urban cities still have a long path to go in the shifting to a formal circular economy that enables socio-economic recovery. Considering that the President believes it is time to consume what the country produces, we believe that circular economy could be discussed at the formal and institutional level. Hence, the next section of this discussion will provide some recommendations based on information gathered in the SWOT analysis.

2. RECOMMENDATIONS

The recommendations presented in this section have been inspired by our discussion with interviewees. We understand that several factors have to be considered in order to implement them. Hence, those recommendations should not be seen as directly applicable measures. They just represent opportunities for the Malagasy Government if the latter decides to adopt a structured circular model.

Firstly, some interviewees highlight that urban citizens are not taught about waste sorting, recycling, and reusing. That is mostly explained by the importation of the Western linear model. Interviewees also emphasize the importance of children and youth. At the beginning of the year, the Government has established a new education plan that is expected to be applicable in three years. This plan will include several subjects about sustainable development (Henintsoa, 2020). It should then be ensured that circular economy is also included. This could promote the circular lifestyle and influence social structures such as families.

Secondly, Madagascar should pursue relations with the ACEN and the ACEA. Lemille (2020) explain that the ACEN has not received any news from Madagascar for years. Moreover, the country is not a member of the ACEA. Pursuing relations with those institutions would enable Madagascar to lead by example.

Thirdly, the necessity to incorporate informal actors in the circular model was highlighted. We thus advise to create an online platform at the national scale in order to connect the different circular economy actors. This platform should not be linked to CSR topics or waste

management, but should be named “Circular Economy in Madagascar” or “Circular Economy in Malagasy Urban Cities”. On this platform, cases of companies and organisations having succeeded in the adoption of a formal circular economy would be dressed. Furthermore, financial and social benefits would be discussed. For example, the platform could present cases of former waste pickers whose formalisation positively changed their life. Information would be accessible to everybody, and actors would interact with each other. In Malagasy urban cities, circular economy is mainly focused on the recycling of plastic, paper/cardboard, textile and also compost. However, recycling is not a long-term solution and other branches of circular economy should be considered. The platform will therefore be an opportunity to show other circular activities and concepts such as performance economy, industrial ecology, biomimicry, C2C, MFA, Blue Economy, etc.

Furthermore, several interviewees talked about the importance of a regulatory framework that promotes the circular model. In this case, the Circular Economy Law Program that is being launched by the AfDB could be a starting point for Madagascar. As previously explained, the regulatory framework should just be presented as a support to the private sector in the adoption of circular approaches. Nevertheless, financial or non-financial incentives should not be considered.

Then, it is essential to ensure that circular economy is always operated inclusively. If it came to the idea to take the model at a higher scale, indicators should be dressed and monitored. Those indicators would assess circularity of the national economy (e.g. food waste, household expenditure on product maintenance and repair, evolution of tonnage of landfill waste, incorporation of recycled raw materials into production processes, and job creation thanks to circular economy) (cf. Part I, Chap. 2, Point 1). The contribution of the model to inclusive growth could also be analysed (cf. Part I, Chap. 3, Point 2.2). However, it is crucial to select indicators that are adaptable to the the Malagasy context. Otherwise, this approach will not have any valuable impacts.

Next, the Malagasy Government is launching the “Plan Marshall post COVID-19”. The aim is to enable economic recovery by investing in infrastructures (e.g. education, health, transport, etc.). The Government could take this opportunity to prioritise the importation of materials that are designed to last long and be reused. This would enable the country to not fully depend on

importation in the future and stimulate employment in repair and remanufacturing. International funders could help the Government in this process.

Finally, as stated by Winter Reed (2020), circular economy is still at its embryonic phase in the World Bank. They are looking for new projects. The Malagasy Government can therefore take the opportunity to develop a circular economy project in Malagasy urban cities with the World Bank.

CHAPTER 2: CONCLUSION

1. PURPOSES AND LITERATURE

The main purpose of this thesis was to assess how circular economy could contribute to a socio-economic recovery in Malagasy urban cities. Several reasons explain the choice of this topic. The first reason is the lack of information from official institutions such as ACEA, ACEN, AfDB, World Bank, etc. on this particular topic and for this particular country. Secondly, we observed that Madagascar presents some opportunities from the Government with regards to the promotion of local economy and the protection of the environment (e.g. Karenjy, Gasycar, COVID-Organics, reforestation plan in January 2020, etc.). Moreover, from preliminary research, we found several local actors operating in circular economy. This thesis answers to four sub-questions: 1) How is circular economy perceived in Malagasy urban cities?, 2) How does circular economy contribute to inclusive growth in Malagasy urban cities?, 3) Which opportunities to take in the future?, 4) How does/will COVID-19 influence circular economy in Malagasy urban cities?

To answer these questions, a funnel-shaped structure was adopted. The first step of the funnel consisted in a literature review explaining circular economy. It provided definitions, theories, examples, and also news about the implication of COVID-19 on circular economy. This review was clearly built to explain circular economy in a territorial perspective. This was followed by an explanation about what a socio-economic recovery means. It opened the door to the term "inclusive growth", which is a growth that is also beneficial to the lower strata of society and not only to the higher one. The literature goes further by explaining how circular economy can be inclusive and the potential benefits that it could bring. Authors suggested that the success in the implementation of circular economy relies on macroeconomic policies, businesses, and citizens' behaviour. This information helps build the first sub-question "How is circular economy perceived in Malagasy urban cities?". Authors also argued that circular economy could contribute to several Sustainable Development Goals (SDGs): 1) SDG 3: Good health and well-being, 2) SDG 4: Quality education, 3) SDG 8: Economic growth and decent jobs. This helps build the second sub-question "How does circular economy bring inclusive growth?". To analyse new opportunities of circular economy, the literature proposes to dress a Material Flow Analysis (MFA) in order to capture ideas of activities or industries on which to focus. The second step of the funnel consisted in a first exploration of circular economy in

Africa. There were three main learnings from this step. Firstly, in order for circular economy to be inclusive, it should answer to Malagasy key socio-economic issues. Two new SDGs have thus been selected: 1) SDG 1 (No poverty), 2) SDG 10 (Reduce inequalities) (e.g. women, waste pickers, ex-convicts, disabled people, elderly, etc.). Secondly, the notion of complementary currency has been evoked. Thirdly, the importance of the EEE (Electrical and Electronic Equipment) sector was also highlighted. The third and last step of the funnel involved analysing Malagasy urban cities.

2. RESULTS

2.1 SQ1: How is circular economy perceived?

There is no infrastructure on the institutional scale to promote circular economy. The concept is still at the awareness phase. It is talked about, but the priority is primarily put on classic economic growth. The real actors of circular economy remain the private and non-governmental sectors. In general, circular economy is practiced in the informal sector. Regarding citizens, they are receptive to the idea as long as processes and solutions are simple and affordable. Yet, the concept of circular economy is not understood in the fullest among the private sector and also among citizens. This notion is mainly reduced to the ideas of waste management and recycling. Some interviewees therefore believed that a better learning on the concept and field applications should be done.

2.2 SQ2: How does circular economy contribute to inclusive growth?

Circular economy activities in the formal sector contribute to some indicators of SDG 1 and SDG 10 by offering jobs to the lower strata of the population namely waste pickers, women, homeless people, and ex-convicts. Those people are the ones struggling to find a job and are excluded from the society. By being employed, they have access to a stable income that prevents them from living from day to day.

The circular model also contributes to SDG 3. Those circular economy activities help reduce the amount of plastic, organic, paper/cardboard, and EEE waste in the street and landfill. This waste represents a danger for the population and for informal waste pickers. By internalising them, circular economy actors help reduce pollution and contribute to the well-being of the population in urban cities.

Those activities also contribute to SDG 4 by offering new knowledge and trainings. Employees develop new skills and knowledge concerning the recycling of plastic, textile, paper/cardboard, WEEE, and compost. In some cases, they get business-related insights that they can use in the future for new opportunities.

The circular model also contributes to SDG 8 by providing safe and decent jobs to citizens. They have access to all information and materials needed to work safely (e.g. social coverage, protective equipment, HSQE training, etc.). Furthermore, their income enables them to finance their daily consumption and provide their families. In the case of people also working in agriculture, they use their salary earned in industries to invest in equipment to improve their crop yield. Moreover, circular economy activities directly contribute to reducing unemployment rate.

The price compared to imported goods still remains a problem. It is believed that citizens will be open to consume a product manufactured in a circular model but the price competitiveness compared to some imported products makes the process difficult. Regarding the contribution of circular economy to young unemployment, disabled people, and elderly, we decided to not dress any conclusion due to the lack of data collected for these topics.

2.3 SQ3: Which opportunities to take in the future?

The two opportunities highlighted are related to the development of performance economy[9] in the telecommunication equipment industry, which is thriving in Malagasy urban cities, and the implementation of a complementary currency[10] in Malagasy urban cities. Regarding performance economy, we proposed the implementation of a container deposit system for telecommunication items (e.g. phones, laptops, desktops, etc.). This was well received from the interviewees. Next to that, none of the interviewees do see visible benefits of the implementation of a complementary currency.

[9] It consists in paying for the use of the product instead of the product itself (Stahel, 2019).
[10] A currency only used in a small geographical space and that would be dedicated to stimulate the local economy (Aglietta, cited in Aurez & Georgeault, 2016, pp. 323-324)

2.4 How does/will COVID-19 influence circular economy in Malagasy urban cities?

We could not dress any conclusions about the influence of the border closure on the way circular economy is perceived. Currently, private sectors and citizens in Malagasy urban cities are experiencing an economic crisis. They are trying to survive which thus prevents them from thinking about changing their habits. Some interviewees think that COVID-19 can be the changing point, but most of them believe that the situation will still remain the same. However, the President realised that it is necessary to consume what the country produces and invited some local businesses to talk about.

2.5 Answer to the research question

Based on the above observation, we believe that circular economy contributes to a socio-economic recovery in Malagasy urban cities. Regarding that the Government begins to think that the local economy is key, several recommendations have thus been given in order to build a formal and inclusive circular economy on a larger scale. However, strategies - such as financial incentives, non-financial incentives, sanctions, etc. - do not seem optimal for Malagasy urban cities. The Government should encourage the adoption of circular models by leading by example in its expenses and its actions. It should also support local circular economy actors, promote collaboration in the private sector, and raise awareness. This can also help the Malagasy Government earn trust from citizens.

3. LIMITATIONS

Although this master thesis contributes to the literature and proposes some recommendations, some limitations have to be highlighted.

Firstly, the choice to adopt a qualitative approach was motivated by the socio-cultural aspect of this research question. Yet, the main danger of the qualitative method is its subjectivity. This thesis was written with the aim of being the most objective possible, but biases can still be present from the interviewees' background to the analysis in itself. We therefore believe that completing the empirical research with some quantitative analyses would have brought tremendous value to this thesis.

Secondly, the number and the choice of respondents can be questionable. Despite the efforts put to find as many respondents as possible, the pandemic crisis and the geographical distance made this quest difficult. A strength of this thesis still remains the diversity in terms of interviewees' background and activities. However, a weakness is the absence of respondents working at the Malagasy institutional level.

Thirdly, the world is moving fast with COVID-19. Depending on when this thesis is read, it is possible that the results provided are not fully representative of what is actually happening on the field. Therefore, it is advised to take all this information in retrospect.

Finally, a large part of the information presented in this thesis is related to the capital city, Antananarivo. This is due to the lack of information with regards to other urban cities.

4. FURTHER RESEARCH

This thesis has been written with the aim of bringing some missing information on the table. Regarding that not all aspects of circular economy have been explored in its fullest, this gives room for further research.

Firstly, we decided to answer the research question by adopting a territorial perspective for only local-oriented areas. This gives room to analyse how circular economy is adopted in international-oriented areas. Moreover, a bigger contribution can be to conduct case studies analysis in the territory. Therefore, each strategy or method adopted by companies or associations can be analysed to assess their inclusiveness. This thesis gives information of several potential actors for this type of study.

Secondly, this thesis does not provide proper conclusions regarding the reinsertion of young people, elderly, and disabled people. Furthermore, other factors linked to the country's sociology are not taken into account. This gives room to analyse circular economy at a higher scale of inclusiveness.

Thirdly, this work opens to the reflexion on the performance economy in the telecommunication equipment industry. According to Gallart (2020), Telma and Orange are

thinking about incorporating this model in their business. An opportunity for future research would be to assess how those companies can successfully shift to this business model.

This thesis only presents opinions and experiences from experts and actors operating in the private and non-governmental sectors. The next step can be to talk with actors at the state level. That way, a more complete analysis can be conducted confronting opinions from several levels of society.

Finally, considering that no proper conclusions were drawn for the influence of COVID-19 on circular economy, a continual analysis of companies and consumers' behaviour during COVID-19 can be made. The situation before, during, and after COVID-19 could be analysed. Then, a comparison between the three scenes could be made in order to see if citizens in urban cities increased their consumption of local products and if circular economy activities were more adopted.

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