Deliverable 6.1

Pilot Project Description.

Project: Evaluation of the Circular Economy current situation for the development of a roadmap for Brazil

RFP/UNIDO/7000003530

December 2020

Factor
Ideas for change

ASDF
Americas Sustainable Development Foundation

CONTENT

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ACRONYMS

AFOLU Agriculture, Forestry and Other Land Use

CE Circular Economy

MCTI Ministry of Science and Technology and Innovations

NCRE non-conventional renewable energies

NDC Nationally Determined Contribution

NGO Non-Governmental Organizations

PNRS Waste Management National Policy

R&D+I Research and Development plus Innovation

SDG Sustainable Development Goals

SME Small and Medium enterprises

TAP Technology Action Plan

TNA Technology Needs Assessment

1. Introduction

The purpose of this document is to present a general outline of the rationale, objectives, and approach for the implementation of a platform dedicated to the deployment of demonstration projects for the development of circular economy in Brazil.

In general, the aim is to promote the development of innovative solutions and technologies to accelerate the adoption of more sustainable production and consumption systems, with more responsible use of resources in products design and industrial processes.

In accordance with the previous results obtained in this technical assistance, this report presents a background and provides a general understanding on the problems and critical issues that substantiated the conception of a Brazilian Circular Economy Platform, in the aim of supporting the implementation of a circular economy in the country.

General objectives related to these critical issues are described and an implementation approach for the platform is summarized, indicating the profile of potential executing entities and implementing partners.

The context of this initiative is presented based on the main barriers to be addressed and the expected outputs targeting the critical issues previously identified.

A baseline of five pillars presents the rationale for the Brazilian Circular Economy Platform, and a framework proposes the setup and operational phases regarding planning, deployment and platform implementation as well as the assistance to demonstration projects development.

2. Identification and Selection Process

2.1. Background Information

This technical assistance has assessed the degree of adoption of the Circular Economy in Brazil. The study has identified initiatives with strategic value to the local context, especially the ones with broader scope explicitly related to the circular economy which are currently being developed in the country. This process has given for the first time a general understanding about the Brazilian context regarding the implementation of a Circular Economy in the country.

Key organizations with national scope initiatives explicitly related to the circular economy which are currently being developed in the country were listed. An open survey and a complementary interview gave a broader understanding of the general aspects in many potential impact areas key to build circular economy value chains in Brazil. The projects and activities presented in the survey have approached multiple sectors both for the circular economy technological and the biological systems.

Overall, the initiatives identified present a wide variety of approaches and different ways to apply the circular economy principles and concepts. But, In the other hand, there was no shared vision, common strategy and/or objectives identified among these actors, regarding the circular economy implementation in the country as a whole.

An analysis of opportunities, strengths, threats and weaknesses was also applied to bring insights to support the decision for the best strategy for the implementation of a circular economy in Brazil, based on the most relevant information gathered from the survey and interviews, as well as from the assessment of complementary data from successful cases and experiences abroad.

The analysis of the strengths and opportunities have approached the following aspects:

a. Industrial, innovative and technological infrastructure;
b. Policies and initiatives related to recycling, climate change and circular economy;
c. Governance and leadership related to circular economy;
d. Level of incorporation of non-conventional renewable energies, (NCRE);
e. Alignment of public and private agendas (commitment of government, companies, organizations, academia and society);
f. Potential for job creation;
g. Impact on NDCs and SDGs to Brazilian context; and
h. Main economic activities in the country that might be most impacted by the circular economy.

And the analysis of the weaknesses and barriers have approached the aspects of:

i. Regulation;
j. Market;
k. Culture;
l. Entrepreneurship support;
m. Financing and capital;
n. Industrial and technological; and
o. Recovery of products or materials (logistics, collection, repair and manufacturing).

As a result from this process, with the aim of taking most of the potential of the opportunities in the circular economy model for the Brazilian context, it was envisioned that a platform for knowledge sharing should be developed to enable a systematic support in the development and deployment of demonstration projects on circular economy in the country.

It is expected that, by creating a dynamic network for knowledge sharing and supporting actor's collaboration in circular economy solutions, this platform could enable the socio-technical innovations needed in different levels.

To discuss the general aspects of this proposal, a group of key stakeholders identified in this work from government, academy and business sectors were invited to join a discussion through an on-line meeting. The main characteristics for the development of a platform to support the implementation of demonstration projects on circular economy in the country were discussed. The information presented in this report is based on the whole process of this technical assistance added to the direct contributions from the mentioned meeting.

In this meeting, the technical team of the Technology Needs Assessment (TNA) project for Brazil presented the most updated information about the "Industry 4.0" Technology Action Plan - TAP. The Industry 4.0 TAP includes the implementation of a "Technological Network of Circular Economy and Industry 4.0" (Rede Tecnológica em Economia Circular e Industria 4.0) in the country, which results serves as a strong reference for this Pilot Project.

The scope of the "Technological Network of Circular Economy and Industry 4.0" is to integrate techniques and technologies of industry 4.0 in the circular economy, in order to improve the competitiveness of the Brazilian industrial park. The Network's ambition is to develop R&D+I, training and infrastructure in techniques and technologies of industry 4.0 and circular economy. The documents and final report of the Technology Action Plan for Industry 4.0 from the TNA Brazil project are available in the MCTI website[1].

[1] https://antigo.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/tna_brazil/tna_brazil.html

3. Summary of the initiative

In this section, a summary of the rationale with the problem statement and objectives are presented, as well as the selected implementation approach for the project including the profile for the executing entities and other implementing partners.

Table 1. Summary of the initiative

Pilot Project Title:	Brazilian Circular Economy Platform (Plataforma de Economia Circular Brasileira)
Location / Country:	Brazil
Estimated duration of Pilot Project:	2 year for set up phase plus 7 years for operational phase.
Government counterpart:	Ministry of Science, Technology and Innovations
Pilot Budget:	US$ 2,7 million*
Pilot Rationale:	The platform will embrace activities to support circular economy demonstration projects on research and innovation, technological development, capacity building, cross-sectoral cooperation, policymaking, and knowledge creation and sharing.
Pilot Objective(s):	To create and set up a national circular economy network platform, integrating sectors and stakeholders to foster the development of solutions to catalyze the implementation of a circular economy in Brazil.
Pilot Approach:	The approach is based on the assessment of the relevant actions identified in the circular economy roadmap and the TNA's Technology Action Plan for industry 4.0*, prioritizing selected barriers to be overcome as well as supporting initiatives already in course, and seeking a higher coherence and impact to mainstream the circular economy agenda in the country.

*Reference from the TAP Industry 4.0 (total implementation cost of R$15.1 million) for implementing the "Technological Network of Circular Economy and Industry 4.0".

3.1. Problem statement

For the development of circular economy systems in the country, a set of combined tools, processes, technologies and business models are needed as a means to improve the management of materials and residues in the production and consumption cycles.

To facilitate and accelerate the implementation of circular economy innovative solutions across economic sectors and multiple value chains, it is important to enable the engagement of the many actors enrolled in these systems.

Implementing a network approach with the adequate framework is key to support collaboration and cooperation among these actors and to influence the creation of the conditions and overcome critical issues to this purpose.

3.2. Critical issues

The CTCN technical assistance has identified five main **'critical issues'** for the implementation of a circular economy in Brazil:

1. **Build a shared vision and common development strategy**

   All actors in Brazil must have a shared vision for adopting the circular economy, aligned to national objectives for more sustainable and responsible development and a common implementation strategy towards these objectives.

2. **Establish a more systemic and sustainable approach**

   The circular economy implementation approach in the country will demand a systemic understanding of the flows of products and materials in different levels, with the aim of enabling the development of more sustainable production and consumption patterns.

3. **Enhance the knowledge about the diversity of local contexts**

   Different circular economy implementation approaches in Brazil need to be assigned considering different scales and the regional diversity of the economic, social and environmental contexts of the country.

4. **Influence the creation of enabling Infrastructures and technologies**

   To create the right enabling environment for circular economy initiatives, structural factors in form of policies, regulations, funding and tax mechanisms, professional capacitation, infrastructures, etc., and new 4.0 technologies, may need to be developed and/or adopted in Brazil.

5. **Foster collaboration on cross-sector socio-technical innovations**

   The successful deployment, implementation and scale-up of circular economy innovations in the country will demand a multi-stakeholder cross-sectoral approach with acknowledgment of its impacts in economic, social, technical and environmental levels.

3.3. General objectives

Creating a Brazilian Platform for the Circular Economy is a first step towards a consistent implementation of a circular economy at the country level. The following set of general objectives is proposed to address the critical issues previously identified:

1. **Build a national shared vision about the benefits of a circular economy to the country**

   A national platform can build and promote a shared vision of the specific social, economic and environmental benefits of the circular economy for a more sustainable development in Brazil, and define the desired changes in the technical-social and behavioral dimensions at the country level.

2. **Create a more systemic relationship between actors**

   Building a strong network to be a reference for actors engaged in circular economy initiatives in the country will improve knowledge exchange and help to accelerate the local capacity building. It will also enable the necessary systemic relationship between the broad variety of actors enrolled in innovative solutions for the circular economy - such as firms, industries, SMEs, startups, public authorities, research centers, NGOs, civil society and others.

3. **Support continuous innovation in a broad range of relevant areas**

   The challenge of integrating the circular economy approach to enable more sustainable production and consumption patterns in Brazil demands a systematic support to continuous improvement and innovation in many areas relevant to innovation in the field of materials, products, business models, digital systems and 4.0 technologies.

4. **Provide means to explore the most effective circular economy solutions**

   Innovation needs the adequate working structure and criteria to catalyze demonstration projects to explore and test different options for development, deployment and implementation of circular economy solutions in the country. This structure should set the coordination and orientation to build synergies across value chain networks and take the most of different contexts and scales.

5. **Integrate technologies with positive social and environmental impacts**

   An effective criterion must be drawn to select the preferred demonstration projects for a sustainable and responsible circular economy, which associates solutions and technologies with intentional positive social and environmental impacts, for example to mitigate the effects of climate change and build adaptation strategies, create jobs and combat social inequalities.

3.4. Executing entities and implementing partners

The Brazilian platform for the Circular Economy intends to connect and integrate a network of actors working with circular economy in Brazil and abroad. To this aim, it

should be capable of mobilizing and engaging a great diversity of actors and organizations in multiple sectors and foster systemic relationships between supply chains integrating different sectors of the economy.

The governance structure of the platform should be representative, composed by actors representing organizations from business, academy, governmental and non-governmental enrolled in relevant circular economy initiatives. Oriented by the circular economy Roadmap and the TNA's TAP for industry 4.0, these organizations should be responsible for planning, deployment and implementation of the platform activities and also keep common elements to improve synergy with other networks dedicated to more specific topics in Brazil.

The government entities, especially the Ministry of Science and Information Technology (MCTI), have the institutional role to facilitate the collaboration across different economic sectors like energy, agriculture and manufacture and to promote relations with national and international partners for the circular economy projects. It should identify and invite the organizations that may be important to create a circular economy in the country and also bring in actors that may be out of the mainstream value chains.

3.5. Implementation Approach

The proposed main objectives to the implementation of the Brazilian Circular Economy Platform are organized in two phases:

1. Setup phase

The setup phase will be developed in the first two years (24 months).

Objectives in the 1st year of the setup phase:

- Define the network organizational guidelines
- Define the network strategy, roles and actors enrolled
- Define activities and processes to be performed by the network
- Define the staff profile
- Define indicators to measure and evaluate performance of the network
- Establish the strategy to grow the number of affiliated actors into the network
- Develop of a website for communication

Objectives in the 2nd year of the setup phase:

- Establish criteria and identify potential pilot projects to foster and support in the development of technologies, capacitation and infrastructures for the circular economy
- Establish criteria for partnerships with sectors with greater potential for the circular economy projects

2. Operational phase

The Operational phase will be developed in 7 years (84 months).

Objectives for the operational phase:

- Communicate with the relevant actors and the general public
- Work on actions to stimulate circular economy skills and capacitation development for professors/researchers and professionals in the country, like on-line courses and short courses technical update and networking
- Perform advocacy for new enabling infrastructure (policies, regulations and standards) needed for testing, implementation and scale of the circular economy demonstration projects
- Launch and manage the calls for circular economy demonstration projects in different categories levels, for companies, SMEs and Startups

4. General Information

4.1. Context and Baseline

There are many barriers to be addressed on technological, cultural, professional, entrepreneurial, legislative and other areas, in order to overcome the critical issues identified and enable the arrangements for circular economy projects enrolling several actors from different sectors.

4.1.1. Barriers to be addressed

For each of the five critical issues identified and presented in section 3.2, there are key barriers to be addressed, listed below.

1. **Build a shared vision and common development strategy**
    a. There is a need of a shared vision, common objectives and goals for the implementation of circular economy in Brazil.
    b. Circular economy initiatives rely on coordinating a broad range of interests from the many actors engaged.
    c. Most circular economy initiatives need open collaborative and cooperative environment to build partnerships and collaboration between actors enrolled.
    d. The lessons learned from circular economy successful benchmarks in European countries are mostly in a different context from Brazil and is not easy to evaluate its applicability to the local context.

2. **Establish a more systemic and sustainable approach**

a. There is a need of a diversified experimentation of initiatives in circular economy across the national contexts to improve the access of the potential to fit the specific sustainability needs of the country.

b. The wide range of scope of the circular economy projects needed in the country demands a coherent, flexible and adaptive framework capable of supporting cross-sector collaboration considering socio-technological systems innovation in a diverse range of regional variations and contexts.

c. Implementing circular economy projects in Brazil demands a good understanding of the interdependence between the industry, the agriculture sectors and the ecosystems services, for a more environmentally sustainable approach.

d. There is still low awareness on the circular economy potentialities to connect manufacturers, service providers and users within the product lifecycle, and to the use of 4.0 technologies to influence behavior change for circularity.

3. Enhance the knowledge about the diversity of local contexts

a. The circular economy in Brazil is still in the early stage of development for its implementation.

b. The business value of specific opportunities in the Brazilian context for circular economy initiatives is not completely understood.

c. Public and private managers need to improve their understanding on the advantages in implementing circular economy for business competitiveness.

d. Socio-cultural, economic, and environmental benefits of circular economy in the Brazilian diverse context are yet not demonstrated by experimental results and outcomes.

e. More training and awareness programs for circular economy in the country context are needed to guide professionals, business managers and policy makers to engage decision makers and society.

4. Influence the creation of enabling infrastructures and technologies

a. Relevant socio-institutional changes are needed as well as the introduction of new public policies, regulatory and fiscal norms as enablers to create the right conditions for circular economy technological and business transition projects.

b. Overall, much improvements are needed in five key enabling areas: policies, financing, market regulations, R&D+I and professional capacitation, all important to support the implementation of circular economy innovation projects in the country.

5. Foster collaboration on cross-sector socio-technical innovations

c. Demonstration projects for circular economy solutions will need to explore the complex cross-sector interlinkages among different sectors of the economy, specially for emerging activities of industrial symbiosis, low-carbon agriculture, bioeconomy, biofuels and others.

d. The success of circular economy innovations to strength value chains competitiveness and sustainability in Brazil relies on exploring the linkages among multiple actors and drive innovation partnerships through many sectors.

e. Circular economy projects will need great support for R&D+I funding to explore the best options in designing new products, processes and business models, specially across Industry and agriculture sectors, including SMEs and startups.

f. The path of transition to a circular economy from the current linear economic models towards a more sustainable and responsible production and consumption systems in Brazil will demand great efforts to enable complex socio-technical innovations.

4.1.2. Expected outputs

To guide the performance of the Brazilian Circular Economy Platform and help address the identified barriers, a set of nine essential outputs have been defined:

1. **Act as a knowledge and advocacy center for the circular economy,** working transversally across many sectors and engaging a broad range of actors. Dedicate efforts to promote capacitation programs to professionals and influence the implementation of regulatory infrastructures.
2. **Foster R&D+I and technological development to strengthen the connection between specialists in circular economy with other emergent areas** like Industry 4.0 technologies, Industrial symbiosis, low-carbon agriculture, urban and rural productive inclusion, life cycle assessment, bioeconomy, biofuels, and socio-technical innovations for more sustainable of production and consumption patterns.
3. **Search and establish means to finance and support circular economy demonstration projects specifically for opportunities in the Brazilian context.** Focus especially on improving efficiency and sustainability in the responsible use of materials and natural resources at important sectors of the national economy and for the development of product design, production processes and innovative business models that can strengthen the country's global competitiveness.
4. **Support more systemic relations between rural and urban systems of production and consumption**, for biological and technical materials cycling across agriculture, industry, forestry and coastal activities.
5. **Promote the circular economy perspective to the Waste Management National Policy (PNRS) benefits for business**, the supply chain integration in networks and support the use of solid urban waste as technical or organic resources for supplying industry and agriculture with of materials, as input for several economic activities and processes.
6. **Support the development of the "technical cycle" approach for value chains for recovering non-renewable materials back to industry.** Promote the improvement of actors in understanding their role in managing residues, materials and products

for circular economy systems and the value in cooperating in sectoral agreements to reverse logistics.

7. **Support the development of technologies and systems innovations in the "biological cycle" value chains, to boost the use of bio-based materials and renewable sources**. Promote solutions across industry, agriculture and cities, specially exploring the potential of application of bio-based renewable sources, as Brazil is uniquely positioned to become a relevant global player in the bioeconomy.
8. **Support the implementation of new circular economy business models in product-service systems and shared economy commercial systems** like reuse, sharing, resale, maintenance, refurbishment and redistribution, with great potential for productive inclusion and in labour intensive activities that increase jobs creation of and improve the access to better quality products (including home, basic products and services) specially for low-income families.
9. **Support the adoption of 4.0 embedded technology for tracking products and control assets considering the whole product life cycle** to improve efficiency and reduce costs in transportation and logistics in Brazilian continental territory, between rural and urban areas.

4.2. Description of the Brazilian Circular Economy Platform

This section establishes the baseline for the Brazilian Circular Economy Platform and summarizes five main pillars for its performance.

The Brazilian platform for the Circular Economy has the mission of dedicating all efforts to the implementation of circular economy demonstration projects in Brazil across all economic sectors, including manufacturing, agriculture, forestry (AFOLU), water, energy and services.

Above all, the platform will foster the industry collaboration and look for innovative ways to support organizations enrolled in technology and systems innovation initiatives, and thus, connect different actors to support circular economy initiatives for sustainable productions and consumption patterns across value chains.

4.2.1. Rationale of the initiative

A cultural change and new capacities are needed to upgrade the current linear mindset in production and consumption systems, more focused on efficiency, minimization of negative impacts and the down-cycling of materials.

To shift the development pathway toward a more sustainable development, circular economy demonstration projects need to be implemented in Brazil to accelerate the adoption of technologies integrating positive environmental social and economic impacts.

Circular economy solutions demand that actors collaborate to take advantage of socio-technical innovations to respond to macro-level economic, environmental and social pressures.

A dynamic network is key to enable collectively action with the aim of taking most of the potential of the opportunities in the circular economy model for Brazil, to influence the changes for the right enabling environment and create the socio-technical innovations for the transition, impacting in society as a whole.

To be able to perform in this context toward its bold mission, the Brazilian Circular Economy Platform will base its actions in five main pillars:

1. **Systemic and sustainable innovations**

- **The platform will support circular economy for systemic and disruptive socio-technical innovations in Brazil**, with demonstration projects that have the potential to build economic, social and environmental value together.
- **The platform will promote circular economy initiatives to create more sustainable practices in the supply chains** especially for productive inclusion, exploring the potential of circular economy for job creation and opportunities to local economies and focusing on increasing the natural capital and regenerate endangered ecosystems in rural and forestry activities.
- **The platform will support technological innovations resulting in ecological effectiveness beyond resource efficiency**, mostly to create environmental positive impacts and not just for the reduction of externalities.

2. **Cross-sectoral governance**

- **The platform will have a governance system bringing together business, academic, non-governmental and governmental organizations** to coordinate the implementation of circular economy demonstration projects in the country to create common frameworks for shared initiatives.
- **The platform will foster close relationships with other national networks to work in the benefit of a Brazilian agenda for the circular economy as a whole,** connecting with the Circular Economy 4.0 network (TNA) and other circular economy networks from the industrial, academic, non-governmental sectors.
- **The platform will prioritize strategic projects selected for its potential to create more systemic relationships between actors**, keeping a broad and transversal approach for the application of new technologies and systems for the integration of the whole value chain in a circular economy.

3. **Funding projects and supporting partnerships**

- **The platform will foster partnerships between research institutes, companies and police makers** to create synergies for improvements in regulatory, political and financial environment that stimulate test, development and scale of demonstration projects for the circular economy.
- **The platform will maintain relationships with existing and new programs funds, grants and industry financial counterparts**, that are increasingly investing in circular economy initiatives and make partnerships to create new practices find solutions for the bottlenecks in green funding.
- **The platform will access to international funding sources and building partnerships with organizations that are willing to support circular economy demonstration**

projects in Brazil, with special attention to green funds and other sources dedicated to finance technologies with positive environmental impacts for climate change mitigation and adaptation.

4. **Knowledge exchange and capacitation**

- **The platform aims to be a reference for circular economy knowledge exchange and information in the country**, to promote synergies across circular economy initiatives to improve human resources for the capacitation of professionals to the Brazilian context.
- **The platform will support initiatives for educating the market for the transition from the linear models towards more circular business models**, with programs to introduce a more systemic mindset in business and professional activities across supply chains towards more sustainable patterns of production and consumption.

5. **Advocacy for enabling infrastructures**

- **The platform will advocate for updating and change enabling infrastructures to provide the conditions for testing and scale of circular economy demonstration projects** – in public policies, financing and operational services, regulations, etc.
- **The platform will also promote and support efforts from the industry for the adoption of circular economy models** in product design, infrastructure and logistics and communication for consumer behavior change and others, in alignment with industrial sectoral agreements for waste management and looking for the extended supply chain of materials.

4.3. Implementation of the Brazilian Circular Economy Platform

For the Setup phase and Operational phase, there are key activities to be carried out to comply with the four main steps to establish a basic operating structure for the Brazilian Circular Economy Platform.

Setup phase steps and activities

1. **Plan the working structure**
    a. Invite key actors to contribute to the development of a detailed setup plan and to coordinate the platform setup phase processes.
    b. Ensure that the core group of actors have a clear understanding of the mission and goals of the platform and have strong skills for this setup phase.
    c. Demand that parties describe their interests before defining their activities in the network.
    d. Hire staff with the right profile to contribute with legal, financial and technical expertise.
    e. Establish the management methods, define the organizational guidelines and the criteria for balancing the interests among different actors.

2. Deploy the management Infrastructure

- **a.** Establish the governance and management system of the platform to enable the openness and flexibility to welcome a broad range of ambitions and objectives relevant to the circular economy. Secure a strategy to grow the number of affiliates qualified to the network.
- **b.** Establish a technical coordination staff with proven competence and the reasoned criteria to evaluate the platform performance and manage the resources for the best effectiveness for the network and ensuring the public interest.
- **c.** Establish the targets, milestones and indicators for monitoring, evaluating and reporting the network performance, engaging a third party for validation of the process.
- **d.** Establish the methods, channels, protocols for secure transparence by sharing information among all members.

Operational phase steps and activities

3. Implement the platform

- **a.** Start planning, design, and communication to advocate for the enabling infrastructures needed for testing and scale the selected projects.
- **b.** Start planning, design, and communication of capacitation programs in the benefit of the scope of the demonstration projects to take the most of innovation processes.
- **c.** Search and establish contact with national and international organizations that can potentially provide the means for funding the development of circular economy demonstration projects.
- **d.** Start planning, design and communication for the calls for circular economy demonstration projects.
- **e.** Build the technical teams for select and mentor the demonstration projects and assist its objectives and results.

4. Develop the demonstration projects

- **a.** Set the cooperation and partnership agreements with national and international financing agencies, and manage the prioritization for topics of interest.
- **b.** Set the criteria and start the activities for the launch of the calls and select the demonstrations projects with the greatest capacity to deliver successful results.
- **c.** Manage the application of the funding resources and perform the evaluation of the results, communicate the evidence of the circular economy benefits and evaluate the rate of success of the demonstration projects.

d. Constantly improve the scope for demonstration projects enrolling a broad diversity of companies, SMEs and startups in the process, which are dedicated to circular economy solutions and innovations.

4.3.1.Indicative of the financial Information

The budget is estimated in US$ 2,7 million[2] for 9 years of activities, including the Setup phase or planning and deployment of the Brazilian Circular Economy Platform and the Operational phase for implementation of the platform activities and developing the demonstration projects. The demand for this report is just to provide a general indication of the order of costs for implementing the Pilot Project.

It is expected a high engagement and as many counterparts as possible from the private sector to support and scale the activities of platform.

Setup phase (24 months)

1. Plan the working structure
2. Deploy the management

Operation and Implementation phase (84 months):

3. Implement the platform
4. Develop the demonstration projects

[2] This was estimated from the TAP Industry 4.0 total cost of R$15.1 million for "Technological Network of Circular Economy and Industry 4.0" action plan (Rathmann et.al, 2021).

5. Conclusions and recommendations

The project described in this report is an initial work to be developed as a future proposal and serves as the basis for discussion with key stakeholders engaged in the circular economy in Brazil for the development of a Brazilian Circular Economy Platform.

Results from the implementation of the "Technological Network of Circular Economy and Industry 4.0" (Rede Tecnológica em Economia Circular e Industria 4.0) in the TAP Industry 4.0 from TNA Brazil serves as a strong reference for this Pilot Project.

6. References

Rathmann, R. et al. (2021) Planos de ação tecnológica para os setores do sistema energético, agricultura, florestas e outros usos da terra. Brasília: Ministério da Ciência, Tecnologia e Inovações, Programa das Nações Unidas para o Meio Ambiente, 2021. 339 p.: il. ISBN: 978-65-87432-10-6 available at: https://antigo.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/tna_brazil/tna_brazil.html

Torresa (2017) Design for Socio-technical Innovation: A Proposed Model to Design the Change, The Design Journal, 20:sup1, S3035-S3046, DOI: 10.1080/14606925.2017.1352811 Available at: https://doi.org/10.1080/14606925.2017.1352811

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