

# CIRCULAR ECONOMY

STRATEGIC PATH FOR  
BRAZILIAN INDUSTRY



*Brazilian National Confederation of Industry*

**THE FUTURE OF INDUSTRY**



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BRAZILIAN INDUSTRY

**NATIONAL CONFEDERATION OF INDUSTRY - CNI**

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Brasília, 2020



*Brazilian National Confederation of Industry*

**THE FUTURE OF INDUSTRY**

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# FOREWORD

Brazil is endowed with many natural assets, such as with the largest availability of freshwater on the planet and the world's second largest forest cover, as well as fantastic biological diversity. Our energy matrix is predominantly based on renewable sources, and we are among the world's largest biofuel producers. Turning these comparative advantages into competitive advantages is our greatest challenge.

Worldwide, population growth and the ensuing increased demand for manufactured goods have been increasingly requiring strategies to ensure the efficient use of natural resources.

Given this reality, the productive sector has been investing in new business models, in the cyclical use of products and materials (without waste formation), and in redesigning processes and products. These are typical attitudes of the circular economy, which favor the reduction of waste and lower consumption of raw materials, generating environmental and economic gains for the country.

To keep moving forward, industry also sees the transition to the circular economy as a business opportunity. This model contributes to promoting competitiveness in a sustainable way, through the rational use of natural resources and by developing new production chains, generating jobs and income.

However, there are still regulatory and technological barriers to be overcome through joint actions involving the different sectors of society - government, business, academia, and consumers. The circular economy needs to be an element of the domestic agenda.

This document, which portrays how our domestic industry sees the circular economy, proposes a strategic path to increase appreciation for our natural resources while enhancing the competitiveness of Brazilian industry. It proposes initiatives related to public policy, education, research, development and innovation, financing and market.

The industrial sector is committed to adopting and encouraging the best practices of the circular economy. Joint actions involving society as a whole are essential for this transition, which will bring many benefits for Brazil.

Have a good reading.

**Robson Braga da Andrade**

President of the National Confederation of Industry - CNI



# EXECUTIVE SUMMARY

The circular economy is based on improving the utilization of natural resources, avoiding waste and reducing the need to dispose of it. It can be applied on any scale to individuals, organizations, cities, etc. By proposing challenges for producing goods by recirculating the resources used for producing them, new job and business opportunities will emerge. The transition from the current linear economic model to a circular one requires mainly public policies, financing lines, and new business models.

Industry has a key role to play in this transition by incorporating secondary raw materials into its processes, adopting technologies designed to reduce energy expenditure, producing products with greater durability and/or easier maintenance, i.e. giving more value to the resources it uses and to the products it makes.

Public policies are being developed worldwide to promote the circular economy. They involve setting indicators and targets for waste reduction, incentives for reverse logistics and recycling, structuring selective collection and sorting of materials, etc. In Brazil, the National Solid Waste Policy (PNRS) is the one most closely associated with the concepts of circularity, as it was designed to encourage the reduction of waste generation, reverse logistics and recycling, shared responsibilities for waste management and disposal, etc. In addition to the PNRS, we have other policies contemplating precepts of the circular economy, such as the National Policy on Climate Change and the Energy Policy, among others.

Apart from public policies, a transition to the circular economy requires investments for companies to be able to acquire technologies and develop processes leading their activities toward a circular model. Companies in Brazil can raise finance from funding institutions such as the Brazilian Development Bank (BNDES) or major banks operating in the country. They can also issue green bonds for this purpose. The Ministry of Environment (MMA) made a map available on its website providing detailed information on financing lines for solid waste management.

Seeking alignment with the precepts of the circular economy, companies have been adjusting their business models. The main ones are: resource recovery, product-as-a-service, sharing, circular inputs, product life extension, and virtualization. They usually consist in maximizing product use, durability, maintainability, and recyclability. In addition to business models, waste disposal minimization can be promoted by designing products for circularity, reverse cycles, and value proposition. Design for circularity incorporates the precepts of

resource valorization from the design phase. In industrial symbiosis, waste from one company is used as raw material in others. Energy recovery is an option for waste with high calorific value for which no other more cost-effective use is possible.

Considering the three key elements mentioned above, namely, public policies, financing lines, and business models, a questionnaire was prepared that together with interviews held with representatives of associations from different industrial sectors resulted in a diagnosis of the current situation of productive activities in Brazil in relation to the circular economy. Many circular practices were already being adopted by Brazilian industry before the circular economy concept emerged. Examples of these practices include process optimization with lower energy and input costs and water recirculation. The main obstacles to the transition to a circular economy lie in the lack of selective waste collection, insufficient level of environmental education, lack of more solid incentive policies for reusing and recycling materials, and scant investment in research and technology.

*Many circular practices were already being adopted by Brazilian industry before the circular economy concept emerged. Examples of these practices include process optimization with lower energy and input costs and water recirculation.*

A diagnosis of where Brazil is perceived to stand in relation to the circular economy was presented and discussed at a meeting with representatives of companies and industry associations and federations. That meeting led to an analysis of where we are, where we want to get to, and of actions that could lead to this transition. The results are presented in terms of educational, marketing, public policy, financing and research and technological development actions (see page 52).





The Circular Economy is a concept based on product design, sharing, maintenance, reuse, remanufacturing, and recycling of materials. It emerged as an alternative to the traditional model, which involves production, consumption and disposal, as it advocates for the use of natural resources with less of it being disposed of.



# 1 INTRODUCTION



This paper is the result of an initiative of the National Confederation of Industry (CNI) that brought together state-level industry federations, sectoral associations, and representatives of companies to prepare a diagnosis of Brazil's degree of development in the realm of the circular economy and to devise strategies to speed up the transition toward this new economic model. The proposals will be based on observable practices and trends seen around the world with regard to the subject at hand.

The concept of circular economy is variable and has given rise to different definitions. However, the general understanding is that in this type of economy the energy and matter used in productive activities should be recirculated with the aim of minimizing waste generation. In a circular economy, economic activities contribute to the overall health of the system. The concept is not restricted to any scale and can be applied to large and small businesses and to organizations and individuals globally and locally. (ELLEN MACATHUR FOUNDATION, 2017a).

There is a distinction between technical and biological cycles. The biological cycle is the one where food and other bio-based materials (such as cotton and wood) can be returned to the system through processes such as composting and anaerobic digestion. These cycles regenerate living systems such as that of the soil, which in turn provide renewable resources to the economy. The technical cycles preserve the value of products, components, and materials through sharing, maintenance, reuse, remanufacturing or, ultimately, recycling. (ELLEN MACATHUR FOUNDATION, 2017a).

**FIGURE 1 –** Diagram of the Circular Economy System

**DEFINITIONS OF THE CIRCULAR ECONOMY**

**PRINCIPLE**

**1**

Preserve and improve natural capital by controlling finite stocks and balancing renewable resource flows **RESOLVE** Levers: regenerate, virtualize, exchange

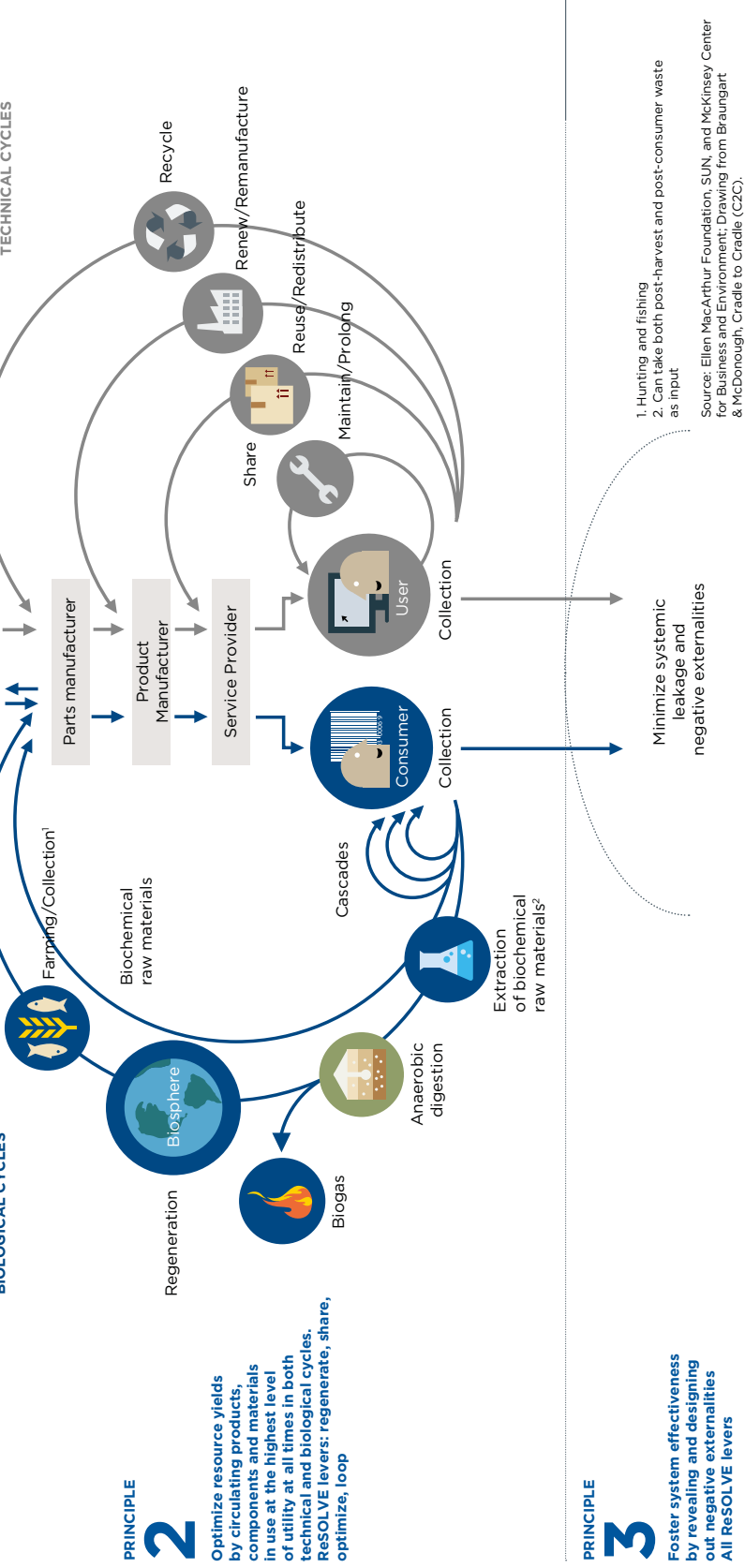


Restore

Renewable flow management | Inventory management

**BIOLOGICAL CYCLES**

**TECHNICAL CYCLES**



**PRINCIPLE**

**2**

Optimize resource yields by circulating products, components and materials in use at the highest level of utility at all times in both technical and biological cycles. **RESOLVE** levers: regenerate, share, optimize, loop

**PRINCIPLE**

**3**

Foster system effectiveness by revealing and designing out negative externalities **All RESOLVE** levers

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as input

Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

The transition to a circular economy represents a systemic change that builds long-term resilience. The consequence of producing with the aim of minimizing waste disposal affords new opportunities for industries spanning the entire economy.

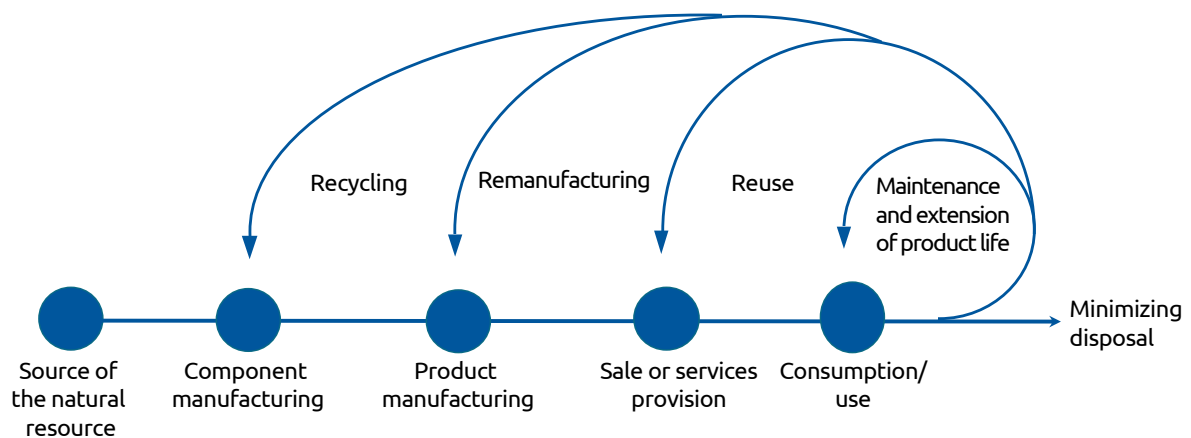
Challenges then arise such as the following ones:

- innovating in product design for greater circularity;
- reducing dependence on virgin raw materials;
- reducing losses in production processes;
- ensuring greater distribution efficiency;
- extending product maintenance and repair services; and
- building channels for reverse logistics and recycling.

That is, this economic system provides new job opportunities that will involve professionals from different areas integrating knowledge. It can be said that this process will require professionals specializing in automation, new materials development, repair and maintenance of all types of products, chemical and physical processes for recovering materials, among many others.

It is critical to understand that the shorter the cycle, the lower the product value loss. Therefore, there is a sequence of priorities for recirculation, namely: maintenance, reuse, remanufacturing, and recycling - in a nutshell, as there are many possibilities for recirculating matter and energy. (ELLEN MACATHUR FOUNDATION, 2017b).

**FIGURE 2** – How resources can be recirculated




Source: CNI, inspired by Ellen MacArthur Foundation, 2014.

*The Circular Economy has gained visibility in recent years by promoting a model that minimizes waste generation based on the use of renewable sources, cyclical use of products and materials, new business models, and process and product redesign.*

Based on understanding the strategic need to adopt the circular economy model to foster Brazil's development by promoting a healthier environment, new job opportunities, investment in science and technology, waste reduction, and greater competitiveness in the international market, this paper was prepared to provide examples and possibilities for expanding circular practices.

Business models related to the circular economy will be presented, as well as financing lines and public policies that can foster its adoption. Then, based on this information and on an assessment of the current situation of Brazilian industry, a strategic plan will be drawn suggesting paths for the transition of our economy.





As warned by several international organizations, demand for consumer goods has been putting pressure on natural resource reserves. Based on this reasoning, it would be impossible to provide, for the entire world population, the standard of living achieved by developed countries with the natural resources available on the planet.



## 2 PUBLIC POLICIES



Governments play a major role in the transition to the circular economy, which is already on the public agenda of international politics. In order to better understand the role played by governments and government agencies in this area, one must be aware of the main public management tools that can be used to promote this transition. (DE GROENE ZAAK, [2019]).

The main public policy instruments adopted worldwide for this purpose are the following ones:

- regulatory instruments;
- tax-related actions;
- measures in support of research, education, and information;
- collaborative platforms;
- financial aid;
- investment in infrastructure; and
- subsidies for business.

### WORLD SCENARIO

A worldwide movement toward implementing strategies for the transition toward the circular economy model can be observed. Analyzing these strategies in the light of what is being incorporated in Brazil helps us define a path to also allow us to achieve our goals within this new economy.

The principles behind the circular economy are not new, and they are provided for in a number of laws in force around the world. The global scenario shows us paths that some countries have taken with satisfactory results.

The first public policy directly focused on implementing the circular economy is a Chinese law enacted in 2009. But European countries are the ones that have made the most progress in adopting public policies for the transition from a linear to a circular economy. In 2015, the European Union (EU) came up with a plan for implementing the circular economy in its member countries. In addition to this plan, member countries have been adopting specific national public policies for different sectors of their economy.

We will provide an overview of measures and policies being implemented around the world to promote the circular economy. (PARDO; SCHWEITZER, 2018).



## CHINA

China was the first country to pass a specific law on this topic, which was enacted in 2009. The Circular Economy Promotion Law is focused on improving resource efficiency, protecting the environment, and promoting sustainable development. The law is based on the 3-R principle, namely, "Reduce, Reuse and Recycle", using a top-down approach mainly focused on fiscal instruments, financial support, and regulations based on the principle of shared responsibility for products. Complementing this law, a five-year plan was launched to implement actions contemplated in public policies. The plan involves all levels of government, so in addition to implementing policies, government agencies have adopted the target of reducing the use of resources. Both the Chinese law and action plan are focused on three levels: micro (entrepreneurs), meso (industrial parks), and macro (cities) levels. (CHINA, 2008).



## JAPAN

Japan is one of the countries taking the largest strides toward the transition of its economic model. A law called Law for the Promotion of Effective Utilization of Resources was passed in the country for the purpose of reducing resource use, thus reducing waste generation and promoting reuse and recycling - based on the 3-R principle (Reduce, Reuse, Recycle), including the entire life cycle of products such as plastics, consumer electronics, paper, packaging, and automobiles.

Manufacturers are required to use recycled material in new products and to stimulate the design of more reusable and recyclable products. (JAPAN, 1991).





## EUROPEAN UNION

The European Union launched an action plan called Closing the Loop. The plan involves an economic package designed to promote the implementation of the circular economy model in European countries belonging to the bloc. As the plan's main economic tool, more than €650 million were made available for innovative projects focused on promoting the circular economy. (EUROPEAN ENVIRONMENT AGENCY, 2015).

The main actions taken are intended to reduce waste disposal in landfills and stimulate the reuse and recycling of waste using economic tools as incentives. Five priority areas were chosen for the action plan: plastic; food waste; essential raw materials; construction and demolition; and biomass and bio-based products. The priority actions contemplated in the plan are the following ones:

- measuring food waste with the aim of halving it, improving consumer access, and reducing losses along the production and distribution chain;
- developing quality standards for secondary raw materials;
- adopting measures to encourage ecodesign with the aim of creating more repairable, durable, and recyclable products, as well as of promoting energy efficiency;
- reviewing fertilizer regulations;
- 55% recycling of plastic packaging by 2030;
- reusing water, including minimum quality standards for effluent reuse;
- reviewing waste-related laws for the purpose of: recycling solid waste, reducing waste disposal in landfills, promoting reuse, and stimulating industrial symbiosis; and
- providing economic incentives for green product manufacturers and reverse logistics.

It is worth highlighting a pilot approach to innovation agreements designed to identify and respond to regulatory hindrances that represent an obstacle to innovative proposals.



## THE NETHERLANDS

The Dutch government developed a program to stimulate the transition to a circular economy, the Waste to Resource Programme (VANG), which is focused on reducing waste generation and on establishing a partnership with research and industry institutes to assess the financial dimension of the benefits afforded by the circular economy (RACE).

As a financial instrument, the Netherlands raised taxes on resources and reduced labor taxation to align itself with the circular economy principle of selling fewer products and providing more services. Resource taxation contributes to improved efficiency in using resources and can be applied to fuels, water, air pollution, energy, and waste. Increasing these taxes reduces demand for short-lived products; by contrast, lower taxes on maintenance and repair services have shaped consumer habits. This example leads to increased demand for more durable goods, reducing resource consumption and contributing to a more environmentally sustainable economy. (EUROPEAN COMMISSION, 2019).



## GERMANY

The German government created a national program for promoting the circular economy in the country. It is called The German Resource Efficiency Programme (ProgRes) and was developed to be applied to the entire product value chain, with a focus on sustainable resource use and pollution abatement, targeting abiotic resources. Therefore, the program encourages efficient resource use and is intended to double its efficiency by 2020 in relation to 1994. (DE GROENE ZAAK, 2015).



## BELGIUM

Belgium's Flanders region has taken the first steps toward promoting the circular economy. Flanders intends to become a social, open-door, resilient, and international territory, generating well-being in innovative, sustainable, and inclusive ways. For this purpose, the Flanders government set seven strategic priorities to promote the transition to a circular economy, introducing economic provisions such as increased fees for waste disposal in landfills and restrictions on demolition waste disposal. Its objective is to increase the recycling rate and reduce the pressure on natural resources in the horizon of 2050. To this end, a work front was established focused on three pillars: sustainable procurement, circular cities, and circular businesses. (IWASAKA, 2018).



## DENMARK

Denmark is one of the countries with the highest per capita waste generation in the world. To improve this scenario, the Danish government created a program called Denmark Without Waste - Recycle More, Incinerate Less. The main goals of the program are to increase recycling of electronics, paper, glass, and metals. Fees and financial subsidies were adopted to boost the recycling industry. (DENMARK, 2013).



## SPAIN

In 2015, the government of Catalonia implemented a strategy called *Estratègia d'impuls a l'economia verda i a l'economia circular*. The strategy contemplates funding for research and development, sectoral plans for energy, biodiversity, protected area management and energy efficiency, waste management programs, incentives for a social and collaborative economy, and sustainable public procurement. The focus is on public policies and programs designed to ensure efficient use of raw materials. (GENERALITAT DE CATALUNYA, 2015).



## FINLAND

Finland has developed a roadmap to turn the country into a world leader in the realm of the circular economy by 2025. The roadmap was developed by the Finnish Innovation Fund (SITRA). The document includes instruments such as food waste control legislation, subsidies for renewable energy, valorization of forest products, green public procurement, investment in bioproducts and bioservices, ecodesign requirements, taxes to discourage the use of fossil fuels, and incorporation of the circular economy into the educational agenda. (SITRA, 2016).



## FRANCE

In 2013, France set up the National Institute for Circular Economy (Institut de l'économie circulaire) made up of 200 members, including representatives of the public and private sectors and bringing together partners for the purpose of promoting and speeding up the transition to a circular economic model in the country. The Institute is not a government agency, but it has been working closely with the Ministry of Sustainable Development to exchange information and expertise among its member organizations. (ADEME, 2015).



## CANADA

In 2016, the government of Ontario in Canada passed the Resource Recovery and Circular Economy Act, whose main focus is on minimizing waste by applying penalties for failure to comply with the provisions of the document. (CANADA, 2016).



## UNITED STATES

USDA's BioPreferred Program is intended to boost economic development, create new jobs, and develop new markets for agricultural commodities. The program is being implemented through a mechanism designed to give preference to the procurement and consumption of products based on agricultural (renewable) inputs to replace those based on coal and petroleum (nonrenewable inputs). (USDA, 2019).

Through a prominent local initiative, the city of San Francisco adopted, in 2002, a Zero Waste Goal with a focus on reducing waste generation in the city to near zero by 2020. This goal includes reducing landfill disposal and doing away with waste incineration plants. This objective is not likely to be achieved, despite the provision of financial incentives for recycling and composting projects, but it has already promoted significant progress toward it. (AIRHART, 2018).



## SOUTH AFRICA

An industrial symbiosis incentive program called The Western Cape Industrial Symbiosis Programme (WISP) was launched in the Western Cape province in South Africa. Its goal is to create a network of companies with the aim of identifying business opportunities by focusing on resource sharing, turning waste from one process into raw material for others. (WESTERN CAPE GOVERNMENT, 2019).

One of the main waste problems in South Africa is that of the accumulation of unused tires, which total ten million units per year. To solve this problem, REDISA (The Recycling and Economic Development Initiative of South Africa) was created as a non-profit organization supported by government to develop a plan for collecting and recycling tires in the country. A fee to be paid by manufacturers for each kilogram of new tire produced was established as a measure to address this problem. The revenue from the fee is being used to develop and implement a tire collection and recycling plan. (SAFLII, 2017).

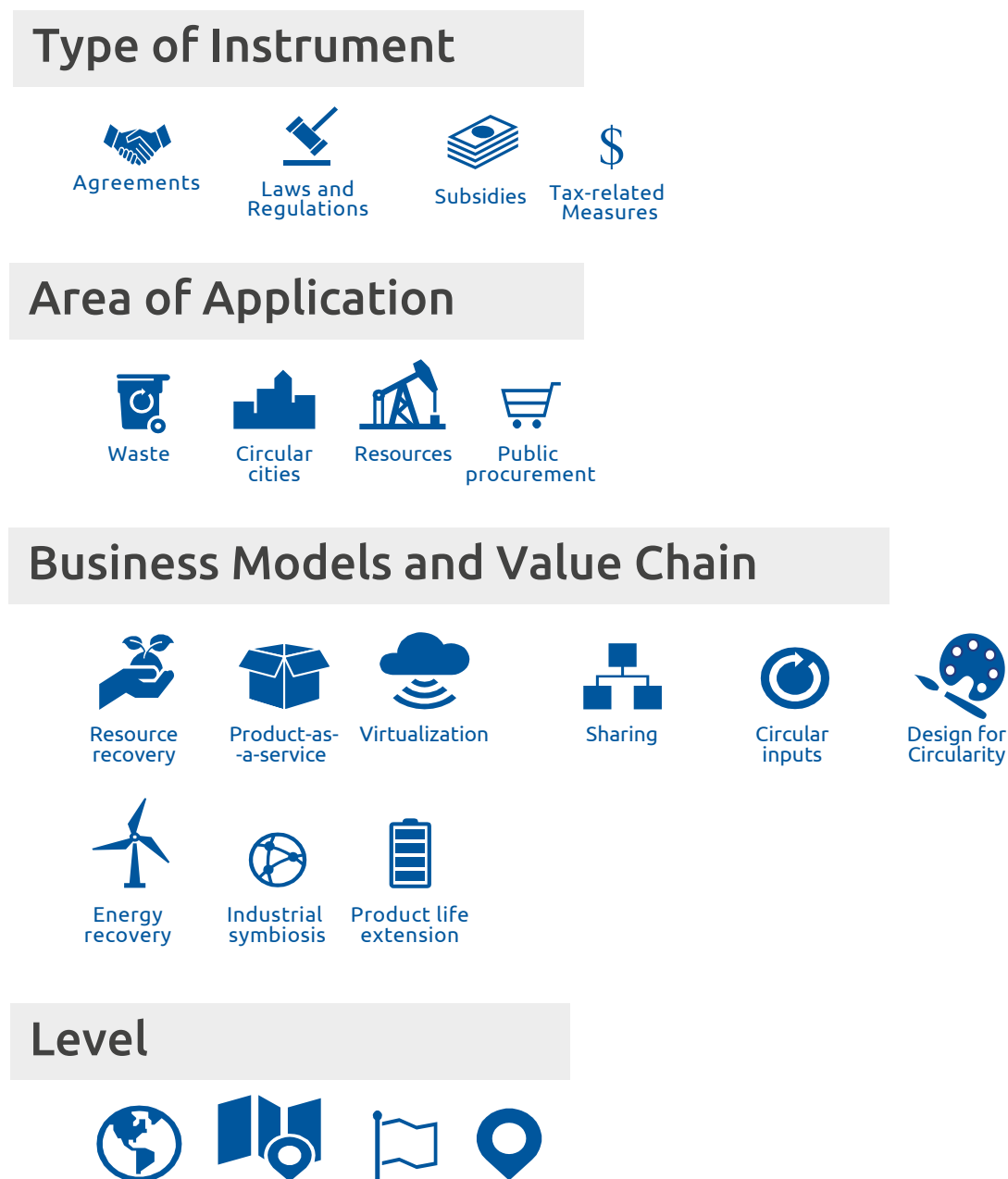


## AUSTRALIA

Focusing on plastic packaging, the Australian government created the Australian Packaging Covenant (APC) to change the packaging design culture with the aim of increasing recycling possibilities. Its functionality relies on legislation that imposes obligations and penalties on those that do not join the pact, so that joining it does not make a company less competitive. APC signatories are required to draw up and implement an annual action and reporting plan. (AUSTRALIA, 2017).





























Captions for the summary tables of international and national public policies associated with the circular economy will be provided below:

**FIGURE 3** – Captions for the summary tables of international and national public policies



Source: CNI (2019).

**FIGURE 4 –** Summary table of international public policies

International Public Policies		
China 	Circular Economy Promotion Law	
Japand 	Law for the Promotion of Effective Utilization of Resources	
Canada 	Resources Recovery and A Circular Economy Act	
Germany 	The German Resources Efficiency Programe (PROGRESS)	
Belgium 	Circular Flanders kick-off statement	
Denmark 	Denmark Without Waste - Recycle More, Incinerate Less	
Spain 	Estratègia d'impuls a l'economia verda e a l'economia circular	
Finland 	Leading the cycle - Finnish road map to a circular economy	
France 	Institut de L'economie circulaire White Paper on the Circular Economy of Greater Paris 50 measures for a 100% circular economy (roadmap)	
The Netherlands 	Waste To Resource Programme (VANG)	
United States 	USDA Bio Preferred Program	
South Africa 	The Western Cape Industrial Symbiosis Programme (WISP) The Recycling and Economic Development Initiative of South Africa	
Australia 	Australian Packing Covenant (APC)	
European Union 	Closing the Loop	

Source: CNI (2019).

## DOMESTIC SCENARIO

No national strategy has been adopted in Brazil to implement a circular economic model. However, some policies, programs, and plans are under way that, to a certain extent, are intended to foster sustainability through circular practices and address sustainability-related topics.

The National Solid Waste Policy (PNRS) is the first public policy addressing waste management more comprehensively and leading to discussions on different management tools used in circular economies.

## SOLID WASTE

Promulgated in August 2010, the National Solid Waste Policy (Law No. 12,305/2010) was a milestone in Brazilian law for dealing with solid waste management in Brazil. It contemplates concepts of shared responsibility for product lifecycle management and recognizes reusable or recyclable solid waste as an asset with economic value, in line with circular economy concepts.

The policy reinforces the responsibility of waste generators including the whole chain involved: manufacturers, importers, distributors, and traders. Accountability raises concern about proper disposal in ways that are not harmful to human health and the environment. Concerns about the final disposal and impact of waste further increase the importance of policy instruments such as reverse logistics, promoting reuse, recycling, and more efficient production processes.

For the purpose of making readers truly aware of the need to valorize waste, the PNRS provides a definition for differentiating solid waste from residues - defined as solid residues that, once all treatment and recovery possibilities through available and economically feasible technological processes are exhausted, cannot be reused for any possible purpose and must be disposed of in an environmentally appropriate way. It is thus understood that solid waste can be utilized.

Reverse logistics leverages all solid waste management solutions and puts an end to the end-of-line concept by turning the production process into a circular one where components of final products that would otherwise be disposed of in landfills are reused as raw material. The PNRS provides for an obligation to structure and implement a reverse logistics system for manufacturers, importers, distributors, and traders of:

- pesticides, their packaging and residues;
- batteries;
- tires;
- lubricating oils, their waste and packaging;
- fluorescent, sodium, and mercury vapor lamps and mixed light lamps; and
- electronic products and their components.

The Law also provides for incentives for several actions designed to improve solid waste management, as in its article 42, according to which public authorities may take inductive measures and provide financing lines to support, on a priority basis, initiatives intended to:

- prevent and reduce solid waste generation in manufacturing processes;
- develop products with lower impacts on human health and on environmental quality in their life cycle;
- structure selective collection and reverse logistics systems;
- develop research focused on clean technologies applicable to solid waste; and
- develop environmental and business management systems designed to improve production processes and allow for waste to be reused.

The objectives of the PNRS are in line with the pillars of the circular economy when it comes to reducing waste generation, encouraging the adoption of sustainable production and consumption patterns, improving clean technologies, and stimulating the adoption of reverse logistics and recycling systems. (BRAZIL, 2010).

## CLIMATE CHANGE

In 2015, the most significant Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) was held in Paris. The meeting, known as COP21, led to the Paris Agreement, a document signed by 195 countries to define strategies to limit the average rise in Earth's temperature and to strengthen actions taken by countries to adapt themselves to the impacts of climate change.

To implement the Paris Agreement, Brazil submitted its commitment to the Convention, referred to as Nationally Determined Contribution (NDC), which upon its ratification in 2016 became legally binding on national territory. Brazil's NDC contemplates a 37 percent greenhouse gas reduction target for the entire economy by 2025 and an



indicative contribution to a 43 percent reduction by 2030, based on 2005 emissions. To achieve the proposed target, additional indicative measures were presented for the forest, energy, and biofuels sectors.

## ENERGY

With the aim of meeting demands related to mitigating climate change, the Incentive Program for Alternative Electricity Sources (PROINFA) was created by Law No. 10,438/2002 to be coordinated by the Ministry of Mines and Energy. The program contributed to diversifying the domestic energy matrix mainly by promoting wind power generation using financial incentives and financing lines made available by Brazil's Development Bank (BNDES) as instruments for this purpose. The Law was highly important for the Brazilian electricity industry, as it included distributed energy generation on the energy agenda. Energy efficiency and matrix diversification contribute to the transition to a circular economic model by making it possible for resources to be used in better ways to generate renewable energy and reduce GHG emissions.

Distributed electricity generation also contributes to a circular economy by shortening the distance between power plants and consumers, reducing losses and promoting better use of resources. For this purpose, the Brazilian Electricity Regulatory Agency (ANEEL) defined two regulatory frameworks to stimulate, in particular, photovoltaic generation. A Program for the Development of Distributed Electricity Generation (ProGD) was launched to further stimulate power generation from renewable sources, particularly photovoltaic generation, by consumers themselves. Normative Resolution (RN) No. 482/2012, which regulates the Energy Compensation System in Brazil by establishing the microgeneration concept, was a milestone for connecting small residential plants to the electricity distribution grid. (ANEEL, 2015).

In addition to specific programs, subsidies were granted by government such as exemption of the ICMS (turnover tax) for electricity and exemption of the IPI (tax on industrialized products) for equipment and components for use in solar and wind power plants. The following measures should also be highlighted: tariff discounts in the transmission/distribution system for small-scale (less than 30MW) plants and ICMS exemption on distributed generation, apart from a reduction in the Import Tax and finance from the BNDES for distributed generation projects in public schools and hospitals.

## **WATER RESOURCES**






The National Water Resources Policy contributes to improved management efficiency and for water to be used in better ways. However, it does not contribute to water reuse. Two law bills to stimulate water reuse were submitted to the Federal Senate and filed: Supplementary Law Bill (PLS) No. 58 of 2016, which regulates water supply from alternative sources, and PLS No. 12, 2014, which provides for incentives to encourage reuse of water resources. (BRAZIL, 2014).

## **FOREST RESOURCES**

Law No. 12,651/2012, known as the New Forest Code, sets out general standards for vegetation protection, permanent preservation areas, and legal reserve areas. These standards are intended to control land use and occupation, preserving the role of vegetation in protecting soils and water resources.


The Law regulates forest exploitation, contemplates means for controlling the origin of forest products and for controlling and preventing forest fires, and provides for economic and financial instruments for its objectives to be achieved. It provides for important rules for forest exploitation designed to promote the sustainability of forest-related activities by not allowing the extraction rate to be higher than the replacement rate. (BRAZIL, 2012).

**FIGURE 5** – Summary table of national public policies

<b>National Policies</b>	
<b>Solid Waste</b>	
<b>Climate Change</b>	
<b>Energy</b>	
<b>Water Resources</b>	
<b>Forest Resources</b>	

Source: CNI (2019).

Brazilian public policy on the circular economy is still very incipient, but its concepts are contemplated in various laws, plans, programs, and projects, albeit in a decentralized way. It is important to create a national strategic plan contemplating concrete measures to foster research, technologies, and business models designed to promote the development of the circular economy in line with Brazil's economic development needs.

The image features a hand holding a smartphone in the foreground. The background is a vibrant blue and teal digital landscape. It includes a city skyline with various skyscrapers, a globe icon, an '@' symbol, an airplane icon, a cloud icon, a group of people icon, and a bar chart icon. The entire scene is overlaid with a pattern of binary code (0s and 1s).

**In Brazil, the National Solid Waste Policy (PNRS) is currently the most impacting one in terms of leading to circular practices, as it contemplates, for example, shared responsibility for the life cycle of products.**

# 3 BUSINESS MODELS AND VALUE CHAIN

Knowledge about circular business models and the technologies used in them can be translated into opportunities with significant results for companies through reduced use of inputs and lower production and disposal costs, appeal to conscious consumers, financing possibilities, new markets, etc. In addition, knowledge that waste can often be used as a resource leads to management models that valorize it and allow it to be included in a value chain.

## BUSINESS MODELS

**Resource recovery:** Model designed to recover the value and function of products, components, or materials through remanufacturing or recycling. It reduces demand for virgin raw material and avoids wastage of components and materials. Models of this kind can be adopted in a closed circuit in the same production chain or in cascade form to enable waste and byproducts to be used in other production chains in which their value can be best recovered.

**Product as a service:** In this model, the idea is to provide services that can meet the needs of consumers without them having to buy a product. Another possibility is to include services in the sale or rental of a product, with the organization assuming responsibility for its maintenance and updating. (SAVAGET; SILVA, 2015; CNI, 2018).

**Sharing:** Business model intended to intensify and extend the use of goods by reducing idleness. It is a clever change of view based on the understanding that it is not necessary to sell most products on the market, but rather to be able to use them when needed. The Internet is a tool that greatly facilitates the possibility of sharing all kinds of materials.





There are several applications focused on this market through which one who has a certain object makes it available for use by others for a certain price: a true application of the win-win concept. (SAVAGET; SILVA, 2015; CNI, 2018).

**Circular inputs:** Business models that use recycled and/or renewable raw materials and refurbished, regenerated, and remanufactured products. The success of this model is also related to the use of pure inputs, i.e. to the use of materials without combining them with others, which contributes to their reuse or recycling. It is intended to keep materials in the value chain, reducing the need for extracting natural resources. (SAVAGET; SILVA, 2015; CNI, 2018).

**Product life extension:** Business model closely associated with the concept of modularity. It consists in replacing defective or obsolete components that can be repaired or updated with more modern ones, making it possible for them to continue to be used and avoiding disposal of an entire product if only one of its components needs to be replaced. (SAVAGET; SILVA, 2015; CNI, 2018).

**Virtualization:** Driven by computers and the Internet, this business model is characterized by dematerialization. Making products and services available online avoids the need to build physical stores and for people to go to stores to check prices, bargain, and buy products or services. It reduces the need for hard-copy documents such as service reports, for example. Virtualization allows for service providers to make virtual calls; a technician can provide video or live instructions on how to repair a certain piece of equipment for customers to repair it themselves. Today, it is no longer necessary to buy CDs to listen to music or DVDs to watch movies or to commute and attend face-to-face classes to attend college, etc. (SAVAGET; SILVA, 2015; CNI, 2018).

*For the Circular Economy to gain scale and realize its full potential, enabling conditions must be created for this transition, such as better-quality education, specific public policies, circularity-based infrastructure, and innovative technologies.*

## VALUE CHAIN

**Design for circularity:** Making the best use possible of resources used for producing goods begins in their design. They must be designed in ways that make it possible for them to be remanufactured, refurbished, or recycled, keeping their components and materials circulating at the highest level of valorization possible. When designing a product, thought is given to which material can be used to maintain its functionality while reducing negative impacts related to its life cycle. (SAVAGET; SILVA, 2015; CNI (2018).

**Reverse cycles:** Return of a consumed product to its manufacturer or repairer for maintenance, disassembly, reprocessing, assembly, recycling, and redistribution. This involves reverse logistics, where a product, its packaging and/or waste can be remanufactured and/or disassembled and its parts used for manufacturing other products or taken to a recycling plant to generating secondary raw material. (CNI (2018).

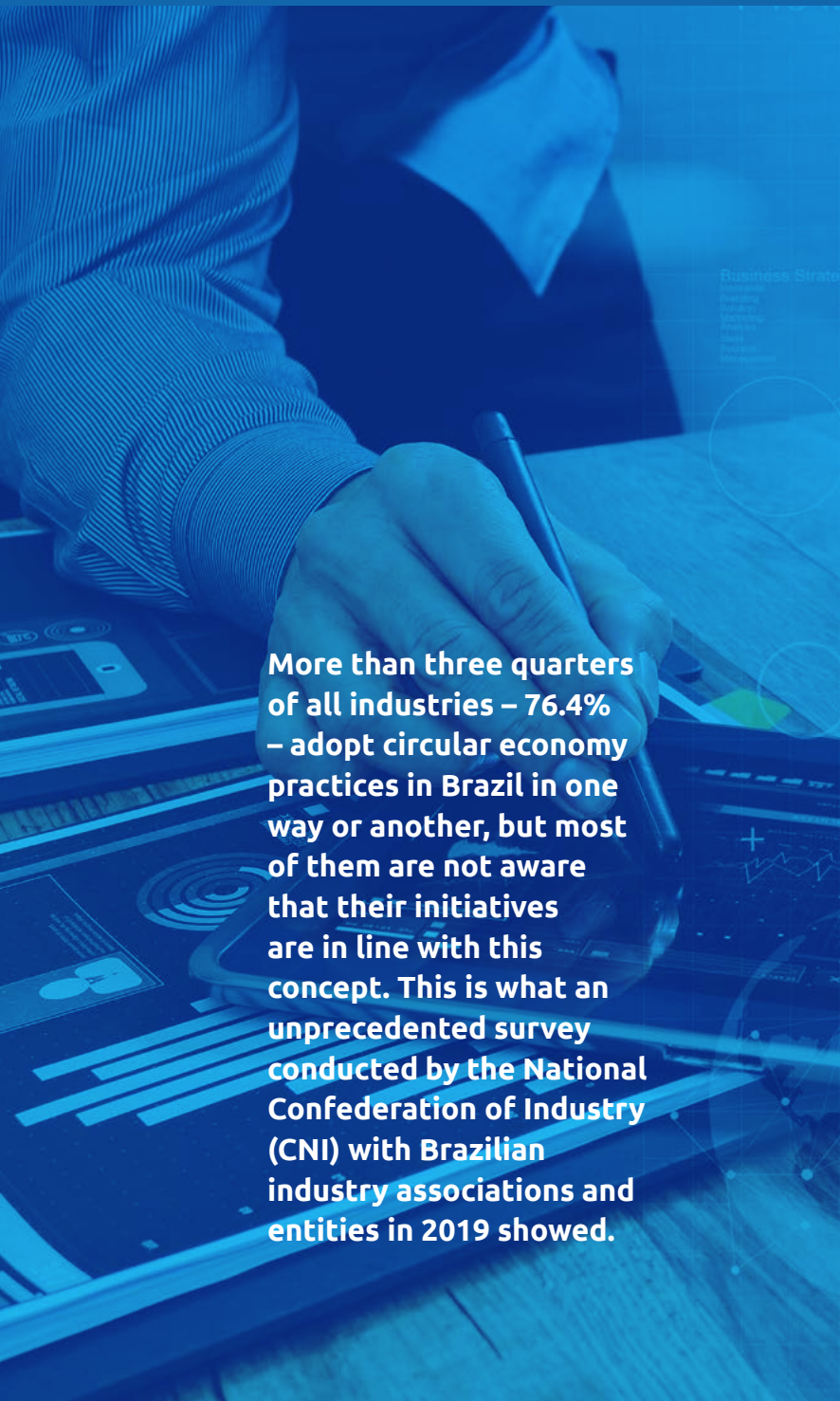
**Value proposition:** Industrial symbiosis and energy recovery are other means used to valorize resources used in manufacturing activities. (CNI (2018).

Industrial symbiosis is characterized as a branch of circular economy where the potential of approaches based on “systems integration” is explored. The main idea is that waste from one manufacturer is used as a raw material by another one to “close the cycle.” This model involves efforts related to logistics, infrastructure needs, and geographic location, as facilitating cost-effective transportation is critical to making it work.

With a focus on sharing transportation and infrastructure services and on exchanging waste/byproducts, developing and creating symbiotic cooperation networks between companies makes it possible to reduce consumption of materials and energy.

**Energy recovery** is an option for waste that is difficult to reuse or recycle but has high calorific value or generates combustible gases when decomposed. It turns waste into thermal energy and electricity. The main ways of recovering energy are the following ones:

- incineration with power generation;
- co-processing in clinker ovens;
- pyrolysis and gasification; and
- anaerobic digestion.



More than three quarters of all industries – 76.4% – adopt circular economy practices in Brazil in one way or another, but most of them are not aware that their initiatives are in line with this concept. This is what an unprecedented survey conducted by the National Confederation of Industry (CNI) with Brazilian industry associations and entities in 2019 showed.



23:35:60  
Business Strategy  
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Business Strategy



# 4 DIAGNOSIS OF INDUSTRY IN BRAZIL



With the aim of understanding the extent to which our economy is in line with the circular model, a survey was carried out of information available in different publications and on the websites of industry associations and of information provided in a questionnaire filled out by representatives of these associations and in interviews held with them.

## INFORMATION COLLECTED IN PUBLICATIONS AND ON WEBSITES OF INDUSTRY ASSOCIATIONS

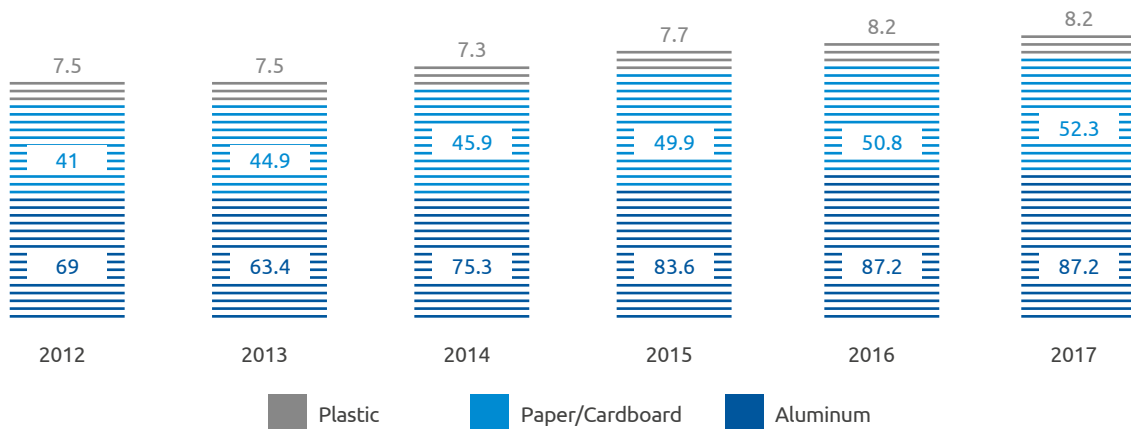
Currently, no specific statistical data is available on the adoption of the circular economy in its broadest concept, but some information is available for its main components: recycling and reverse logistics – post-consumer actions that allow for waste collected in production processes to be reused (remanufacturing).

Faria (2018) highlighted the scarcity of information and data on resource use and waste generation. Sectoral analyses are hard to come by in the literature and the ones that do exist do not allow for a deeper understanding. This is the first problem to be addressed to promote the transition from linear to large-scale circular production practices, namely, filling the data gap in order to develop a better understand of missed opportunities posing risks today. (FARIA, 2018).

According to data provided by the Brazilian Association of Public Cleaning and Special Waste Companies (ABRELPE) in its report *Panorama dos Resíduos Sólidos no Brasil 2017* (solid waste scenario in Brazil in 2017), policies setting the obligation to adopt reverse logistics for certain types of materials have been producing significant results.

Another major finding in ABRELPE's report related to the circular economy is the recovery percentage of some recyclable materials, in this case plastic, paper/cardboard, and aluminum. An upward trend in the recovery rate has been observed in recent years. (ABRELPE, 2018).

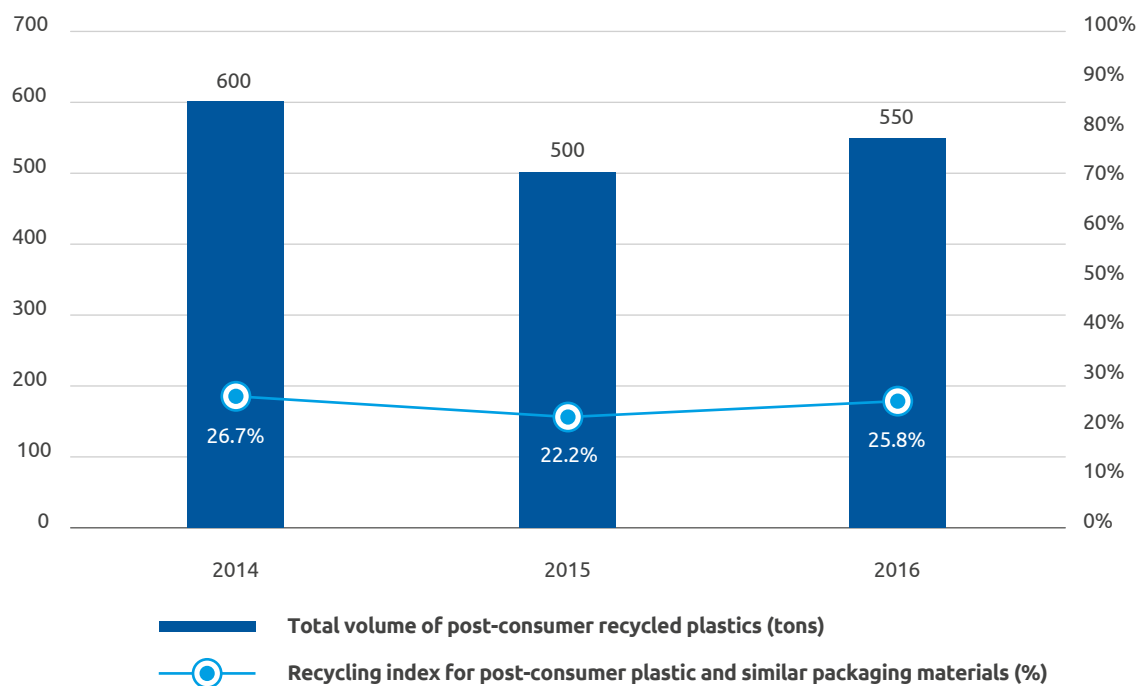
**FIGURE 6 –** Recovery rate for some recyclable waste items from 2012 to 2017



Source: LCA Opinion; Prepared by: ABRELPE.

ABRELPE's report stresses that citizen participation is crucial for improved solid waste management, increased recycling, and lower waste disposal in landfills. It cites a survey conducted by the Brazilian Institute of Public Opinion and Statistics (IBOPE) with 1,816 people, 98% of whom see recycling as important for the future of the country and 94% agree that separating waste is essential for selective waste collection as part of this process. However, despite showing knowledge about the importance of waste separation for recycling, it was seen that the respondents were not behaving in line with this reasoning, as 75% of them reported that they do not separate waste at home mainly for lack of environmental education. Sixty-six percent of the respondents indicated in turn that they know little or nothing about selective waste collection. (ABRELPE, 2018).

This shortcoming in selective waste collection constitutes a major challenge for the plastics industry, as despite all the progress made in recycling there is still a lot of room for improving its rate. The following are the recycling rates for plastic and related packaging published in the report *Perfil 2018 - Indústria Brasileira de Transformação e Reciclagem de Material Plástico* (profile of the Brazilian plastics processing and recycling industry in 2018).

**FIGURE 7 –** Recycling rate for plastic and similar packaging material in Brazil from 2014 to 2016

Source: Perfil 2018 – Indústria Brasileira de Transformação e Reciclagem de Material Plástico.

As shown in the graph above, the plastic packaging recycling rate in 2016 was 25.8%, unlike the percentage identified by ABRELPE, which considers total plastic and waste generation. ABIPLAST uses data collected by the Brazilian Institute for Geography and Statistics (IBGE), which show that 6.3 million tons of products processed into plastics were consumed in 2016 (including imports of such products). Of this total, 33% (2.13 million tons) are short-lived plastics (up to one year), a category that includes plastic and similar packaging materials. According to a study conducted by the Administration Institute Foundation (FIA) of the School of Economics, Business and Accounting of the University of São Paulo (FEA – USP), 550.400 tons of plastics were recycled in Brazil in 2016. Therefore, if we compare the volume recycled per year with the actual consumption of plastic and similar packaging materials in Brazil, we have a recycling rate of 25.8%. (ABRELPE, 2018).

Efforts to expand circular economy precepts across the sector must be complemented by public policy and social engagement to speed up the achievement of desired outcomes. Through the Sectoral Agreement on Reverse Packaging Logistics, basic goals to increase the recovery rate and reduce the disposal rate of packaging waste in landfills contemplated in a public call issued by the Ministry of Environment in 2012 have been generally achieved.

Publications launched in 2018 made available on the website of the Brazilian Chemical Industry Association (ABIQUIM) include one entitled *Voluntary Commitment to the Circular Economy of Plastics*, which sets the intermediate goal of reusing, recycling, or revalorizing 50% of all plastic packaging. The ambition is to reach 100% by 2040. (ABIQUIM, 2018).

Another publication available on ABIQUIM's website deals with concerns about the loss of pellets in plastic handling steps is one entitled *Manual Perda Zero de Pellets – Por um Mar Limpo* (manual for zero pellet loss - for a clean sea), an initiative of Plastivida through the Plastics Sector Forum - For a Clean Sea, which has 18 signatories, including companies, unions and associations, ABIPLAST and ABIQUIM included. It reinforces once again that the best way to reduce environmental problems caused by improper disposal of plastic material is through the process of selective collection with reverse logistics and recycling. (POR UM MAR LIMPO [for a clean sea], 2018).

**FIGURE 8 –** Ways of recycling plastic waste

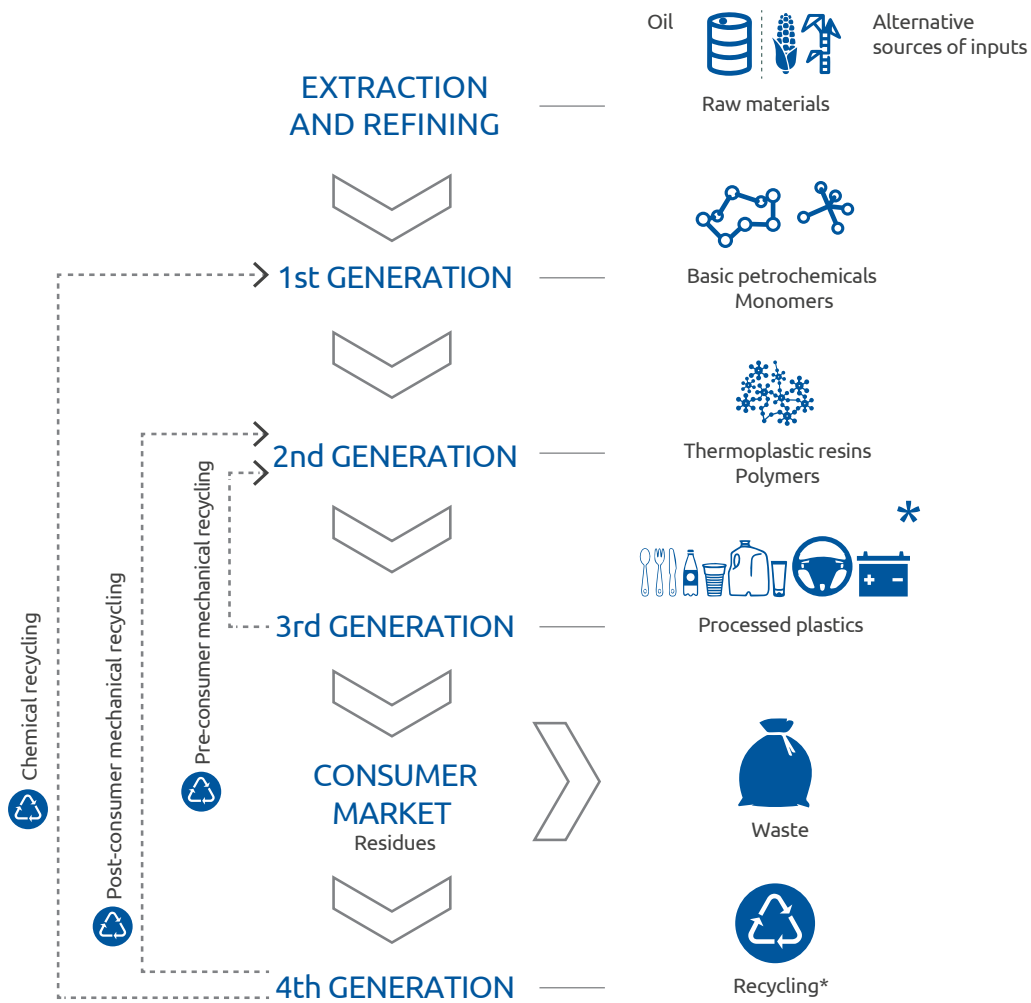


Figure 1. Plastics production chain.  
\* Stages in which pellets may be lost.

The National Institute for Empty Packaging Processing (inpEV) reported important figures in its 2018 Sustainability Report. Through a reverse logistics program for pesticide packaging – Campo Limpo System, a target of ensuring environmentally appropriate disposal of 94% of all primary plastic packaging waste was achieved. Of all the material referred to the Campo Limpo System in 2018, 93% returned to the production cycle as raw material for other products. This corresponds to the percentage of recycled packaging waste: plastic packaging properly washed after use in the field, lids, cardboard packaging, and metal packaging. Non-washable packaging (about 5% of total packaging waste) and packaging not properly washed by farmers were sent to accredited incinerators. (INPEV, 2019)

Due to the volume of waste it generates, the construction industry deserves special attention in connection with the topic addressed here. Despite the availability of certifications and seals for sustainable buildings, which already ensure lower spending on water and energy and a higher rate of use of recyclable materials, resulting in lower impacts on natural resources, the linear model still prevails in the sector. It is difficult to reuse and recycle waste in a way that ensures the same quality as that of new materials. But some companies have adopted modular building models using materials that can be recovered and replaced, as well as other ideas related to circularity that have been gaining ground in the construction industry.

Another important sector of the economy, the steel industry, has been increasingly applying circular economy practices. Its products can be reused, remanufactured, and recycled repeatedly without losing their characteristics. Because steel can be permanently recycled into raw material in the production chain without loss of quality, it is the most recycled industrial product in the world. Automobiles, refrigerators, rebars, and all other steel products are, at the end of their useful life, collected and sent back to steel mills to be used for producing steel with the same quality excellence. Other metals such as copper, aluminum, nickel, etc. are recovered during the recycling process and sold to metallurgical plants. Recycling accounts for about 30% of all the steel produced in Brazil. (BRAZIL STEEL INSTITUTE, 2019).

In its 2018 annual report, ABINEE (Brazilian Electrical and Electronics Industry Association) shows that promoting reverse logistics is the main environmental initiative related to the circular economy launched by the electrical and electronics industry in Brazil. In 2016, ABINEE founded the organization Green Eletron to manage the reverse logistics of batteries and electrical/electronic products. Green Eletron was created to ensure compliance with commitments assumed by the sector, such as those of setting up voluntary delivery sites (PEVs) in all cities in São Paulo state with populations exceeding 80,000 by 2022 and environmentally appropriate disposal of 100% of the waste collected through its system.

Major progress in the reverse logistics of electrical/electronic products and batteries has been observed. According to a report published by United Nations University - Institute for the Advanced Study of Sustainability (UNU-IAS) entitled *eWaste in Latin America*, about 7kg of electrical/electronic waste were generated per inhabitant in Brazil in 2014. For 2018, it was projected that each inhabitant in Brazil would generate 8.3 kg of such waste. According to a representative of the sector, based on data already available on established operations of reverse logistics and recycling of electrical/electronic waste, Brazil has the potential to generate more than 60,000 jobs if 100% of it is recycled. (ABINEE, 2019; GSMA, 2015).

In his 2017 paper entitled *A Quarta Revolução Industrial do Setor Têxtil e de Confecção* (the fourth industrial revolution in the textile and apparel industry) posted on the website of the Brazilian Textile and Apparel Industry Association (ABIT), Flávio da Silveira Bruno includes the adoption of circular business models as an environmental trend in the sector. The paper draws attention to the need to create new materials that can be more easily recycled and reused, consume less water and energy in their manufacturing process, and are biodegradable. It also mentions the development of new, more efficient processes that avoid wastage of any kind. It highlights several points related to the concern observed in the sector to migrate to a circular economy. It also points out the importance of measuring impacts to assess the effectiveness of these changes. That is, several circular practices are being developed in isolation, but no general statistical data is provided in that document for the sector in relation to the subject. (BRUNO, 2016).

The website of the Brazilian Portland Cement Association (ABCP) has a tab for the sustainability topic for highlighting the recognized role of co-processing in utilizing waste for energy purposes. It also presents a Modular Life Cycle Assessment program for concrete blocks to be used for building a Brazilian inventory that serves as a basis for life cycle inventories of other building materials. (CBCS; ABCP; BLOCOBRASIL, 2016).

## **INFORMATION COLLECTED THROUGH A QUESTIONNAIRE AND INTERVIEWS**

For a better diagnosis of the adoption of the circular economy model in Brazilian productive activities, a questionnaire was prepared with 15 questions divided into three topics (blocks):

- public policy;
- financing lines; and
- business models.

The questionnaire is attached to this Guide. It was sent to Brazilian industry associations and state industry federations. The information collected through the questionnaire was complemented by interviews with representatives of some industrial sectors.

## RESULTS FOR PUBLIC POLICIES

In sectoral associations, the most widely known and considered public policies are focused on reverse logistics and waste management. Therefore, their effect on increasing the adoption of circular economy practices by companies is limited. It is believed that the population needs to be made more aware of these practices to pressure governments to come up with more efficient policies focused on the subject.

Most associations believe that the National Solid Waste Policy is currently the most impactful in terms of leading to the adoption of circular practices by establishing, for example, shared responsibility for the life cycle of products. According to its definition, shared responsibility would consist in a set of individualized and linked procedures carried out by manufacturers, importers, distributors, traders, consumers, and providers of public urban cleaning and solid waste management services to minimize the volume of solid waste and residues generated, as well as to reduce the impacts of the life cycle of products on human health and environmental quality.

The National Solid Waste Policy (PNRS) also induces the following:

- use of solid waste, steering it to its production chain or other production chains;
- use of more sustainable inputs with a less negative impact on the environment; and
- a market for products derived from recycled and recyclable materials.

Although the PNRS addresses and sets out many circular economy practices, its effect has been poorly understood. Knowledge of the concepts provided for in the law must be improved. There is still no clear understanding of the circular economy and of how to ensure the feasibility of practical instruments to promote it (incentives, exemptions, subsidies, training, bonuses, etc.), so as to enhance the appeal of the topic and its implementation.

One of the critical aspects pointed out in interviews in relation to public policies for promoting the circular economy is the lack of incentives for recycling. No differentiated tax burdens or conditions to favor this branch of activity in an attractive way are available. This has led some companies to close down and give up investment plans.



For cement companies, specifically in the state of São Paulo, plans are being drawn up to encourage the use of waste from other companies in the cement manufacturing process. For example, more appropriate deadlines for licensing plants that will incorporate waste into their processes. Creating benefits such as this one is what is expected to spread a culture of circularity of materials in production processes.

## RESULTS FOR FINANCING LINES

Financing lines are available for sustainable practices, but there is no integration between them to address the several circular economy practices that can be applied across different sectors of industry. Another point is that these financing lines are not widely publicized and, as a result, only a very small number of entrepreneurs are aware of them.

Complaints about the possibility of getting finance refer to the complex requirements imposed on project preparation, collateral requirements, prior environmental licensing requirements, and the time frame for submitting funding applications. Several factors make it impossible to access finance, especially for companies with lower capital contributions.

Another factor that discourages companies from seeking finance is the little knowledge some entrepreneurs have of circular practices, of their advantages, and of their associated opportunities and risks. For this reason, they see no advantage in making a change that would require considerable financial investment and initial efforts.

In Brazil, there is a need for reforms to curb public spending, promote entrepreneurship, and create jobs. This environment inhibits investment and access to attractive finance, as uncertainties imply economic instability.

## RESULTS FOR BUSINESS MODELS

The adoption of circular business models seems to be incipient in all industries. Perhaps this perception can be explained by the lack of knowledge about what the circular economy is all about because, according to a survey conducted by CNI with entrepreneurs, 70% never heard about the circular economy, but when they are asked about the existence of circular practices in companies, 76.4% of them respond that they do exist.

In general, companies that are migrating to circular business models are large and multinational companies. This is due to factors such as the following ones:



- greater investment capacity;
- profile of clients and investors who are more demanding in relation to social and environmental responsibilities;
- imported culture;
- signatories to international agreements.

Special mention should also be made of the role of startups in developing circular business models by creating their own circular business models or carrying out activities that support or involve companies in the process of incorporating circular practices or models into their business. They promote circularity in different ways. Some of them create platforms to facilitate the sharing of equipment and materials between companies, optimizing the use of physical spaces and resources. Others develop methods and technologies for treating effluents or materials to be reincorporated into processes. The simplicity and flexibility of their framework speeds up the development of a wide range of solutions to promote circularity, turning promising startups into drivers of the transition process.

The main reasons that discourage companies from adopting circular business models are listed below in descending order by number of claims:

- they see no financial advantages in circular models;
- they want to make the required changes but have no capital to invest in them;
- they are not aware of the circular economy; and
- they fear the risks involved in the change (unfair competition from non-adopters of the model, which is indifferent for consumers, suppliers, and investors).

A simplified analysis allows us to infer that the main reasons why companies in general are not migrating to circular business models are precisely linked to the lack of public policies designed to make their financial return more attractive, lack of understanding and consequently lack of vision of the opportunities afforded by the new model, and lack of investment, i.e. of easier access to available financing lines, apart from the need to create specific financing lines for the circular economy in different sectors.


It has been observed that using circular inputs is the most common practice among companies in relation to the circular economy, probably due to the use of secondary raw materials as in the steel, aluminum, and metal industry in general, and even more so in the glass and plastics industry. In this context, industrial symbiosis is the driver of this model. Energy recovery is also very common, especially among agribusiness, cement, and metallurgical companies. However, within the possibilities of the circular economy, these are the options that preserve the value of products the least.

In terms of financial investments in relation to the revenues of companies, the perception is that entrepreneurs are very afraid to bet on circular business models in Brazil because they are, in general, insignificant. It has been particularly observed that investments have been more focused on practices designed to sell services rather than products.

The most adopted practices related to circular business models include the following ones:

- manufacturing products with parts and elements made from secondary raw materials;
- selling refills or spare parts of equipment to be reused;
- remanufacturing by the manufacturers themselves;
- equipment modernization: as technology evolves, manufacturers have access to increasingly smaller (and more powerful) equipment, resulting in lower consumption of natural resources, less space and weight for transportation, leading to reduced carbon emissions from transportation and to other benefits;
- automated waste sorting systems with increased recycling capacity;
- technologies that increase the durability of materials, extending their life cycle;
- research on systems to process waste into new inputs; and
- increased operational efficiency by reducing the energy and resources required for producing goods.



A man with a beard and glasses, wearing a dark suit, white shirt, and patterned tie, stands in a meeting room. He is looking towards the right. In the foreground, the back of another person's head and shoulders is visible, looking towards the man in the suit. The room has a whiteboard with several charts and graphs on it. The lighting is bright, and the overall color palette is dominated by blues and greys.

**One of the critical aspects pointed out in interviews in relation to public policies for promoting the circular economy is the lack of incentives for recycling. No differentiated tax burdens or conditions favoring this branch of activity in an attractive way are available.**

# 5 TRANSITION STRATEGIES



Given the current situation of Brazilian industry in relation to the circular economy and based on the progress being made domestically and internationally in public policies in this field, measures have been devised to support and drive the change to a circular economic model in Brazil. Some of these measures were proposed after the diagnosis described in the previous chapter was presented at a meeting with representatives of the different sectors of industry, state industry federations, and interested companies.

Carrying out a strategy to implement the circular economy in Brazil depends on the engagement of government, companies, industries, and retail outlets, as well as of the population. The strategy was mainly based on the answers provided by representatives of sectors, industry federations, and companies to the following three guiding questions:

## 1. “HOW DO YOU IMAGINE THE INDUSTRY OF THE FUTURE AND THE ROLE OF THE CIRCULAR ECONOMY?” (WHERE SHOULD WE GET TO?)

This question was intended to elicit an answer from respondents, based on their knowledge, about what Brazilian industry will look like in the future as a result of the necessary changes brought about by the circular economy to make us competitive in the world market.

## 2. “WHAT IS THE CURRENT SITUATION OF BRAZILIAN INDUSTRY IN RELATION TO THE CIRCULAR ECONOMY?” (WHERE DO WE STAND NOW?)

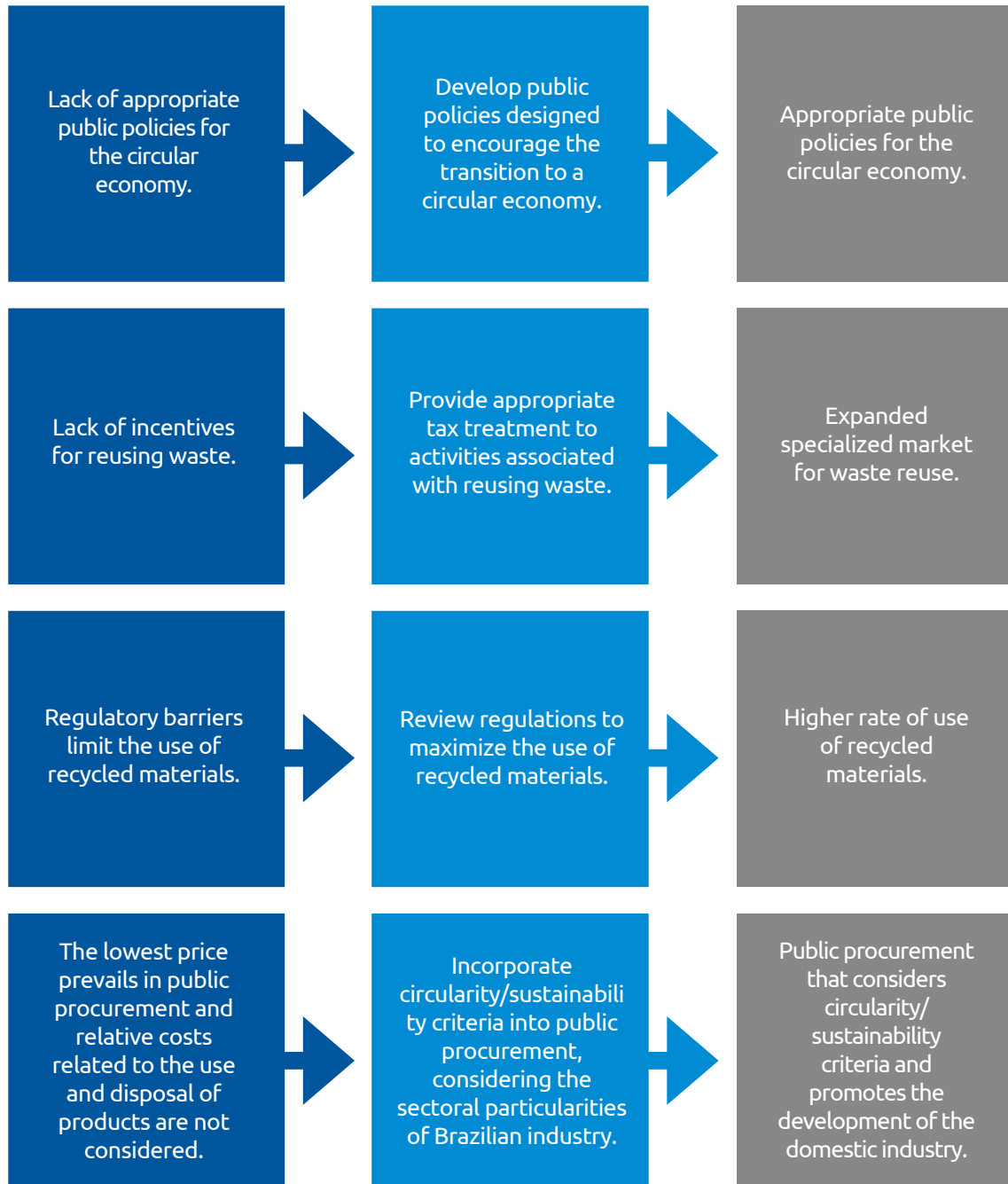
The purpose of this question was to identify barriers and opportunities perceived in various sectors and the need for policies, investment, and knowledge to promote the circular economy.

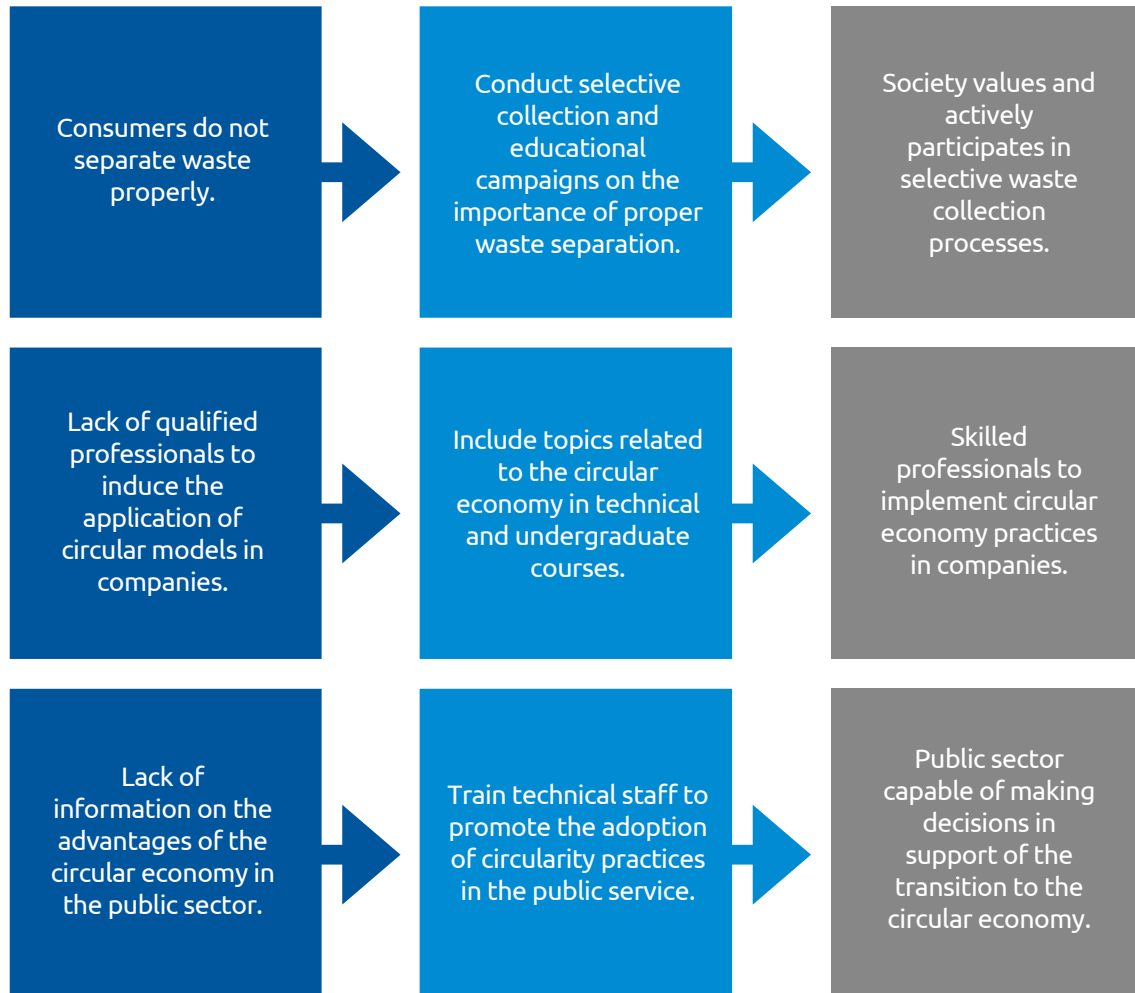
## 3. “WHAT MAIN ACTIONS SHOULD WE TAKE ON THE PATH TOWARD THE TRANSITION TO THE CIRCULAR ECONOMY IN BRAZILIAN INDUSTRY?” (WHAT SHOULD BE DONE TO GET THERE?)

This is probably the most important question, as it was intended to elicit ideas on how to create well-structured public policies, as well as business models and social awareness practices, designed to bring about the desired economic transition.

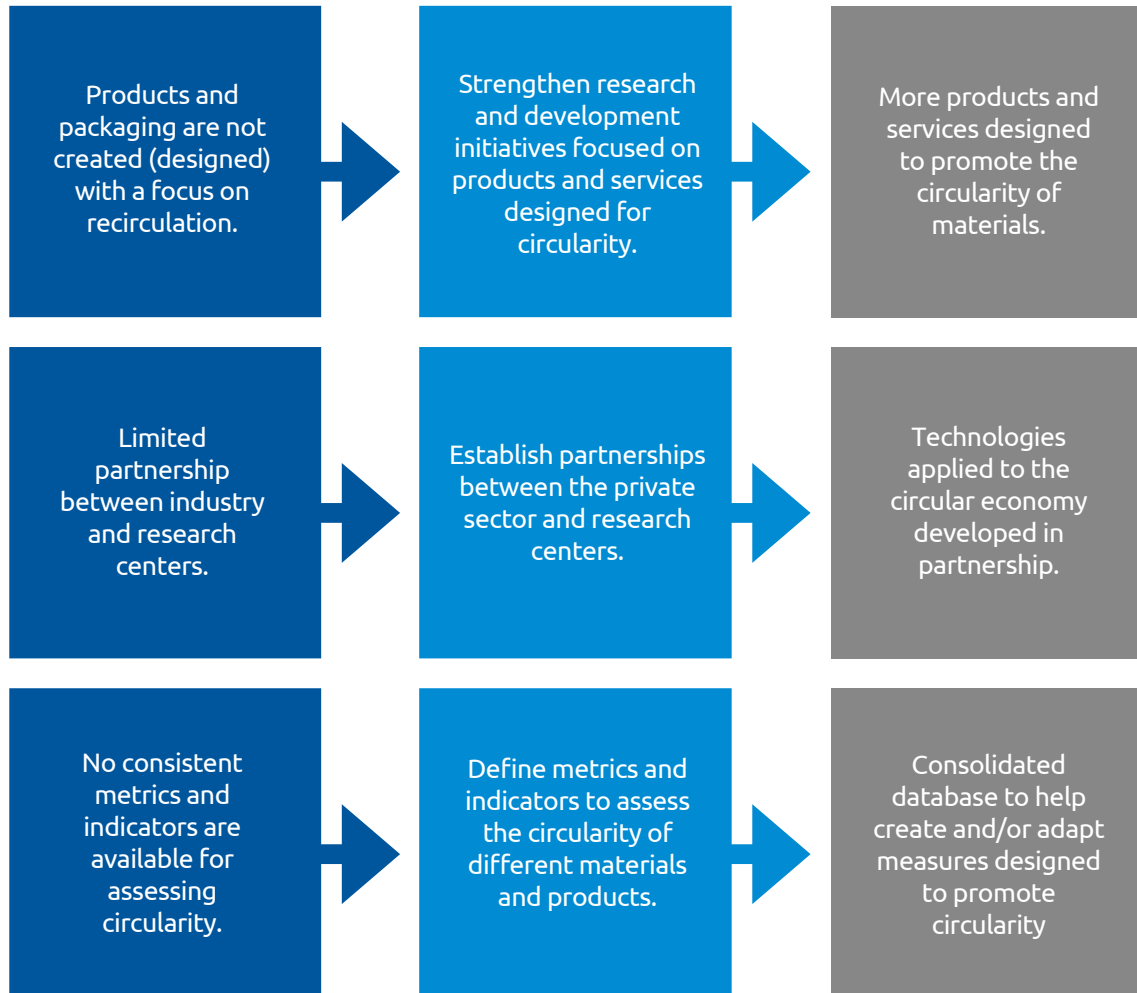
The answers to the questions above were organized and adapted in a sequence according to the model shown below, which includes, in short, a starting point, where we want to get to, and the path to get there.



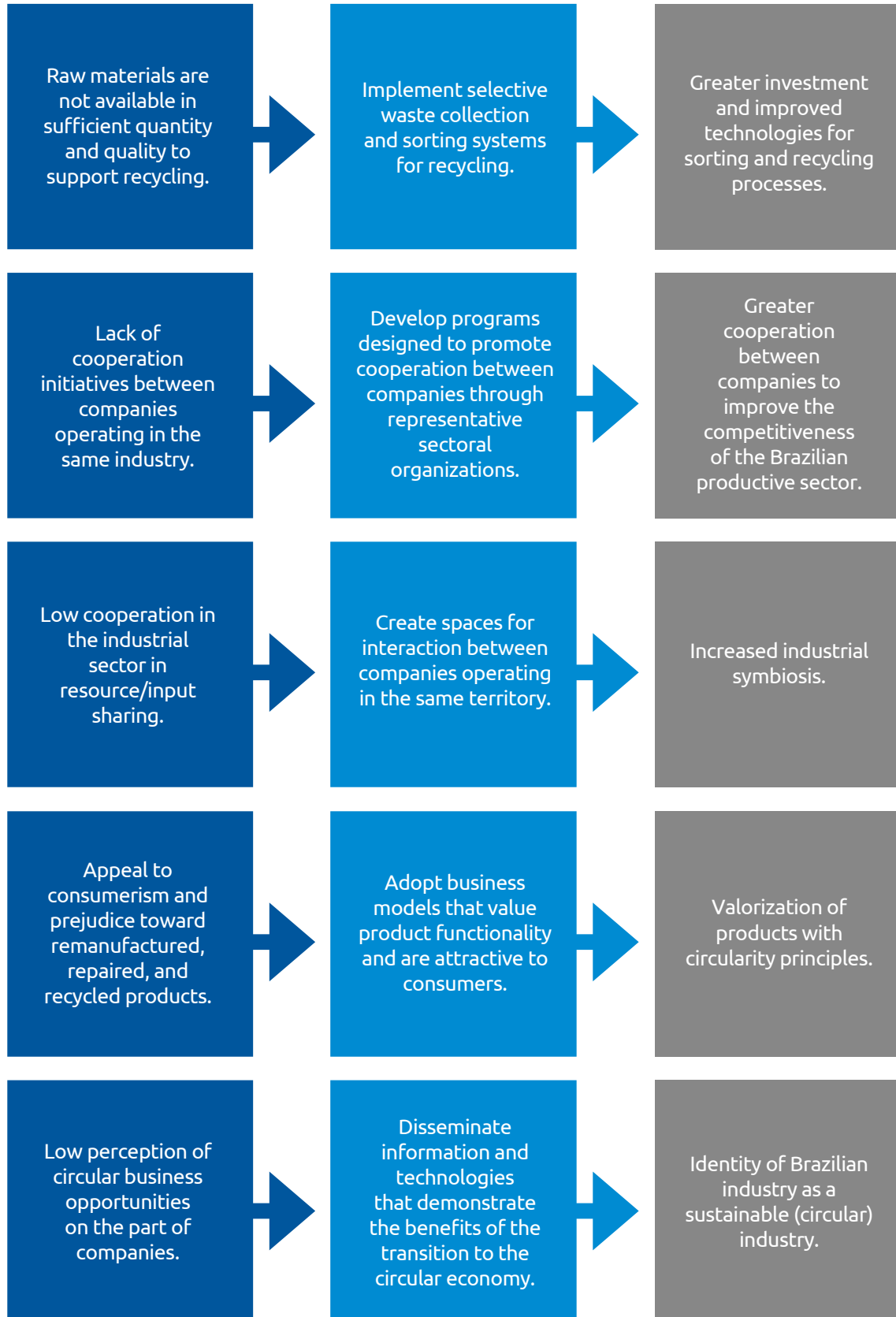
**PUBLIC POLICIES**

**EDUCATION**

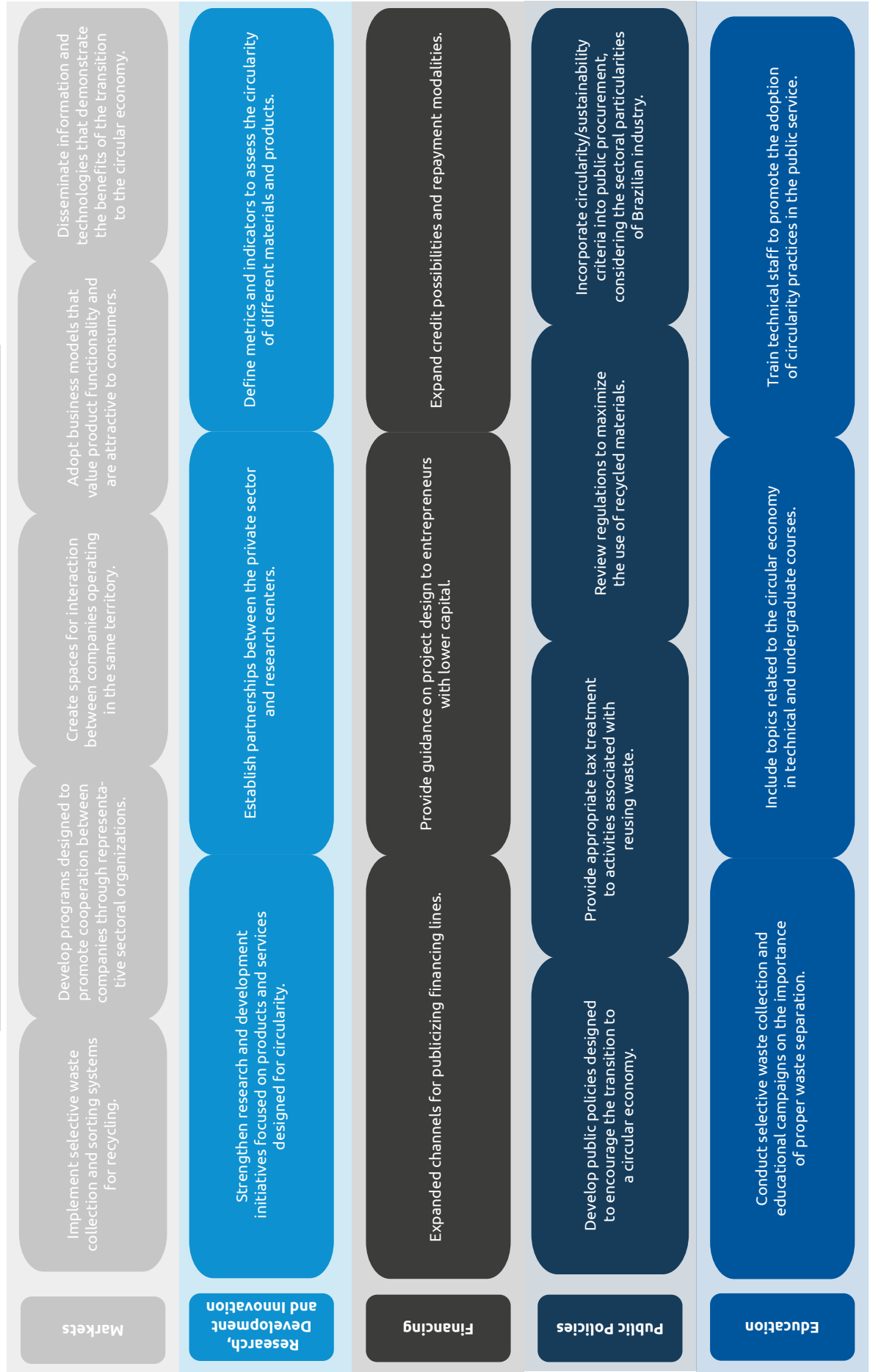


**RESEARCH, DEVELOPMENT AND INNOVATION (RDI)**

**FINANCING**

**MARKET (BUSINESS ENVIRONMENT)**

**FIGURE 9** – Strategic path for the transition of the Brazilian economy to a circular model  
**Transition to the Circular Economy in Brazil**







# CONCLUSIONS

Our society has achieved a high standard of quality of life as compared to historical moments of the past as a result of the structuring drive of the economic, scientific, and technological development it experienced over the last decades.

The industrial sector has been playing a key role in this evolutionary process, especially in adding value to natural resources, turning them into products and making them available to the consumer market.

Today we are facing new challenges that make it necessary to improve the quality of life achieved for the world population as a whole without causing environmental imbalances that may pose risks for the world economy.

For this purpose, it will be necessary to rethink the economic model adopted so far. We are faced with the need to promote a more sustainable flow of materials in our society and to put an end to what we refer to as “trash” by considering every material used in our society as a useful and reusable “resource.”

The operation of nature's cycles inspires us to lay the foundations for the transition to a model capable of internalizing social and environmental aspects more broadly and value long-term planning.

Public policies are being drawn up in several countries to foster the transition from a linear to a circular logic of thought (inspired by nature's cycles). Companies are already identifying a trend toward consumers valuing products and services that take into account social and environmental issues in their design.

We have identified that this new logic has the potential to create and/or reinsert new production chains into our economic system through sharing, reuse, maintenance, remanufacturing, and recycling. The concept of circular economy has shown its strength by combining various practices that were already being worked on, such as: Cleaner Production (CP), Industrial Symbiosis, Cradle to Cradle (C2C), Functionality Economy, Biomimicry, Design for Environment, Product as a Service, among others.

In this context, various business opportunities can be identified as we rethink the functioning of the economic system and provide access to the formal market to part of the world population that is still not enjoying the benefits and quality of life that we have achieved.

For the potential of the circular logic to be realized in Brazil, greater investment in education and innovation will be necessary. In addition, Brazilian public policies need to be adjusted to further encourage the reuse of waste and the use of recycled goods.

The strategic path presented in this document listed five lines of action that need to be addressed to accelerate the transition to the circular economy in Brazil, namely:

- public policies;
- education;
- research, development and innovation (RD&I);
- financing; and
- market (business environment).

*We are faced with the need to promote a more sustainable flow of materials in our society and to put an end to what we refer to as “trash” by considering every material used in our society as a useful and reusable “resource.”*

The productive sector is aware of its role in addressing the challenges our society will have to face in the coming decades. However, concerted action will be required involving representatives of the private sector, government, and academia to come up with new ways of producing and consuming.

We hope this paper will contribute to lead our country to take the first steps toward this transition and to seize the opportunities afforded by the circular economy concept.







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ABCP – Brazilian Portland Cement Association

ABIA – Brazilian Food Industry Association

ABINEE – Brazilian Electrical and Electronics Industry Association

ABIPLA - Brazilian Cleaning Product Industry Association

ABIPLAST – Brazilian Plastic Industry Association

ABIQUIM – Brazilian Chemical Industry Association

ABIT – Brazilian Textile and Apparel Industry Association

ABRELPE – Brazilian Association of Public Cleaning and Special Waste Companies

ArcelorMittal

Braskem

CBIC – Brazilian Construction Industry Chamber

FIEB – Bahia State Industry Federation

FIEMG – Minas Gerais State Industry Federation

FIEP – Paraná State Industry Federation

FIESP – São Paulo State Industry Federation

FIRJAN – Rio de Janeiro State Industry Federation

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