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Perspective on the New Paradigm of Sustainable and Innovative Territorial Development

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Resumo
O aumento populacional e ampliação e velocidade da realização das atividades econômicas, aliado a rápida urbanização, são motivos de uma mudança no padrão de consumo e na geração crescente e acelerada de resíduos sólidos urbanos no mundo, em especial nos países em desenvolvimento, como o Brasil. Conhecer esse processo evolutivo, sistematizar os dados qualitativos e quantitativos e, principalmente avaliar seus paradigmas, são essenciais para o desenvolvimento territorial sustentável, criativo e inovador. Tal aspecto permitirá que a sustentabilidade, tanto para os países pós-industrializados quanto para aqueles em fase de industrialização, trilhe caminhos para gestão econômico e ambientalmente sustentável. Assim, o presente trabalho buscou explicitar os aspectos evolutivos relacionados com os fundamentos, conceitos e paradigmas ligados a teoria do desenvolvimento territorial. Para tanto, a metodologia contemplou um estudo teórico, prospectivo e multidisciplinar que, permeia elementos do processo evolutivo conceitual, seguida de uma análise crítica e propositiva. A estrutura resultante deste estudo contemplou a análise do desenvolvimento territorial no contexto evolucionário das características da humanidade, desde seu surgimento no período pré-histórico, efeitos econômicos, sociais e ambientais oriundos da revolução industrial, até o surgimento do tema sustentabilidade, criatividade e inovação. Os resultados, além da síntese da evolução histórica no contexto do desenvolvimento territorial demonstram a atualização de conceitos, fundamentos e a proposição de novos paradigmas para subsidiar o planejamento estratégico focado no desenvolvimento econômico, sustentável, criativo e inovador dos diversos territórios. Assim, o levantamento e análise bibliográfica permitiram apresentar ferramentas de análise para o desenvolvimento territorial numa visão sistêmica, transversal e multidisciplinar.
Palavras–chave: Desenvolvimento Econômico. Desenvolvimento territorial sustentável e inovador. Desenvolvimento Híbrido. Economia Circular.

Perspective of the new paradigm of sustainable and innovative territorial development

Abstract

The population increase and expansion and speed of economic activities, combined with rapid urbanization, are reasons for a change in consumption patterns and the growing and accelerated generation of urban solid waste in the world, especially in developing countries, such as Brazil. . Knowing this evolutionary process, systematizing qualitative and quantitative data and, mainly, evaluating its paradigms, are essential for sustainable, creative and innovative territorial development. This aspect will allow sustainability, both for post-industrialized countries and those in the industrialization phase, to pave the way for economic and environmentally sustainable management. Thus, the present work sought to explain the evolutionary aspects related to the foundations, concepts and paradigms linked to the theory of territorial development. To this end, the methodology included a theoretical, prospective and multidisciplinary study that permeates elements of the conceptual evolutionary process, followed by a critical and propositional analysis. The structure resulting from this study included the analysis of territorial development in the evolutionary context of humanity's characteristics, from its emergence in the prehistoric period, economic, social and environmental effects arising from the industrial revolution, to the emergence of the theme of sustainability, creativity and innovation. The results, in addition to the synthesis of historical evolution in the context of territorial development, demonstrate the updating of concepts, foundations and the proposition of new paradigms to support strategic planning focused on the economic, sustainable, creative and innovative development of different territories. Thus, the bibliographical survey and analysis made it possible to present analysis tools for territorial development in a systemic, transversal and multidisciplinary view.

Keywords: Economic Development. Sustainable and innovative territorial development. Hybrid Development. Circular Economy.

Perspectiva del nuevo paradigma de desarrollo territorial sostenible e innovador

Resumen:

El aumento demográfico y la expansión y velocidad de las actividades económicas, combinados con la rápida urbanización, son motivos de un cambio en los patrones de consumo y de la creciente y acelerada generación de residuos sólidos urbanos en el mundo, especialmente en los países en desarrollo, como Brasil. Conocer este proceso evolutivo, sistematizar datos cualitativos y cuantitativos y, principalmente, evaluar sus paradigmas, son esenciales para un desarrollo territorial sostenible, creativo e innovador. Este aspecto permitirá que la sostenibilidad, tanto para los países postindustrializados como para los que se encuentran en fase de industrialización, allane el camino para una gestión económica y ambientalmente sostenible. Así, el presente trabajo buscó explicar los aspectos evolutivos relacionados con los fundamentos, conceptos y paradigmas vinculados a la teoría del desarrollo territorial. Para ello, la metodología incluyó un estudio teórico, prospectivo y multidisciplinario que permea elementos del proceso evolutivo conceptual, seguido de un análisis crítico y proposicional. La estructura resultante de este estudio incluyó el análisis del desarrollo territorial en el contexto evolutivo de las características de la humanidad, desde su surgimiento en la prehistoria, los efectos económicos, sociales y ambientales derivados de la revolución industrial, hasta el surgimiento del tema de la sostenibilidad, la creatividad. e innovación. Los resultados, además de la síntesis de la evolución histórica en el contexto del desarrollo territorial, demuestran la actualización de conceptos, fundamentos y la propuesta de nuevos paradigmas para sustentar la planificación estratégica enfocada al desarrollo económico, sostenible, creativo e innovador de los diferentes territorios. Así, el levantamiento y análisis bibliográfico permitió presentar herramientas de análisis para el desarrollo territorial en una visión sistémica, transversal y multidisciplinaria.

Palabras clave: Desarrollo Económico. Desarrollo territorial sostenible e inovador. Desarrollo Híbrido. Economía Circular.

1 INTRODUCTION

The evolution of economic history has always sought to demonstrate, both theoretically and practically, how certain territories grow, develop, and become more dynamic than others, addressing issues against a backdrop of existing social, economic, and environmental inequalities at any scale. Thus, identifying patterns and strategies that could promote the development of specific regions/territories, aiming to enhance not only income growth but also an effective improvement in the living conditions of the population, has become a global concern. In this context, the term "development" has gained prominence in debates over economic, social, and political crises, being seen as a diverse concept with a broad, multi- and transdisciplinary problematic scope.

Initially treated as synonymous with growth, a country was considered developed based on higher economic indicators, such as Gross Domestic Product (GDP). Over the years, this analysis has incorporated more specific indicators, such as infant mortality, incidence of contagious diseases, literacy rates, and information on access to the ways of life created by industrial civilization, contributing to merging the ideas of development and social well-being of the population (FURTADO, 2000). In the meantime, for development to occur, it is necessary to remove the main sources of freedom deprivation: poverty, tyranny, lack of economic opportunities, systematic social deprivation, neglect of public services, and intolerance or excessive interference by repressive states (SEN, 2000).

Furthermore, the emergence of the territorial approach coincided with the profound restructuring of the Brazilian state following the 1988 Federal Constitution. Thus, the economic dynamics of a geographic space/territory are linked to endogenous and exogenous factors, which relate directly to interventions by the local base, i.e., occur through the action of individual entrepreneurship of citizens or by the action of civil society organizations; and/or are external to the reference space, as they result from top-down interventions, whether by the action of the state or private initiative from other regions. In purely economic terms, this means that territories are not immune to economic fluctuations and cycles and may benefit, for example, from the dynamics of the national or global economy that sweep them along (FERRERA DE LIMA, 2017).

In this conception, it is necessary to consider the forms of action by the state and local actors in promoting development policies and combating poverty, as well as those stimulating economic growth and development. With this in mind, social actors, representatives of organized society, are responsible for directing other actors and subjects, as they have the capacity for cooperation and social interaction and can influence the dynamism of the region or territory (DRUCIAKI, 2017).

It is also important to highlight the theoretical understanding of Endogenous Development, which presupposes that local actors or agents are the protagonists of economic development, interacting in territorial cooperation networks. Thus, by identifying the currently decisive factors of production (social capital, human

capital, knowledge, Research and Development (R&D), and information), regions endowed with these factors (or strategically aimed at fully developing them) would be in the best position to achieve accelerated and balanced development (PIACENTI, 2016).

It is worth noting that, when discussing the term "territorial development", performance indicators should not only be based on economic and social variables, but also on those related to the environment. In this context, the sustainability indicator of the territory should be based on social, economic, and environmental aspects, allowing for a comprehensive assessment of the territory, and thereby identifying its profile of sustainable territorial development. Thus, the set of data that can be included in the scope of the analysis allows for a broader view of the territorial development process, depending on the problem to be researched, which can be seen as a mixed approach, including to the analysis variables that are both endogenous and exogenous (MOREJON, FERRERA DE LIMA, AND BIANCO, 2017).

Until the end of the 1970s, the adjective "sustainable" was merely technical jargon, but the noun "development" only became irrevocably followed by the adjective "sustainable" to emphasize the need to reconcile the necessity to conserve ecosystems that enable their own existence as a species (VEIGA, 2010).

The author also stresses that a problem element in the evolution and application of the term sustainable territorial development is linked to the crisis of unsustainability with which humanity is confronted, resulting from the process of global warming, if ways to decarbonize energy matrices are not discovered. And this will depend essentially on decisive investments in science, technology, and innovation.

Furthermore, the evolution of economies was linked to their productive capacity and potential for waste generation. As a result, throughout the 21st century, sustainability, in its epistemological context, linked the issue of waste generation as a problem or waste as a cost factor. Evolutionarily, in the current economic scenario, still heavily based on the exploitation of natural resources (both finite and infinite), a strong emphasis is placed on attributing commercial and industrial value to waste as strategic raw materials for new industrialization processes, within the context of a multi-circular economy, where environmental preservation is a positive consequence.

Such a scenario could be enabled from the mid-2000s, when the Innovation Law (Law No. 10,973/2004) was enacted, which, among other aspects, presents the expansion of concepts and techniques for mitigating environmental damages, based on the new form of management and use of Waste, enabling its use as a source of raw material for the three productive sectors of the economy.

To mitigate potential environmental consequences, it is necessary to seek mechanisms for the utilization of waste in productive processes and to support the maintenance of products, materials, and resources in the economy for as long as possible, as initially based on the concept of a Circular and interdisciplinary economy. This approach seeks a new model of production and consumption of goods and services linked to sustainability (IBERDROLA, 2020).

In this regard, the present work aims to elucidate the evolutionary aspects (both formal and informal) related to the foundations, concepts, and paradigms connected to the theory of sustainable territorial development, expanding the

concept of circular economy to the multicircular context of waste management and utilization from 1st, 2nd, and 3rd generations.

The methodological procedures were based on a systemic study from historical, economic, social, and environmental perspectives, aiming to present a prospective scenario in a multidisciplinary and transversal perspective that permeates the elements of the evolutionary process, followed by a critical and propositional analysis about the theory of creative and innovative sustainable territorial development.

To this end, this article is organized into three sections, the first being this one, which introduces the discussion and theoretical survey of the topic. The second section presents the theoretical framework of territorial development used by the authors, a concept that guides the interpretation of the resulting structure, which encompassed the analysis of territorial development from its theoretical emergence in a synthesis of evolution, including the update of concepts, foundations, and the proposition of new paradigms to support strategic planning focused on the economic, sustainable, creative, and innovative development of territories.

The third section describes some final considerations that, based on the bibliographic survey and analysis of the results presented, outline the systematization of a theoretical framework. This framework lists the evolutionary phases of sustainable and innovative territorial development and its relationship with the aspects identified from the management and utilization of waste from various sources.

2 SUSTAINABLE AND INNOVATIVE TERRITORIAL DEVELOPMENT: A HISTORICAL PERSPECTIVE

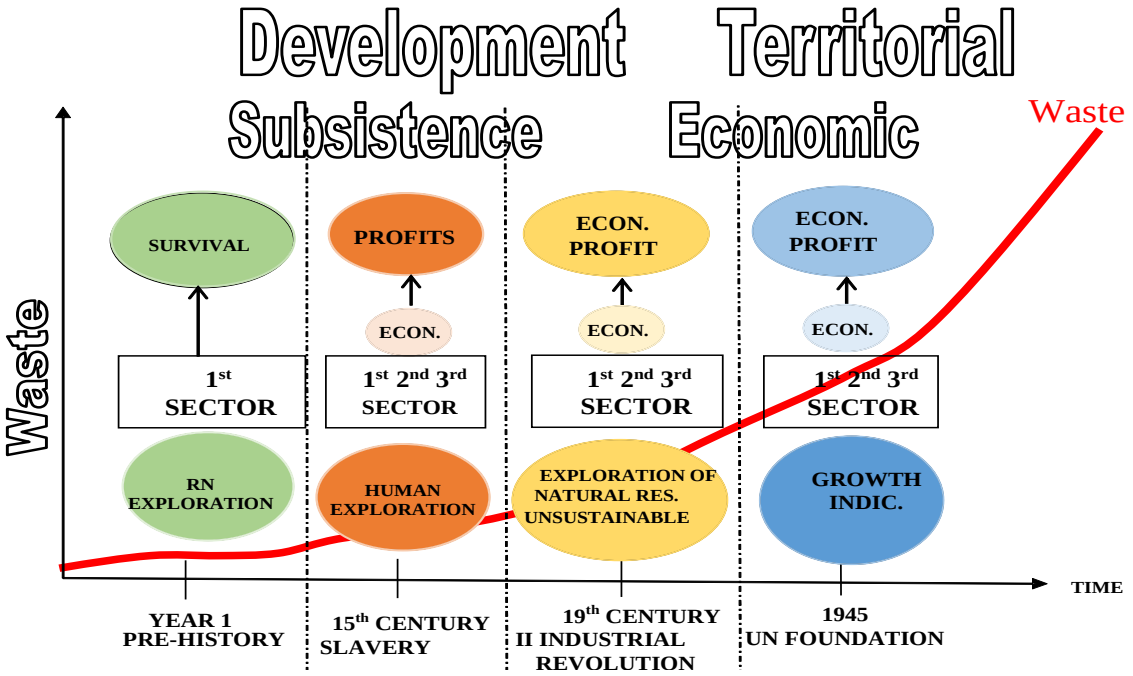
The employment of the concept of territorial development starts from the principle that it is necessary to mobilize and organize the resources existing within a given territory. More than just a defined geographical area, a territory is a product of human action, a space for interaction, dialogue, and adjustment of individual plans around collective projects, capable of forming a positive agenda under the coordination of local governance (BALEM, SILVA, AND FROEHLICH, 2016).

Among territorial relationships, consumption is considered one of the similarities between economic and social spaces. Evolutionarily, it has been part of human history in the world and the formation of territories. Although initially consumption was seen merely as an activity aimed at the survival and subsistence of the local population, ever since it began to serve as a synonym for status, happiness, self-esteem, and well-being, the environment has gradually suffered from this change due to the exponential increase in production across various sectors as shown in Figure 1.

Historically, as a consequence of increased human movements and occupation, there is evident an increase in waste generation in the environment. Although these wastes have been produced since ancient times by various productive activities, they were essentially composed of organic remains, allowing the environment to assimilate them quickly and without harming natural resources.

As the global population and its consumption needs increase, a new process becomes evident, that of man exploiting man, characterized by intense commercialization of people, mostly of African origin to various territories, for areas of production and economic growth. However, according to Guimarães (2011), the difficulty in accessing primary resource sources in the 15th and 16th centuries tends to minimize, among other analyses, those concerning the slave trade during this period.

Figure 1: Evolution of Territorial Development Theory: From Subsistence to Economic Development



Source: authors, 2020.

Since the Second Industrial Revolution, which began in the mid-19th century, production has been carried out on a large scale, offering an increasingly large number of new products and generating a plethora of different types and forms of waste and discarded packaging, especially in urban areas (Morejon et al., 2011). At that time, industries began to use large amounts of natural resources to supply their factories and meet the demands of an increasingly consumerist market, as a result of the prevailing ideology that promoting consumerism was a way to increase production and the country's wealth (PEREIRA AND CURI, 2013). Thus, the increase in population coupled with the increased need for food and consumer goods production leads to the transformation of raw materials into new products and, consequently, greater quantities of waste, both in the industrial production process and post-consumption.

As a result of changes in the form and scale of production, brought about by the mass production model worldwide, a movement of concern for environmental issues began in the mid-1960s. Factors arising from industrialization processes, spatial concentration, agricultural modernization, population growth, and

urbanization were the main pressure points on the extraction and use of natural resources, as well as on human awareness of global environmental issues.

During this period, according to Abramovay (2012), the economic growth process of goods and services production is increasingly dismissed as the universal path to well-being and quality of life for contemporary societies. Advances in this direction must take into account, beyond economic and social characteristics, the fact that climatic balance, biodiversity, and the very supply of materials and energy by nature may be seriously threatened if current resource exploitation and economic growth conditions are maintained. From this context, the need for greater attention, discussion, and studies on the environmental issue emerged on the agenda of global researchers.

In conjunction with this scenario, the emergence of the environmental movement, in which the depletion of natural resources, energy dependence on infinite resources, and the environment in general, became a topic of economic, political, and social importance. In addition to the expansion of the scale of human activities, the evolution of the economic system, as it has been occurring, has led the world into an era in which natural capital, in place of manufactured capital, becomes the limiting factor of economic development. Thus, environmental criticism, initially emerging in scientific and environmental circles, is progressively entering the field of economic science (AMAZONAS, 2021).

In addition to the environmental imbalances resulting from human intervention in the environment, the industrial revolution, based on the intensive use of large reserves of fossil fuels, paved the way for an expansion in the scale of human activities that heavily pressures the planet's natural resource base (ROMEIRO, 2010). At this point, reconciling the demands of the development process with the preservation and regeneration of the most important ecosystem services upon which human societies depend would only be possible with a change in the management of materials and energy that support current production systems (ABRAMOVAY, 2012).

With increasing population, production, and waste generation, post-modern society, considered post-industrial, has exerted unprecedented pressure on natural resources. This demand for virgin resources for production on an ever-increasing scale has put at risk not only the ecosystems affected by this process but also the very fate of humanity, compromised by unsustainable production and consumption patterns. This points to a conflict, if not a potential incompatibility, between economic growth and the preservation of the environment and environmental quality, which could ultimately impose limits on the continuity of economic growth itself (AMAZONAS, 2021).

Aligned with this process, from the mid-1940s, economic and social improvement became one of the major concerns of leaders who, through colonial relationships, extended this concept to the world's poorer nations. In this context, the United Nations (UN) was established in October 1945, an international arrangement formed by countries that voluntarily proposed to work for global development. This concept guided government efforts in various countries in pursuit of development until the 1960s.

However, the development and well-being of populations were measured primarily by substantially economic indicators, a more restricted view of traditional

developmentalist theory, which identifies development with the growth of Gross National Product (GNP), increases in personal incomes, industrialization, technological advancement, and/or social modernization (SEN, 2000). As a result, there is criticism towards the prevailing economic development models, pointing out the incompatibility between conventional economic growth processes and the long-term survival of the human species, considering economic development merely as an analysis of production growth in a region.

Thus, theoretical advances have started to consider, in addition to economic and social characteristics, the climatic balance, biodiversity, and the supply of materials and energy by nature, which can be seriously threatened under current global economic growth conditions. As a result of this scenario, by the end of the 1960s/70s, the emergence of the environmental movement and the oil shock made natural resources, energy, and the environment in general a matter of social, political, and economic importance (AMAZONAS, 2021; ABRAMOVAY, 2012).

In this environment, there was a growing discrediting of the central government's ability to lead a sustainable development process, strengthening the belief in local development plans based on bottom-up planning, built participatively and supported by local social capital (ORTEGA, 2007).

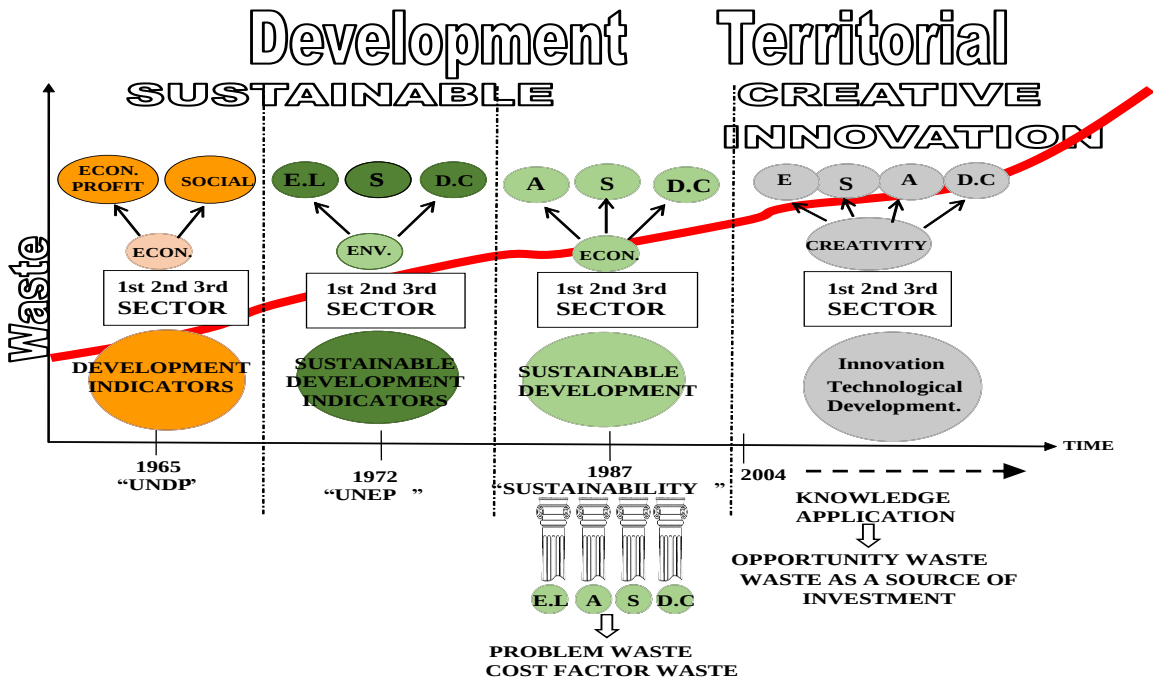
According to Corrêa (2009), territorial structures were adopted in European countries before their own industrialization process. In this context, the existence of relationships between local actors; between them and the representatives of the territories, and between these and the national states, became evident. This coordination deepened as countries advanced technologically.

To this end, in 1965, the United Nations Development Programme (UNDP) was created, focusing on the development of capacities, science and technology, modernization of the state, strengthening its institutions, combating poverty and social exclusion, environmental conservation, and sustainable use of natural resources. This relationship was exposed in the theoretical scheme presented in Figure 2.

From 1970, a more forceful debate began about the profile of the policies to be adopted for the development of a given locality and, considering European and North American experiences, the idea that the development of a space partly depends on the level of organization of its society in relation to the objectives that are common to them deepened. These experiences paved the way for what became known as the "territorial approach" (CORRÊA, 2009).

In 1972, the UN convened the United Nations Conference on the Human Environment in Stockholm (Sweden), and as a consequence, the General Assembly created the United Nations Environment Programme (UNEP) in the same year, alerting to crucial issues such as energy, sanitation, pollution, health, environment, and population growth. Following the paths of growth and how humanity pursued its goals, it was suggested at the time that the economic model then practiced had a limit to its growth. A new type of development, "Ecodevelopment," was suggested, which would seek to reconcile economic development with ecological prudence and social justice, thereby strengthening public awareness of environmental problems.

Figure 2: Evolution of the Theory of Sustainable Territorial Development to Creative Innovation



Source: authors, 2020.

In 1982, the Nairobi Conference was held in Kenya, where the World Assembly of States convened to express great concern about the current state of the environment worldwide and to acknowledge the urgent need to intensify efforts to protect and improve it. As a result, the World Commission on Environment and Development was established in 1983. In 1987, this Commission published the report "Our Common Future" — also known as the "Brundtland Report" — which included among its main recommendations eco-efficiency based on the four pillars of sustainability: economic, social, environmental, and cultural diversity. At that time, the concept of "sustainable development" emerged clearly and definitively, defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WORLD COMMISSION ON ENVIRONMENT, 1991).

Analogous to the eco-development thinkers, the authors of the report considered that the environmental risk of economic growth should be taken seriously, a concern that is expressed in the defining motto of what should be understood as sustainable development. Thus, it can only be achieved with a set of policies capable of simultaneously ensuring an increase in national income, access to basic social rights (economic security, access to health and education), and the reduction of the impact of increased production and consumption on the environment (ROMEIRO, 2011).

Previously, the trajectory of businesses was exclusively based on extraction, production, consumption, and disposal, which gave the economy a linear form in processes. With broad technological development, the expansion of the scale of production, and the extensive use of fossil fuels in the production process, which significantly impacted the environment, it began to supply a greater quantity of

inputs, as well as an increase in the generation of waste. Environmental impacts began to be perceived by different social classes, understanding that resources were finite and fundamental for the maintenance of planet Earth and industrial production, as well as impacting the quality of life of society.

Following the evident relevance of the environment in economic processes, two forms of thought emerged within environmental economics: environmental economics and ecological economics, which elevated the debate to a new level regarding two fundamental aspects: (a) the treatment of environmental risk, and (b) the trade-off between economic growth and the environment.

In the paradigms of Environmental Economics, the environment is simultaneously a supplier of material resources and a receptor of waste, which caused economic analysis to concern itself with issues related to the increasing scarcity of resources as well as pollution generated by the process resulting from this economic system. The economic system began to be seen as the main source of pressure on the environment, necessitating that mainstream economic analysis provide answers to its traumatic relationship with natural systems. In the face of this productive process, neoclassical economic thought did not envision the environment as a limiting factor of economic growth, but rather as a provider of inputs and receptor of final resources (PROENÇA, 2018).

On the other hand, Ecological Economics, through an innovative perspective on the economic and environmental process, understands that environmental problems lie in the form of societal development, creating a critical view on the perspective of environmental economics, since it did not consider in its analyses the interrelations that currently exist in society.

According to Amazonas (2021), Ecological Economics is founded on the principle that the functioning of the economic system, considered at broader temporal and spatial scales, must be understood through the conditions of the biophysical world on which it operates. Thus, it is from this world that the energy and raw materials for the economy's functioning are derived. Since the economic process is also a physical process, physical relationships must be part of the economic system's analysis, without which it would be incomplete. Consequently, the nature of the problem involves both economic and biophysical elements. Indeed, the disregard or minimal importance attributed to the biophysical attributes of the economy in conventional economic models has been a primary point of critique and motivation for Ecological Economics.

According to the author, this theory acknowledges the importance of markets but advocates for the regulation of these markets to better allocate environmental goods and services. Factors such as the lifespan of consumer goods and their unequal social utility demonstrate excessive consumption that directly impacts available natural resources. Despite its motivations and foundations returning to the development of the Environmental Issue, Ecological Economics only established itself as a more effective thought movement in the 1980s, with the founding of the International Society for Ecological Economics (ISEE) in 1988 and the creation of the journal *Ecological Economics* in 1989.

It is evident that economic development, population growth, urbanization, and technological revolution have been accompanied by changes in lifestyle and modes of production and consumption. As a direct consequence of these

processes, there has been an increase in the production of solid waste, both in quantity and diversity, especially in large urban centers, containing in their composition synthetic elements dangerous to ecosystems and human health due to new technologies incorporated into processes.

For Galante et al. (2011), the way society produces surpluses, accumulates capital, and consumes causes profound changes in the climate, the landscape, and the quantitative and qualitative availability of natural resources. Thus, rethinking this model is to consider how these resources are used and allocated by the productive structure and society, in order to contain their deterioration (and the resulting costs), as well as to prolong their availability. Hence, the proper management of Waste emerges as challenges/goals to be achieved to minimize the negative impacts caused by the generation of waste from various sources. Such solutions can occur through better use of materials and/or through the implementation of programs aimed at recycling, industrialization, and processing of waste.

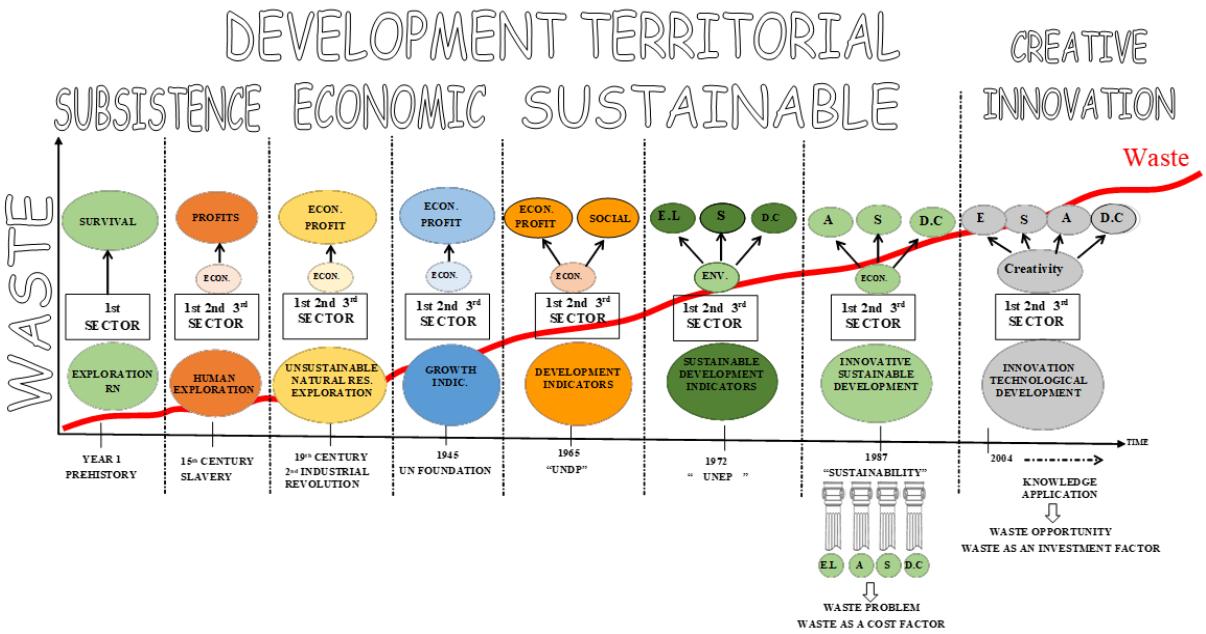
Permeating this entire process, there is the innovation of productive processes and the evolution of the listed theories, as the demands and needs expressed by the population over the years determine the directions to be followed, as well as the current economic scenarios. Thus, the concept of development has moved from a reductionist approach, focused on economic and social characteristics, to a broad and interdisciplinary concept, encompassing environmental variables and cultural diversity beyond these.

As a result, the conception of an environment conducive to sustainable and innovative territorial development is evident, with the capacity to create means and mechanisms for modifications to the traditional productive system, as well as the possibility of introducing new raw materials into processes, based on the utilization of waste, primarily. This relationship was expressed in the theoretical scheme presented in Figure 3.

Through innovation, mechanisms are sought to ensure that materials used in industrial and commercial processes, viewed as technical or biological nutrients capable of perpetually entering metabolism cycles, effectively eliminate the concept of waste. By applying knowledge in specific areas, the potential for waste utilization can be enhanced, transforming it from a problem and cost factor into an important source of investment and opportunity for sustainable business models.

In this proposal, the economic variable is one of the main attractors for individuals, while also having positive impacts on the environment and society. Therefore, the aim is to transform an environmental problem into a source of opportunities for new business models, in which waste is considered raw materials and/or inputs for industrial processes. Thus, waste becomes an important source of income, products, and allows for the reduction of the use of natural resources and environmental degradation.

Figure 3: The Evolution of the Theory of Creative and Innovative Sustainable Territorial Development from a Historical Perspective



Source: authors, 2020.

Eco-efficiency can be achieved by offering goods and services at competitive prices that meet human needs and promote quality of life. At the same time, it reduces environmental impacts and the intensity of resource use throughout the lifecycle of the good or service, to levels commensurate with Earth's carrying capacity. This project encompasses the application of aspects such as Cleaner Production (CP), which works with eco-efficiency, advocating technical rationality in mitigating environmental impacts and risks to human health arising from industrial activities, agriculture, and urbanization. It also considers the risks that pollution eliminates in production processes, contributing to a structural and institutional change in the new avenues of research and technical implementation of actions aimed at reducing/mitigating the economic, social, and environmental impacts generated by waste generation (PROENÇA, 2018).

In this scenario, waste management involves a concept of circularity in production and utilization, where sustainability is considered an essential condition for survival on the planet. Thus, scholars in the economic field have been working to address sustainable development from a circular perspective, that is, one that allows a real intersection between business, the environment, and society, considering natural resources as finite and production systems more efficiently balanced between material flows and processes. In this regard, the concept of a circular economy, developed in the 21st century in China, has been seen as quite innovative in considering new ways to manage production processes, evaluating aspects such as material management, product durability, and eco-design, for example.

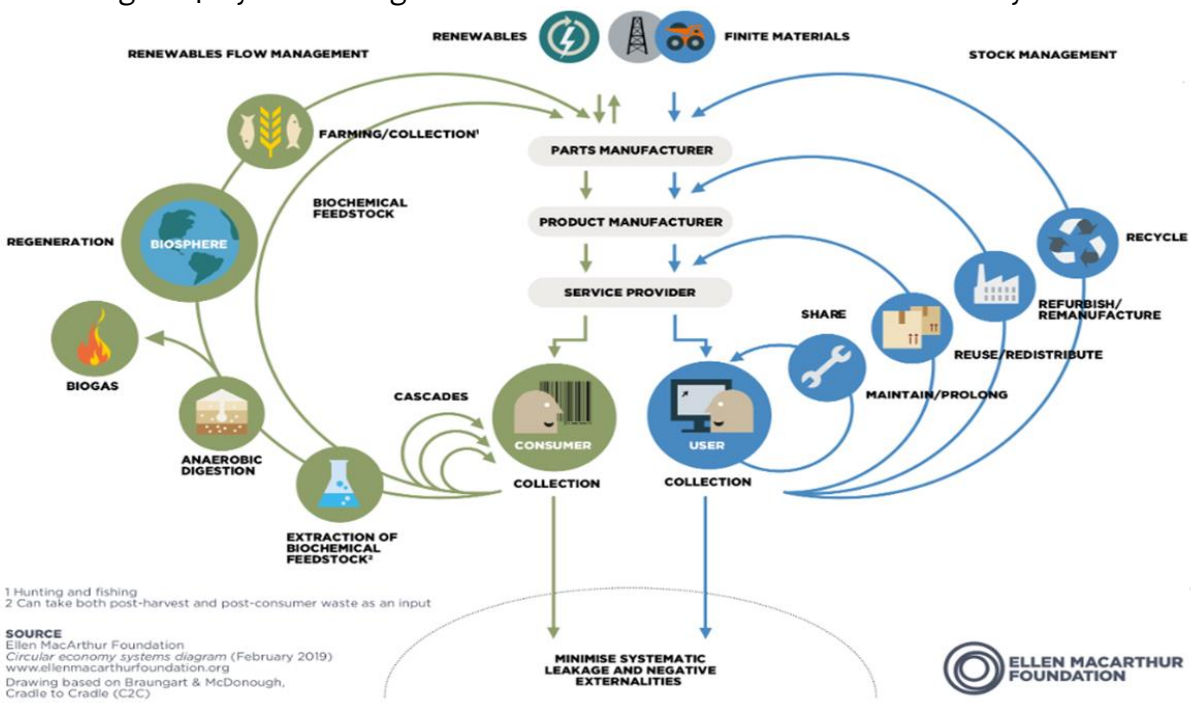
From this period, discussions began in Europe on the topic, and social organizations such as the Ellen MacArthur Foundation and Circle Economy, founded in 2010, introduced the concept of a circular economy to various economic actors. They also compiled case studies on the subject and possible practical solutions for

implementing the new economic model in productive sectors (ELLEN MACARTHUR, 2016).

The concept of a circular economy, still quite recent and under development, aims to decouple economic progress from the use of finite natural resources, reducing the need to extract virgin reserves from nature to feed new cycles of production, consumption, and material loss (SANTIAGO, 2015). Thus, a new format for managing materials, inventories, and resources becomes necessary, extending their useful life and reducing the high socio-environmental impact present both in the extraction of raw materials and in the production process and waste generated by them. Therefore, understanding the interconnection between economic models along with the flow of materials and energy, as well as the resilience of ecosystems, forms the foundation of circular economy thinking (ELLEN MACARTHUR FOUNDATION, 2016).

To highlight this relationship, the Systemic Diagram of the Circular Economy definition was presented in Figure 4. As outlined, this new relationship seeks to rebuild capital, whether financial, manufactured, human, social, or natural. This ensures enhanced flows of goods and services, represented by the systemic diagram, which illustrates the continuous flow of technical and biological materials through the 'value circle'.

Figure 4: Systemic Diagram of Material Flows in the Circular Economy



Source: Ellen Macarthur Foundation, 2019.

Such a perspective will be achieved by promoting the three principles that govern the circular economy: preserve, optimize, and stimulate. The first principle—preserving and enhancing natural capital—is dedicated to controlling finite stocks and balancing the flows of renewable resources.

The second aims to optimize resource yields by circulating products, components, and materials in use at the highest utility level at all times, both in the

technical and biological cycles. And, the third principle contemplates stimulating the system's effectiveness by revealing and eliminating negative externalities from the start of the production system. It is evident that, in a circular economy, economic activity contributes to the overall health of the system. The concept, based on the principles of preservation and enhancement of natural capital, optimization of resource production, and fostering system efficacy, recognizes the importance of the economy functioning at any scale—for large and small businesses, organizations, and individuals, globally and locally. However, the transition to a circular economy is not limited to adjustments aimed solely at reducing the negative impacts of the linear economy. It represents a systemic change that builds long-term resilience, generates economic and business opportunities, and provides environmental and social benefits.

The third principle aims to enhance system effectiveness by identifying and understanding negative externalities through the application of the ReSOLVE Principles: regenerate, share, optimize, and return. Thus, the transition from linear to circular logic involves analyzing business model innovation opportunities for companies, enabling the creation of better processes, products, and services, and expanding the value proposition by capturing lost and unrecognized values by all stakeholders (CNI, 2018). However, even though the application of the mechanisms outlined for the circular economy may allow for potential cost reductions in the production chain, generate value, attract investments, and stimulate innovation in the coming decades, there are many challenges to its implementation. Among them, there is a need for flexible and decentralized production, organized in networks with the application of innovative and cooperative knowledge. According to the National Confederation of Industry (CNI, 2018), companies attempting to implement circular economy measures in Brazil face fiscal and regulatory difficulties that hinder full and large-scale adoption. However, this scenario presents more promising prospects given the social and economic appeal linked to sustainability and the cooperation strategies necessary for its implementation, based on the construction of a participatory territorial development.

In this context, the National Policy on Solid Waste (PNRS), regulated by Federal Law No. 12.305/2010, prioritizes recycling (the transformation of waste involving changes in its physical, physicochemical, or biological properties, aiming to transform these into inputs or new products), reverse logistics (a tool of shared responsibility for the life cycle of products), appropriate final disposal of waste, the elimination of open dumps by the end of 2014, and the social inclusion of recyclable material collectors. These elements align with the premises of the circular economy, linking issues of reduction, reuse, recycling, and recovery. The circular economy aims to transform waste into resources and return them to production and consumption systems, yet it remains very limited to research centered on this aspect. It is based on closed loops through different levels of material and product recovery in useful services by resource efficiency. This involves understanding urban development from a complex perspective (SILVA, 2019).

While the circular economy is achieved by increasing added value and prudent use of raw materials and energy at all stages of the value chain, according to the CNI (2018), among the challenges for its implementation, the loss of competitiveness stands out, due to the cumulativeness of taxes. Under the current

rules of the indirect taxation system in Brazil, it is possible for taxes to be charged more than once on the same added value. Thus, recycled and remanufactured products, due to the characteristics of their production chains, may suffer more tax cumulativeness and have higher tax costs than virgin materials of the same value. As a main consequence, tax cumulativeness, which harms the entire Brazilian economy, is particularly detrimental to remanufacturing and recycling, which have production chains with many small companies.

Another fiscal problem faced by reverse logistics chains is the need for invoices with product values for waste transportation. For tax control purposes, the transportation of materials between states occurs only with invoices detailing the value of the goods and the taxes to be collected. In the case of waste, this is not possible as they are not purchased, but collected after being discarded without market value. Thus, companies that collect them do not have an invoice that identifies their value. Often the value of the material to be recovered is only assessed after the separation, treatment, and reconditioning of these wastes to return them to the market. A simplified fiscal document is needed for waste transportation, which identifies it as cargo without a defined market value. This could be implemented through a self-declaratory instrument, specifying the nature, origin, and destination of the cargo, without the need to declare market value or due taxes.

Another obstacle to the circular economy is the imposition of inhibitive regulations on new business models that facilitate their implementation. Finally, the dissemination of circular economy principles also suffers from a lack of knowledge by government agents, the population, and companies about their opportunities and benefits. In the case of companies, those that utilize circular economy principles can reduce their costs and expand their market—whether by reaching environmentally conscious consumers or by exporting their products to markets where regulations promote the purchase and sale of sustainable products—will be more willing to make the necessary investments to adapt their products and business models to circular principles.

As highlighted by SILVA (2019), the circular economy represents a recent attempt to integrate economic activity associated with the use of natural resources in an environmentally responsible manner into a development process. In this process, one of the nations that has most developed and implemented policies to apply the concepts of the circular economy is China, where the implementation of the concept was distributed across activities focused at three levels: companies, industrial parks, and regions. The planning essentially involved translating the principles of the 3Rs into local actions.

However, the author emphasizes that the concept and practice of the circular economy are neither hegemonic nor devoid of criticism. There is a need to develop the circular economy from a global dimension agreement, aiming to avoid risks in this process by not tracking the origin and treatment of some raw materials that could compromise or even create social costs in the process beyond the environmental gains, which would no longer sustain the circular economy as an alternative for a sustainable development process.

In addition to this scenario, the importance of implementing the Innovation Law No. 10,973/2004, in Brazil, becomes evident when there is a need to expand the

concept of economic circularity. The results of a linear economy show that between 80 and 90% of what is consumed becomes waste for final disposal or incineration within less than 12 months, and 20% of the extraction of natural resources becomes waste each year for the same purpose (NEWMAN, 2016).

However, according to SILVA (2019), there is an institutional void regarding the development of the circular economy, which places the waste industry at the center of these changes and opens a window of opportunity for new public policies and new legislation consonant with this theme. In this aspect, cities denote a conducive environment for such discussion by materializing the circular economy in a territory that delineates agents and interests through economic, social, cultural, and political relations, around the same institutional environment, whether formal (norms and rules) or informal (conducts and morals), as per North (1991).

Thus, highlighting the need for discussion for the implementation of a multicircular economy, prevailing the innovative character of urban solid waste management and in production processes, through endogenous and exogenous regional analysis, contemplating the construction of a development model that considers the need for a comprehensive territorial development planning method, from the municipality/state/country and subject to extracontinental expansion. In this regard, the concept of a multicircular economy must involve economic, social, and environmental issues both locally and globally.

As Silva (2019) emphasizes, it is not only about a politically coordinated action of the public sector, but also of the government, which is important to direct and stimulate innovations through strong planning between research and development aligned with the process of public procurement. This way, a set of actions is aligned at different levels (macro, meso, and micro) of circular economy practice structure linked to different governmental strategies and actions for promoting cities.

Thus, the denial of current development policies, centered on the top-down planning model that disregards the opinions of the local society with respect to projects formulated by the central government, becomes evident. In this environment of democratic struggle, the discredit in the capacity of the central government to lead a sustainable development process was consolidated, strengthening the belief in local development processes based on bottom-up planning, constructed participatively and supported by local social capital (ORTEGA, 2007).

Therefore, experiences of territorial development and multicircular economy have gained greater expression in a more hegemonic vision of building autonomous productive arrangements. As a result, a new Innovative Territorial Development Model will be achieved, in which wastes will be properly separated and utilized, identifying a new market economy system where Wastes would become sources of raw materials for production processes in the three sectors of the economy (primary, secondary, and tertiary) and demonstrating that the problem of waste generation can be transformed into a sustainable local business model.

3 FINAL CONSIDERATIONS

From the prospective research, it was possible to present a new paradigm of territorial development, which was systematized through a scheme that lists the evolutionary phases that support the new nomenclature of sustainable and innovative territorial development in which the environmental issue is a positive consequence resulting from the new way of operating the economic system.

Although proper waste management is initially seen as a challenge/goal to be achieved to minimize the negative impacts caused by the generation of waste from various sources, the application of diverse knowledge can enhance the capacity to utilize waste, transforming it from problem factors and cost into a significant source of investment and opportunity for innovative businesses.

In this scenario, the concept of development has shifted from a reductionist approach focused only on economic and social characteristics to a broader concept that includes environmental and cultural diversity variables. As a result, the conception of an environment that enables sustainable and innovative territorial development becomes evident, with the capacity to create means and mechanisms for modifications to the traditional production system, based on the possibility of introducing new raw materials into processes, primarily based on waste utilization.

The implementation of new waste management models, based on different methods and technologies in the stages of collection, transportation, utilization, and final disposal of waste, supported by case studies, demonstrated the technical and economic viability of the proposal, in which waste is no longer a cost factor but an investment opportunity.

In this setting, the economic variable is one of the major attractions for individuals, while also having positive impacts on the environment and society. Therefore, the intention is to transform an environmental problem into a source of opportunities for new business models, in which waste is considered raw materials and/or inputs for industrial processes.

Consequently, the Circular Economy becomes a tool in implementing an economic model that reconciles accelerated growth with improved social and environmental performance, leading to the real implementation of sustainability in business management, moving from theoretical discourse to practical experience that can be applied and extended to other basic industry sectors.

Thus, the feasible path, in the short term, for the existence of concrete actions of a circular economy in Brazil would be to unite government, businesses, and consumers, starting from a general awareness that this economic format not only benefits the environment but also provides lower operational costs, production, and competitiveness, as it results in efficient use of energy and natural resources.

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