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Sustainable Development as a Catalyst for a New Paradigm for Regional Growth

Mariane Beatriz Wittmann
Universidade Federal de Santa Maria UFSM – Santa Maria – RS – Brasil
ORCID: https://orcid.org/0000-0002-7641-7609

Marcelo Trevisan
Universidade Federal de Santa Maria UFSM – Santa Maria – RS – Brasil
ORCID: http://orcid.org/0000-0002-2403-7970

Lucas Veiga Ávila
Universidade Federal de Santa Maria UFSM – Santa Maria – RS – Brasil
ORCID: https://orcid.org/0000-0003-1502-258X

Abstract:
Regional development often faces a lack of integration between environmental and social dimensions. In this context, this article explores territorial development in association with sustainability, proposing it as a starting point for a new paradigm of regional growth. The objective is to identify proactive development practices and propose sustainable actions, based on bibliometric research on the term "sustainable development". The methodology adopted is qualitative, exploratory, and descriptive, aiming to reflect and provide relevant information on the topic. The bibliometric analysis focused on the identification of theoretical and methodological references and central themes in studies selected between 2020 and 2024, from the Web of Science platform, using the term "sustainable development*". After applying filters, four articles were analyzed. A common point among the studies is the search for solutions that minimize negative environmental impacts. As a result, the article proposes actions that promote efficient practices to mitigate the effects of human activity, with an emphasis on public governance policies that involve the participation of local and regional actors.

Keywords: Territorial development. Regional development. Sustainable development. Environment

Desenvolvimento sustentável como catalisador de um novo paradigma para o crescimento regional

Resumo
O desenvolvimento regional frequentemente enfrenta a falta de integração entre as dimensões ambientais e sociais. Nesse contexto, este artigo explora o desenvolvimento territorial em associação à sustentabilidade, propondo-o como um ponto de partida para um novo paradigma de crescimento regional. O objetivo é identificar práticas de desenvolvimento proativo e propor ações sustentáveis, com base em uma pesquisa bibliométrica sobre o termo "desenvolvimento sustentável". A metodologia adotada é qualitativa, de caráter exploratório e descritivo, visando refletir e fornecer informações relevantes sobre o tema. A análise bibliométrica concentrou-se na identificação de referenciais teóricos, metodológicos e temas centrais em estudos selecionados entre 2020 e 2024, a partir da plataforma Web of Science, utilizando o termo "desenvolvimento sustentável*". Após a aplicação de filtros, foram analisados quatro artigos. Um ponto comum entre os estudos é a busca por soluções que minimizem os impactos ambientais negativos. Como resultado, o artigo propõe ações que promovem práticas eficientes para mitigar os efeitos da atividade humana, com ênfase em políticas públicas de governança que envolvam a participação de atores locais e regionais.

Palavras–chave: Desenvolvimento territorial. Desenvolvimento regional. Desenvolvimento sustentável. Meio ambiente.

1 Introduction

Urban growth has always been associated with the historical evolution of economic development, which has sought to demonstrate reasons why some territories progress and are considered more dynamic than others, considering the scenario of social, economic, and environmental inequality (SERAFINI et al, 2022). In this context, the aim is to identify strategies and patterns that promote the development of certain regions, aiming not only to increase income but also to effectively improve the living conditions of the population, which represents a global sustainability challenge (BIANCO, MOREJON, 2024).

The context of development has gained ground in debates on economic, social, political, and environmental sustainability, being seen as a multidisciplinary concept. In this context, development is associated with the progress of regions and countries and with population growth and urbanization, driving changes in behavior patterns, especially in developing countries such as Brazil (RANIERI et al, 2022). But how can we define the concept of development?

Initially, development was considered synonymous with growth, with a developed country being considered one with better economic indicators. However, over time, other aspects were incorporated, such as quality of life, income distribution, and demographic indicators based on the construction of economic and social equity parameters. In this scenario, economic development is analyzed alongside improved quality of life, including, according to Vasconcelos and Garcia (1998, p. 205), "the allocation of resources across different sectors of the economy to improve indicators of economic and social well-being (poverty, unemployment, inequality, health conditions, food, education, and housing)." Therefore, economic metrics must include factors related to quality of life, which has been the subject of growing academic and political interest, especially as global challenges such as social inequality, climate change, and health crises continue to impact society (ONOCKO-CAMPOS, 2023).

This development dynamic triggers the urbanization process, which often occurs uncontrolled in inappropriate areas. Combined with a lack of planning, ignorance of appropriate construction techniques, and poor land preparation and occupation, it causes disasters through natural processes that affect populations and their homes in areas unsuitable for occupation (VILLANOVA, et al, 2024). As a consequence, deforestation, soil impermeability, and improper waste disposal occur, which ultimately worsen recurring hydrological disasters, such as floods, inundations, and floods (PEREIRA, MIRANDA, 2023).

Floods occur due to climate change, which interferes with the recurring rise in river water levels, causing water to overflow and flood roads, homes, and businesses, which in turn causes financial losses to the local economy. This scenario creates challenges involving relationships between humans and practices that influence the occurrence of climate change (PEREIRA, MIRANDA, 2023). The geographic space/territory, associated with economic dynamics, correlates with endogenous and exogenous factors. Endogenous factors, therefore, are directly related to interventions arising from the local base resulting from the actions of citizens or civil society organizations. Exogenous factors, therefore, are external to the reference space due to actions by the State or private initiatives from other regions, such as the "butterfly effect," which, in complexity theory analyses, takes us to the limits of chaos and the universality of intercurrences (LUKOSEVICIUS, et al, 2016).

In this context, when analyzing territorial space, one must consider the universality of actors, such as the role of the State, comprising the Union, States, and Municipalities, together with local actors in promoting public policies for development and economic and social stimulation of the regions (MARQUES, RIBEIRO, 2019). In turn, society is responsible for directing the other actors, possessing the capacity for collaboration and social interaction, with dynamic action within the territory and context of the region.

When analyzing the role of the State and society in territorial development, performance indicators should be based not only on economic variables but also on those related to the environment in the context of interaction with human beings (ONOCKO-CAMPOS, 2023). With a systemic view of the regional development process—that is, encompassing economic, social, and environmental aspects —it is possible to more closely approach this research problem by addressing both endogenous and exogenous variables.

To prevent and mitigate the likelihood of environmental consequences, it is necessary to seek tools and mechanisms that enable the effective use of territorial space. To this end, this study aims to identify proactive development practices by proposing sustainable actions based on bibliometric research involving the term sustainable development.

This study's approach is relevant given the environmental challenges associated with climate change, which entails not only environmental but also economic, social, and territorial governance losses. Therefore, the study is justified by its focus on the three dimensions of analysis: social, economic, and environmental.

To this end, this article is organized into five sections. The first introduces the discussion and initial context addressed in the study. The second section presents the theoretical framework of regional development and sustainable development, which encompasses the main definitions and concepts of environmental, social, and

economic development. Subsequently, the methodological procedure used for the study is presented, which consisted of a bibliometric survey, descriptive, exploratory, and qualitative. Finally, the analysis of the results and concluding remarks are presented.

2 Regional development

Regional development is a concept that seeks to reduce economic and social inequalities between different territories. This process not only aims to improve living conditions and promote social justice but also becomes essential for strengthening a nation's territorial cohesion and economic stability (COSTA, FAVARETO, 2023).

According to Haddad (1989), regional development presupposes interventions aimed at reducing spatial inequalities, taking into account local specificities, such as natural resources, human capital, and infrastructure. The logic is that growth concentrated in isolated hubs, such as large urban centers, deepens economic asymmetries, hindering the integration of the national territory.

Swedish economist Gunnar Myrdal introduced the concept of "circular and cumulative causation" in his book *Economic Theory and Underdeveloped Regions* (1957), to explain why some regions develop more rapidly while others remain stagnant (MYRDAL, 1957). Economist Albert O. Hirschman, in his book *The Strategy of Economic Development* (1958) contributed the concept of linkages, which complements Myrdal's view. These authors' ideas remain relevant, especially in countries with significant regional disparities, such as Brazil. They reinforce that the absence of the state tends to reinforce inequalities and encourage public policies to attract investment in less developed regions.

In this sense, one of the pillars of regional development is the formulation and effective implementation of public policies adapted to the specific characteristics and needs of each territory. While metropolitan regions can benefit from investments in infrastructure, security, and technology, rural areas may need support for agricultural development and improvements in education and health. Tax incentive programs, infrastructure investments, and support for small and medium-sized businesses are some of the strategies that can be adopted to stimulate regional development. Combined with the development of social capital and administrative decentralization, these strategies can allow territories greater autonomy to make decisions that reflect their local realities (PUTNAM, 1996).

Beyond public policies, innovation plays a crucial role in regional development (IPEA, 2023). Regions that successfully implement advanced technologies and promote research and development tend to experience faster growth. This can range from establishing incubators and technology parks to fostering collaboration between universities and local businesses, encouraging access to digital technologies, and promoting science and technology education, which are essential to preparing future generations for a constantly evolving job market. Furthermore, training the local workforce can help create a more competitive and attractive environment for investment through regional interaction and cooperation (CRUZ, SARTORI, 2023).

Effective regional development must promote inclusion and social equity to ensure that all groups in society have access to the opportunities and benefits of

economic growth, associated with reducing disparities between different social and economic groups, and creating a solid foundation for sustainable progress. In this future, implementing training programs, promoting gender equality, and eliminating barriers for marginalized groups are important steps toward achieving greater equity. Furthermore, the active participation of local communities in the development process can help ensure that initiatives are truly inclusive and beneficial to all (CRUZ, SARTORI, 2023; SERRA, et al, 2021).

In this context, regional development is a complex process that requires an integrated approach adapted to the particularities of each region (GALVANESE, 2021). By adopting strategies that promote innovation, sustainability, inclusion, and equity, it is possible to create a more just and prosperous future for all areas of a country. Success in this field depends not only on the actions of governments and businesses, but also on the active involvement of civil society and collaboration between different actors. In this context, the next topic presents the approach to regional development within the field of sustainability, contextualizing environmental definitions and challenges.

3 Sustainable regional development

Sustainable regional development emerges as one of the most promising approaches to addressing contemporary challenges, balancing economic growth with environmental preservation and social justice (INÁCIO, 2013). This concept is not limited to promoting a strong economy, but integrates the need for a healthy environment and cohesive communities, ensuring that today's progress does not compromise future generations (LIMA, 2021).

Sustainable regional development is an integrated process that aims to foster economic growth, improve the quality of life of local populations, and protect the environment (BUARQUE, 2006). Unlike development models that prioritize economic growth at any cost, the sustainable approach considers the regenerative capacity of natural resources and social equity as essential foundations (DASGUPTA, 2022). Thus, it is possible to understand that sustainable regional development encompasses three important integrated areas: economic, environmental, and social (Figure 1).

Figure 1 – Key elements of sustainable regional development

Source: Alvez Filho (2003).

The economic dimension seeks inclusive and equitable growth, which involves supporting companies of different sizes, fostering innovation, and ensuring that the benefits of growth are distributed fairly and equitably. Strategies such as economic diversification and encouraging local and regional entrepreneurship are crucial to creating resilient regional economies.

Environmental sustainability involves the protection and responsible use of natural resources. This includes sustainable water management, proper waste management, and the occupation and preservation of local ecosystems. Projects that promote renewable energy and sustainable agricultural practices are essential to reducing the ecological footprint.

Finally, the social dimension focuses on improving quality of life and promoting equity. This includes ensuring access to basic services such as health and education, promoting social inclusion, and strengthening citizen participation. Investments in social infrastructure, such as community centers and community spaces, are vital to community cohesion and well-being.

Among the main challenges to sustainable regional development are economic inequality, environmental degradation, and the lack of adequate infrastructure. Implementing public policies that address these issues in an integrated manner is essential to overcoming the barriers to sustainable development. Furthermore, the opportunities for sustainable regional development are broad and include technological advancement and social innovation through the use of clean technologies and the adoption of circular economy practices , which offer ways to reduce environmental impacts and create employment. It is also important to emphasize that promoting partnerships between governments, the private sector, and civil society organizations can strengthen the implementation of sustainable initiatives.

To achieve sustainable regional development, it is important to adopt a systemic approach, given the complexity of interdependent relationships. These include participatory planning, involving communities in defining strategies and priorities to ensure solutions that meet local needs. Furthermore, education on sustainable practices and empowerment of the local population are priorities in the implementation and management of sustainable initiatives (COSTA, FAVARETO, 2023). Brandão (2011) emphasizes that sustainable regional development must consider the multiple scales of the territory and value local knowledge and actors as protagonists of the process. Table 1 illustrates the differences cited in the text, comparing regional development and sustainable regional development.

Sustainable regional development broadens the perspective by incorporating the principles of sustainability, prioritizing not only economic progress but also social equity, community participation, and environmental conservation. It is supported by integrated and participatory territorial strategies, valuing local resources and promoting a long-term vision. With a territorial and participatory approach, also called *bottom-up* , it is a planning and development model that starts from local realities, valuing the knowledge, demands, and participation of stakeholders within the territory itself, such as residents, associations, and producers.

In this context, sustainable regional development represents both a conceptual and practical evolution, proposing solutions that reconcile economic growth, social justice, and ecological balance. To this end, initiatives such as investments in renewable energy, efficient water resource management, and sustainable urban planning demonstrate how sustainability principles can be incorporated into regional development. Furthermore, promoting responsible business practices and protecting natural areas directly contribute to building a more balanced future, combining environmental preservation with the well-being of local populations.

Table 1 – Comparison between regional development and sustainable regional development

Aspect	**Regional development**	**Sustainable regional development**
Objective	Reduce territorial inequalities and promote economic growth in specific regions	Promote regional growth with economic, social and environmental balance
Emphasis	Economic: job creation, income and infrastructure	Multidimensional: economy, environment, social inclusion and local culture
Approach	Top- down (often centralized by the state)	Territorial and participatory (bottom-up), with the involvement of local actors
Associated Public Policies	Tax incentives, infrastructure, industrialization, Development Zones	Sustainable territorial planning, sustainable APLs , environmental conservation
Theoretical basis	Classical regional economics	Theory of sustainable development

Source: Alvez Filho (2003), Brandão (2011).

Therefore, sustainable regional development is a complex journey that requires collaboration between different actors and the integration of multiple dimensions, with public policies, Governance practices, and social participation. By adopting a balanced approach that considers economic, environmental, and social aspects, it is possible to build resilient communities and a more promising future for all. The pursuit of development that respects the planet's limits and promotes social justice is not only a responsibility but an opportunity to create a positive and legacy for future generations.

5 Methodology

This exploratory and descriptive study seeks to identify information on sustainable development and discuss the findings in line with existing literature. The research is qualitative and uses content analysis methodologies, with data extracted from academic databases, civil society organization websites, and public documents.

Web of Science (WoS) database, covering the period 2020 to 2024. The expression "sustainable development*" was used to ensure a precise search for the full term, with the asterisk (*) used as a wildcard to include both singular and plural forms. The search field called "topic" was chosen, which includes titles, abstracts, author keywords, and **Keywords Plus**. The search was conducted in Portuguese, aiming to analyze national publications and prioritizing primary sources.

Results from scientific articles that were not Brazilian cases were eliminated, which corresponded to the first filter, as shown in Table 1 . thus, through of that filter, suppressed you following articles : [1]" *Sustainability and women entrepreneurship through new business models: the case of micro franchises in post-peace agreement Colombia* "; [2] " *Resource nationalism and energy transitions in lower-income countries: the case of Tanzania* "; [3]" *Informality as a choice to do legitimate business: evidence from Peruvian women in times of COVID-19* "; [4] " *Smart governance strategies and their relationships with SDGs in three Latin American cities* " and [5] " *Special section* - Editorial: Sustainable Development Goals in Iberoamerica Editorial para seccion special: Sustainable Development Objectives in IberoamericaEditorial for the special section : Development Objectives Sustainable in Ibero- America ".

related to regional or local development were also eliminated, this being filter 2, as shown in table 1. Therefore , eliminated you articles : "[1] Panstrongylus geniculatus (Latreille , 1811) (Hemiptera , Reduviidae , Triatominae): first record on Ilha Grande, Rio de Janeiro, Brazil ; [2] "Local Biodiversity Supports Cultural Ecosystem Services in the Pantanal "; [3] " Comparison of two methods for determining Q95 reference flow in the mouth of the surface catchment basin of the Meia Ponte river , state of Goias , Brazil " and [4] " Predicting the potential distribution of aquatic herbaceous plants in oligotrophic Central Amazonian wetland ecosystems ". From these two filters was possible reach the four final articles, as shown in table 2.

Table 1 – Bibliometric research on "sustainable development"

Stage	Filter	Total articles
general research	"regional development"	13
filter [1]	Brazilian cases	8
filter [2]	unrelated to regional development	4

Source: Research data (Web of Science, 2024).

Table 2 – Articles maintained with the term "sustainable development*", in *WoS*

Smart Sustainable Cities : characterization and their impacts on the objectives of sustainable development
Mobility, participation and data: the case study of Waze for Cities Data in Joinville (SC)
Social Innovation in Urban Mobility Experiences: Analysis from the perspective of the Sustainable Development Goals
The contribution of the private sector to poverty alleviation programs: exploring business engagement in conditional cash transfers

Source: Research data (Web of Science, 2024).

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Once the data were collected, each article was analyzed to verify whether its objectives and results aligned with the proposed theme. The analysis focused on identifying the main references to the topics addressed, contributing to a deeper understanding of the relationship between sustainable development and regional practices.

6. Analysis of results

The four selected articles used a total of 261 references. The main areas of knowledge included management, environmental sciences, ecology, and green sustainable scientific technology. The authors with the highest number of citations among the selected articles were Gerardo Rivera Ungson, David Hudgens, Maria Alejandra Gonzalez-Perez, Yim -Yu Wong, Sara A. Wong, Fabiola Monje-Cueto, Armando Borda, Sada Soorapanth, who wrote the article [4] "The contribution of the private sector to poverty alleviation programs: exploring business engagement in conditional cash transfers ", according to table 3.

The scientific production was published in the following journals: [1] environmental management and sustainability journal; [2] URBE, Brazilian Urban Management Journal; [3] International Management Journal of Knowledge and technology and [4] management The Journal of the Iberoamerican Academy of management. Furthermore, the authors' main Brazilian institutions are the Oswaldo Cruz Foundation and the National Institute for Amazonian Research.

Each of the four articles identified by the bibliometric search was evaluated for its theoretical or methodological approach. The article with the highest number of citations among those selected using the filters, " The contribution of the private sector to poverty alleviation Programs: Exploring Business Engagement in

Conditional Cash Transfers aims to propose roles for companies in government programs to improve investment in human capital. Through cash transfers, companies have opportunities to alleviate poverty, address the United Nations 2030 Agenda (SDGs), improve the viability of conditional cash transfers, and explore new market opportunities.

The articles published on the topic of sustainable development in the 5 years analyzed were studies on: [1] sustainable smart cities about the Sustainable Development Goals (SDGs); [2] a case study in the city of Joinville on mobility and the use of the Waze application; [3] urban mobility comprising the SDGs and [4] the private sector with the use of poverty reduction programs.

a) [1] Sustainable Smart Cities about the Sustainable Development Goals (SDGs): This study focused on the concept of *Smart Sustainable Cities*, creating a correlation with the term sustainable development. The project sought to map technologies implemented in this concept of smart cities, identifying their benefits for sustainable development. To this end, the Methodi Ordinatio, a multicriteria methodology for systematic literature review (PAGANI *et al*., 2015; 2017).

Technologies mapped as fundamental for the development of *Smart Cities are based on information and communication technologies (ICT), as they enable interconnection between users and decision-makers, improving the provision of urban services. Therefore, the research presented as its main result that Smart* models *Sustainable Cities* help promote sustainable development by implementing digital technologies tailored to the needs of citizens.

The challenge of sustainable mobility in *Smart Cities* supports the importance of structured public governance, social participation, and the use of technology as a basis for sustainable urban mobility practices in smart cities (SANTA et al., 2024). Technological innovations that emphasize local governance demonstrate social impacts, such as greater inclusion, shorter travel times, and encouraging environmental sustainability (DE PAULA et al., 2024, PAIVA et al. (2021)

Emphasizing the role of universities and research centers in developing the interface between urban mobility and smart grids can transform the urban structure toward sustainability (DE ABREU, D'AGOSTO; MARUJO, 2024). Brazilian universities have distinguished themselves as living laboratories of urban innovation, promoting technological solutions and collaborative strategies essential for the development of sustainable smart cities. Neiva and Costa (2023) analyze the concept of "sustainable university cities," where institutions such as UFSC and the University of Hamburg work alongside local governments, businesses, and the community, generating initiatives that connect applied research to improving the quality of urban life.

b) [2] A case study in the city of Joinville on mobility and the use of the Waze program: this study sought to understand the Smart Mobility project, which was developed by the Secretariat of Urban Planning and Sustainable Development (Sepud) of the city of Joinville, Santa Catarina. The project is responsible for implementing the Waze for Cities Data program, with its mobility planning anchored in traffic data collected by the company Waze.

Table 3 – Articles, authors, and year of publication with the term "sustainable development*", in *WoS*

Articles	Authors	Year of publication
[1] Smart Sustainable Cities: characterization and their impacts on the objectives of sustainable development	Alana Corsi, Regina Pagani, Tiberius Bruno Rocha e Cruz, Fabiane Florencio de Souza, João Luiz Kovaleski	2022
[2] Mobility, participation and data: the case study of Waze for Cities Data in Joinville (SC)	Stella Marina Yuri Hiroki	2021
[3] Social Innovation in Urban Mobility Experiences: analysis from the perspective of the Sustainable Development Goals	Silvia Stuchi Cruz, Sonia Regina Paulino	2022
[4] The contribution of the private sector to poverty alleviation programs: exploring business engagement in conditional cash transfers	Gerardo Rivera Ungson , David Hudgens , Maria Alejandra Gonzalez-Perez, Yim -Yu Wong, Sara A. Wong, Fabiola Monje-Cueto , Armando Borda, Sada Soorapanth	2023

Source: Research data (Web of Science, 2024).

Like the first article, this one also uses Smart Cities concepts, associated with the application of Big Data in urban planning and public participation in incorporating information into technology projects. The main findings of the research include [a] Citizen participation. Using Waze leads to greater community engagement in collecting traffic data, contributing to a better understanding of local needs. [b] Real-time data. With this information, more accurate decision-making regarding traffic interventions and urban planning is possible. [c] Impact on mobility. Using Waze can help mitigate congestion problems, providing more efficient routes and promoting more sustainable mobility. However, it also presents implementation challenges. While the tool offers opportunities, there are also challenges, such as the need to ensure data quality and accuracy, as well as the inclusion of different user profiles in the information collection. It is worth highlighting that the results demonstrate that

using data collected with the help of technology platforms can contribute to optimizing urban planning and management.

Also highlighted, as in the first article, is the role of universities and research centers in developing the interface between urban mobility and smart grids. A study conducted at the State University of Santa Catarina (UDESC) established a strategic partnership with the Secretariat of Urban Planning and Sustainable Development (Sepud) of the Joinville City Hall to develop innovative urban mobility initiatives. This collaboration resulted in the implementation of the *Smart Mobility* program, using data from *Waze. for Cities Data* integrated with other georeferenced databases, creating a Big Data foundation for research and innovation in urban mobility. The goal was to build a *Big Data foundation* capable of supporting more efficient public urban mobility policies, promoting applied research and technological development. The initiative enabled more accurate traffic diagnoses, better-planned urban interventions, and greater involvement of the academic community in formulating solutions to the city's urban challenges (UDESC; SEPID, 2018).

c) [3] Urban mobility encompassing the Sustainable Development Goals (SDGs): This study aimed to analyze innovative urban mobility initiatives associated with the SDGs. The main findings include SDG integration, as mobility actions address several SDGs, including reducing social inequalities and developing sustainable cities. Furthermore, it addresses societal engagement, as mobility solutions improve quality of life, well-being, and strengthen local economies. The main challenges encountered in the research relate to the lack of resources and resistance from traditional stakeholders.

Complementing this study, the importance of integrating urban mobility with civic education and spatial justice is reinforced, essential in analyzing the logic of the SDGs , through the integration of technology, social inclusion, and local financing to make urban mobility more sustainable (PAULINO, FREITAS, CARVALHO, 2024). The authors' research reveals that children identify relevant urban barriers, such as the absence of sidewalks, lack of safety, and heavy traffic, and value sustainable transportation, such as cycling and walking. The integration of environmental themes into schools, with practical activities and community participation, leads to greater student engagement and a positive impact on socio-environmental education (ALMEIDA, et al., 2025; BARROS, et al., 2024; EVANGELISTA, SANTOS, 2023).

The integration of urban mobility initiatives with the Sustainable Development Goals (SDGs) has established itself as a fundamental strategy for promoting more inclusive, resilient, and sustainable cities. Recent studies indicate that active mobility interventions (such as accessible bike lanes and sidewalks), low-emission public transport, and data-driven solutions not only improve urban quality of life but also directly contribute to achieving targets related to SDG 11 (Sustainable Cities and Communities) and SDG 10 (Reduced Inequalities) (VASCONCELOS; SANTOS, 2023). By prioritizing equitable access to mobility, such actions expand travel opportunities for vulnerable populations, fostering greater social inclusion and local development.

However, the implementation of such strategies faces significant structural and cultural barriers. Resistance from traditional stakeholders—such as the motorized individual transportation sector—combined with limited public investment, poses significant obstacles to the implementation of sustainable mobility

policies (ALMEIDA et al., 2022). Furthermore, the scarcity of integrated and up-to-date data hinders the continuous monitoring of the social and environmental impacts of these initiatives. Faced with these challenges, coordination between governments, universities, businesses, and civil society becomes essential to enable innovative and participatory solutions, ensuring that mobility policies truly contribute to the sustainable development of Brazilian cities.

d) [4] The private sector with the use of poverty reduction programs: this study investigates how the private sector can collaborate in conditional cash transfer programs to improve investment in human capital. To this end, conditional cash transfers (CCTs) are provided to companies, providing them with the opportunity to alleviate poverty and explore new market opportunities, addressing the 2030 Agenda and the SDGs.

The main findings include private sector engagement, enabling programs to be strengthened by combining resources and expertise to increase the effectiveness of transfers. Furthermore, companies can develop models that integrate social responsibility and profit, bringing benefits to society and business. The article also highlights some challenges, such as companies' reluctance to engage in social programs and partnerships, as well as the lack of alignment between social objectives and corporate interests. Authors Poter and Kramer (2011) reinforce the idea that companies can generate economic value while simultaneously solving social problems, proposing that companies should seek to create economic value alongside social value, rather than treating social actions as philanthropy or isolated social responsibility. In this way, the researchers break the logic that companies and the state operate in separate spheres, demonstrating that there is a real economic incentive for companies to invest in social programs, such as conditional income transfers, for example, in education, health, and training.

It is important to note that conditional cash transfer programs are institutional structures with multiple combinations of conditionalities. Companies must rigorously analyze the design of local conditionalities (health, education, community participation), collaborating with operations in social spaces (ANTÍA, ROSSEL, KARSACLIAN, 2024). The economic impact occurs through a local multiplier effect, primarily driven by increased domestic demand, which leads to new jobs and heightened activity in local sectors, ultimately extending to the dynamism of the most vulnerable regional economies. Companies can exploit these regions that receive transfers as emerging markets with real and growing demand, following a *shared-capitalist approach. value* (FELER, et al., 2024).

6.1 Proposals for sustainable actions

Based on the data obtained in this bibliometric research and the theoretical framework, we propose sustainable actions that support companies and public agencies in their efforts to achieve sustainable development through strategic initiatives. In this future, based on the concept of three fundamental pillars, we propose guidelines associated with: economic viability, social relevance, and environmental prudence, as shown in Table 4. This highlights the importance of two main points: [1] the concept of needs, relating to the needs of the most vulnerable

population; [2] the concept of limitations, which is related to issues imposed by social organization and technological position with the real capacity of the environment to serve society (SILVA, ALMEIDA, 2019).

Table 4 – Economic, social and environmental guidelines

Economic viability
Raising funds through projects, agreements and public-private partnerships in infrastructure
Development and improvement of monitoring instruments in the application of public and private resources
Strategic use of ICT, information and communication technology, to capture updated information and provide public services
Adopt ecological and economically viable solutions for urban centers
Improve efficiency and reduce costs in production processes, improving social and environmental well-being .
Redesigning products that meet economic and social needs
Formulate agile responses to unforeseen events and emergency situations in the city
Social relevance
Promote training and continuing education programs with educational institutions
Implement projects in schools to promote environmental awareness teachings
Promotion of environmental programs for social participation in businesses and services, investing in local communities to improve the business environment.
Encourage social participation in public policies aimed at environmental governance
Environmental prudence
Map risk areas and expand disaster warning systems.
Implementation of projects that seek the resilience of cities in line with sustainable development objectives.
Promotion of actions that enable participatory engagement and consequently environmental governance
Develop actions that implement sustainable smart city mobility strategies

Source: prepared by the authors (2024).

Planning sustainable actions for contemporary cities presupposes an integrated approach that encompasses economic, social, and environmental aspects. According to Sachs (2002), urban sustainability must promote a balance between economic viability, environmental prudence, and social relevance, so that public

policies and private initiatives work together in the pursuit of sustainable development. In the economic dimension, raising funds through public-private partnerships, modernizing management and oversight tools, and the intensive use of information and communication technologies (ICT) are strategic factors for increasing the efficiency of urban administration and boosting infrastructure investments (VANZ et al., 2023). Furthermore, ecologically viable solutions and innovation in sustainable products and services contribute to reducing costs and increasing collective well-being, in line with the Sustainable Development Goals (SDGs) proposed by the 2030 Agenda (UN, 2015).

In the social and environmental sphere, strategies include strengthening citizen participation, environmental education in schools, and promoting programs that value community engagement (ALMEIDA; SILVA, 2022). Initiatives such as mapping risk areas and expanding early warning systems are essential to mitigating disasters and building more resilient cities (FERREIRA; GONÇALVES, 2021). The development of smart and sustainable mobility projects, combining real-time data and inclusive public policies, has demonstrated significant potential for reducing socio-spatial inequalities and improving environmental governance (VASCONCELOS; SANTOS, 2023). These practices reflect the understanding that urban sustainability depends on the articulation of technological innovation, economic efficiency, and social justice as inseparable pillars of municipal planning.

7 Final considerations

The final considerations of this study reinforce the need for an integrated and collaborative approach to sustainable development, corroborating the literature of Silva and Almeida (2019), who highlight the importance of involving multiple actors and factors in urban planning processes. This study also advances the discussion on the use of emerging technologies and multicriteria methodologies, such as the Methodi Ordinatio (Pagani et al., 2015; 2017) for a more robust analysis of the challenges and opportunities presented by smart cities. The integration of social, economic, and environmental factors is essential for the success of sustainable and resilient initiatives.

This work makes an innovative contribution by proposing guidelines that integrate economic viability, social relevance, and environmental prudence, aligning with the Sustainable Development Goals (SDGs). The proposals presented here have the potential to transform regional development from a fragmented and reactive model to a more proactive and holistic one. By emphasizing the importance of community participation and consideration of regional specificities, the study offers a practical perspective for creating policies that promote sustainable and equitable urban growth, ensuring that economic development is intrinsically linked to environmental protection and social well-being.

of Science database , which limited the scope of publications reviewed. For future research, we suggest expanding the study to include other databases, such as Scopus and Spell, in addition to exploring relevant international conferences. It would also be valuable to investigate how smart city technologies can be adapted to different socioeconomic realities. Building a culture of resilience and sustainability requires collaboration between government, the private sector, and civil society to

strengthen the capacity to adapt to and mitigate urban challenges, promoting a sustainable and inclusive future.

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Mariane Beatriz Wittmann Doutoranda em administração. UFSM. Av. Roraima nº 1000 Cidade Universitária Bairro - Camobi, Santa Maria - RS, 97105-900. marianewittmann@gmail.com

Marcelo Trevisan. Doutor em Administração. Professor da UFSM. Av. Roraima nº 1000 Cidade Universitária Bairro - Camobi, Santa Maria - RS, 97105-900. marcelo.trevisan@ufsm.br

Lucas Veiga Ávila. Doutor em Administração. Professor da UFSM. Av. Roraima nº 1000 Cidade Universitária Bairro - Camobi, Santa Maria - RS, 97105-900. lucas.avila@ufsm.br

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CONTRIBUIÇÃO DE CADA AUTOR

Conceituação (Conceptualization) - Marcelo
Análise Formal (Formal analysis) - Mariane
Investigação/Pesquisa (Investigation) - Mariane
Metodologia (Methodology) - Lucas
Administração do Projeto (Project administration)
Recursos (Resources) - Mariane
Supervisão/orientação (Supervision) - Marcelo
Validação (Validation) - Mariane
Visualização (Visualization) - Mariane
Escrita – Primeira Redação (Writing – original draft) - Mariane
Escrita – Revisão e Edição (Writing – review & editing). - Lucas

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