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THE PARADOX OF THE SEARCH FOR SUSTAINABLE DEVELOPMENT: A CRITICAL LOOK AT THE ISSUE OF PUBLIC TRANSPORT

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ABSTRACT

In urban centers, the problem of public mobility is one of the great challenges to be faced. In view of the complexity of the issues that guide the field of public transport, the article proposes to make a critical review addressing some concepts related to causes and consequences, as well as a brief approach to possible solutions.

Keywords: Education. Environment. Pollution. Sustainability. Public transport.

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INTRODUCTION

Currently, one of the major socio-environmental problems to be solved in urban centers is the growing use of motor vehicles. The traffic jams that were notable mainly in large cities, are now also observed in medium and small cities. The consequences of the problem of public mobility in urban centers are beyond the time lost in traffic, stress and economic losses due to major traffic jams. The development model in the country and the lifestyle of modern society has contributed to motor vehicles becoming the main source of air pollution due to the emissions of gases and atmospheric particulates that are harmful to the health of the population as well as the environment.

According to data from the Ministry of Transport, in ten years the vehicle fleet has increased by 43%. In December 2024, the total number of registered vehicles was almost 124 million, of which 51.06% are automobiles and 22.82% motorcycles. However, the bus fleet, although it has increased, the percentage has decreased from 0.66% to 0.59% of the total fleet in the last ten years. The State of São Paulo has more than 28% of the national fleet (34 million), of which 59.9% are cars and 0.52% are buses (Ministry of Transport, 2024). Given this scenario, the negative impact on the lives of citizens is notorious, since traffic jams are inevitable and every day reaches new records in large metropolises, such as those observed in the city of São Paulo.

In the search for solutions to the problem, there is a contradiction in the measures adopted by the competent public agencies. The guidelines of the National Urban Mobility Policy (Law No. 12,587/2012 and the law that amends it, Law No. 14,000/2020; BRAZIL; BRASILb) which aims to make municipalities with more than 20 thousand inhabitants prepare their Urban Mobility Plan (PMU). Cities will only receive financial resources from the Federal Government for urban mobility when they present their PMUs. In addition to this measure, competent institutions such as the Environmental Company of the State of São Paulo (CETESB), have been jointly developing a Sustainable Transport Project that proposes guidelines to guide public policies related to the transport system and land use in order to rationalize travel, expand urban mobility and reduce impacts on the environment and quality of life (CETESBa, 2025). Among the guidelines are:

- Encourage the use of public transport and non-motorised transport;
- Promote the use of low-impact polluting vehicles;
- Discourage the use of individual transport;
- Promote the densification of central areas and control urban dispersion;
- Promote urban environmental management;

- Promote the dissemination of information on the environment in the transport, traffic and urban planning sector.

However, the public power offers society inefficient and costly public transport. In addition, currently, the country's development is linked to the automotive industrial segment, since this is a means of generating income and employment. Thus, the issues of greater interest are around the reduction of the tax on automobiles, having as a palliative form of pollution, an incentive only in which the best type of fuel should be used and/or invested in new technologies. Such conditions have induced and contributed to the increasingly installed culture of citizens acquiring and using their own car.

For Lindau (2013), the interest of government officials continues to be focused on specific and unsustainable practices making wrong decisions. Investments are in the construction of roads and viaducts for automobiles, tax reduction for the acquisition of private vehicles, incentive to the construction of housing in distant, discontinuous and disconnected areas of consolidated urban areas. In addition, transport systems in Brazilian cities reduce opportunities for walking and cycling, conditions that contribute to the use of automobiles indiscriminately. However, users are still not aware of the exact impacts of this decision on their health and well-being.

The most affected are the users of public transport, since the congestion caused by cars reduces the speed of buses. Other important impacts of congestion are related to the increase in energy consumption due to the low speed of vehicles, which in turn increases the emission of greenhouse gases such as CO_2, in the case of the use of fossil fuels, increasing the levels of contamination of the atmosphere (Vasconcellos, 2013).

Currently, motor vehicles are the main responsible for air pollution in large cities (CETESBb, 2025). Air pollution has been verified as a public health problem since the first systematic pollution measures, which began in Brazil through the CETESB network in São Paulo, in the late 1970s. Thus, some emission control measures were taken, such as the Industry Emissions Control Program and the Vehicle Emissions Control Program (Proconve) (CETESBb, 2025).

As a result of these programs, pollution in large cities such as São Paulo has decreased significantly (CETESBc, 2025). However, epidemiological studies indicate that air pollution, even if concentrations are in the acceptable range, causes hospitalizations for respiratory diseases (Amâncio and Nascimento, 2012).

Thus, in Brazil, with regard to air pollution as a public health problem, there is still a deficiency in the formulation, implementation and evaluation of public policies, which are not compatible with the World Health Organization (WHO).

In view of the above, the objective of this article is to make a critical review of the concept of sustainable development, considering some issues related to the current model of economic development, public transport and its impacts on public health, as well as to briefly address possible solutions to the problem.

SUSTAINABLE DEVELOPMENT: BRIEF CONSIDERATIONS

The biggest challenge for cities has been to maintain economic development and ensure quality of life for the entire population. In other words, the search is for the creation of sustainable communities. For this, it is necessary that their ways of life, business, economy, physical structures and technology do not harm nature's intrinsic capacity to sustain life (Capra, 2005).

According to Rattner (1999), the concept of sustainability is imprecise. This highlights the absence of a theoretical frame of reference capable of systematically relating the different contributions of discourses and fields of specific knowledge. To complement Rattner, this situation is a reflection of indecision, misinformation, conflict of interest or the lack of interest, prevalent in relations between economic and political elites, in defining a coherent plan and program of action that accepts and incorporates the growing criticisms directed at the conventional and dominant development model. However, the most important advance in the evolution of the concept of sustainability is represented by the growing consensus that it requires and implies in: political democracy, social equity, economic efficiency, cultural diversity, protection and conservation of the environment (Rattner, 1999). For Jacobi (1999), sustainable development leads to the necessary redefinition of the relations between human society and nature, as well as to a substantial change in the civilizing process itself. The lack of specificity and the totalizing pretensions make the concept of sustainable development difficult to be classified in concrete, operational and analytically accurate models. Therefore, at the conceptual level it is still possible to say that there is no paradigm, but an orientation, an approach, or a perspective that encompasses normative principles.

In Rattner's opinion, sustainability cannot be derived only from a better balance and harmony with the natural environment (Rattner, 1999). The question that arises is inherent to the human universe. Nature encompasses everything that exists in material existence, including the human being. But it was this, in its smallness, that decided to move away from

the immense nature and create its own anthropic environment. It was human desires and their contingencies that modified nature (Jonas, 2016). The importance of conciliation with nature is the beginning of forming consciousness, but conciliation is not the practical starting point that will lead to sustainability, but rather which human desires are more noble, those of short or long term; the purely financial ones (except that the economy goes far beyond that) and the fleeting pleasures or those that seek quality of life. Thus, according to Rattner (1999), the roots of sustainability lie in an internal relationship with society, of an economically and politically balanced and equitable nature. If the predominant emphasis is placed on productivity, competition, and individual consumption, then the social and cultural dimensions of personal identity, responsibility, and solidarity will be neglected. This, in turn, will result in dramatic effects for the cohesion and continuity of social organization (Rattner, 1999).

The current form of global capitalism, in addition to being economically unstable, is unsustainable from an ecological and social point of view, and therefore unviable in the long term. Most of today's environmental and social problems have their deep roots in our economic system (Capra, 2005). Climate change, loss of ecological and cultural diversity, poverty, and inequality tend to increase the vulnerability of human life and planetary ecosystems. Therefore, it is necessary to understand the complex and dynamic interactions between society and nature, in the light of the non-linear, complex and feedback relations of observable processes (Rattner, 2009).

However, there needs to be a change in the principle that corporate profit and GDP growth are above democracy, human rights, environmental protection, or any other value. For this, it is necessary to adopt measures that go beyond stricter environmental legislation, a more ethical business activity, a more efficient technology. Although such measures are important, it is not enough, there needs to be a deeper systemic change (Capra, 2005).

Technology, which is an ally in this process, is also the cause of socio-environmental problems. Technology must be sought to bring us improvements and efficiency in the sense of preserving resources and energy. However, it should not be sought compulsorily, as identified by Jonas (2016). For the author, the human being uses the technique to meet his needs. In this way, man dominates nature and feels comfortable. However, the benefits of such expansion strengthen the technique in such a way that it propels man into the future. "The attainment of total dominion over things and over man himself" brings confidence, power, and a false sense of freedom. Such trust blinds man to wisdom, that is, to ethics. We see the ethics of man in his actions. However, its action is to meet new technologies. In this

way, man engages in new technologies, which accumulate compulsively, without looking at the nature and fatality of this action (Jonas, 2006).

According to Rattner (2009), there must be a change, where the new paradigm is based on a democratic and inclusive society. The author, when discussing the paradoxes of capital accumulation and concentration, points to the need to build a new development paradigm, based on cooperation and solidarity, on the equitable distribution of the social product and on the reformulation of the political system, overcoming authoritarian patterns, through the construction of a participatory and co-management model. However, everything goes through an educational and cultural process that should lead human behavior towards a more sustainable way of living, which we will see later. But first, we will look at some socio-environmental issues.

THE COMPLEXITY OF SOCIO-ENVIRONMENTAL PROBLEMS

Faced with the complexity of the issues that drive socio-environmental problems and the consequences of this phenomenon of such adverse proportions, professionals from various segments (government, academia, NGOs) seek to develop strategies with the objective of stimulating mitigation and adaptation actions.

The current challenge is to overcome social, economic, cultural and political barriers. For this, there needs to be a paradigmatic shift with the aim of transforming a fragmented view of reality into a holistic view. The Cartesian-Newtonian paradigm contributed to the excessive fragmentation and dispersion of knowledge by the numerous specializations and mechanistic view of the world. Nevertheless, industrial development, the offspring of this paradigm, with its specific demands, contributed to science taking fragmentary paths, providing more for the expansion of technique and technology than for the development of science itself and its paradigms (Coimbra, 2000).

For Morim (2005), it is not possible to consider a complex system according to the alternative of reductionism (which wants to understand the whole based only on the qualities of the parts) or "holism" that neglects the parts in order to understand the whole. The ambition of complexity is to account for the articulations shattered by the cuts between disciplines, between cognitive categories and between types of knowledge.

One of the socio-environmental problems of great complexity is the link that exists between the environment and public health. According to Rattner (2009), public health problems have systemic and interdependent roots that refute and make any linear and Cartesian approach unfeasible and, therefore, it is possible to infer that any reductionism in dealing with complex problems proves to be sterile and unproductive. To change this

scenario, it is necessary to improve the indicators of the effectiveness of public health policies, to inform and raise awareness among civil society, for its full participation in decisions that affect its health and well-being.

The fact that we are at the same time physical, biological, psychic, social, cultural, and spiritual beings, complexity is what tries to conceive the articulation, identity, and difference of all these aspects, while simplifying thinking separates these different aspects, or unifies them by a mutilating reduction. Thus, complexity attracts the strategy that allows us to move forward in the uncertain and the random. Such a strategy consists of the art of using the information that appears in the action, of integrating it, of formulating action schemes and of being able to gather the maximum certainty to face uncertainty without disregarding uncertainties (Jonas, 2006; Morim, 2005).

According to Coimbra (2000), the environment is a historical, social, multifaceted reality and, therefore, an interdisciplinary reality, since it is [also] the result of the interaction of human society with terrestrial ecosystems. Thus, the solution to the problems or the organization of *the óikos* lies in interdisciplinarity, seen as one of the driving forces in the reformulation of knowledge, being and doing. However, in the field of sciences, there is still no precisely defined "interdisciplinary epistemology" (Coimbra, 2000).

The interdisciplinary approach consists of establishing links and links between two or more disciplines so that a more comprehensive knowledge, a shared understanding and the direct involvement of the interlocutors can be achieved (Coimbra, 2000). However, it is not enough to bring together several disciplines, interdisciplinarity needs a deliberate intention, based on systematic intersubjective exchanges, based on the confrontation of disciplinary knowledge, which considers one or more problems in the society-nature relationship. The deliberate intention is expressed in the research problematic and becomes the product of a practice of confrontation between different types of knowledge about the nature-society systems, in a given spatial-temporal (empirical) context; the theoretical-methodological control is produced through the permanent exchange between the research subjects (authors and actors), which can be called 'intersubjective control of the research' (Floriani, 2000). In the context of the environment and development, interdisciplinarity is an action of knowledge that consists of confronting knowledge with the objective of achieving complex and integral knowledge. Therefore, it differs from the one in which there is no integration between the different disciplines, which becomes unable to explain the complexity of the interactions between human societies and the natural environment (Floriani, 2000). Here is the criticism made by Jonas (2006), in which technology brings comfort to man in the face of the threat of nature that is great and infinite, but displaces him,

distances him, from his natural origin and his dependence on nature. Socio-environmental issues are linked to the man-technology relationship, in which technological compulsion influences man. The reductionist aspect that keeps man's decision-making for technology keeps man away from greater knowledge, away from complex issues.

Matulja et al. (2010) identified interdisciplinary points, reporting the experience and results of the workshops held during the International Symposium on Climate Change and Poverty in South America that demonstrated the potential of the interdisciplinary perspective to address complex sustainability syndromes. Among the thematic points of essential services that were addressed, especially with regard to means of transport, the problems of air pollution were discussed, thus identifying its causes and consequences. The causes of the syndrome were identified: economic factors, energy matrix, government policies, vehicle fleet, dispersed urban form, technology, culture/education/information, consumption, in an individual model adopted. Among the consequences they cited: congestion, increased greenhouse gas emissions, loss of quality of life, formation of heat islands, loss of biodiversity and public health problems.

EDUCATION & CULTURE: POSSIBLE SOLUTIONS

In order for us to live in a just society, it is necessary to consider two important issues: a) integration of economic, social and sustainable development and b) adoption of a new lifestyle. For this, it is necessary to form reflective and critical citizens with an ethical conscience that questions the current development model so that they can transform reality. A model whose bases are still based exclusively on economic issues and, thus, contributes every day to the increase of socio-environmental problems.

However, to face the urban environmental challenge, the focus must be on actions that boost citizens' access to environmental awareness through intense education work (Jacobi, 1999). According to Freire (2020), when man understands his reality, he can raise hypotheses about the challenges of this reality and look for solutions. Thus, he can transform it and with his work he can create a world of his own: his self and his circumstances. Nevertheless, there must be a change in culture; a culture that consists of recreating and not repeating. For Freire:

> "Man can do it because he has a consciousness capable of grasping the world and transforming it. Man is not a man for adaptation. Education is not a process of adaptation of the individual to society. Man must transform reality to be more (political or commercial propaganda makes man an object)" (Freire, 2020).

In modern urban societies, audiovisual media have become the main channels of social and cultural communication. From the various contents offered by these means of communication, people build their symbolic images, their values and their rules of behavior. Thus, companies and their products are present in the media to have their brand recognized. However, the way in which individuals react to a specific commercial is beyond the control of advertisers (Capra, 2005). The objective is the sale, however, the social impacts, in addition to the sale, can be extrapolated as to the formation or influence on the behavior of the individual or the collective. This condition has had a negative impact on modern societies. Through the different types of communication networks there is an intense approach to inducing unbridled and irresponsible consumption. Nevertheless, it has increasingly contributed to the citizen taking individualistic attitudes.

According to Welsch (1995), we are in an emotional and entertainment society. The entire environment is aesthetically developed for this purpose. Aesthetics are emotional, so it is developed to be emotional and produce emotions. In the contemporary case, emotion is amplified in entertainment to meet the enjoyment of a free-time society. Thus, aesthetics, that is, what appears, becomes the main product and the article, the physical product itself, becomes secondary. In the subjective, when we buy, we acquire an imaginary, aesthetic lifestyle, conveyed by the advertising linked to the product, regardless of the useful value of this product (Welsch, 1995)

In view of this, education is fundamental in the process of forming citizens who are aware of the impacts of their attitudes. According to Welsch (1995), there is nothing more natural than being aesthetic, however, from aesthetics, we must move on to true knowledge.

According to Law No. 9,795/1999 (BRASILc), which institutes the National Policy for Environmental Education and other measures, in its article 2 defines environmental education as: an essential and permanent component of national education, and must be present, in an articulated way, at all levels and modalities of the educational process, in a formal and non-formal character. Non-formal environmental education is understood as: educational actions and practices aimed at raising the awareness of the community about environmental issues and their organization and participation in the defense of the quality of the environment (art. 13).

Among the fundamental objectives of environmental education in Law No. 9,795/1999 (BRASILc) are the development of an integrated understanding of the environment in its multiple and complex relationships. It must involve ecological, psychological, legal, political, social, economic, scientific, cultural and ethical aspects, as

well as the stimulation and strengthening of a critical awareness of environmental and social problems (art. 5). The basic principles are: a) the humanistic, holistic, democratic and participatory approach and; b) the conception of the environment in its totality, considering the interdependence between the natural, socioeconomic and cultural environments, under the focus of sustainability (art. 4).

Nevertheless, as part of the educational process, the same law incubates the mass media to collaborate actively and permanently in the dissemination of information and educational practices on the environment and to incorporate the environmental dimension into its programming and to society as a whole, maintain permanent attention to the formation of values, attitudes and skills that provide individual and collective action aimed at prevention, the identification and solution of environmental problems (art. 3). It is also up to the Government, at the federal, state and municipal levels, to encourage the dissemination, through the mass media, in noble spaces, of educational programs and campaigns, and information on topics related to the environment (art. 13, Law No. 9,795/1999; BRAZILc).

But as has been commented, the media are more concerned with entertaining and catering to the enjoyment of a "free time" society. Such a contradiction is found with regard to the problems related to public mobility. Through the different communication networks, what is offered to society is the constant incentive and induction for the acquisition of new motor vehicles. To further contribute to the problem, due to the real inefficiencies of public transport, there is an increasing strengthening of a culture that values individual transport.

For Gutiérrez (2013), changing the image of public transport is a key factor in encouraging people to use it instead of their own vehicles, and this must be achieved with a communication and marketing strategy that considers users as customers. According to Travassos (2012), unlike what happens in Europe where public transport is seen as a heritage of the city and an asset for society, in Brazil the culture that public transport is a service for the poor and inadequate for the middle and upper class is strongly rooted in Brazilian society. There is a non-explicit prejudice on the part of society since it is not politically acceptable to admit it. For the author, the strong economic and social segmentation of the Brazilian population is one of the main barriers to the adhesion of the middle and upper classes to public transport. To change this scenario, it is necessary to take into account at least three lines of action, as well as the political conviction of the decision-makers:

- Improvement of public transport, within reasonable and realistic standards and limits for the payment capacity of Brazilian users;

- Permanent restrictions on certain uses of private vehicles (rather than on their ownership);
- New presentation of public transport, as a heritage of society, promoting it in a broad and constant way, emphasizing its relevance for the sustainability of cities and urban mobility.

There needs to be a change in mentality and above all a change in attitude. To this end, it is necessary to break the challenges encountered in the integration of different institutions and fields of knowledge so that, in this way, the issue of interdisciplinarity and sustainable development does not remain at the level of abstraction. According to Leff (2011), just as interdisciplinarity is important to think about and diagnose complex environmental problems, "... the deep causes of the environmental crisis – its manifestations in the different "environmental problems" – refer to a questioning of the rationality that generates them and to the construction of a new rationality". This means that environmental conflicts will not be resolved by the scientific power of economics or ecology, but through existential meanings, cultural values and differentiated development styles, in which the exploitation, conservation or sustainable use of resources depend on the social meanings attributed to nature.

Finally, it is necessary to make society aware of the development model and its impacts on the environment and health, such as the adoption of the indiscriminate use of individual vehicles. Society has an important role in changing the current scenario since its standards of values and choices affect the environment as a whole. It should be noted that a conscious society will be able to act in a participatory way in the planning and evaluation of projects and thus contribute to improvements in the social, environmental, health and economic areas. For this, environmental education is fundamental, and can be approached in different ways, including communication networks.

The demonstrations that took place in mid-2013 throughout Brazil, capitals and the countryside, which culminated due to the increase in bus fares, but their complexity related to socioeconomic dissatisfaction was not restricted to just that, they seemed to be an indication of a change. Competent authorities were pressured to take initiatives for solutions to the various problems experienced in the daily life of the population, including the issue of public transport, which should be understood as part of the solution and not the causes of the problems. It is important to understand that the impact of efficient public transport goes beyond improvements in public mobility. An efficient transport system means less air

pollution and therefore less damage to the environment, less hospital admission for respiratory diseases and therefore less public spending.

In view of the above, it is possible to say that, currently, the limitations are still in the conceptual and methodological field, as well as, and more strongly, in questions of values and political and social will to make a change that allows society to live in safe conditions of well-being.

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