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Economic instruments for reducing the use of plastic bags in the state of Pará, Brazil

Instrumentos econômicos para a redução do uso de sacolas plásticas no estado do Pará, Brasil

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ABSTRACT

The state of Pará has prohibied the sale and distribution of conventional plastic bags to mitigate their socio-environmental impact. This article aims to suggest economic incentives to assist State Law 8902/2019 in diminishing plastic bag consumption. This study employed the SWOT Matrix analysis to develop two economic instruments based on the externality precepts defined by Arthur Pigou and Ronald Coase. The initial proposal, derived from Pigou, involved of a "tax exemption for plastic recycling enterprises", whereas the subsequente proposal, based on Coase, stipulated "offering discounts to customers who refrain from utilising plastic bags". Both instruments demonstrated potential for yielding favorable outcomes when integrated with Law 8902/2019; nevertheless, their efficacy relies on an effective selective collecting system and the advancement of environmental education.

Keywords: Theories of externalities; Plastic waste; Plastic bag; Sustainable consumption; Economical incentives.

RESUMO

O Estado do Pará, passou a proibir em lei a comercialização e distribuição de sacolas plásticas convencionais na tentativa de reduzir seus impactos socioambientais. Nesse sentido, o artigo teve como objetivo propor incentivos econômicos capazes de auxiliar a Lei Estadual 8902/2019 a reduzir o consumo de sacolas plásticas. A pesquisa utilizou da análise de Matriz SWOT para a formulação de dois instrumentos econômicos baseados nos preceitos de externalidade definidos por Arthur Pigou e Ronald Coase. O primeiro se baseou em Pigou e consistiu na "Isenção de impostos para empresas de reciclagem de plástico", enquanto o segundo, embasado em Coase, estipulou o "Oferecimento de descontos para os clientes que não utilizarem sacolas plásticas". Mediante a discussão, ambos os instrumentos se mostraram promissores em gerar bons resultados se estiverem em conjunto com a Lei 8902/2019, mas possuem dependência de um sistema de coleta seletiva eficiente e da promoção de educação ambiental.

Palavras-chave: Consumo sustentável; Resíduos plásticos; Sacolas plásticas; Teorias das externalidades; Incentivos econômicos.

INTRODUCTION

Plastic bags are recurrent nowadays all over the planet, making them one of the most traditional means for transporting small quantities of goods and products. However, when it comes to this material, collection and recycling are essential to reduce its presence in all environments, given that a large portion of the bags is not collected by urban cleaning (Silva, 2022). Thus, the bags have become one of the main targets of public actions whose focus is to seek solutions for their typical and expressive consumption through educational campaigns or restrictive rules.

One of the reasons for the permanent use of plastic bags is related to the material's durability. However, much of it is not biodegradable since many are manufactured based on petroleum derivatives, so their degradation can reach 400 years (Santos et al., 2018; Baia et al., 2020). In addition, only small amounts are recycled. At the same time, most are improperly discarded and carried away by rainwater, causing the clogging of gutters and the pollution of forests and seas (Freita & Frota, 2019). Consequently, millions of tons of plastics end up in the oceans yearly, causing severe impacts on marine ecosystems and coastal communities, creating entanglement and poisoning of species capable of swallowing pieces of plastic in these environments (Danh & Hoi, 2019).

During the 1970s, plastic bags began to replace traditional paper packaging in the market because they were cheaper and more durable. (Indrele et al., 2021). In Brazil, starting in the following decade, their use began to be adopted in supermarket chains due to the rising cost of paper, culminating in the constant and everyday use of plastic bags by the population due to their practicality, which invariably led them to serve as containers for household waste. (Baia et al., 2020). From another perspective, the popularity of plastic bags also stemmed from the free distribution that encouraged consumers to choose them when packing their purchases at no additional cost (Magalhães Júnior et al., 2020).

Annually, Brazil consumes an average of thirteen billion plastic bags, equivalent to 1.5 million entering the consumption cycle every hour in the country. (ABRAS, 2019). The generation of resin for the production of plastic bags reaches about 210 thousand tons per year in Brazil, with a significant portion of this amount quickly ending up in the trash, making up 10% of all solid waste generated in the country. (Escocard et al., 2018). In this way, many items end up not being reused for packaging new purchases, further increasing the demand for new units and, consequently, the number of plastics that end up in landfills or dumps across the country.

However, this panorama is seen as a structural challenge of the current society because of its consumption habits since the population has few incentives to foster a sensitivity about the impacts generated by the constant disposal of plastic bags and lacks information on how to consume them in a sustainable way. That is, the misinformation about the recycling capacity of many materials and the lack of consumers knowing where they can adequately deposit their waste allows the incorrect disposal of recyclable material and the generation of solid waste, becoming, therefore, an externality of local industrial production and from public cleaning (Alves & Pereira, 2020).

The understanding of externalities occurs when a particular economic activity generates effects on subjects not involved in producing or consuming goods produced by the economic agent, affecting them directly or indirectly (Fernandes & Luiz, 2022). Moreover, externalities can be perceived when there is no compensation for their effects, indicating that private costs are not equal to social costs (Borchardt et al., 2023). Thus, the absence of commitment by the activities that use plastic bags in informing and offering mechanisms to ensure the proper disposal of this material creates externalities for society and the environment since they do not compensate for the impacts caused by plastic bags on their production costs.

On the other hand, in an effort to reduce the consumption of plastic bags, some regulations have already been approved with a focus on restricting their use in specific Brazilian states. This is the case of Law 8902/2019 established in the State of Pará, whose guidelines prohibit the distribution of disposable plastic bags within the territory of the federative unit, requiring them to be replaced by bags made of at least 51% of material from renewable sources (Pará, 2019). Despite this effort made by the government of Pará, the law lacks instruments capable of compensating for the externalities linked to activities that depend on conventional bags to transport goods. This paper is to suggest economic incentives to support State Law 8902/2019 in diminishing plastic bag consumption in Pará.

THE CONCEPT OF EXTERNALITY BY PIGOU AND COASE

The concept of externality was developed by the English economist Arthur Cecil Pigou (1877–1959) in 1920, whose idea consists of the existing consequences of a particular activity or individual consumption that affect the standard of living of other people or productive processes without any compensation between those involved. (Tawfeiq & Samir, 2020). Externalities can be negative or positive, based on the impacts

resulting in the area where they occur. That is, if a company causes harm to its neighborhood, it is its responsibility to compensate them. However, in the case of benefits, the company may receive incentives from those who benefit, which can be financial, material, or other.

In Pigou's understanding, state actions could correct and regulate negative externalities through taxes, subsidies, or levies. (Olsson & Kruger, 2021). In this way, a Pigovian solution refers to the imposition of a fiscal solution, such as a tax, for an externality, the responsible agent is tasked with incorporating the social costs arising from their economic activity into their expenses to remedy damages. (Atamanczuk & Prates, 2021). Thus, for Pigou, the State would act as a mediator in the relationship between the perpetrator and the victim; however, in many cases, this role is neglected, allowing businesses to avoid repairing the socioeconomic and environmental damages they cause.

In contrast to this, Ronald Harry Coase (1910-2013), an English economist, in his understanding, whose studies gave rise to the theorem bearing his name, argues that negotiations between the parties can be the most effective way to address externalities and economic inefficiencies, as there is no reliance on the mediation of a regulatory entity or the action of the State for them to occur. (Santos et al., 2020). The Coase Theorem consists of reconciling the parties affected to internalize losses resulting from externalities without incurring transaction costs. (Alves & Pereira, 2020). In this sense, the harmed agent could make agreements for the damages to be repaired. At the same time, those who generate benefits for their surroundings could demand incentives to maintain their advantages.

The concept developed through the studies of Pigou and Coase has gradually been incorporated into Environmental Economics, eventually serving as a foundation in various countries for creating diverse environmental policies. (Salles & Matias, 2022). Among the most famous examples is the carbon credit market, one of the most successful economic instruments practiced in the environmental field. (Dias, 2022). With the creation of this market, companies that emit the most greenhouse gases are taxed according to their carbon footprint, increasing the market value of their products by linking private costs to social costs. (Hellvig & Flores-Sahagun, 2021).

These strategies promote a new economic dynamic, as they encourage companies to seek new means of production that generate increasingly fewer impacts or to capitalize on more resources that keep them more competitive by replacing more profitable and polluting production processes with more sustainable alternatives. However, the pressure

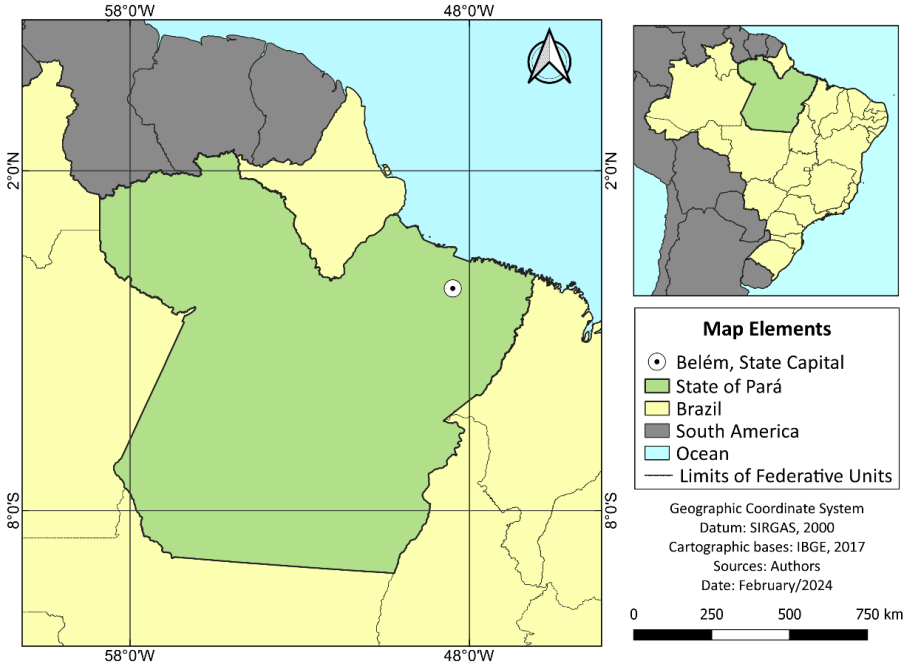
exerted by consumer demands on the productive sector still allows for many theoretical debates in Environmental Economics, as these demands have generated externalities and increasing socio-environmental burdens. (Salles & Matias, 2022). Moreover, economic agents pass their negative costs onto society while only internalizing the benefits and maximizing profits. (Rezende & Floriano Neto, 2019).

This perspective is the core of the issue that encompasses the disposal of plastic bags since current consumption implies the creation of external costs for activities that enjoy the benefits of their practicality and economic viability. However, there is an evident trend that environmental legislation evolves to the point of making companies increasingly responsible for the life cycle of their products, entrusting them with the final destination after use by customers and the impacts they produce on the environment (Liva et al., 2003). However, the measures found by the public authorities do not yet follow this perspective, whose solutions found by the states have been to create their regulations to restrict plastic bags, but without proposing compensation, as currently occurs in the State of Pará through Law 8902/2019.

METHODOLOGY

The area chosen for the study comprises the state of Pará, whose population is 8,121,025 inhabitants distributed in a territorial area of 1,245,870.704 km 2, being the second largest in Brazil in territory and the ninth in population (IBGE, 2022). Pará is one of the nine states comprising the Legal Amazon and borders Amapá, Amazonas, Roraima, Mato Grosso, and Maranhão. Figure 1 represents the geographic map of the state.

Figure 1 – Geographic map of the state of Pará.



Source: Authors (2024).

The research was conducted using a qualitative approach, employing procedures characteristic of bibliographic, documentary, and case study research. Through qualitative investigation, the researcher adopts an empirical approach to their object, starting from a predetermined theoretical-methodological framework, which will support their data collection instruments. (Guerra, 2014). This type of research considers the subjective relationship, analysis, and interpretation, considering people's perceptions and worldviews. However, it does not rely on statistical methods; it requires standardization of records and analyses. (Rodrigues & Neubert, 2023). From this, one can foster ideas and discuss results through the methodological procedures that best fit the research objectives.

The bibliographic and documentary sources consulted include scientific articles, dissertations, theses, legislation, and other materials on official sites relevant to the study topic. Taking the precepts of bibliographic research as a survey of reliable sources, the researcher needs to dedicate himself to the exercise of reading and having an exploratory look, selective and critical about the contents consulted for the purpose of classifying and

solving the research problem or test hypotheses raised (Guerra, 2023). Documentary research includes public archives of public or private bodies and institutions, such as scientific associations, churches, unions, and political parties, as well as other materials, such as letters, photographs, recordings, and crafts (Gil, 2023).

Yin (2015) expresses that the case study is understood as a strategy used when the researcher has little control over events and when the research is focused on contemporary phenomena inherent in real life, often used in conjunction with two other types of study – exploratory and descriptive. In this sense, to aggregate with a more excellent theoretical basis in the discussion around the research scenario, it was necessary to use case studies whose focus would help in the proposal of solutions related to the problem of plastic bags and could be implemented together with the guidelines of State Law 8902/2019 approved in the State of Pará.

The study's goal was to suggest two financial tools that would lessen the use of plastic bags and their negative effects on the environment. Each instrument was based on a line of thought from the two authors who promoted the concepts of externality, with the first (Instrument I) grounded in Arthur Pigou's perspective and the second (Instrument II) developed from Ronald Coase's viewpoint. These instruments, in turn, were created based on the author's experience in studyimg of externalities, reverse logistics, and solid waste management. The instruments created can be seen in Table 1.

Table 1 – Economic instruments proposed in the research.

Instrument	**Title of the economic instrument**	Author based
I	Tax exemption for plastic recycling companies	Arthur Pigou
II	Offering discounts to customers who do not use plastic bags	Ronald Coase

Source: Authors (2024).

The study included the formulation of two SWOT matrices, whose acronym represents the strengths, weaknesses, opportunities, and threats. For Cordioli (2001), this method is the conjunction of four focused variables of analysis, these being: the strengths (achieved goals, benefits, satisfactions); the weaknesses (difficulties, failures, dissatisfaction); the opportunities (capacities without exploration, ideas of improvement) and the threats (adversities, oppositions, resistance to changes), whose origin is derived from the environment where the analysis is being carried out. The tool used to produce the SWOT Matrix was the online software CANVA, a platform used for creating digital

content and graphic materials. Table 2 represents the model used for the construction of the SWOT Matrix, indicating the criteria that determine the components of the analysis.

Table 2 – SWOT Matrix Model applied in the research.

Factors	Positive	Negative
Internals (direct effects caused by the economic instrument)	Strengths	Weaknesses
Externals (efeitos indiretos ou provocados por outros agentes)	Opportunities	Threats

Source: Authors (2024).

RESULTS AND DISCUSSION

Brazil currently does not have a specific national guideline for plastic management, which allows for a variation in the material handling according to the interests of the public administrations responsible for the collection and treatment of solid waste in Brazilian states and municipalities. Meanwhile, the National Solid Waste Policy (PNRS), which was established by Law No. 12.305/2010, establishes principles, objectives, instruments, and guidelines related to integrated management and the management of solid waste in the country, assigning responsibilities to those who generate waste, the public authorities, and the applicable economic instruments. (Brasil, 2010). Furthermore, the National Solid Waste Policy (PNRS) proposes practices such as selective collection, recycling, and reverse logistics of waste, along with innovative concepts that share responsibilities throughout the product life cycle. (Silva & Capanema, 2019).

In this way, taking the National Solid Waste Policy (PNRS) as the fundamental guideline for solid waste management, the importance of the Public Authority in promoting solutions that help reduce the impacts of excessive and improper plastic disposal is emphasized. This role is emphasized in the case of plastic bags, where the costs generated by proper collection and treatment are silently transferred to public management and society. At the same time, manufacturers keep their costs low due to the non-internalization of their externalities. (Rodrigues, 2012). In this sense, the path many Brazilian states have been on is to propose laws prohibiting conventional plastic bags from circulating in society and restricting their commercial distribution without any economic incentive accompanying these measures.

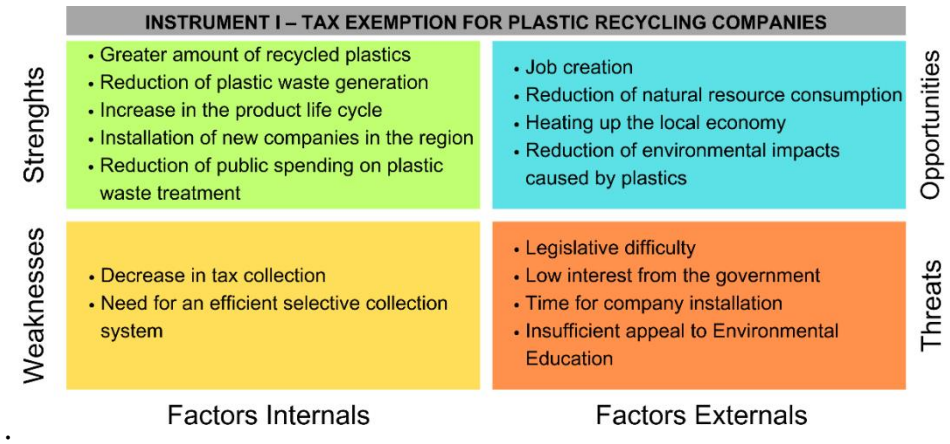
In Pará, the debate surrounding plastic disposal has grown in recent years due to the approval of State Law 8902/2019, which has impacted the daily lives of the population in the federative unit. Meanwhile, just like other state laws approved in Brazil, the

legislation from Pará only uses educational incentives to promote the non-use of plastic bags. (Nascimento et al., 2024). The legislation in Pará requires that establishments covered by the law display informational materials and posters aimed at raising awareness among the population about the impacts caused by the incorrect and excessive disposal of non-biodegradable plastic, as well as the environmental benefits derived from the use of non-disposable and non-polluting materials (Pará, 2019).

However, this environmental education tool again allows only the consumer to rethink his way of consuming plastics. In contrast, the externalities generated by the distribution of plastic bags remain without compensation for society. In this perspective, when the balance of externalities is not reached by the companies producing the social costs incurred, whether positive or negative, the state can intervene to obtain an equitable equation through economic instruments capable of controlling pollution with the lowest overall cost to society (Olive, 2023). In other words, the state can compose a more arbitrary role for resolving externalities, thus decreasing the wear more efficiently.

Around this problem, even at the beginning of the twentieth century, Pigou guided in his discussions a concern about pollution and damage to natural resources by activities or organizations that generate social costs, i.e. negative externalities, emphasizing the role of the state in correcting and regulating these costs through taxes, fees or subsidies (Olsson & Kruger, 2021). Based on this premise, the "Instrument I - Tax exemption for recycling companies" was formulated as a possible way to reduce the damage resulting from the irregular disposal of plastic bags in Pará. The analysis of its possible effects can be seen through a SWOT matrix chart in Figure 2.

Figure 2 – SWOT matrix analysis of the possible results of the Economic Instrument I.



Source: Authors (2024).

Through this matrix, several effects that can be incurred by promoting this economic incentive were admitted, explaining the strengths and weaknesses as internal factors, which represent direct results from this instrument, and the threats and opportunities related to external factors and their indirect effects. With the tax exemption for plastic recycling companies, it is hoped that a more efficient panorama will be created for treating this material in Pará since this measure allows companies to use plastic waste, especially plastic bags, to manufacture new consumer goods. However, it is assumed that there is a dependence on the performance of other public and private entities for their effects in achieving their objectives in reducing externalities caused by the use and disposal of plastic bags.

However, the main strengths of this economic instrument tend to decrease the damages derived from plastic waste since it directly implies a more significant amount of recycled plastics, in the reduction of plastic waste generation, and generates an increase in the life cycle of plastics. Thus, there could be improvements in the presence of plastic waste in the oceans. According to a study published by the Journal Nature in 2021, products based on this material, especially plastic bags, Straws, and bottles, represent approximately 80% of the garbage found in the seas, where they cause numerous problems to the marine fauna (White, 2022). However, for these effects to occur, it would be necessary to solve the need for an efficient selective collection system, which is one of its weaknesses.

In the past, some practices were being implemented in the market to benefit reverse logistics, enabling, for example, the return of returnable bottles at exchange centers (Freitas et al., 2020). This type of strategy applied to plastic bags could reduce the need for new raw materials to manufacture new bags and even create new products. For Assis and Santos (2020), implementing of this practice in the stages of use and development of plastic presents itself as an alternative to its incorrect disposal. However, it is essential to note that the recycling of plastics is a current challenge in the country, which makes it difficult for its most usual destinations, streets, and ecosystems, to their ultimate disposal sites.

Currently, plastics stand out as one of the materials with the lowest recycling rate; this condition may be related to the low value paid for the collected volume or the difficulty of collecting large quantities (Santos et al., 2018). In contrast, the reuse of plastic waste, especially plastic bags, could follow the parameters found in the recovery of other materials, such as aluminum. According to the Brazilian Association of

Aluminum Cans Manufacturers - ABRALATAS, Brazil recycled 97.6% of a total of 375.7 thousand tons of beverage cans that came into circulation in the market, and 56% of the aluminum consumed in the country comes from recycling, placing it among the leaders in the reuse of this metal for more than ten years (ABRALATAS, 2020).

However, the insufficient appeal to environmental education threatens this economic instrument in Pará. Sanjad (2018) observes a variety of public roads in the state capital, Belém, with a buildup of waste, particularly in the more peripheral neighborhoods, where the most vulnerable population resides and where there is less garbage collection. Mesquita et al. (2022) reveal in their study, which involved the application of 83 questionnaires to citizens of Belém, that 44.6% of respondents stated that there is no selective waste collection in their respective neighborhoods, while another 16.9% responded that they did not know how to provide information on the subject.

Meanwhile, the Pará law on plastic bags, along with four other state legislations from Paraíba, Rio de Janeiro, Ceará, and Maranhão, forms a select group of regulations approved in Brazilian states that propose instruments for raising awareness about the importance of sustainable consumption of plastic bags. (Nascimento et al., 2024). However, more than that is needed to reduce the incidence of plastic bags or other natural materials. The public authorities must maintain an interest in strengthening reverse logistics practices so that plastic reaches recycling companies.

However, the low interest of the public power and legislative difficulty are presented as threats to implementing this subsidy since it depends on bills to implement it. In addition, it is emphasized that environmental actions have medium-long-term effects. In some cases, extending beyond the mandate period, the priorities of those in power become consistent with their interests in the permanence of office. Thus, they do not prioritize sustainability in the government agenda (Sousa et al., 2023). Still, when it comes to the proposal of subsidies for plastic recycling companies to set up, we deal with the issue of the possibility of reducing public collection. This point appears to be an internal weakness of this incentive.

Furthermore, with the repurposing of plastics by recycling companies, public spending would be reduced on the treatment of this material. In this way, although the state would stop collecting taxes from this sector, reducing social costs related to the plastics chain could balance in this discussion. Still, it is noteworthy to emphasize that although establishing new companies is seen as a strength driven by subsidies, there is a

setup time for this new industry that may extend the period before results become apparent.

Another point is the advent of greater consumer awareness about environmental issues linked to recycling and correct disposal of waste, factors capable of encouraging changes even in the business environment, leading organizations to seek more sustainable alternatives (Tonello et al., 2022). In this sense, assuming plastic bags are an externality related to the activities it depends on to offer its customers, applying economic instruments to discourage their use can weaken this dependence on bags for both companies and customers. Nevertheless, these instruments can strengthen the adoption of Law 8902/2019, which needs a more effective strategy to address this issue.

On the other hand, the nature of who can be inserted in this discussion is the divisor between the concepts built by Arthur Pigou and Ronald Coase, since for Pigou, the state and the individual private agent must establish a relationship. At the same time, for Coase, the solution can be obtained from a relationship between individual private agents (Atamanczuk & Prates, 2021). With this in mind, Coase's vision indicates that solutions can also come from the business sector without the state directly acting on the imposition of instruments, which could streamline the process of offsetting externalities. Through this, "Instrument II - Offering discounts to customers who do not use plastic bags" aims to bring a solution to the problem addressed without starting from state intermediation. Figure 3 shows one can observe their imaginable effects categorized in a SWOT matrix.

Figure 3 – SWOT matrix analysis of the possible results of the Economic Instrument II.

Source: Authors (2024).

Providing discounts to customers who do not use plastic bags, one can directly influence the change in society's everyday habits regarding plastic bags. In this way,

strengths and weaknesses represent the direct effects that the incentive can have on society and businesses. Therefore, they correspond to internal factors. On the other hand, opportunities and threats are the indirect effects that can arise from the incentive, thus representing external factors. Due to the lack of state involvement, this instrument exposes more threats at the expense of fewer strengths than Economic Instrument I; however, it presents the same number of weaknesses and opportunities.

Through Instrument II, the main strength that should stand out is the reduction in the distribution of plastic bags since it directly affects the quantity of this product in circulation in society. Based on the lower circulation, other effects are presented as strengths since it would lead to a lower generation of plastic waste and growth in the sale of reusable bags. In addition, removing bags contributes effectively to the environment, although there is a limit of attitudes based on their costs (Flores et al., 2022). This limitation corresponds to a higher demand for reusable bags, which, although they may be positive, have a higher acquisition value due to their manufacturing materials. Soon, this demand becomes a weakness to the economic incentive.

Nevertheless, with the reduction in the distribution of plastic bags due to the lower demand obtained by the proposed incentive, the sectors that purchase this product would spend less on its replacement, which would reflect on the impacts of the production of plastic bags. Because they are derived from petroleum, polyethylene bags require large amounts of water and energy in their manufacturing processes and are considered polluting (Santos et al., 2018). That is its production results in the release of effluents, waste, and emissions of harmful gases to the atmosphere that corroborate the increase of the greenhouse effect and the damage to nature (Lima et al., 2020).

Another weakness of the application of discounts to customers stems from the possibility of reduced profitability since traders could dispose of part of the profit in favor of sustainable consumption. However, Dantas (2023) points out that supermarkets can retain their customers and establish a win-win relationship through discount programs on future purchases based on the return of solid waste. In addition, with the higher demand for reusable bags, the sector would have a new product with less impact, allowing it to make profits and still attract new customers through sustainable marketing.

According to Au-Yong-Oliveira and Sousa (2022), evidence shows that sustainable marketing efforts bring gradual benefits to companies, increasing brand recognition and giving them a boost in competitiveness due to consumer demand for environmentally friendly businesses. Even so, the marketing strategy linked to the appeal

of sustainability can lead to various opportunities gained through this incentive model, as strengthening sustainable or green marketing promotes sustainable enterprises, generating changes in social habits by fostering more conscious consumption.

Green marketing, which is also referred to as environmental or ecological marketing, is primarily designed to emphasize to consumers the company's dedication to the sustainability of its production processes, as per Moraes (2009). This approach enables organizations that implement the model suggested by Instrument II to sustain their profitability and competitiveness, as they would garner a higher level of consumer preference as a result of the image enhancements that accompany this marketing approach.

Martins (2021) emphasizes that companies with incentives to promote sustainable business models can successfully face the market's increasing competitiveness and greater ecological and social demands. With this, the issue of plastic bags ceases to be merely a socio-environmental concern and adds meaning to the economic discussion within the business sector. That is, green marketing stimulates awareness about the impacts of products and services, paying attention to the life cycles of consumer goods and the consequences generated by their use in consumers' daily lives. (Lozano-Ramirez, 2024).

For customers, discounts for not using plastic bags allow them to carry goods at lower prices, increasing the population's purchasing power. Alongside this assumption, the discounts would compensate for the externalities generated by plastic bags. They would reduce the burden of switching to reusable bags that fall on the population. Thus, consumers would start to prefer new alternatives such as eco bags and biodegradable bags, whose decomposition, unlike conventional ones, does not release methane gas but water, carbon dioxide, and biomass. (Freita & Frota, 2019).

However, the discounts still need to be attractive so that consumers can see all the benefits of substitution. Otherwise, as explained by Nascimento et al. (2017) in their study conducted at BH and MartPlus supermarkets in Belo Horizonte, Minas Gerais, where it was the opinion of customers about the sale of biodegradable bags, whose response obtained was that the bill, regarding the disuse of conventional plastic bags, fell once again into the consumer's pocket. This is in line with the objective of direct action on prices, whose intention is to promote the internalization of environmental costs in the private costs of economic entities (Ferreira & Ferreira, 2021). Thus, the responsibility for externalities falls on public revenue, society, and the environment.

Therefore, the possibility of enterprises' low adhesion and unattractive discounts may emerge as threats to the success of this proposal for an economic instrument. In addition, there is a social dependence on plastic bags, which, without an efficient incentive, compromises the achievement of the desired effects for the reduction of impacts of plastic in nature targeted by State Law 8902/2019. To elucidate this question, in a survey conducted in Ipixuna of Pará, it was observed that 68% of the residents of the Centro neighborhood and 80.3% of the residents of the João Paulo II neighborhood used plastic bags to pack household waste, which indicates that in different spaces of the cities, this type of packaging is part of the daily life of the population (Gonçalves et al., 2021).

Considering that achieving the desired results of Economic Instrument II in reducing plastic bag consumption is essential, it is crucial to implement an efficient selective collection system. That is, with the proper collection of solid waste, this incentive, just like Instrument I, gains greater strength in society because for people to become less dependent on plastic bags, it is also necessary to propose new ways to dispose of their waste that were previously packaged in polyethylene bags. This was the path taken by the public administration of the city of San Francisco, California, whose public policies include promoting environmental education, teaching the population to separate their household waste and recycling techniques, as well as encouraging composting through discounts on waste fees for those who engage in this method the most. (Fidelis et al., 2019).

In general, it is understood that there is an inefficiency in the force of Law 8902/2019 to solve the problems resulting from the use of plastic bags too much due to the absence of more efficient strategies that only restrict the use in order to remedy this problem. However, there must be a commitment to create incentives that give direction to the market, either through state mediation or to meet the new demands of consumers (Martins, 2023). With this in mind, the panorama in which plastic bags are inserted in the context of developing a more sustainable society requires a change in habits regarding their consumption and how to deal with their costs of use by economic activities.

CONCLUSIONS

Plastics, especially bags, are a common part of contemporary society's way of life, which means that proposing changes depends on social commitment. As such, unless plastics are completely exhausted on the planet, there is no way to solve their impacts through a single measure. In other words, the approval of Law 8902/2019 appears to be

the first step towards solving this problem in the state of Pará, but it does not have the necessary attributes to generate significant changes in society.

In that respect, the study sought to develop proposals capable of assisting the current legislation. The first of these proved promising in terms of environmental and economic aspects, encouraging reverse logistics by strengthening the recycling industry for this material in the state. However, because it depends on political action for its establishment, it tends to face difficulties due to the low electoral appeal of the environmental agenda. On the other hand, the second instrument does not have this dependency, as it takes place through the relationship between the consumer and the commercial sector. In addition, its strengths and opportunities cover the three pillars of sustainability: the social, through the increase in purchasing power generated by discounts; the economic, through sustainable marketing; and the environmental, the reduction in the use of plastic bags.

In general, it was observed that both the tools developed in this study come up against the need for an effective selective collection system, a factor that makes it difficult for society to be indifferent to the use of plastic bags, given that their main mode of reuse is for household waste. In addition, the lack of environmental education also requires more effective measures to raise awareness among the population. It is not enough just to ban the use of plastic bags without promoting alternatives that replace or mitigate their functions given by citizens.

It is therefore necessary to continue studying new ways of dealing with plastics in society, which can be based on academic suggestions through successive research on the subject. In this sense, studies can be carried out based on the vision of society and the sectors involved in order to identify attractive incentives for reducing plastic waste. Through this, a plan can be drawn up to promote more conscious, sustainable and compensatory consumption of products based on this material.

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