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THE REVERSE LOGISTICS SYSTEM AS A FORM OF DEVELOPMENT OF BRAZILIAN COMPANIES: THE WAY OF NATURAL CAPITAL

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ABSTRACT

The Brazilian environmental legislative framework has been included in the Reverse Logistics System, among the reinforcements approved by Law No. 12,305 / 2010 (National Solid Waste Policy), which aims to hold all stakeholders in the product life cycle, by its final destination. Among those responsible, the Brazilian business community is included, such as manufacturers, distributors and traders, who, through legislative innovation, have another legal burden on corporate performance. The present work, through a bibliographical research, aimed to conceptualize the reverse logistics system, still little debated in Brazil, in order to verify its applicability in Brazilian organizations, not as a burden to the central profit objective, but as a plausible means of and to direct them to sustainability, according to the concept of natural capital, under the bias advocated by Tercek and Adamns, with the possibility of being an alternative capable of developing profitable and at the same time sustainable companies.

Keywords: Reverse logistic; Brazilian Companies; Natural Capital.

O SISTEMA DE LOGÍSTICA REVERSA COMO FORMA DE DESENVOLVIMENTO DAS EMPRESAS BRASILEIRAS: O CAMINHO DO CAPITAL NATURAL

RESUMO

O arcabouço legislativo ambiental brasileiro sofreu a inclusão, dentre os reforços positivados pela Lei nº 12.305/2010 (Política Nacional de Resíduos Sólidos), do Sistema de Logística Reversa, que tem como objetivo a responsabilização de todos os atores do ciclo de vida dos produtos, pela sua destinação final. Dentre os responsabilizados, inclui-se a sociedade empresarial brasileira, a exemplo de fabricantes, distribuidores e comerciários, que passam, a partir da inovação legislativa, a ter mais um ônus legal na atuação corporativa. O presente trabalho, por meio de pesquisa bibliográfica, visou conceituar o sistema de logística reversa, ainda pouco debatido no Brasil, a fim de verificar a sua aplicabilidade nas organizações brasileiras, não como um ônus à finalidade central lucrativa, mas como um meio plausível de direcioná-las à sustentabilidade, segundo o conceito de capital natural, sob o viés defendido por Tercek e Adamns, com a possibilidade de ser uma alternativa capaz de desenvolver as empresas de forma lucrativa e, ao mesmo tempo, sustentável.

***Palavras-chave**: Logística Reversa; Empresas Brasileiras; Capital Natural.*

INTRODUCTION

The national solid waste policy, created through Law 12305/2010, is another legislative mechanism aimed at establishing certain environmental criteria to be respected by the State, both individuals and corporations, in Brazil.

With the participatory bias, emanating from basic ideas, such as listing as one of its principles the valorization of the waste collector, the law also presents, as a complement to the existing logistics system, the reverse logistics system, which determines responsibility for the destination end of the solid waste of the actors who participate in the product life cycle, inserted in this role, consumers, as well as national companies.

This extensive role is justified by the definition of the product life cycle amplitude, as identified by Valle (2002, p.145) as "the analysis of the Life Cycle of a Product comprises from the extraction of natural resources or raw materials needed for it's production until the final disposal of the product at the end of its useful life ".

The present work, when analyzing the concept of the reverse logistics system, distinguishing the products that the law regulates as an obligatory analysis along with its logistics, as well as the responsible ones listed by the norm to carry out the functions in the system, so that there is the minimum of possible entropy, seeks to verify the doctrinal divergences between those who defend free enterprise and those who intend to suggest a sustainable performance of companies.

Here we find entropy, as conceptualized by Greco, which confers its definition as being "the measure of the disorder of a system. The greater the entropy, the greater the degree of disorder of a system" (2015, p. 58). In this way, it is argued that the reverse logistics system can, when used correctly, influence the reduction or containment of the natural entropy of the ecosystem.

In today's capitalist theories, there are some doctrines that advocate the absence of state intervention in economics, as can be seen in Hayek's (2010) doctrine, which states that a minimal intervention ends up generating some imperfection in the economic cycle, so it must be corrected by a new intervention, forming a cycle in which market freedom would be suppressed and impaired by the State.

In Vidal's words:

> In other words, Hayek argues that the imperfections caused by state intervention in a free market capitalist economy generate demands for a new intervention, precisely for the correction of said imperfections. In this way, successive interventionist rounds will follow, until little or nothing will remain of a competitive capitalism. There, for both the author and other liberals, there is the emergence of any of the variants of socialism, which in turn becomes totalitarianism. (VIDAL, 2007).

In this section, Robert Reich (2008) analyzes the current capitalist system, mainly the North American, to structure his theory of supercapitalism, from which he verifies that the current tendency of the capitalist system is the withdrawal of companies from moral issues, ethical or environmental, that require discussions that may result in a fall in financial income.

On the other hand, Tercek and Adams (2014) propose greater corporate participation with regard to the survival and well-being of all, in order to better harmonize with the natural environment.

This proposal is defended by the authors, even in a scenario where all actions are interconnected through the urgency of communication and connection in relationships, with the technological tools being acted on, as well as the acceleration of industrial growth, which generates more elastic relationships and between individual companies.

In this treadmill, as Reich (2008) identifies, some organizations tend to present themselves with the proactive discourse and identified with noble causes of society, as is the case of the environmental crop.

In liquid modernity, a concept created by Zygmunt Bauman (2001), however, it is not known if what these organizations are seeking is the recognition of society in general in order to obtain greater profits by searching for their products or, in fact, an engagement to a sustainable course. Tercek and Adams (2014) identify that organizations can and should, in spite of only being concerned with the positive media, to move towards the path of corporate sustainability, without losing competitiveness in the market.

In a study with a bibliographical methodology, the present work presents the ideas of Reich (2008) and Tercek and Adams (2014) in order to expose the current reality of organizations in their relation with the environment, as well as, giving focus to the defense of that companies can opt for sustainable choices, such as the reverse logistics system, persisting with the tendency to be profitable and at the same time environmentally

appropriate.

In this sense, companies, observing sustainable mechanisms in their ordinary activities, may also be promoting their own subsistence in the ecosystem, since they contribute to the sustainable development of the planet, which involves its own shareholders, consumers and distributors.

The reverse logistics, as proposed by the PNRS, is presented as a form of state intervention in the economy, defended here as a democratic intervention, in a constructive perspective of democracy, as defended by Coutinho (2016), for dealing with the defense of the balanced environment, fundamental right listed in the roll brought by the constituent legislator in the 1988 charter.

In this way, it will be analyzed that the idea is shown as a mechanism capable of being used by Brazilian organizations, even as a modern way of turning business thinking in the country towards sustainability as a viable form of development.

1 THE REVERSE LOGISTICS SYSTEM OF THE NATIONAL SOLID WASTE POLICY

The National Policy on Solid Waste (PNRS) has as one of its objectives the non-generation of waste and, in this sense, has mechanisms to prevent the accelerated production of waste, such as the reverse logistics system, which aims, as a pure system, contain the entropy, that is, the disorder, of the environmental system.

This instrument aims to reduce the amount of solid waste, through the planning of the manufacturers, aiming the consumer to reuse the packaging, promising to reduce waste and damage to the environment. Its concept is easily found in Article 3. XI of the Law in question:

> XI - reverse logistics: an instrument of economic and social development characterized by a set of actions, procedures and means to enable the collection and restitution of solid waste to the business sector, for reuse in its cycle or in other productive cycles, or other destination.

The reverse logistics system aims to take the reject to the source of its production or to the marketing chain, with the specific purpose of having it reused. It is a procedure that entails the application of post-consumer responsibility, representing the application of the polluter-pays

principle, one of the guiding principles of PNRS.

Reverse logistics can be implemented through sectoral agreements, regulations issued by the public authority and terms of commitment, in order to jointly hold users (or producers) responsible for the product life cycle.

In addition to these mechanisms, reverse logistics can be implemented by encouraging reusable and recyclable waste pickers, a crucial point for the present analysis and from the technical and financial cooperation between the public and private sectors, for the purpose of developing research of new products, among other methods, with the purpose of an environmentally adequate final disposition of the tailings.

In view of the principles of administrative law, the reverse logistics system must be carried out independently of the public urban cleaning and solid waste management service, which is what is recommended in Article 33, *caput*, of Law No. 12.305/10.

If the public service, by industry agreement or commitment term, take responsibility for the obligations of manufacturers, importers, distributors and merchants, there must be remuneration, according to article 33, paragraph 7, and can not occur free of charge.

1.1 Activities covered by the reverse logistics system.

Article 33 of Law no. 12.305/10 lists activities in which the reverse logistics system should be made compulsory:

> Art. 33. They are obliged to structure and implement reverse logistics systems, upon return of products after use by the consumer, independently of the public urban cleaning and solid waste management services, manufacturers, importers, distributors and traders of:
>
> I - agrochemicals, their residues and packaging, as well as other products whose packaging, after use, constitutes hazardous waste, observing the hazardous waste management rules established by law or regulation, norms established by the organs of Sisnama, SNVS and Suasa, or in technical norms;
>
> II - batteries and accumulators;
>
> III - tires;
>
> IV - lubricating oils, their residues and packaging;
>
> V - fluorescent lamps, sodium and mercury vapor lamps and mixed lamps;
>
> VI - electrical and electronic products and their components.

When analyzing the provisions of law, it is noticed that the mandatory application of the reverse logistics system for pesticides, batteries, tires and lubricating oils, waste and packaging, provided for in items I to IV, prescind any regulations, sectoral agreement or commitment term, in accordance with the provisions of Decree No. 7.404 of 2010, and the duty to operate it stems from the very National Policy on Solid Waste. It should be noted that the responsibility of companies producing pesticides or marketing these products was introduced in 2000, by Law 9.974.

The reverse logistics to be implemented in relation to fluorescent lamps, sodium and mercury vapor and mixed light, as well as the electronic products and their components, exception created in article 56 of the law, adding that the implementation should be progressive according to established schedule in a regulation, making a distinction between the forms of implementation, the first being called immediate implementation (article 33, I to IV) and this one of progressive implementation, according to article 56 in conjunction with article 33, V and VI.

In turn, the first paragraph of article 33, adopts the possibility of extension of the obligation by regulation or sectoral agreements and terms of commitment, for products sold in plastic, metal or glass packaging and other products and packaging.

In this case, the definition of products and packaging should consider the technical and economic feasibility of reverse logistics, as well as the intensity and extent of the impact on public health and the environment as to the waste generated, therefore, the role assumed by article 33 is not a taxable one.

Thus, the law itself already differentiates again the types of products, packaging and waste reached by the reverse logistics system, and those established in article 33, items I to VI, do not have a subsequent procedure to be done, since it is considered an agent of harm to public health and the environment (although with different validity) and the second role, described in the first paragraph of article 33, as being dependent on prior analysis to be inserted in the reverse logistics system.

1.2 Measures of implementation and operation of the reverse logistics system

Also in article 33 of the National Policy on Solid Waste, more precisely in paragraphs 4 to 6, the duties of the different categories of

persons responsible for reverse logistics are distributed, and the law has sought to achieve the greatest number of duties in favor of environmentally appropriate measures and to list such burdens in proportion to each category, a legislative innovation that distributes responsibility for the protection of the balanced environment, a principle enshrined in the text of the Federal Constitution of 1988, to all actors in the process of production and final disposal of waste .

1.2.1 As for consumers

Before final disposal of solid waste, most products pass through the hands of consumers who, according to Law 12.305 of 2010, after the use of the products and packaging that are the object of reverse logistics, should return to the merchants and distributors, because the generator of household waste has ceased its responsibility for the waste with the adequate provision for collection and with the return, in the cases of article 33, in compliance with article 28 of the law that prescribes "Article 28.The generator of solid household waste has ceased its responsibility for the waste with the adequate provision for collection or, in the cases covered by art. 33, with the return. "

However, consumers may be held responsible if they dispose of waste to subjects not provided for in Law No. 12.305, as well as if they fail to launch or do so in inappropriate places, that is, in disregard of the legal text.

Like all subjects with rights and duties, consumers are called upon by the PNRS to consume in a sustainable manner, this being one of their objectives, as stated in article 7, item XV. That is, there is an undeniable link between waste generation and consumption and, therefore, the law has put one of the axes of the chain of responsibility to the person of the consumer.

For the purpose of integrating with the public authorities in the implementation of the PNRS, as well as the monitoring of compliance, the law determined the existence of municipal plans for integrated solid waste management, with the provision of the selective collection system, in the form of articles 18 and 19 of the PNRS, when applying the reverse logistics system, consumers are obliged, according to article 35 of the law, to adequately and differently pack the solid waste generated; adequately dispose of reusable and recyclable solid waste for collection or return,

and the Municipal Government has the power to impose administrative penalties, such as fines, for natural or legal persons, who do not properly prepare and make available the reusable and recyclable solid waste.

However, in discussing the possibility of granting economic incentives to consumers who fulfill the obligations of Article 35, the PNRS is, in a way, encouraging Municipalities to take this step towards the beginning of this public environmental policy, which seems to have been the proposal suggested by the power constituted when legislating accordingly.

Thus, PNRS created mechanisms for state intervention in the lives of consumers, as well as other actors in the process of creation, use and final destination of solid waste.It remains to be pointed out, however, whether such intervention can be considered democratic.

1.2.2 As for traders, distributors, manufacturers and importers

Law No. 12.305/10 affirms the duties of traders, distributors, manufacturers and importers, as is verified in the analysis of article 33, paragraph 3:

> § 3 Without prejudice to specific requirements laid down by law or regulation, norms established by the Sisnama and SNVS bodies, or sectoral agreements and terms of agreement signed between the public authority and the business sector, manufacturers, importers, distributors and traders of the products referred to in items II, III, V and VI or of the products and packages referred to in items I and IV of the caput and paragraph 1 take all necessary measures to ensure the implementation and operation of the system of logistics under its charge, according to the established in this article, being able, among other measures:
> I - implement procedures for the purchase of used products or packaging;
> II - to provide reusable and recyclable waste collection points;
> III - to work in partnership with cooperatives or other forms of association of collectors of reusable and recyclable materials, in the cases dealt with in §1.

By using the expression “among other measures”, the PNRS is not suggesting, but obliging three types of procedures to the addressees of the law: 1) to implement procedures for the purchase of used products or packaging; 2) to provide reusable and recyclable waste collection points; 3) and work in partnership with cooperatives or other forms of association

of collectors of reusable and recyclable materials, in cases referred to in the first paragraph of article 33.

In this case, merchants and distributors shall return to the manufacturers or importers of the products and packaging collected or returned in accordance with paragraphs 3 and 4 of article 33, where the standstill in the chain of restitution of the products used or their inadequate stocking implies responsibility of these professionals.

Manufacturers and importers must give the products and packaging collected and returned the environmentally adequate destination, and the waste must be sent to disposition, in the form established by the competent body of the National Environmental System (SISNAMA) and, if management of solid waste, in accordance with paragraph 6 of article 33.

Still referring to manufacturers and importers, it is considered that they will have a double duty, one referring to products and packaging and another related to tailings. As far as products and packaging are concerned, they are likely to be recycled or reused.

On the other hand, wastes, which are the residues that after the exhaustion of all the possibilities of treatment and recovery by the technological processes available and economically viable, only present the possibility of their environmentally adequate disposal, in most cases, being the landfill, manufacturers and importers should enjoy a private landfill, which should be monitored and inspected by the Government.

As stated above and according to Machado:

> The principle of polluter pays, as provided for in Law 12.305 (article 6, II), is applied in reverse logistics, and the waste generators can not transfer to the society or the population the financial charges arising from their activities, applying the brocardo *ubi emolumentum, ibi onus,* for where there is profit or advantage, there must be consideration. (MACHADO, p. 61, 2012).

As one of the innovations of the PNRS, is the responsibility of manufacturers and importers to manage the tailings from the products they manufacture, not having to create contaminated areas, but areas where environmental degradation is avoided, monitored and, if necessary, remedied.

2 HOW TO CONCILIATE BUSINESS ECONOMIC DEVELOPMENT WITH SUSTAINABILITY? REVERSE LOGISTICS AS A PLAUSIBLE SYSTEM

How, in today's modern society, can we produce and secure profits while at the same time being sustainable? How to ensure the full functioning of the business system, having to submit to proposed rules through state intervention, so as to observe respect for the fundamental right to the environment? This is the current challenge for organizations.

Capitalism has already proved to be the most appropriate form of economic liberalism, according to Rosenfield (2010), so companies need more freedom to boost their investments in order to make a profit and thrive in the economic marketplace.

Thus, every time that the State intervenes in business practices, in a way, it will affect the freedom of the companies, externally, being able, therefore, to generate effects in the business structure, in the way of acting in the market of the organizations and even, in its profits, as a consequence.

Part of the scholars of capitalism and corporate growth believes that organizations should not submit to external interventions, including that of the state, given that their larger objective (profit) can be achieved more productively and effectively, if the company itself determines the guidelines of its action.

Robert Reich (2008), in his work "supercapitalism", identifies that in the current scenario of capitalism, companies choose to debate and align with moral and ethical causes, or simply, by previous experiences not very satiafatory, refrain from these discussions in order to ensure greater demand from the various consumer niches.

In this vein, the paper proposes to analyze that, the state intervention in Brazil through the National Solid Waste Policy, with the proposal to operate the system of reverse logistics in companies, in addition to being democratic, since its purpose is to preserve the guarantee to the balanced environment, a fundamental right inserted in the role of the original constituent, is fully compatible with the development of companies, which need, as well as natural persons, to be concerned with the sustainability of the planet.

The interaction between companies, society and the environment, however, are factors that can no longer be ignored at the present time of civilization. According to Garbaccio, Krolik and Maciel (2017), companies

have, as well as all social system builders, responsibilities related to the better development of the ecosystem .

Such a need is seen in an example identified by Tercek and Adams (2014), when portraying part of the natural marine system, with the paradigm of the key species. Such species have a disproportionate effect on their ecosystems when compared to common species, such as Pacific otters. These animals are in a dispute for mollusks such as haliotes, clams and crabs, against fishermen.

If the fishermen therefore wished to win this dispute, they could act externally by hunting the otters until they were no longer opponents for mollusc hunting. It occurs that the Pacific sea otters also feed on sea urchins, helping to control their population, so that the algae, food of the urchins, remain preserved in the ecosystem.

So if the fishermen decided to hunt the otters in order to keep all the molluscs, naturally, there would be less algae, which is a vital environment for several marine species.

Likewise, companies are in a system where their functioning is only justified if other system members (consumers, producers, distributors) are able to compete and survive.

Without the balanced environment, a preponderant factor for the lives of humans and the ecosystem, how could companies play their role, develop and seek profits?

Companies, in this sense, if they do not engage in sustainable business in order to obtain their own "natural capital", in the idea presented by the authors, will not have the least prospect of future subsistence, thus suffering from the loss of resources of the natural environment "composed of fauna, flora, soil, water and other elements that arise naturally and conform to nature", according to Casagrande Junior and Agudelo (2012).

Manufacturers and suppliers, for example, when inserting a product into the market, are inserting in the natural environment a structure made by man and not directly by the natural environment itself.

Thus, the reverse logistics system proposed by the PNRS, is a way to hold these actors accountable so that they can insert products that are not dumped into the natural environment, without an adequate final destination, which would damage it's normal development.

This performance of companies should not be considered as a way to limit their development, or even impair their material maintenance equanimity, but as a form of economy, as when a particular company

chooses to store their products in economic and sustainable packages, to return to the companies for new storage or to be recycled, which can be done through the help and intermediary of the associations of collectors, another basic principle that the PNRS brought in its text.

Such an attitude, as well as being a way of guaranteeing the reverse logistics of their artificial products, can also be a way of reducing costs with production or packaging contracts, which would naturally boost their investments, thus collaborating with the full development the company.

An example of this was presented by Tercek and Adams (2014) in his work "Natural Capital", when he analyzed the choice of the US company *Dow Chemicals* to build a nearby swamp for the treatment of water.

In the mid-1990s one of the enterprises of the great company *Dow Chemicals*, located in *Seadrift*, *Texas* after a regulatory pressure, had to make improvements in water treatment at its facilities. The initial investment of treatment in the conventional way, that is to say, with discharge of a lot of concrete and construction, was foreseen to approximately 40 (forty) million dollars, amount previously accepted by the shareholders.

However, one of his engineers had the idea of building a swamp to realize the integral water treatment of the business unit, an alternative path to the common one, that would be to spend a great amount of money on something realized by the artificial environment, in the concept given by Casagrande Junior and Agudelo (2012).

Dow Chemicals, the second largest chemical manufacturer in the world, operating in 160 (one hundred and sixty) countries and sold only in 2011, 60 (sixty) billion dollars, followed the alternative recommendation of the engineer and managed through the building of the swamp, treating the water of its unit for only 1.4 (millions) of dollars, a considerable saving and that yielded not only the best water treatment of its unit but a smaller imbalance in the structure of the local ecosystem, making possible the circulation and subsistence of several species of fauna.

It is clear, therefore, that *Dow Chemicals*, when opting for the less aggressive choice for the environment, at the same time, opted for the best deal, which was far more profitable for their economic interests, showing a distinctly entrepreneurial vision, while regarding the environmental aspect in order to be able to thrive for longer in the market, as demonstrated by the studies of Tercek and Adams (2014), with the company's sales number,

only in the year 2011, therefore, more than ten years after this and other choices thinking about social capital.

The reverse logistics system, therefore, should not only be analyzed as a state intervention, which could jeopardize the development of Brazilian organizations, with repercussions on its economy, but rather as a system capable to, in tunning the responsibility of companies with the responsibility of consumers, to add economic value, with profitability in product flows, for example, to change the direction of business in Brazil, in order to influence the thinking directed to natural capital.

CONCLUSION

Not always a state intervention in the functioning of the companies may have, as a result, something that tends to undermine its progress or mitigate its lucrative possibilities. The reverse logistics system, when implemented by the National Solid Waste Policy, presents itself as a possibility for organizations to follow the path of sustainability, without undermining their development.

In proposing the direction of firms to natural capital, Tercek and Adams (2014), contribute to the present work with the position that the efforts of companies to turn to sustainable thinking can sometimes be rewarded, not only with the maintenance of the ecosystem and improvement of the quality of life of the population, but also with the possibility of development, in such ways, including, economic, so that it can be a profitable alternative to the companies.

Environmentalists, environmental activists or professionals linked to the idea of *compliance*, when integrated with companies, can also bring this developmental vision to contribute to greater profitability, while at the same time surpassing the strict vision of growth for profit.Profit is the survival guarantee of the company, however, it can and should, in the vision presented, be sought in conjunction with respect for a balanced environment.

Moreover, such a profitable and at the same time sustainable projection can be realized even if through a state intervention, as long as it is democratically feasible. In the perspective of participatory democracy, brought by COUTINHO (2016), the reverse logistics system is feasible in a Democratic State of Law, since it tends to protect the Fundamental Right to the Balanced Environment, listed in the Federal Constitution of 1988.

The reverse logistics system is therefore a way of developing companies, so that they can, in carrying out the proposed legislation, as well as propose new and sustainable ideas, keep the development competitive, which will give them room in the market, as exemplified in this article.

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