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# COMPLIANCE PROGRAMS AND COMPANY RESPONSIBILITY IN THE POST-CONSUMPTION STAGE OF ELECTRONIC WASTE

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## ABSTRACT

Environmental Compliance is an instrument of undeniable relevance and effectiveness in meeting the National Solid Waste Policy (PNRS) implemented by Law 12,305/10, especially for the treatment of electronic waste in post-consumption. Thus, this study becomes necessary, considering that criminal sanctions and enforcement of fines are not able to restore balance to the environment. According to Agenda 2030, companies must adopt sustainable development policies. Compliance programs work before the commitment of a crime via top-down supervision and the implementation of a new ethical culture of social and environmental responsibility for organizations, which involve respect for human beings and the environment. We used the hypothetical-deductive method, with support from analysis of case law, the literature, and reports on electronic waste. It was possible to deduce that the relevance of the topic makes compliance practice mandatory for meeting social and environmental obligations, avoiding charges with environmental technical agencies and criminal prosecution, which may lead to brand devaluation and even disregard of corporate entity.

**Keywords:** compliance; electronic waste; environmental sustainability; reverse logistics.

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## *PROGRAMAS DE COMPLIANCE E A RESPONSABILIDADE DA EMPRESA NA FASE DE PÓS-CONSUMO DE LIXO ELETRÔNICO*

### *RESUMO*

*O compliance ambiental é um instrumento de inegável relevância e efetividade no cumprimento da Política Nacional de Resíduos Sólidos (PNRS) implementada pela Lei n. 12.305/10, em especial, no tratamento de resíduos eletrônicos no pós-consumo. Assim, o estudo se torna necessário tendo em vista que as sanções criminais e aplicação de multa não são capazes de restabelecer o equilíbrio do meio ambiente. Com base na Agenda 2030, as empresas devem adotar políticas de desenvolvimento sustentável. Os programas de compliance atuam anteriormente à prática do delito, pela fiscalização de forma top-down e pela implementação de uma nova cultura ética de responsabilidade socioambiental das organizações, que envolvem o respeito ao ser humano e ao meio ambiente. Utiliza-se do método hipotético-dedutivo, com o apoio da análise jurisprudencial, bibliográfica e reportagens acerca do lixo eletrônico. Foi possível deduzir que a relevância do tema torna a prática do compliance obrigatória para o cumprimento das obrigações socioambientais, evitando denúncias junto a órgãos técnicos ambientais e à persecução criminal, que podem levar à desvalorização da marca e até mesmo à desconsideração da personalidade jurídica.*

***Palavras-chave:*** *compliance; desenvolvimento sustentável; logística reversa; resíduo eletrônico.*

## FOREWORD

In an increasingly globalized world, corporations are beginning to realize and acknowledge the importance of containing business risks in relation to the environment. Along these lines, the compliance program becomes an effective mechanism for meeting with national and international transparency laws, standards and policies.

As predicted by Beck, Giddens and Lash (2012), the risk society, driven by the industrial revolution and unbridled capitalism, caused part of the population to live in a world subject to environmental catastrophes and imbalances, arising from the sociology of risk.

The worsening of uncertainties and tragic probabilities since the Chernobyl nuclear accident (1986) requires that Governments and other social players identify the faults in production and exploitation systems for the implementation of a new sustainable culture.

In this sense, this research advances compliance programs as a preventive and complementary tool to the traditional ways of administrative and criminal punishment<sup>3</sup>, which can be implemented before the commitment of the violation, thus allowing companies and Governments to have better control of the environmental risks.

The methodology chosen for this research was the deductive hypothetical one, with consultation of law theory, environmental legislation and reports on the subject, for further confirmation of the hypotheses now being discussed here. This paper was broken down into three sessions, the first part focusing on the introduction of the theme and the research objectives. In the second part, sustainable practices for socioeconomic development will be addressed, with participation not only of the State, but of the community and companies in the construction of this new process of sustainable development.

In the third part of the text, we intend to discuss the forms of knowledge required for implementing Environmental Compliance Programs and companies' responsibility for reverse logistics of electronic products, based on the National Solid Waste Policy (PNRS).

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<sup>3</sup> Accordingly, anyone who causes pollution of any kind at levels that result in or cause harm to human health, the death of animals, or significant destruction of the flora will be subject to imprisonment for one to five years (Art. 54 of Environmental Crimes Law No. 9,605/1998).

## **1 SUSTAINABLE PRACTICES FOR SOCIO-ECONOMIC DEVELOPMENT**

The design of compliance programs, as well as the definition of the variables whose actual measurement indicates the extent of corporate responsibility in the current environmentally sensitive post-consumption time of e-waste are issues that require prior consideration regarding sustainability parameters, without which there can be no talk of development and of the likely further threats compromising the success of any compliance practice. Technical unreadiness, impudence, disdain and even deliberate intent to compromise preliminary studies capable of ensuring future sustainability by disregarding the probable risks, in short, are factors that deserve previous consideration; if those issues are not overcome, any compliance program would be useless. This is the challenge to be addressed in this topic.

Sustainable development is a global goal to be achieved in accordance with the United Nations 2030 Agenda. What happens is the extent of development through economic expansion, human development, and protection and preservation of the environment. These measures are essential for maintaining humanity and the health of the planet.

Sustainability can be analyzed as a multidisciplinary ideological, legal, political and economic phenomenon (BLANCHET; COSTA JUNIOR, 2018), as it involves different aspects, which are the subject of study in other areas, such as physics, chemistry and engineering, and without which it would not be possible to advance truly sustainable proposals. These studies validate the need for the use of green technologies to replace non-renewable energies that harm the environment; these measures should be associated with the correct disposal of waste for later reuse through reverse logistics.

The development of prior feasibility studies in any venture or business practice under approaches capable of ensuring sustainability and eliminating risks is the inescapable and appropriate initial measure to identify the basic points in the content of any compliance program. As these are the points that will give certainty to the definition of the guidelines for each compliance program, it can be concluded that it is their non-compliance that will determine the extent of accountability in each actual situation.

Based on this premise, the sustainable development proposal aims at social development, eradication of poverty, hunger and misery, and

implementing tools for the exercise of citizenship. Such proposals allow access to fundamental social rights related to employment, education, housing, safety, health, social security, and others capable of contributing to the dignity and well-being of the population.

Regarding its economic aspect, the democratization of the means of access to assets should be improved, without prejudice to regional and cultural diversity, especially with regard to natural resources, as they are essential for the maintenance of species and for the dignified survival of traditional riverside, quilombola and native communities. Therefore, companies have Social Responsibility vis-à-vis the communities where they operate, so business activities cannot be guided solely by a pursuit of profit, but rather by seeking it within the parameters of ethics, efficiency, resource rationality, planning and control of adverse effects (environmental risks).

Concern for the planet, in its turn, goes beyond that pertaining to the responsibility of sovereign states for the control and enforcement of environmental protection standards, as civil society and companies must take on obligations regarding the consumption and sustainable management of natural resources (SUNDAYS ; VEIGA, 2017).

Sustainable development is a challenge for nations, considered here in their complexity and including all sectors, both in the public and private arena. It is necessary to adopt a set of rational measures for the preservation and protection of species, such as the reduction of polluting factors that cause climate changes and compromise air quality, thus ensuring that present and future generations can enjoy a healthy environment.

The global concept of sustainability is related to the solidarity of all for the effective preservation of natural resources, especially water, soil, and biodiversity, which are vital for the survival of humanity.

The norms pertaining to the right to the environment, raised to the category of formal constitutional norms, are dealt with in the chapter on social order. This is a fundamental right, considered a Third Dimension Right and influenced by values of solidarity for purposes of harmonization in the relationship between human beings and their environment, with special emphasis on fauna and flora, as well as all natural factors that make sustainability possible for both.

An important norm can be taken from Art. 225 of the Brazilian Constitution, which ensures to everyone the right to an ecologically balanced environment, which is essential to the viability and maintenance

of human dignity, whose defense imposes on the Government and on the community as a whole.

The principles defined by the Constitution and that guide Public Administration – and not just those stated in Art. 37 – are essential for a balance between the rationality of economic exploitation and its impact on the environment. It is up to the State, in the exercise of its police power and in its fomenting function, to carry out constant monitoring and to grant incentives for research and production of green technologies.

In order to overcome the climate crisis with medium and long term goals, economic, cultural, social and environmental policies must be adopted (COLOMBO; FREITAS, 2016) by means of global practices of respect for peoples and cooperation with other players for the prevention of environmental damage.

In addition to the preventive practice of compliance, it is necessary to make environmental legislation effective, especially to prevent favoring of personal interests in the granting of licenses, including for the exploration of minerals and the development of ventures in preservation areas and indigenous lands.

## **1.1 The paradigm between development and sociology of risk**

Development based solely on economic criteria, with profit as the main factor, has been insufficient and inadequate in itself to meet the United Nations 2030 Global Sustainability Agenda<sup>4</sup>. This criticism is due to the climatic consequences that affect the communities where companies operate, which is why there is a need to mediate conflicts between economic expansion and preservation of natural resources.

Indeed, economic and environmental risks are felt all over the world; disasters whose effects were previously confined to specific geographical areas now interfere with the health of the local population and global welfare. As an example, the melting of the ice caps is, from one point of view, caused by global warming and, from another, it contributes to its worsening, always resulting in environmental disasters.

Regarding the climate problems produced in Brazil, we see that the increasing deforestation of the Amazon over the centuries has caused the imbalance of rainfall all over the country.

4 The problem of the irresponsible use of natural resources, coupled with atmospheric contamination, has attracted the attention of the United Nations (UN) to the control of pollutants and the proper disposal of waste. Altogether there are 17 global objectives for sustainable development. Among them, it is possible to identify reduction of inequalities, as well as social welfare measures that allow for a more just life, thus making restoring balance to the ecosystem possible. Cf. ONU (2019).

In 2018, the states of Mato Grosso, Roraima and Tocantins accounted for about 55% of the fire outbreaks in Brazil, a fact explained by the hot and dry climate of these regions, but also by the repeated deforestation and environmental degradation caused by the expansion of logging companies and contractors, making the forest recomposition of the forest even more difficult (RORAIMA ..., 2018).

In this analysis, the study by a group of researchers from American Universities stands out. They identified the impact of Amazon deforestation on the rainfall in Rondônia. Thus, as vegetation is removed, the friction that was previously performed by trees in the circulation of the atmosphere changes and this drastically reduces rainfall in the regions where deforestation was carried out (KHANNA et al., 2017).

Along those lines, the rain that was concentrated in the center, shifts further to one side, changing the amount and location of precipitation (deposition of water to the ground) and, as a result, there are points of the forest with less rain, because of a decrease in roughness of the deforested surface (CHAMBERS; ARTAXO, 2017). It should be noted that the resulting rainfall irregularity has intensified the consequences of the *El Niño* phenomenon (NOBRE et al., 2016), given the abnormal warming of Tropical Pacific waters. Furthermore, without trees, the Amazon Forest is unable to absorb greenhouse gases, thus making climate effects more extreme across the globe.

It must be pointed out that deforestation is not the only factor responsible for natural disasters. The burning of fossil fuels is considered the major cause of climate change. Although oil, natural gas and coal are considered important for the energy sector in industrial activities and for vehicle operation, resources are scarce and highly polluting. Analyzed with the objectivity that the subject demands, it can be said that humans were irrationally charmed by the supposed development provided by fossil fuels and today face a deadlock that, if not overcome, will only aggravate the disastrous unsustainability of this process.

Had there been in the past, in terms of awareness, the concern that today is unquestionable for sustainability and, in terms of action, the adoption of compliance practices, people would have been realized in time that the unbridled use of fossil fuels was a mistake, and not a path to development. Another cause that is reflected in the quality of the atmosphere is the absence of an effective policy for the reuse of waste. Illegal burning of municipal solid waste emits carbon dioxide (CO<sub>2</sub>), one

of the major greenhouse gases (MAIELLO; BRITTO; VALLE, 2018).

Beck and Beck-Gernsheim (2008) emphasize the importance of risk mitigation in anticipating disasters. This new global awareness creates spaces for alternative production modes and a moral and political interpretation that can include an international culture of environmental responsibility.

Thus, seemingly harmless practices for the pursuit of profit as the sole engine of development, which gradually became commonplace, override collective needs. The problem requires a reflection between the Government, companies and the society in order to implement practices that are less harmful to natural resources.

Developing economies are struggling with structural problems, which involve high rates of unemployment, job insecurity, rising inflation and disrespect for the environment. These obstacles arouse the collective interest in projects of sustainable development and economic and political resignification. It is therefore necessary for the economic sector to have the autonomy to implement domestic policies and trade mobility with other countries in order to bring sustainable innovations and competitiveness to companies, enabling a decrease in regional inequalities (CARDOSO JR, 2011).

It is worth mentioning that sustainable regional development<sup>5</sup> can be translated into public policies of basic sanitation, access to drinking water, and incentive to cooperatives, such as those that work in the collection and recycling of urban solid waste.

In fact, the point considered as plausible for sustainable development is related to the State and business performance in line with the legal system, enabling development strategies to be part of the objectives of organizations, according to normative parameters and the determinations of environmental protection technical agencies. The State's scope is to draft preventive public policies on biomes, serving as a guideline for companies to develop their compliance programs.

Amartya Sen (1999) rightly warns that economic growth without respect for humanity leads to the poverty of nations. For that author, the economy must be aligned with ethical practices to build freedom and

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<sup>5</sup> Economic development guided by the capitalist model needs to be overcome, as it perpetuates social inequalities, slumming, unemployment and the destruction of biodiversity. Regional development governed by sustainability is only possible with integrated governmental actions at the federal, state and municipal levels, enabling the participation of the local community in decision-making processes together with the Municipal and State Supervisory Councils, in line with collectively-set objectives (ALVES; KNOREK, 2010, p. 13-23).



expand individual capacities through education, job opportunities, access to health, good nutrition, and other fundamental social rights.

Thus, corporations have to carry out the social evaluation of their projects, as well as the impacts of their products on the environment. Economic development cannot be achieved at any cost; the environmental consequences produce social imbalances that we all pay for.

Despite the implementation of the National Solid Waste Policy – PNRS (Law No. 12,305/10), Brazil acts against it, as our reuse level is below the European average (30%), as shown by indicators gathered by the European Environment Agency (EEA, 2016).

It is estimated that over 160 million tons of solid waste is thrown into the environment each day, yet only 13% of total waste is recycled (IPEA, 2017). Waste generation in Brazil increased by almost 30% in the years between 2003 and 2014, due to exacerbated consumption (BRASIL, 2014). In addition, more than 1,600 cities currently have no waste separation measures, making reverse logistics impossible (MELLO, 2018). Today, with the ban on waste shipment to China, Thailand is now considered the new destination for global e-waste, thanks to weak repression by local authorities and the absence of waste management laws (LEE, 2018).

Africa, Southeast Asia and Latin America, despite the policies already adopted individually by some regions, have a deficit in the collection and reuse of waste. These locations lack an effective sanitation policy, which contributes to the contamination of groundwater, with the accompanying risk of serious diseases (heart problems, cancer and possibly changes in human DNA).

The treatment of e-waste is a global problem neglected by the major industrial powers, which are not concerned with developing a research and technology project for reverse logistics of this material. Malicious multinationals take advantage of illegal factories with unhealthy working conditions, usually located in underdeveloped countries, to discard their e-waste disguised as second-hand electrical equipment. Due to constant failures in inspection control and a lack of specialized machinery for the reuse of components, e-waste ends up being improperly disposed of in landfills.

In Brazil, the improper disposal of e-waste is responsible for contaminating the environment. There is also too few points for selective collection and the population has not yet become aware of the importance of reverse logistics and its economic aspect (CERATTI, 2017).

The National Solid Waste Policy (PNRS) aims to eliminate the incorrect disposal of e-waste in the environment<sup>6</sup>. To make these possible, public managers should encourage projects that enable social inclusion, training and employment opportunities in the formal market for waste picker cooperatives, along with companies specializing in e-waste.

With the advancement of technology, it is possible to extract precious metals from waste in computer boards, mobile phones and other electronics. Copper, silver and gold can be sold as raw materials for the manufacture of new electronic components or to the jewelry industry.

Nevertheless, Brazilian reverse logistics still has a high cost when compared to European countries, making the market unattractive to companies. Political players need to see the great potential of recycling, which goes beyond the purely formal application of PNRS, but affects the collective awareness from manufacturers, to sellers, consumers, distributors and picker cooperatives, so that in the future it will be possible to mine for electronic components in a clean and sustainable manner.

In order to change the increasing number of dump yards and landfills, Costa Rica, Mexico and Brazil have expanded their investments in companies that work in the recycling of solid urban waste, thus ensuring the R2 international standard<sup>7</sup>, which aims to give greater security for workers and the environment in the handling of electronic components.

Regarding this subject, the State of Paraná, together with the Secretariat of Environment and Water Resources, developed the R20 group (State Decree No. 8657/2013), which includes 20 municipal regions defined in the State Plan for Regionalization of Integrated Solid Waste Management in order to standardize an international level of excellence for solid waste collection and disposal in the region.

At environmental conferences, Municipal workers and environmental technical engineers present proposals for the decommissioning of dump yards; also, companies focused on recycling have room for drafting

6 Among the measures required for actual reverse logistics, suppliers, traders, manufacturers and importers may a) implement procedures for purchasing second-hand products or packaging; b) establish reusable and recyclable waste delivery points (some supermarkets have adopted machines for collecting batteries); b) act together with cooperatives or other forms of association of pickers responsible for the collection of reusable and recyclable materials, in the cases provided for in Art. 33(1) of PNRS.

7 Document R2: 2013 Standard is responsible for establishing electronic component recycling practices on the global stage through the Certification Body, which ensures that electronic equipment is managed responsibly, protecting the safety and health of employees and the environment. In addition, the R2: 2013 Standard emphasizes the value of the product to stakeholders (customers, employees, the community and the public), as well as the requirement to comply with laws and regulations of all countries involved in importation, shipment and exportation (SERI, 2014).

innovation projects, enabling the intelligent management of waste and public policies in post-consumption

The cooperation between technical environmental protection agencies, Municipal Environment Secretariats and businesses makes the promotion of and research on reverse logistics possible, allowing for the adequacy of the National Solid Waste Plan, especially regarding the proper destination of e-waste.

Companies that develop electronic products now use compliance mechanisms to meet environmental standards, understanding that the additional cost of expert advice is necessary to avoid undesirable effects on the environment, as well as major problems with technical environmental protection agencies, and possible revocation of operating license.

## **2 COMPLIANCE PROGRAMS FOR PROTECTION OF THE ENVIRONMENT**

*Compliance* is a noun derived from the verb to comply, which means to act in accordance with the current legal system, be compatible with the organizations' policies and guidelines and with international standards for the protection of human dignity.

Although the term originally came from the US financial system, what we see is the importation of compliance programs into the Brazilian legal system.

The Superior Federal Court used that institution in the trail of Criminal Action 470 (Mensalão). The Supreme Court understood that the codes of conduct provided for in compliance programs allow for the implementation of actions in accordance with the Law, resolutions and acts issued by the Central Bank (BRASIL, 2012), in order to promote transparency and ethics, with the obligation of being accountable to criminal control and prosecution bodies.

The Anti-Corruption Law 12,846/2013 allowed legal entities to be held liable in the three levels (administrative, civil and criminal) for the practice of acts detrimental to domestic or foreign Public Administration Bodies; it is comparable with the US Federal Sentencing Guidelines Manual<sup>8</sup>.

Legal liability of companies follows the proceeding provided for in the Public Interest Civil Action 7,347/1985 and in Art. 21 of Law

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<sup>8</sup> For more details on compliance programs provided for in the Federal Sentencing Guidelines Manual, cf. Saris (2016, p. 525).

12,846/2013. The Public Prosecutor's Office, in turn, will investigate the extent of damage and the causal link between the activity developed by the organization (GUARAGNI; CHIAMULERA, 2015).

Those responsible for conducting compliance programs should work in cooperation with criminal prosecution agencies to mitigate corruption and possible environmental damage, as outlined in Corporate Anti-Corruption Law No. 12,846/2013.

The main purpose of compliance programs is to prevent illegal conduct within organizations. Compliance officers<sup>9</sup> should act in a timely manner, prior to the application of Criminal Law, to avoid conducts that cause damage or endanger State-protected legal assets (SAAVEDRA, 2011).

Compliance programs began in the United States to prevent fraud associated with the stock market crash in the 1930s. However, it was not until the 1950s, with antitrust regulation and the government's drive to fight corruption, that compliance was integrated into legal systems.

The Sarbanes-Oxley Act (SOX, 2002) is seen as a watershed for corporate governance as it was responsible for promoting business transparency<sup>10</sup>, as well as curbing accounting fraud by US companies and other companies trading their securities in the US financial market, in shares of the Securities and Exchange Commission (VERISSIMO, 2017).

The 2002 Sox Law requires financial officers to make effective and sustainable changes that increase the transparency of transactions, otherwise officers may be held responsible for undesirable or criminal actions.

Corporate governance thus seeks to preserve legal compliance produced by compliance programs, provide for due accountability by means of transparency websites, and implement ethics and a sense of justice that affect shareholders and stakeholders (strategic public, the society, employees and other individuals that may be impacted by the company).

Currently, compliance programs have been expanded to various industries and are no longer restricted to anti-corruption programs in the business sector. Compliance has become synonymous with the company's

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<sup>9</sup> Compliance officers are responsible for internal control, risk management, and contract monitoring based on legal guidelines. Thus, they perform guidance and coordination functions, since they do not have a guarantee duty, as is the case of senior management, but rather to implement a corporate integrity and governance program that reaches all members of the corporation. Therefore, when unlawful or suspicious acts are verified (within their sphere of protection), compliance officers have a duty to report directly to the company senior management and whistleblowing channels, under penalty of liability before the criminal prosecution bodies (GÓMEZ -Jara Diez, 2015).

<sup>10</sup> On the subject, cf. SOX (2002).

self-regulation to properly meet standards and ethical conducts. Compliance is used in the labor, environmental, tax, commercial and hospital fields. Thus, when effectively implemented, it can contribute to the expansion of business activity and to reduce risks.

Although compliance enforcement implies in high costs for the company, it should be considered as an efficient measure to contain regulatory and environmental risks, considering that the mere involvement of the company in an environmental liability suit leads to brand devaluation and investors feeling discouraged toward the business of the organization.

It is important to clarify that compliance programs reach everyone involved in the company, from the gatehouse guards to other employees, suppliers and contractors, down to senior management officers.

Thus, even though the supervisory duty is assigned to the compliance officer, this does exempt senior managers from that responsibility, since senior management is never excused from their supervisory duties, obligation is always only partly assigned.

## **2.1 The company's responsibility for environmental damage**

Responsibility is one of the major themes relating to the mitigation of environmental damage, as it seeks to achieve reparation and curb the practice of illicit acts. In Brazil, even before the Civil Code of 1916, Decree Law No. 2,681 from December 7, 1912 already provided for strict liability in tort applicable to railway transportation. In its Art. 17 it laid down railway companies' responsibility for the death, bodily injury, or harm suffered by passengers on their railway lines (ANTUNES, 2015).

Later, the 1916 Civil Code compounded civil liability from guilt, so that the individual was obliged to repair damages, when caused by voluntary action or omission, negligence or imprudence, violated right or harm caused to others, based on Art. 159 (BRASIL, 1916).

After that, the Civil Code of 2002 innovated in its Art. 927, when dealing specifically with strict liability in tort, regardless of fault, in the cases specified by law, or when the activity normally performed by the perpetrator of the damage entails, by its nature, risks to others (BRASIL, 2002).

Thus, strict liability in tort is based on the notion of the social risk implicit in certain activities<sup>11</sup>, such as manufacturing plants, transportation,

<sup>11</sup> The basis of liability in the Consumer Protection Code – CDC (Law No. 8,078/90) also comes from

nuclear plants, production of substances harmful to health and the environment, and others<sup>12</sup>. Thus, it makes no sense to transfer to society the burden of bearing the losses caused by the polluter, given their vulnerability as the weakest party in the relationship, as well as the difficulty of access to justice, in addition to the high cost of expert and technical reports and procedural delay.

Regarding the duty of environmental reparation, the Constitution broadened its concern with the environment by determining in its Art. 225 § 3 the application of criminal and administrative sanctions, regardless of the obligation to repair environmental damage.

Strict liability in tort is also established in the following laws: a) National Environmental Policy – PNMA (Law 6,938/81), which was one of the first to address that kind of liability for the protection of the environment, imposing on the polluter and predator the obligation to recover and indemnify for damages caused, based on art. 4, item VII; b) Biosafety Law (Law No. 11,105/2005); c) Law establishing the National Policy on Solid Waste (Law No. 12,305/2010); d) New Forestry Code (Law No. 5,869/1973).

The Environmental Crimes Law (Law 9,605/98) lays down the criminal liability of the company, as well as joint and several liability between the company and its members, which may make disregard of corporate entity possible.<sup>13</sup>

The polluter can be both an individual and a legal entity, since liability for environmental damage is strict in tort<sup>14</sup>. Therefore, those who cause damage or risk of environmental damage will be obliged to indemnify or repair property and non-pecuniary (moral) damages caused to third parties and the environment. According to Art. 225, paragraph 3, of the Constitution, it is not necessary to prove the guilt, just the existence of the damage and the causal link.

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the risk of the activity, which is why it dispenses with the fault of the manufacturer and the supplier (Articles 12 and 14).

12 Full risk liability theory does not allow the exclusion of civil liability, such as the sole fault being the victim's, a fact from third parties and acts of God and *force majeure*; therefore, the social risk of the activity developed by the company for the environment and society is seen as sufficient to impute liability for damages caused, regardless of guilt (BEDRAN; MAYER, 2013, p. 45-88).

13 Art. 225, third paragraph provides for civil and criminal administrative liability of legal entities in the event that the offense is committed by decision of their legal or contractual representative, or their collective body, in the interest or benefit of their entity.

14 The Superior Court of Justice (STJ) admits the Full risk liability theory to the polluter by arguing that civil liability for environmental damage is strict, joint and several, and falls to all those who participated in the activity that was harmful to the environment or who obtained profit from it, based on Art. 14, first paragraph of Law No. 6,938/81, combined with Art. 942 of the Civil Code, cf. Wedy (2018).

In theory, collective non-pecuniary damage obtains when it affects the moral level of society, since the fundamental right to the environment is of diffuse ownership. It is breached when it causes a decrease in quality of life, ecological imbalance, or even when the polluter damages a certain space or biome, producing physical or psychological damage, or health risk to individuals.

The payment of the compensation is set based on the severity of the damage and the specific circumstances of the offender; therefore, once illegality of the act is proven, it is necessary to convict the polluter to compensate for the environmental damage suffered by the community<sup>15</sup>. We stress that the payment made by the polluter does not give them the right to pollute, because what is intended is the prevention of damage and the duty of reparation (MACHADO, 2012).

According to Cappelli (2004), criminal conducts can cause harmful effects to the environment that, in some cases, are impossible to reverse, such as the disaster that occurred at Fundão Dam, in the town of Mariana – Minas Gerais, in 2015. Although the compliance officer informed the managers in charge about the fragility of the dam, no appropriate measures were taken by the mining company to avert the risk of dam failure and, consequently, contamination of the Doce River.

The rupture of the dam in the town of Mariana caused the death of 19 people, in addition to the environmental and economic damage suffered by the local community (PARREIRAS, 2018). The company's liability is strict in tort (it waives the element of guilt); it consists in the duty to use reason when adopting more sustainable measures, which included periodic inspection and the use of technologies to remove the risk of its activity to the environment.

It is worth recalling that, in January 2019, another tragedy took place involving company Vale S.A. and the population of Minas Gerais, with the breach of dam 01 in the town of Brumadinho (WENTZEL, 2019).

Even though the technical report indicated that the risk of rupture was slight (RODRIGUES, 2019), it was noticeable that the refectory, the inn, the homes, and the administrative sector were built in an inappropriate place near the dam, which would make it difficult to carry out an emergency and evacuation plan in the event of a disaster.

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<sup>15</sup> For clarification, see Public Interest Civil Action for conviction for collective environmental damage due to deforestation and the polluter's obligation to repair the degraded area (TJ-MG, 2018, p. 1).



Therefore, what differentiates the tragedy caused by mineral exploration in the towns of Mariana and Brumadinho is that the former was recognized as the largest environmental disaster in Brazil. On the other hand, the latter is considered an ecocide (a crime against humanity), due to the burial of approximately 310 people, with 248 identified casualties and 22 people still missing or unidentified, in addition to the destruction of vegetation and the contamination of the Paraopeba River, one of the tributaries of the São Francisco.

When we extend this view, the technical fragility of the environmental agencies and the Public Administration to implement effective control and supervision of companies that operate in the exploration of the environment becomes clear.

What is expected of economic agents is that they act in line with the legal system and the environmental protection standards on their own, for the actual fulfillment of the social function of the company, especially with regard to the rational use of natural resources and the preservation of the health and well-being of the population, which is in the most fragile social and biological condition.

Companies, therefore, need to be in compliance with environmental standards, acquiring the technology necessary for the separation and better reuse of consumer goods in other production processes, intended for the reverse logistics industries. And the Government should supervise companies, even during the period their operating license is in effect (equivalent to four to six years), as a way to prevent possible damage to the environment.

## **2.2 Reverse logistics of electronic products**

Legal protection to the environment comprises the responsibility shared by the company, manufacturers, importers, distributors and sellers regarding the destination of products. The National Solid Waste Policy (PNRS Law No. 12,305/10) determines that companies must put together initiatives for the collection of their products after consumption, in compliance with the polluter pays principle.<sup>16</sup>

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<sup>16</sup> The polluter pays principle assumes that environmental resources are scarce and their exploitation for economic purposes, whether in production or consumption, causes environmental degradation. Accordingly, the State interferes with the market to eliminate costs to the community and to direct them exclusively to producers and consumers. For Antunes (2015), the application of this principle is based on preventive action and the clear identification of the environmental cost so as to allow for the establishment of parameters of care regarding the activity employed. It should be noted that



Consumers and government managers also take responsibility for the final destination of products. Consumers should use collection points for proper waste disposal, amount the volume of e-waste in the ecosystem.

Leite (2009, p. 32) understands that the practice of post-consumer reverse logistics is established through a reverse flow of part of the products or materials that were discarded after use, in the sense that these materials or components may return to the production cycle by means of recycling or reuse. Rationally, the after-sales channels allow for the reuse of products by new consumers; and example of that is the used car trade, which allows for change of ownership until the end of the vehicle's life.

This way, companies should endeavor to provide after-sales disposal and collection points, making it possible to properly dispose those products that were once considered waste and were improperly discarded in landfills or dump yards.

Reverse logistics will have a substantial impact on Brazil only if there are public environmental education policies in place for solid waste separation by consumers, in addition to establishing smart product reuse practices. The lack of financial resources and the State's neglect of the post-consumer research and technological innovation promotion agencies lead to a low rate of return and recycling of electronic products and, consequently, the toxic components in these items end up being deposited in dump yards or landfills, thus contaminating the soil and river beds.

It must be stressed that companies are responsible for adopting strategies that favor the environment, since a significant part of the technological waste is used by them to perform their services and products.

Most importantly, the reverse logistics policy should be scaled up from product design, based on all stages of their life cycle. Eco-design should allow for disassembly and replacement of parts, with the possibility of software upgrade (PAPANEK, 2009).

There is no denying that shared responsibility imposes on all participants in the product life cycle the duty to minimize the amount of waste, tailings and e-waste in the environment by employing all possible means for the correct disposal of waste, after use and discarding of the product by the consumer (GUERRA, 2012).

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consumers' responsibility ends with the proper disposal of waste for collection, or with its return, in accordance with Art. 33 and Art. 28 of PNRS.

In this context, Environmental responsibility operates in a shared, individualized and linked way, based on Art. 33 of the National Solid Waste Policy – PNRS (Law No. 12,305/2010). Manufacturers, importers, distributors and sellers must perform reverse logistics independently of the public urban cleaning and solid waste management service.<sup>17</sup>

This instrument provides for the immediate (Art. 33, I to IV) or progressive implementation of reverse logistics on a case basis (Art. 56, together with Art. 33, V and VI). The Environmental Crimes Law 9,605/98 lays down the criminal liability of the company, as well as joint and several liability between the company and its members, implying in the disregard of corporate entity possible.<sup>18</sup>

In this case, it is possible that the Judiciary Branch, on enforcing post-consumer liability, will determine the progressive implementation of reverse logistics systems in order to prepare the schedule.<sup>19</sup>

In Article 33(3) (PNRS), the responsibility of suppliers is to take all necessary measures to ensure the implementation and operationalization of the reverse logistics system.

However, what one sees is that companies are not prepared for the proper management of electronic waste; thus, as in developed countries, Brazilians discard products in perfect condition, due to “psychological obsolescence”<sup>20</sup> to acquire a “better” product, with updated software, which does not imply any significant upgrade in the product (SLADE, 2007 ).

It is observed that the waste pickers, who previously worked with solid waste, now come into contact with toxic substances in search of

<sup>17</sup> The responsibility extends to citizens, who have the duty of disposing of products in an appropriate place, thus allowing for their recycling (Art. 33, § 4) and to the State to implement the Waste Policy to carry out reverse logistics whose purpose is to reuse the productive cycle by transforming the waste into an environmentally sustainable final destination, serving as an economic and social instrument due to the potential for profit in the activity, based on Art. 3, item XII of the 2010 National Solid Waste Policy (PNRS).

<sup>18</sup> Art. 225, third paragraph provides for civil and criminal administrative liability of legal entities in the event that the offense is committed by decision of their legal or contractual representative, or their collective body, in the interest or benefit of their entity.

<sup>19</sup> *Art. 56. Reverse logistics related to the products dealt with in items V and VI of the heading of Art. 33 will be progressively implemented according to the schedule laid down by regulation. Article 33, items V – fluorescent, sodium and mercury vapor and mixed light lamp bulbs; VI – electro-electronic products and their components.*

<sup>20</sup> Psychological obsolescence is recognized as subjective because it takes into account emotional references, status, fashion and aesthetic quality. It can be said that psychological obsolescence meets consumer dissatisfaction with the lack of updating of electronic products (ECHEGARAY, 2015), especially in the intentional decrease in the life of tablets and smartphones, which are excluded from Security Updates, making them slow and vulnerable to hacker attacks. Such practice is institutionalized by manufacturers; however, it is contrary to global sustainability proposals, as it encourages replacement of the product before its breakdown or technical failure.

copper and gold contained in electronic products. It is considered that the direct contact of workers with harmful products can cause neurological, respiratory and allergic diseases, in addition to the risk of deformation of the fetus during the gestational period, due to the high toxicity of lead and mercury in cell phone and laptop batteries.<sup>21</sup>

The social consequences are countless; Brazil leads the ranking of e-waste production in Latin America.<sup>22</sup> The state of Paraná is one of the main producers of waste. In the city of Curitiba alone, about 500 kilograms of e-waste are removed each year thanks to the support of the Information and Communication Technology Company of Paraná – Celepar; the waste picker organization operates in recyclable collection and has an international certification of responsibility (CELEPAR, 2018). The amount of waste collected could be more significant if there were an eco-conscious plan for companies and the society, with government support, for the proper disposal of this material.

Also in the State of Paraná, the Municipality of São José dos Pinhais passed Law no. 2,566 May 2015 for the implementation of eco points in the city (CMSJP, 2015), recognizing the following as hazardous and special waste: a) fluorescent lamps; b) electronic and computer waste; c) frying oil; d) cigarette butts; e) Styrofoam; f) cell phone batteries; g) batteries; h) table lamp reactors; (i) paints and solvents; j) X-ray plates; k) tarpaulin banners and banners; l) car batteries.<sup>23</sup> When electronic equipment is disposed of directly in nature, toxic waste enters the soil, making it improper for agriculture, pasture and housing.

As already seen, planned obsolescence is one of the major obstacles to e-waste control in Brazil. Companies make minor “adjustments” and improvements in updates of smartphones, televisions and other electronic devices that are considered essential items in modern times.

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21 Health risks are aggravated by the population's socioeconomic conditions, that is, poor communities are more exposed to the risk factors in e-waste, which shows a correlation between the disproportionate impacts of environmental processes and the inefficiency of public policies and waste collection, sanitation and drinking water supply services. Environmental injustice is noticeable in the presence of landfills and dump yards strategically located in city outskirts, instead of reference areas (cf. MARTUZZI; MITIS; FORASTIERE, 2010).

22 Considering a survey conducted by the United Nations University (UNU), in cooperation with the International Telecommunication Union (ITU) and the International Solid Waste Association (ISWA), the United States is at the top of the production of e-waste, with 6.3 tons. Brazil occupies second place, with 1.5 tons of e-waste and low collection capacity, when compared to the world average (BALDÉ et al., 2017).

23 Waste is defined as hazardous and special because of the risk of flammability, corrosiveness, reactivity, toxicity, pathogenicity, carcinogenicity, teratogenicity, and mutagenicity, thus posing a significant public health or environmental quality hazard according to law, regulation or technical standard ( Article 3 of Law No. 2,566/2015).

This leads to the purchase of a new model, either due to the status of being always up to date or the sudden failure of the product. It is a common strategy in capitalist societies to sell more regardless of the impact of e-waste on the environment.

As Amaral (2010) points out, businesspeople cannot exercise their activity solely for the purpose of obtaining profit; they should rather act rationally and ethically, researching and developing new technologies for the better reuse of natural resources.

Similarly, the uninformed population shows neglect by disposing of e-waste in conventional waste or in the open, thus contaminating groundwater and disqualifying the material for proper recycling.

It is important to mention that companies over the years have been major environmental violators; in those cases, their economic activity only causes harm to the community. The payment of fines and the enforcement of penalties is a way of curbing the practice of environmental crimes, considering the difficulty or often the impossibility of returning what has been degraded to its original state.

The big problem is that most plants and organizations do not have a post-consumer reverse disposal and logistics policy, mainly because they do not accept the high compliance costs of product monitoring from inception to waste disposal, which leads to non-compliance with PNRS.

## **CONCLUSION**

The increase in waste due to the improper disposal of solid waste causes a dichotomy between sustainable development proposals and the economic development process. It is necessary to think of new sustainable practices when designing products, and also increase their shelf life and encourage the recycling of e-waste.

The National Solid Waste Policy (PNRS) has shown progress in the correct disposal of products considered harmful to the environment. However, it is difficult to implement, either due to a lack of public funds for research and technology, as well as a lack of proactive action by civil society.

Faced with this problem, compliance programs are presented by experts for the containment of environmental risks as an effective monitoring plan carried out by senior managements.

Given the possibility of accountability and image destruction of legal entities for shareholders' equity, it is believed that the costs of implementing compliance program are necessary to avoid environmental damage and to make companies liable in the administrative, civil and criminal fields.

However, based on the lawsuits against the companies responsible for the Mariana and Brumadinho disasters in the state of Minas Gerais, it is possible to see that the mere creation of integrity programs is not enough; compliance must be effective, a commitment that involves all the sectors, and whose methodology must be top down from companies' management.

The Government can no longer bear alone the production of environmental risks, and other social players (companies, non-governmental entities and the society) must work in a cooperative and committed manner, seeking techniques that allow for reverse logistics of electronic components, in addition to implementing channels of complaints for the prevention of environmental crimes.

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