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Reverse logistics of subscription TV receivers: Assessment and Environmental

Logística inversa de receptores de TV por suscripción: Evaluación e impactos ambientales

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Abstract:

This article looks at the reverse logistics of Pay TV receivers, a crucial issue for environmental conservation and the management of waste generated by people. It investigates how these devices are collected, transported and treated when they become obsolete, analyzing the positive effects on nature, such as waste reduction, more efficient use of resources and reduced pollution. In addition, the text discusses existing policies and regulations on these logistics, suggesting improvements to these processes. The aim is to evaluate the benefits of investing in reverse logistics for Pay TV companies in Brazil. It highlights how adopting sustainable practices can boost their progress and appreciation in the market. The practical implementation of these practices not only contributes to environmental sustainability but can also generate a positive image for companies, increasing their competitiveness in the market and attracting conscious consumers.

Keywords: *Reverse Logistics; Receivers; Pay TV.*

Resumen:

Este artículo examina la logística inversa de los receptores de televisión de pago, una cuestión crucial para la conservación del medio ambiente y la gestión de los residuos generados por las personas. Investiga cómo se recogen, transportan y tratan estos aparatos cuando quedan obsoletos, analizando los efectos positivos para la naturaleza, como la reducción de residuos, el uso más eficiente de los recursos y la disminución de la contaminación. Además, el texto discute las políticas y normativas existentes sobre esta logística, sugiriendo mejoras en estos procesos. El objetivo es evaluar los beneficios que la inversión en logística inversa puede aportar a las empresas de televisión de pago en Brasil, destacando cómo la adopción de prácticas sostenibles puede impulsar su progreso y valor en el mercado. La implementación efectiva de estas prácticas no sólo contribuye a la sostenibilidad ambiental, sino que también puede generar una imagen positiva para las empresas, aumentando su competitividad en el mercado y atrayendo a consumidores conscientes.

Palabras clave: *Logística inversa; Receptores; Televisión de pago*

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1. Introduction

Reverse logistics is essential for environmental protection and more sustainable practices. It involves dealing with products after consumers have used them, ensuring they are reused or disposed of correctly. This involves working together with the government, companies, and society. In the case of pay TV receivers, reverse logistics is essential.

This study aims to evaluate the benefits that investment in reverse logistics can provide for advancing and appreciating pay TV companies operating in the Brazilian market through adopting sustainable measures. The aim is to investigate how this strategy can contribute to reducing the improper disposal of electronic waste, reducing operating costs, improving the company's reputation through adopting sustainable practices, and even generating revenue through the recovery of materials.

The topic of this article is justified by the fact that subscription companies increasingly work under loan-for-use contracts with customers. When canceling services, they must pick up receivers or other borrowed equipment. Therefore, reverse logistics becomes essential in this process, from communicating with the customer about the cancellation, collecting the device, and recycling the product. When signal receivers are disposed of incorrectly, they can pollute the environment and pose risks to human health due to the electronic components they contain. Reverse logistics allows these devices to be collected, disassembled, and recycled safely, thus reducing their environmental impact.

For this study, research materials from several authors will be used, such as Paulo Roberto Leite's (2009) book Reverse Logistics: Sustainability and Competitiveness.

2. Theoretical Basis

2.1 Green Logistics

In the search for a more sustainable world, green logistics stands out for its commitment at each stage of the process, aiming for successful operations with the least possible environmental impact. This approach not only meets market demands but also reflects the growing value that consumers attribute to brands that demonstrate environmental and social responsibility (SEBRAE, 2023).

According to Santos *et al*. (2015), the main goal of green logistics is to meet beneficiaries' needs with the lowest possible environmental impact, considering not only monetary costs but also associated external costs, such as climate change, pollution, waste and environmental degradation. Reverse logistics is an indispensable component in this process.

Figure 1 shows the elements that are part of green logistics:

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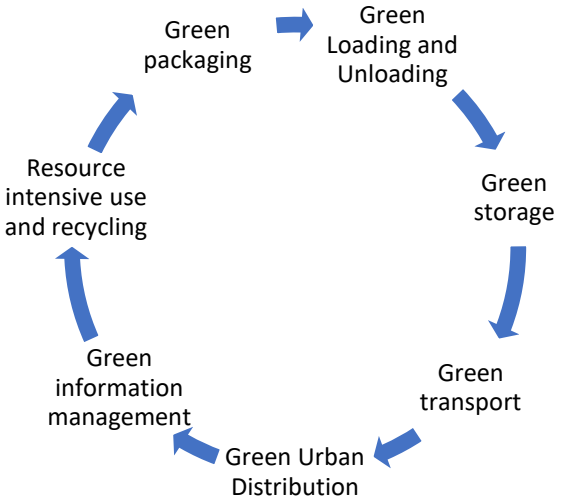
Figure 1– The elements that make up green logistics



Source: Santos *et al.* (2015)

2.2 Reverse Logistics

Reverse logistics is a strategic area that deals with the flow of products, materials, and information in the opposite direction of the traditional supply chain. In the specific context of Pay TV receivers, reverse logistics plays a crucial role in the sustainable management of these devices. After the customer uses them, the customer uses them.

According to Leite (2009), reverse logistics is the process of returning used or unused products. Through this process, economic value, service provision and compliance with legislation are recovered. This ensures the companies' environmental sustainability positioning and competitiveness, reinforcing their brand image.

Reverse Logistics is the opposite of traditional logistics. Although it uses the same processes and practices, such as inventory management, transportation and information systems, it represents a new opportunity to increase companies' profitability (MUELLER, 2005).

Over time, both business logistics and reverse logistics have changed a lot. In the beginning, business logistics was more straightforward; it was only concerned with taking products from the places where they were made to the people who bought them. However, reverse logistics came as a different answer, wanting to bring back products that people no longer wanted to be recycled or used again in some way. These changes show how we now understand better what to do with the products we use, as mentioned by Vaz (2012, p.3):

> Reverse logistics, in turn, represents a reverse flow of logistics. That is, if traditional logistics has the mission of distributing new products to its customers, reverse logistics will collect products considered old, obsolete, damaged, or useless and move them to provide final disposal or adequate treatment, which may be recycling, reuse, remanufacturing, co-processing, etc. (Our translation).

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Over the years, reverse logistics has become increasingly relevant, and new approaches to this model have emerged. The subject began to be explored more deeply, especially in the second half of the 1990s. According to Stock (1992), new perspectives on reverse logistics have emerged, such as product returns, a focus on cost reduction, recycling, and product repair.

2.3 After-Sales/Consumption Logistics

2.3.1 After Sales

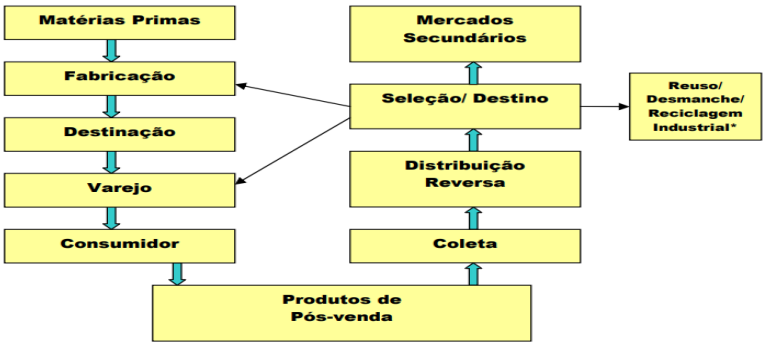
As Mueller (2005) describes, the increasing speed of product delivery is profoundly changing how we shop and receive what we need. Companies are now focused on getting our orders to us quickly and ready to help us if something goes wrong and we need to return something. This means an item's life cycle does not end when it arrives at our doorstep. Sometimes, we must return it for various reasons, such as defects or inadequacies.

This change is affecting the way people shop and interact with companies. It seems they are on our side, ready to solve any problem and ensure we have the best possible experience. As Figueiredo (2002, p.1) states:

> Maintaining a good customer relationship is a vital foundation in today's business world. By maintaining a portfolio of loyal customers, a company can minimize its dependence on continually acquiring new customers in a frantic battle with an ever-increasing number of competitors (Our translation).

Customers can be unhappy and distant when companies have problems with product returns and exchanges. Resolving these issues is essential to avoid future complications with customers or partners, demonstrate the value of the products, and stand out in a competitive market. Trust among everyone in the distribution chain is essential to ensure successful sales in the future (MUELLER, 2005). Figure 2 represents the after-sales logistics flow.

Figure 2– After-sales reverse logistics flow



Source: Leite (2009)

2.3.2 Post Consumption

Post-consumer reverse logistics is how we care for things we no longer use (figure 3). It is like giving new life to products before they are discarded. Finding other

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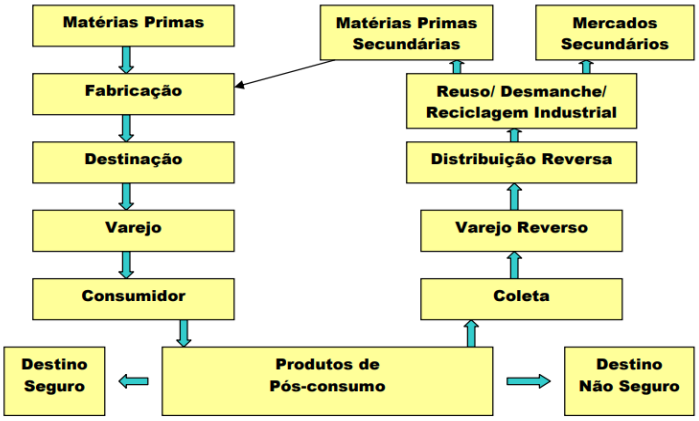
ways to use them is possible if they are still in good condition. But if they are no longer usable, it is essential to dispose of them correctly, either by recycling or throwing them in the trash in a conscious way to protect the environment (GUARNIERI; OLIVEIRA, 2005).

According to "Pensamento Verde" 2018), there are three options: recycling, reusing materials, or simply using the product without disassembling it. If neither of these options is possible, the alternative is to disassemble and separate what can still be helpful to recycle or dispose of carefully. It is about finding ways to revitalize things that are no longer used, offering them a second chance.

Figure 3– Post-consumer reverse logistics flow



Source: Leite (2009)

2.4 Solid Recycling Brazil X Germany

In Brazil, waste is separated into categories such as paper, plastic, glass, and metal when recycling is necessary. These materials are then sent to places where they are selected in more detail and prepared for recycling. From there, they are sent to companies that specialize in recycling, where they are transformed into new things. Despite the challenges faced, such as the lack of structure and awareness, recycling is increasingly essential here to care for the environment and be more sustainable (PIXPEL, 2022).

According to Ibiapina (2019), they dedicate themselves to recycling in Germany. It's all about starting by separating waste into categories such as paper, plastic, glass, and organic materials. This makes the recycling process much more straightforward. They strongly encourage people to do their part with selective collection programs and packaging return systems. These materials then go to special facilities, transforming into new things. It's a very efficient scheme that not only reduces waste but also helps to preserve natural resources.

According to Coelho (2019), Brazil recycled only 1.28% of its plastic, while Germany recycled 37.94% of its production, as shown in Table 1.

Table 1– Production and Recycling Relationship

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País	Total de lixo plástico gerado	Total incinerado	Total reciclado	Relação produção e reciclagem
Estados Unidos	70.782.577	9.060.170	24.490.772	34,60%
China	54.740.659	11.988.226	12.000.331	21,92%
Índia	19.311.663	14.544	1.105.677	5,73%
Brasil	11.355.220	0	145.043	1,28%
Indonesia	9.885.081	0	362.070	3,66%
Rússia	8.948.132	0	320.088	3,58%
Alemanha	8.286.827	4.876.027	3.143.700	37,94%
Reino Unido	7.994.284	2.620.394	2.513.856	31,45%
Japão	7.146.514	6.642.428	405.834	5,68%
Canadá	6.696.763	207.354	1.423.139	21,25%

Source: Coelho (2019)

2.5 Pay TV

Pay TV, a communications service that offers several channels upon payment of a membership fee and monthly fee, began in Brazil in 1989 with *Canal +*, which retransmitted programming from the Entertainment Sports Programming Network. However, due to a series of interests at stake, such as government agencies and large television networks, the official regulation of this service was constantly postponed (SIMIS, 2000).

2.5.1 History and evolution

According to the Brazilian Pay TV Association (ABTA, 2022), Pay TV originated in the USA in the 1940s to bring quality free-to-air TV signals to small communities. Brazil gained strength in the 1990s, with significant media groups entering the business. From 1994 to 2000, subscribers grew by 750%. Law No. 8,977 of 1995, according to Brazil (1995), regulates cable TV service in Brazil, establishing rules for concession, inspection, subscriber rights, mandatory content, technical standards and penalties for violations, and bidding processes between 1998 and 1999 boosted the sector.

Introducing DTH (Direct-to-Home) technology has brought new possibilities for interactivity for subscribers. At the same time, the currency crisis that occurred in the same year left its mark on the trajectory of the Pay TV market in the country. According to Simis (2000, p.4), DTH is defined as:

> DTH, an acronym for *Direct to Home*, is a system that, through a receiving parabolic antenna approximately 60 cm in diameter and the power of the KU Band, allows digital transmissions—with CD sound and videodisc images—directly to the user's home (Our translation).

SeAC Law (Conditional Access Service), Law 12,485, also known as the Pay TV Law, was enacted. This law regulates subscription television services in Brazil, establishing rules for concession, inspection, subscriber rights and mandatory content, among other aspects (Brazil, 2011).

2.5.2 Current Scenario

The evolution of the Brazilian pay TV sector is due to these significant changes,

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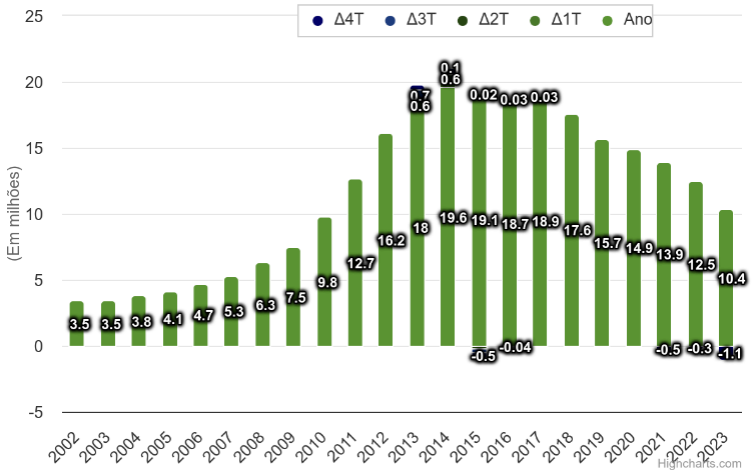
which are influenced by technological progress and the evolution of audience demand. The latest Anatel report (2024) released in January 2024 discloses Brazil's 10.3 million registered subscribers. However, this number has decreased over the last few years, as illustrated in the following figure (Figure 5).

Figure 5 – Evolution of the Number of Pay TV Subscribers



Source: Anatel (2024)

The most common transmission technologies include cable, satellite, and fiber optics. These options offer higher signal quality and a wider variety of channels. According to the report released by Anatel (2024) in January 2024, the access density is 5.7 subscribers for every 100 inhabitants in the country, which indicates that pay TV still has a considerable reach.

With the rise of *streaming platforms* such as *Netflix* and *Amazon Prime Video*, many have opted for an emphatic "no" when maintaining a cable TV subscription. This decision has triggered a significant wave of cancellations of Pay TV services. This movement has not gone unnoticed by cable companies, and they are now investing in technology like never before to create their on-demand streaming services. Be prepared for a showdown as these two giants go head-to-head; this radical competition redefines how we entertain, and companies that can adapt and keep up will have the best chance of success in an ever-changing world (Nascimento, 2023).

One example is Claro TV, which demonstrated its ability to adapt to the market by launching the Claro TV+ Box. As cited by Nascimento (2023), Claro's Video Product Director:

> Our linear channel services have been on the market for 30 years and have modernized their delivery. We offer all of these channels via streaming in an app. This is also Pay TV, but everything we sell via the app or even through our streaming box, the Claro box, is not officially registered with Anatel. So, when you look at the numbers, the base is falling. It is not falling like this in this index. The market is undergoing technological replacement (Our translation).

With the Claro TV+ Box, operators have saved costs in multiple areas, such as cable, car technicians, gasoline, and even network maintenance. These savings will be passed on to customers, making services more accessible. According to

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Nascimento (2023), "Claro has around 5 million subscribers, which is already almost 20% of the base in the streaming model", which highlights the success of the company's innovation and its promising prospects for the future.

3. METHOD

3.1 Methodology

This article was based on bibliographic research, such as a review of books, magazines, and specialized materials, to understand better the concept of reverse logistics and the advantages of its implementation by the business segment. Then, a case study was conducted with a Pay TV company, evaluating how reverse logistics allows it to increase productivity in its processes. Since the company cannot be identified, it will be identified as Company X.

3.2 Case Study

For the work, a case study was carried out in a Pay TV company called Company X, which has been in the business for over 20 years.

Figure 6 represents the company's Reverse Logistics process. The reverse logistics of pay TV signal receivers is a necessary process that involves collecting, transporting and properly processing these devices after the operator's service contract with the customer ends.

An existing pay TV service company in Bebedouro-SP was used to sell TV plans and install receivers.

Figure 6– Reverse Logistics Process of signal receivers

Source: Prepared by the authors

The main procedures analyzed in the company were:

- ✓ **Collection**: When customers cancel their TV subscription or upgrade their receivers, the Pay TV company has policies for collecting the old receivers. This can be done through designated collection points or home collection services performed by a company technician.
- ✓ **Transportation**: The collected receivers are transported to a company headquarters processing center. Transportation is done safely to prevent device damage and ensure they can be reused effectively. The company's headquarters transports the equipment, which is collected, distributed, and ready for use.
- ✓ **Processing**: At the processing center, receivers are first tested to determine whether they are still functional. Functional devices can be refurbished, where a process is carried out to repaint and reuse the

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equipment. Those that are not functional are disassembled, and their parts are separated for recycling.

- ✓ **Safe Disposal**: Any waste that cannot be reused or recycled is disposed of safely and environmentally friendly.

The company in Brazil collects and restores more than 100,000 devices monthly, which are updated with software and undergo technical and aesthetic repairs.

This process resulted in the recycling of more than 5.2 million items, totaling 139 tons of electronic waste recycled by the headquarters of company X. Currently, the company no longer manufactures these receivers, only reusing those already manufactured, a sustainable way to combat carbon emissions and contribute to sustainable practices of the 2030 Agenda (UN, 2015).

4. Results and Discussion

The Pay TV company X case study, with over twenty years of experience, demonstrated an effective reverse logistics process for TV receivers. The company has created a robust system that includes several steps: collection of used devices, safe transportation to processing facilities, software updates and technical and cosmetic repairs, and finally, secure disposal of devices that cannot be restored.

The company collects and refurbishes over 100,000 devices per month. These machines are thoroughly inspected and receive software updates to meet the latest standards. All necessary technical repairs are carried out to ensure that the devices function properly. Cosmetic interventions are also carried out to ensure that they look like new.

Over 5.2 million items were recycled through this process, resulting in 139 tons of recycled e-waste. This process has significantly reduced the volume of e-waste, an environmental problem that is becoming increasingly widespread.

The company has now decided to stop producing new receivers and reuse previously manufactured ones. This long-term practice reduces electronic waste and carbon emissions, aligning the company with the sustainability goals of the 2030 Agenda.

However, it is crucial to note that implementing these practices requires a lot of resources and effort. The company must have clear policies for collecting old receivers and ensuring that transportation and processing are done safely and efficiently. This means switching to more environmentally friendly consumption habits and even investing in new methods of recycling appliances.

5. Final Considerations

Implementing reverse logistics for pay TV receivers is crucial to protecting the environment and ensuring the competitiveness of companies. By reusing this device, electronic waste is reduced, natural resources are saved, and the mass production of new units is avoided; not only is this committed to a more

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sustainable future that the entire world is working towards.

The results confirm that thousands of recycled units are helping to save hundreds or even thousands of tons of e-waste from being discarded. This ultimately helps conserve resources, reduce carbon emissions, and build a stronger and more competitive corporate image.

For reverse logistics to work well, it is essential that everyone, from customers to shipping companies and processing sites, work together as a team. This means collecting devices properly and ensuring they are transported safely and disposed of responsibly. It is also vital to maintain reused devices to function correctly for longer.

The analysis concluded that the company implemented reverse logistics well. However, everyone, including companies, governments, and consumers, must address the e-waste problem. There is a need to reassess consumption strategies, make efforts by authorities to impose restrictions on the disposal of electronics and develop recycling technologies.

Investing in reverse logistics meets environmental demands and brings tangible competitive advantages. By embracing these sustainable practices, we are taking significant steps toward a future where economic development and ecological preservation go hand in hand.

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