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Technology and socio-environmental responsibility are the main challenges of supply chains

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Summary

Supply chains played a fundamental role during the critical period of the Covid-19 pandemic, guaranteeing the delivery of inputs for the manufacture of vaccines and testing in a short time. However, there was an increase in complaints due to slow or non-delivery of goods purchased via *Internet*. Delays in the delivery of products and services, at physical points or on digital channels, can compromise the company's image. To reduce delays and make processes viable, several logistics companies used technology (artificial intelligence, data science, among others) to solve recurring problems, mainly involving suppliers with delays in the delivery of raw materials. By 2025, new supply chain management applications must be developed based on cutting-edge technology, aiming to reduce interruptions that cause slow operational flows. It is not enough to declare adherence to ESG (Governance, Environmental and Social) principles, it is important to put into practice actions that are perceived by consumers. Furthermore, it is essential that suppliers and other business partners are aligned with the same ethical principles. Manufacturing products that do not result in the disposal of industrial waste in nature, as well as extracting as little new raw materials as possible, is truly committed to the good socio-environmental practices provided for in ESG principles. Reverse logistics enables the reuse of waste as raw material in production processes, sustainably reducing the disposal of solid materials in landfills, carbon emissions and the extraction of new natural resources. This research*paper*used the literature review methodology with a qualitative approach.

Keywords: Technology. Reverse logistic. ESG. Clients.

Abstract

Supply chains played a key role during the critical period of the pandemic and ensured the delivery of inputs for the manufacture of vaccines and tests in reduced time. However, there was an increase in complaints about delays or non-delivery of goods purchased via internet. Delays in the delivery of products and services, at physical points or in digital channels can compromise the company's image. To reduce delays and make processes viable, several logistics companies have adopted technology (artificial intelligence, data science, among others) to solve recurring problems, mainly involving suppliers and delays in the delivery of raw materials. By 2025, new supply chain management applications will be developed based on state-of-the-art technology, aiming to reduce interruptions that cause delays in operational flows. It is not enough to declare adherence to ESG principles, it is important to implement actions that are perceived by consumers, in addition, it is essential that suppliers and other business partners are aligned with the same ethical principles. To manufacture products that do not result in the disposal of industrial waste in nature, as well as extracting as little new raw materials as possible, is to be in fact committed to the good socio-environmental practices provided for in the ESG principles. Reverse logistics makes it possible to reuse waste as raw material in production processes, sustainably reducing the disposal of solid materials in landfills, carbon emissions and the extraction of new

natural resources. The present research of this paper used as methodology a bibliographic review with a qualitative approach.

Keywords: Technology. Reverse logistics. ESG. Customers.

1. Introduction

Supply chains played a fundamental role during the critical period of the Covid-19 pandemic, making supplies and consumer goods available to society unable to purchase them

at physical points. The pharmaceutical chains guaranteed the delivery of inputs for the manufacture of vaccines and testing in a reduced time, which benefited the world population (Duarte, 2021).

The pandemic also accelerated the process of digital transformation of supply chains and the consequent replacement of manual processes with automated ones, improving efficiency and agility in the delivery of products and services, making the customer experience personalized and satisfactory (Exame Solutions, 2021) .

Source: Prepared by the authors, 2023.

The methodology of this work was a bibliographical review with a qualitative approach and aimed to evaluate the need to implement cutting-edge technology in the production processes of supply chains, combined with sustainable strategies for the correct disposal of post-consumption waste from products and services, aiming to contribute to preserving the environment.

2. Technology to overcome supply chain challenges

Despite companies' commitment to delivering products/services to end consumers in the shortest possible time, PROCON (Consumer Protection and Defense Program) registered 242 thousand complaints (between January and October/2020) due to increased slowness, or not delivery of goods resulting from the growing demand for purchases*online*, especially during the critical period of the Covid-19 pandemic (Lewgoy, 2020)

Delays in the delivery of products and services, at physical points, or on digital channels, can compromise the company's image, as a dissatisfied customer, in addition to speaking badly about the experience to up to ten people, can report the case on social media and in*websites*complaint (Fernandes, 2022). Therefore, it is imperative to comply with the deadline established at the time of sale, mitigating the company's negative exposure to consumers and regulatory bodies.

To reduce delays and make processes viable, several logistics companies (Interos, Labs, Klear, Now, Ferrom, etc.) adopted technology (artificial intelligence, data science, among others) to solve recurring problems, mainly with suppliers and delays. in the delivery of raw materials. Information confirmed in research carried out by Garther, which found that by 2025, new supply chain management applications will be developed based on cutting-edge technology, aiming to reduce interruptions that cause slow operational flows (Forbes Tech, 2022).

The juice manufacturer Natural One, for example, is investing in automating the supply chain to make management transparent, agile, optimized and safe. The implementation will range from obtaining inputs to hiring suppliers, with an estimated profitability of R$5 million in the first year and R$30 million (R$6 million/year) in the next five. It also tends to facilitate the management of all orders generated and negotiated with the supplier network and increases the speed of deliveries, reducing excess costs, mainly storage and logistics (Bússola, 2022).

The multinational Bunge, in the agribusiness segment, is another example of success in adopting technology to monitor 64% of soybean crops belonging to the supply chain (indirect in the Cerrado), with the prospect of covering the entirety by 2024 (Forbes Agro , 2022).

On the other hand, the traditional cosmetics manufacturer Revlon, which operated in the cosmetics market for 90 years, filed for bankruptcy alleging problems in the supply chain, including competition for inputs, shortage of labor and suppliers' demand for cash payments (previously paid in installments within 75 days) are the main reasons (Forbes Money, 2022).

Source: Prepared by the authors, 2023.

The scarcity of *chips*, caused by the Covid-19 pandemic, also affected the giant's supply chain *Apple*, which obtained a result considered substandard by the company president himself (Reuters, 2021).

3. ESG (*Environmental, Social and Governance*) in the supply chain

ESG stands for Environmental, Social and Governance. The term emerged in 2004, in a UN report and involves a set of governance practices aimed at preserving the environment, social responsibility and corporate transparency. The tripod of ESG values covers practices aimed at preserving and reducing impacts on the environment (E), the structuring of processes and controls that support business governance to provide effective and transparent management (G) and social actions to build a world ethical and fair (S) (Sebrae, sd).

In 2021, the German government defined social responsibility rules for the supply chains of companies with more than a thousand employees, aiming to ensure that suppliers and subcontractors of these service providers do not use slave labor and child labor in production processes, as well as how the remuneration of all participants in the chain must be dignified. Big ones *players* such as Microsoft, Google and IBM have preferred suppliers with female leadership (Picasso, 2022).

It is not enough to declare adherence to ESG principles, it is important to put into practice actions that are perceived by consumers. Furthermore, it is essential that suppliers and other business partners are aligned with the same ethical principles, as customers can identify the connection between companies and demand a responsible stance. It is important that the contracting company periodically certify the existence and updating of licenses and permits of outsourced workers, as well as the constant training and retraining of employees, the adequacy/safety of the equipment used and the periodic performance of medical examinations (Exame Solutions , 2021).

Manufacturing products that do not result in the disposal of industrial waste in nature, as well as extracting as little new raw materials as possible, is truly committed to the good socio-environmental practices provided for in ESG principles. Such actions contribute to the company's competitiveness and attract investors who are increasingly aware of preserving the planet's natural resources (Filippe, 2022).

4. Reverse logistics

Law No. 12,305/10, which supports the PNRS (National Solid Waste Policy), determines that companies must ensure the correct disposal of post-consumption waste from products and services produced and distributed, in line with the good practices provided for in the ESG (Presidência da República, 1998).

Combined with legal determination, society and companies are increasingly aware of the need for sustainable actions and initiatives by public bodies to reduce the indiscriminate consumption of natural resources (Ballam, 2021).

A study carried out in 2021, by Dentsu Internacional, revealed that 91% of respondents want brands to demonstrate sustainable actions to preserve the planet. Such data is corroborated by the 71% increase in searches for sustainable products, in *Internet*, in the last five years (survey carried out by the Economist Intelligence Unit). Companies that invest in sustainable solutions for reusing post-consumer materials in their production processes and reducing demand for natural resources will stand out.

against the competition, as they demonstrate greater commitment to the environment (Maurício, 2022). Reverse logistics enables the reuse of waste as raw material in production processes, sustainably reducing the disposal of solid materials in landfills, carbon emissions and the extraction of new natural resources. Operational procedures for waste collection can be agreed on a sectoral basis, with manufacturers, traders and even importers, producing products and services that preserve the environment for the benefit of global society (Lusina, 2021).

Nestlé, in partnership with Ambipar Boomera (leader in environmental management), promoted reverse logistics actions to collect and transform Nescau packaging into sports equipment (basketball hoops, football goals, volleyball posts, etc.) donated to the NGO (non-governmental organization) of the Youth District in Criciúma - Santa Catarina. In addition to the sustainable value with less waste available in nature, collectors from cooperatives (a total of ten) linked to Boomera benefit, demonstrating a positive social impact (Brand Voice Ambipar, 2022).

Source: Kjpargeter, Freepik, 2023.

Accelerated technological development is contributing to electronic equipment quickly becoming obsolete and being replaced by newer ones, which results in the production of waste, the majority of which are metals, which are considered contaminants in the case of inadequate disposal, which which can have serious consequences for the environment. Most people accumulate electronic products (cell phones, batteries, printers, monitors, remote controls, etc.) and do not know how to dispose of them correctly or do not easily find Voluntary Collection Points (PEV). Ambipar provides PEVs for the population to carry out the sustainable disposal of electronic material and carries out the dismantling and separation of waste (copper, aluminum, iron, plastic, batteries, etc.) that are returned to the production chain of manufacturing companies as material. prima (Brand Voice Ambipar, 2021).

For Ballan (2021), tax diversification between states makes the recycling system difficult, with tax exemption being essential for the processes of collecting and reusing materials in production processes, especially for waste that suffers double taxation for being collected and treated. in different states.

The disposal of medicines, whether because they are expired or due to interruption of treatment, for example, is another problem when discarded inappropriately in nature, as they are composed of chemical substances and can contaminate the soil, marine animals and even collectors and street cleaners. According to Anvisa (Agency National Health Surveillance Agency), more than 28 thousand tons of medicines are discarded every year. In 2020, the federal government determined the establishment of collection points in pharmacies for the collection and correct disposal of medicines, which resulted in the incineration of 40 tons in 2021 (Vêncio, 2022), raising awareness among the population in search for suitable points for the correct disposal of expired or useless medicines, aiming to avoid critical damage to nature.

5. Conclusion

There are several options for the same product or service available on the market for the customer to choose from. Therefore,

In the event of delay in delivery or damage to the physical product, consumers tend to suspend their relationship with the brand and comment on the bad experience with family and friends, in addition to expressing their dissatisfaction on social media, which can result in losses for the company. company's image.
For this reason, it is essential that the organization establish partnerships with suppliers and transport companies that are also committed to the quality and delivery deadline defined at the time of sale, as otherwise the brand will be severely damaged and could lose potential customers due to negligence. or poor planning by partner companies.
Therefore, applying technology in the supply chain is essential for managing production processes to reduce interruptions that cause slowness in operational flows, aiming to improve efficiency and agility in the delivery of products and services and making the customer experience personalized and satisfactory. Another challenge is to manufacture products that do not result in inappropriate waste disposal in landfills, rivers or seas. To this end, it is necessary to promote actions to collect post-consumer materials and reuse them in the production chain, aiming to reduce the extraction of new raw materials from nature in adherence to good socio-environmental practices provided for in the ESG.
Failure to adopt actions aimed at preserving natural resources can impact the management and competitiveness of the business and reduce the attractiveness of potential investors and customers concerned about preserving the environment.

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