

Case Study

Sourcing third party logistics service providers based on environmental, social and corporate governance: a case study

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Abstract

The acronym ESG, environmental, social and governance, emerges as a strong trend in the era of the circular economy and stands out as a need for companies to respond to the segment in which they operate. Although most studies have been done in the past, they did not address ESG criteria to ensure operator exemption for logistics providers. Further research on the application of realistic circular economy techniques is recommended. Therefore, strategic sourcing, based on multicriteria decision analysis (MDA), considering parameters such as economic, technical, and environmental factors, has created a perfect methodology that considers all these essential requirements, revealing an excellent way to outsource logistics service providers (LSPs). The article aims to prove MDA's effectiveness awarding the best LSP through predefined dimensions involving human resources, risk management, environmental and other social aspects, indicating dedication and commitment to social environmental issues and corporate governance during a procurement's strategic sourcing in a Brazilian pharmaceutical company process. A Literature review supported by a real case study where a multifunctional team from Pharmaceutical and Consultants proved the objective was valid. A secondary objective was demonstrated on how current sustainability challenges can be overcome by the organization and generate value for its stakeholders and society, showing responsibility and commitment to environmental, social, and corporate governance issues. After reviewing all the concepts involved using the literature review, the results were achieved indicating that sourcing process' case study through MDA validated the effectiveness choosing the 3PL with the best results in ESG. The article deals with a current, relevant, and not very explored topic and may contribute to enhancing the investments of logistics service providers (LSPs) in ESG, mainly those that weren't awarded at end of the project.

Keywords Circular economy · Logistic provider · Sourcing strategy · ESG

Abbreviations

1SLP	First level logistic provider
2SLP	Second level logistic provider
3LSP	Third level logistic provider
4LSP	Fourth level logistic provider
ESG	Environmental, social and governance
MDA	Multicriteria decision analysis (tool)
XPTO	The case study company
RFI	Request for information

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1 Introduction

This study uses antecedent literature to highlight how ESG activities are currently important to logistics services, complemented with a case study where strategic sourcing using ESG attributes through a MDA tool awards the logistic provider with ESG best performance. The discussion and results show how dimensions and questions may affect the decision-making process. In the ESG category in terms of logistics, issues in the environmental sector and logistics operations were questioned to evaluate the impacts of e-commerce activities. In the social sector, the activities dealing with diversity at work, health and personal security, child labor, and the impact of operations in communities and society. In the governance sector, we chose to evaluate best practices for a better environment.

This article evaluates the selection, through the strategic sourcing methodology, using a MDA tool considering ESG investments in logistics providers of a Brazilian pharmaceutical company. This is the first time that these data are published as part of a research work because, previously, they were part of the collection of OMC Systems Consulting, whose disclosure was authorized. Investments in ESG are no longer just a new approach to integrate the set of values required by the market. The addition of ethical issues in logistic operations exposes that the search for maximizing profits is no longer the only concern because stakeholders are alert to the social and environmental impacts of their assets.

In addition, according to Larson [1], few studies linking aspects of social sustainability to logistics performance at the macro level are available, and the sustainable logistics literature focuses on the organizational or interorganizational environmental dimension of sustainability. Therefore, it should be noted that entrepreneurs in the logistics operators' market are aware that sustainability requires joint efforts through infrastructure works and positive social and environmental behaviors. As a result, the actors of this sector may contribute to environmental conservation, social justice, and general well-being.

This article aims to prove MDA's effectiveness awarding the best LSP through predefined dimensions involving human resources, risk management, environmental and other social aspects, indicating dedication and commitment to social environmental issues and corporate governance during a procurement's strategic sourcing in a Brazilian pharmaceutical company process, through a case study, contributing to enhancing the investments of LSPs in ESG.

The use of strategic sourcing considering the activities of ESG, through a MDA tool, justifies the relevance of the study, as well as because it is a study with inedited data, and so it results the following research contributions; enhanced Suppliers evaluation would be gained from this research, which would also contribute to improved methods for evaluating suppliers. Through ESG-focused strategic sourcing, this study may promote the impact of stakeholder engagement and contribute to a deeper comprehension of how businesses can establish long-term relationships with stakeholders. The article may help Organizations constructing a robust framework for decision making, with the help of an MDA tool that facilitates transparent and systematic decision-making processes. In addition, the study's novel use of previously unexplored data would add to the body of knowledge on ESG-focused strategic sourcing and provide valuable insights into real-world scenarios. Finally, the utilization of unprecedented data would add new perspectives to the existing literature on ESG-focused strategic sourcing and provide fresh insights.

The problem under discussion is how strategic sourcing, to reward the logistics operator that presents greater investment in ESG, contributes to generating environmentally responsible behaviors.

The paper is organized as follows: Sect. 2 presents the literature review, Logistic provider services and environmental, social and governance integration, Sect. 3 develops the Methodology. Section 4 presents the result of the study with charts. Finally, the paper concludes with Sect. 5, which presents conclusions, highlights limitations, and proposes new directions for future research.

2 Literature review

2.1 Logistic provider services and environmental, social and governance integration

Fierce competition in the global business of products based on shorter life cycles and increased customer expectations forces manufacturers to focus on their core competencies and transfer other processes to market traders [2]. The author states that the sector of logistics service providers (LSP or 3LP) is growing at a dizzying pace due to the vertiginous boost in demand through e-commerce during and after COVID-19.

Camilo et al. [3] mention that the increased use of logistics services has environmental impacts on supply chains (SCs) and has not been treated with due importance. For the authors, atmospheric emissions during the movement of goods towards customers in countries of continental dimensions such as Brazil promote an increase in the carbon footprint. It also appears in Camilo et al. [3] that there is a dearth of studies on the LSP's challenge for its selection in emerging economies, given the critical nature of sustainable third-party logistics providers.

Thus, studies that contribute to the proper management of supply chains based on the best ESG practices can result in the reduction of said environmental impacts and serve as motivation for this article.

According to Mageto et al. [4], regarding the investigation of concepts in logistics outsourcing, despite the importance of sustainability in logistics management, there are previous studies that examined logistics outsourcing from the perspective of selection criteria, contracts, reverse logistics, sustainable development, environmental assessment and risk management; thus, none of the studies examined a combination of using a MDA tool, sustainability based, in logistics outsourcing.

Since the acronym ESG was created, according to Pereira et al. [5], organizations have invested in projects to adapt and define metrics and performance indicators in the areas—environmental, social and governance practices—boosting shareholder value and generating competitive advantage in the market in which they operate. According to Howard et al. [6] performance indicators have been used to support financial objectives, reflect operational goals, or even quality. Currently, they are used to measure the way organizations deal with environmental, social and governance issues.

Qureshi [2] states that LSP's selection aims at "cost reduction", "focus on essential activities", "gaining customer satisfaction and competitive advantage", "keep up quality and service reliabilities", "adopt new technologies to overcome competitors", "reduce IT-based system infrastructure", "avoid huge capital expenditures", "make use of cutting-edge technology" and "gain flexibility in meeting market trends".

This article uses ESG practices as a criterion that encompasses at least seven of the nine abovementioned by Qureshi. In the search for a clearer agenda for sustainable development in companies providing logistics services, the contributions of the academy, in the sense of finding a clear definition of the selection processes of these services using their main dimensions, can mean a relevant factor.

Logistics activities are part of the end of the supply chain, and their role is fundamental for improving the overall performance of the supply chain. Additionally, the management of the logistics process plays an important role from the acquisition to the storage and distribution of products to satisfy customers' needs efficiently and cost-effectively. In this scenario, logistics service providers have become vital to improve supply chain operations.

Moreira et al. [7] define logistics service providers (LSPs) as companies in the transport, shipping and logistics segment that offer the range of services presented in Table 1.

A way to improve the operational efficiency and competitiveness of LSPs, according to Rodrigues et al. [8], is to leverage their best practices through strategic sourcing requirements where performance standards can drive sustainable investments. The sourcing strategy has brought about very rapid changes and best practices in organizations to the organizations that have adopted it as best practices.

For Mageto [4], logistics service companies' sustainability-based are knowledgeable in the practice of environmental laws and with proper investments in IT, driving companies to acquire these capabilities through outsourcing logistics, where, successful implementation requires an objective selection, sustainability based, of LSPs.

Table 1 Range of services

Service type	Characteristics
1LSP—first level	Company or individual that needs to transport, goods, products or merchandise transported from point A to point B with its own fleet
2LSP—second level	Company that offers logistics services based on its assets: ocean, air, rail freight, or warehouse owners who can market their storage spaces
3LSP—third level	Company that offers multiple integrated logistics services, or in packages that may involve receiving; storage; preservation, separation, issuance of invoices, packaging and final transport also including contract and offer of mutual benefits
4LSP—fourth level	Company does not own assets; it is usually a logistics consultancy specialized in transportation and supply chain management that leads other logistics operators. Common supply chain management activities and their information-based integration and coordination functions are included to leverage advantages to clients

Source: Author's elaboration

However, due to the characteristics of multidimensional decision-making difficulties, the selection of LSPs can be considered a complex challenge of a MDA model, given the presence of statistical, interpersonal, and numerous factors in the natural phase of decision-making decisions.

Most studies on the selection and hiring process for outsourcing services and logistics operations, according to Govindan et al. [9], were carried out in the USA, Brazil, China, Turkey, United Kingdom, India, and Iran. The predominant techniques used to evaluate service providers include different variants of decision-making models. Additionally, according to the authors, strategic supply, based on a MDA's model, considering various parameters such as economic, technical, and environmental factors, creates the perfect methodology for selecting the supplier with the best performance by considering all these essential requirements.

Despite the importance of sustainability capabilities in logistics outsourcing, Mageto [4] mentions that there is limited research when mapping past, current, and research trends that can guide professionals and theory in the discipline of logistics management. Furthermore, the relevant elements of logistics outsourcing from the point of view of technology and sustainability are not explicitly known.

The question that arises is, how MDA's using relevant elements of sustainability, can be used, to award the best LSP in outsourcing logistics services for a Brazilian Pharmaceutical Company?

For Ecer [10], the subjective evaluation of relevant elements in a selection process by decision makers, the MDA model (MCDM), has attracted increasing attention.

For Jakšič et al. [11], the outsourcing of logistics services is no longer a fad, and the inclusion of environmental sustainability criteria in their capabilities is the main determinant that encourages LSPs to satisfy their customers' new requirements.

This article aims to show, through a case study, how environmental, social and governance practices; were used to select logistics service providers, through the sourcing strategy, based on a MDA tool, which can contribute to valuing the investments of logistics service providers (LSPs) in ESG.

Traditional purchasing processes became obsolete, where each buyer sought to negotiate the lowest price in each negotiation process that was involved. Therefore, the sourcing strategy, through a MDA model, which considers economic, technical, and environmental parameters, creates the perfect methodology to select the supplier with the best performance in the market, considering all these essential requirements.

3 Methodology

Usually, the solution to complex problems in a multitude of areas is the result of a decision-making process; according to Jordão et al. [12], one of them is suppliers' selection. For the authors, these solutions are based on intuition, feeling, experience or some subjective parameter. They point out that one way is the use of multicriteria decision-making. The method originated in 1971 with Saaty. Saaty [13] used it in a study on energy rationing for industries and later applied it in and from Sudan's logistic transportation problem.

As we see, it is common to confront ourselves with decision-making, and the choice must always be made confronting situations; what are the criteria? What dimensions are involved? A problem that requires a multi-criteria decision requires the choice of a finite number of alternatives based on a set of selected criteria and dimensions. According to Marins et al. [14], Saaty's method can be decomposed into three stages. In the first stage, the problem must be structured with criteria and dimensions at hierarchical levels, facilitating the understanding and evaluation of it. The first level corresponds to the overall purpose of the problem. In the second stage, the evaluations of the criteria occur, and in the last stage, decision-making is reached.

The scope of this qualitative research develops an innovative structure for evaluating logistics providers during the sourcing strategy process using predefined parameters approved by stakeholders and the procurement team. An integrated approach to decision making is proposed through a MDA in which through internal calculations (using the weights for the dimensions involving ESG, services, finance, risk move to sourcing final steps).

The study includes a real case of the selection of logistics operators based on the abovementioned dimensions in which, after using the tool, the five finalists of the fifth stage are appointed, where the decision tool has its parameters adjusted after they are approved by the stakeholders and sourcing team. Bibliographic research (from 2017 to 2022) is carried out to support the relevant concepts of the topic. The case study was adopted as a research strategy.

Lee [15] defines a case study as a research method developed to understand and interpret facts and phenomena in depth in a particular case and integrate it in the solution of problems with similar characteristics. Heale et al. [16] define a case study as a research methodology in the field of social sciences, that is, an intensive and systematic investigation in which the researcher analyses in-depth data related to several variables.

A systematic literature review (WOS—Web of Science) pointed to the existence of few studies from 2017 to 2022, specifically related to the selection processes of logistics service operators and based on sustainable development and sustainability goals.

Mensah [17] argues that the relevance of sustainable development needs to grow in the same proportion as the population because natural resources do not keep up with the same pace. For the author, the environment is affected by almost all actions; on the other hand, so is the continuity of existence and the well-being of humanity.

3.1 Data collection

The literature researched in this article was obtained from the Web of Science (WOS) database of the main journals published between 2017 and 2022, focusing on the following strings: Third Party Logistics Service Provider or “3LSP” or Environmental, Social and Corporate Governance and “ESG” (All Fields). Motivated by the belief that the “strings” above are closely related to companies’ ESG practices. First result 942 articles. The second filter used, newspapers with open access, resulted in 26 articles. After reading the abstracts, five remained, directly related to the interest and motivation of the article. Other articles from previous years were used due to the few that addressed the interrelationship between PSL and sustainability.

3.2 Environmental, social and governance issues (ESG) factors

The factors of environmental, social or governance issues, according to Li et al. [18], impact, in some way, the financial performance of an entity, sovereignty or individual. For the authors, ESG represents a sustainable and coordinated development value that considers economic, environmental, social and governance benefits.

The environmental dimension included in the concept of sustainability, from the perspective of entrepreneurs and managers, according to Evangelista et al. [19], encompasses activities and decisions related to environmental pollution caused by a company to minimize them.

For Sergei et al. [20], ESG implementation projects require a review of individual corporate policies, as well as the corporate culture, mainly for industries that create a larger carbon footprint than others, where environmentally responsible investments are less attractive.

Due to the intensification of carbon emissions and global warming, according to Rad et al. [21] academia and industries are investing substantial efforts in ESG practices to ensure the sustainability of the environment and reduce these emissions.

For Froio et al. [22], logistics service providers in Brazil make a decisive contribution to socioeconomic factors for a country of continental dimensions because they are distributed in all states and carry out different distribution strategies aiming at environmentally sustainable benefits.

3.3 Sustainability in logistics services

For Galpin et al. [23], the simple fact that a company includes sustainability in its mission has not implied its effective realization. For the authors, without investments and real efforts, no company becomes sustainable, and even so, they risk being penalized for superficially employing sustainability merely as a marketing tactic. Sustainable activities are those aimed at ensuring the proper use of the environment.

According to Mageto [4], logistics services, as responsible for the emission of greenhouse gases harmful to the environment, require that the providers of these services proceed with sustainability initiatives. Due to the 2030 Agenda of the United Nations with a view to sustainable global development, as well as achieving a more sustainable legacy for future generations, 17 goals were established.

Therefore, for Lazar et al. [24], the dimensions of sustainability and its goals are becoming increasingly relevant to be incorporated into business logistics and supply chain management. Wichaisri et al. [25] state that resource management that combines sustainable development with a logistics system, results in a sustainable logistics system that may be used to reduce costs and activities that impact the environment and society’s way of living. For the authors, environmental,

social and governance practices through logistical services promote results increasing energy efficiency, reducing impact on the community and better quality of life.

For Jakšič et al. [11], there is a gap between the perception of the environmental sustainability aspect and the adoption of green logistics practices in outsourcing. For the authors, this gap can be attributed to the fact that this adoption is not updated in relation to the existing high environmental awareness. Another fact that the authors point out is the gap between the importance of environmental sustainability and the real drive of companies to become green.

3.4 Sourcing strategy

According to Çankaya [26], the complexity of meeting customer requirements during the acquisition process in companies has increased due to its importance in strategic planning processes, therefore becoming an indispensable part of them. According to the author, in the face of more competitive markets, sourcing specialists need to have the technical knowledge required to coordinate the entire process.

The sourcing strategy is responsible for successful supply chain management; it works to remove organizational barriers, improve relationships with its suppliers and customers, maintain excellence in service, improve its financial position and optimize operating costs [8].

The critical issue for Medina et al. [27] is faced by procurement professionals is deciding between making or buying through external suppliers. The authors claim that it was studied in the past, without considering sourcing options combined with the use of a practical tool for its operationalization—MDA.

The wide adoption of logistics outsourcing in the business environment leaves no doubt that it has become one of the most used practices by the logistics departments of companies of the most diverse profiles and sectors.

Below, we present an overview of the strategic sourcing process for logistics providers, highlighting the fifth step where MDA is applied in the present study (Fig. 1).

Figure 1 presents the structured general vision of the sourcing strategy methodology, comprising 7 stages, where step five stands for using MDA for LSP selection and contracting processes. We emphasize that for the purposes of this article, we will focus on the fifth step to describe how the MDA tool was used to select those providers that stood out with investments in ESG. As seen in Fig. 1, it is worth mentioning that the process begins with the selection within all spend data for category—freight expenses—to serve as a reference point for negotiations with carriers (Fig. 2).

According to Sharma [28], after generating the general spend data (summary of general expenses), the next responsibility for the sourcing team is to select the expense that most impact(s) the company’s results. After a careful analysis, expense categories are validated to avoid adding value from one category to another, followed by choosing the one with a higher impact on minimizing costs, maximizing productivity, strengthening the relationship with suppliers or

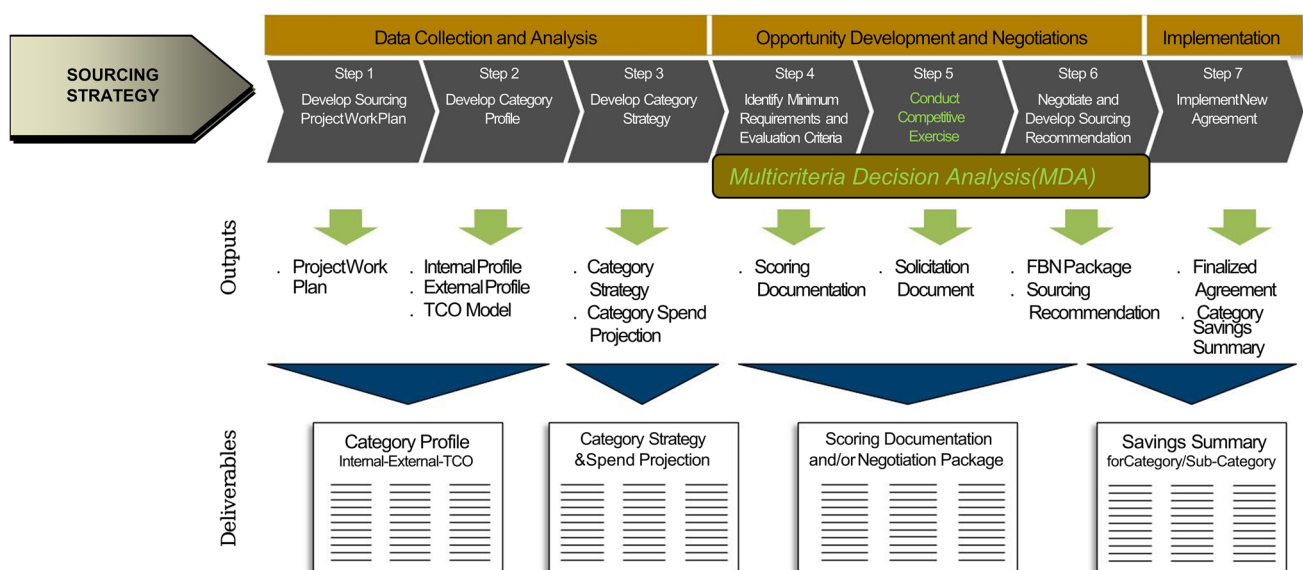


Fig. 1 Strategic Sourcing methodology with MCDA tool highlight

CONCEPTUAL

ROUTE									TRANSACTIONS					STATUS			EXCEPTIONS
ORIGIN				DESTIN					Date	Volume (Tons)	Number of assets	Freight Value (US\$)	Carrier	Agreed	On Going	Ended	
Local	City	State	Type	Local	City	State	Type	Distance (KM)									

Fig. 2 Spend data—Freight spends basis

contributing to a sustainability project. According to the author, this step is characterized as a process to collect, clean, classify and analyse spent data through dedicated software.

From this database, it is possible to track the historical trends of freight rates by carrier and by route (Fig. 3). In this way, the sourcing team can outline the strategies to be adopted—Regional freight? What are the modals? How did prices evolve?

The following section details MDA’s tool characteristics.

After the four initial stages, where the spending base was raised, the category selected, the global list of suppliers evaluated and the strategy to be adopted approved, the fifth stage is reached, where, after the parameters of its

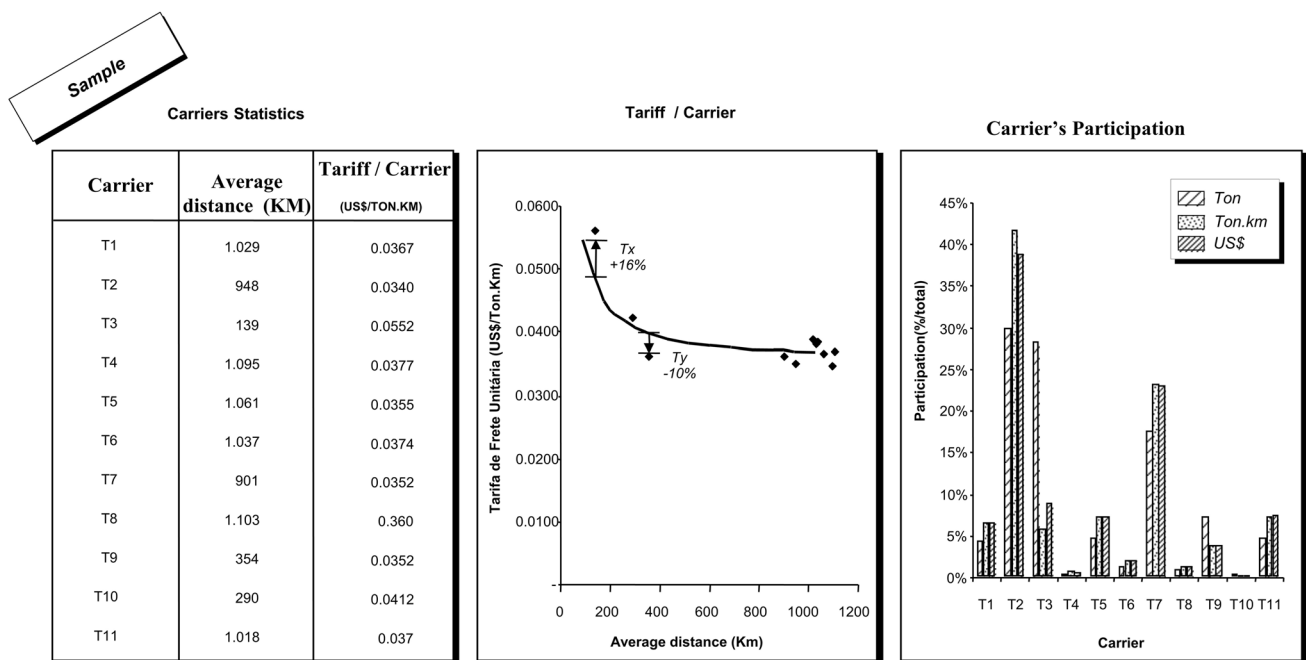


Fig. 3 Spend Analysis driving sourcing strategies

dimensions are approved by the stakeholders and sourcing team, the decision tool has the weights of each dimension and the percentage of participation of each question adjusted internally.

The reason of using an MDA model, is based on previous sourcing strategies, where MDA showed flexibility to accommodate all the parameters and dimensions required to support the multifunctional team in the decision-making process.

Main characteristics of MDA are:

- Capable to adapt and select suitable choices to evaluate suppliers.
- Capable to adapt to rank alternatives to questions of predefined classes.
- Capable to rank suppliers from top to bottom according to their individual performance in each criterion.

It is then sent to suppliers for them to respond to and be evaluated according to their responses. These adjustments occur to align the type of supply and suppliers because each of them will have its own dimensions. Additionally, at this stage, workshops with suppliers take place, which will be detailed in a proper section.

4 Results

4.1 The company

The pharmaceutical company XPTO, which despite its 60 years of existence, seeks to use the concept of Circular Economy daily, a model of economic growth that aims at sustainable development, preventing pollution and protecting the environment, and managing shared. Social capital is 100% Brazilian, and its management model has helped its evolution and advancement in the national pharmaceutical sector. Located in the Southeast region of Brazil, it has several governance instruments, including those focused on sustainability. The company has a code of conduct that brings together the principles and establishes norms that guide the company's internal and external relations. It is important to highlight that this Pharma company started the project, based in the following motivators: the high costs spent with 3LSPs and the consultant company experience in strategic sourcing. This also points out the reason why their case was selected.

4.2 Strategic sourcing drivers

The main drivers for outsourcing transportation with LSP carriers, using a sourcing strategy, according to Fadile [29], are represented in Table 2: risk sharing, exploitation of external resources and globalization.

The main internal drivers identified by the sourcing team that motivated Pharmaceutical to invest in the sourcing project are shown in Table 3.

According to Barker et al. [30], a company's diversification actions are a result of pressures from competitors, customers, and other characteristics of the competitive environment. For the authors, they are external motivators, and previous research recognizes the main role that the competitive environment plays in the design and success of new services. Then, any strategy is the sum of the actions planned for each service necessary to meet the business objectives.

Table 2 Strategic sourcing—external drivers

Drivers	Results	Citation (%)
Cost reduction	Economies of scale because of higher volumes involved	83
Increase focus on core business	Services where company is strong valued and, those that do not represent competitive advantages, transferred	75
Increase flexibility	LSP's expertise are capable to deal better with demand fluctuations	65
Better order fulfillment	Lead-time reduction and better service quality to clients	57
Risk sharing	ESG	47
Exploitation of external resources	Effectiveness	40
Globalization	Global reach	35

Source: Author's elaboration adapted from Fadile [29]

Table 3 Strategic sourcing—internal drivers

Drivers	Description
Organization’s competencies	Best manufacturing practices allow quick adjustments to capabilities and better risk management
Economy growth	Savings in negotiations, through the sourcing strategy contributes to more competitive companies and country’s economy growth
Competitive edge	Agreements with suppliers can help preventing out-of-stocks products and parts when demand uncertainty is high
Performance based in best practices	Manufacturing best practices enable flexible coordination integrated with strategic sourcing
Services’ standardization	Standardizing its services to customers and suppliers, the company seeks a balance between producing or outsourcing that helps to better adapt to changes in the global environment

Source: Author’s elaboration

Due to the analysis of the expense base, the top management was alerted to an improvement in costs, as it was demonstrated by an external auditor that when using the sourcing strategy seeking to meet the needs of logistics services (freight), costs would decrease. By distributing the routes through specialized companies instead of using a single LSP, the company becomes more competitive, efficient, and effective.

4.3 LSP cost structure

Previous research mentions that the costs of transporting goods from 3LSPs are operational and/or internal costs due to expenses arising from the daily operation of a transport company, which includes fixed costs (related to keeping the vehicle available for use) and variable costs (fuel, lubricants, tires, and maintenance). More recently, social, environmental, and economic aspects have emerged as external costs, which include financial, nonfinancial, tangible, and intangible components. A typical carrier’s cost structure (Fig. 4) indicates that it is possible to change to a win–win relationship based on maximizing fleet utilization for volume agreements.

It is up to the cross-functional team that represents the organization in the sourcing strategy project to understand its role in each of the stages, as well as in the other improvements required in the rules established for the sourcing of freight.

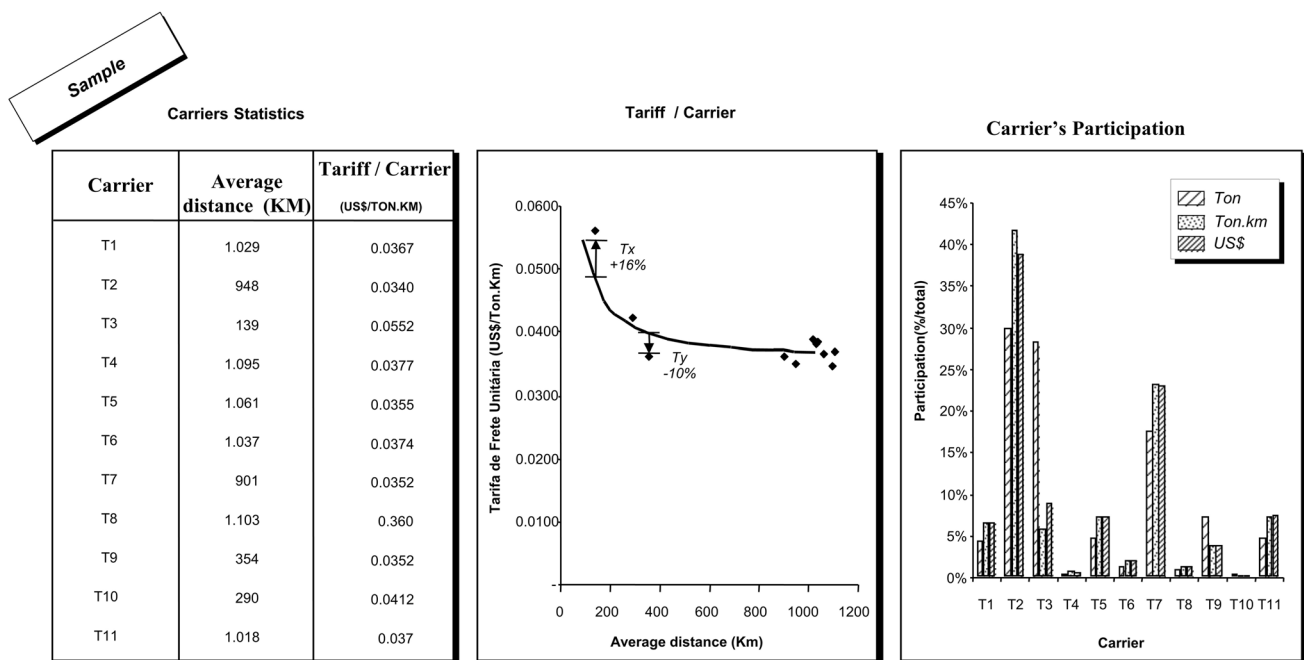


Fig. 4 Possible savings through Strategic Sourcing agreement with 3LSP’s

Fig. 5 MCDA tool supporting Request for Information (RFI)

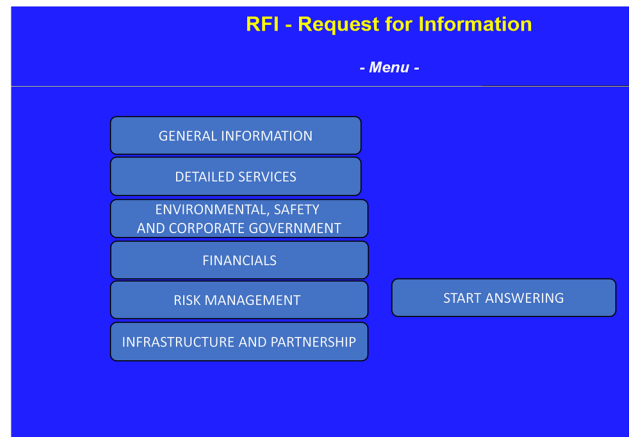


Table 4 RFI (request for information)

Use—utility	Results	Deliverables
Find a logistic provider with innovative solutions to fulfil Clients’ requirements	Align functional requirements with market	Summary of responses’ feedback and Summary of doubts
Validate project feasibility	Provide content to strategic sourcing’s next phases	How many LSP’s accepted invitation to participate
Compile best practices in sustainability, governance, infrastructure, and functionality		How many LSP’s declined to participate

Source: Author’s elaboration

Therefore, it is necessary to know in detail each of the above costs so that it is clear to top management that the team can specifically demonstrate the following:

- The current values,
- The goals to be achieved,
- The period defined to meet the business requirements,
- Which services will be provided internally or externally,
- Where they will be performed,
- How many changes are needed to optimize the service?

4.4 The MDA model

Planning Logistic Service Provider Selection: Request for Information-RFI.

The MDA tool was developed in Java using an Excel spreadsheet, programmed to be adjusted for each stage of strategic sourcing (Fig. 5).

In the initial phase, the multifunctional team started the project using the expense base to prioritize the groups that will be part of each wave of sourcing initiatives. It is the moment when the cross-functional team starts to raise the dimensions (service, raw materials, parts, travel, risks, partners, ESG, finance) and criteria (questions to be answered by the suppliers that will allow the tool to assign weights and values to the answers). Each different category to be negotiated will require different set ups. This is a crucial process because the result will reflect what is being proposed as improvements by the team and internal stakeholders.

Request for Information is a document used in one step of sourcing strategy’s fifth stage, formalizing the invitation to suppliers when they acknowledge receipt of MDA. Table 4 summarizes its utility, expected results and deliverables. To move forward, suppliers fill in the answers that will be used to collect, share, and clarify information about each one’s companies and processes.

The objective of this step is to create a database of potential suppliers through the information collected about their functionalities, tools and other capabilities existing or under development in the project participants.

4.5 Preliminary filter—LSPs to invite to RFI

A list generated through all stakeholders using Carrier's services and the sourcing team. The result considers companies capable of fulfilling the requirements primarily defined (Fig. 6).

As seen in Fig. 5, the team started with a list of 120 logistics service providers initially selected by the team.

After analysing the services provided, investment in ICT, customer services and ESG projects, as well as the size of the companies, a final list was reached with 20 participants to be invited to the RFI. The selection of carriers for quotation followed a series of rules:

- Carriers must have their own fleet—it is not necessary to carry out all transport in their own trucks.
- Trucks must be appropriate for the product to be transported.
- The carrier must comply with the requirements of the law and be eligible for transportation in the region in question.
- The carrier must have an office at the place of origin.

4.6 Preparation of the request for information (RFI)

The RFI document officially forwarded the analysis tool that was set up based on a questionnaire prepared and approved by the cross-functional team. After approval, it was sent to be filled in by the participating companies, aiming to collect information that would allow the evaluation of each logistic provider (3PL) in the following dimensions:

- General information.
- Services.
- Infrastructure and partners.
- Financial stability.
- Personnel qualification.
- Management via ESG.

Once the questions determined by the team were approved, RFI evaluation mechanisms were created through weights applied to the questions, as shown below (Fig. 7):

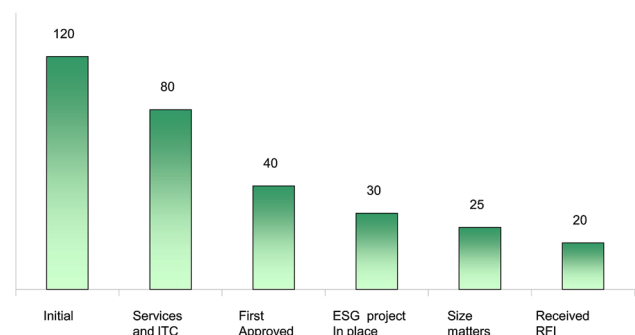
The selection criteria, as well as the weights assigned to each question, are the result of meetings with the sourcing team and stakeholders. The values are unknown by the invited participants to avoid formulating artificial and biased answers.

4.7 Preliminary classification after receiving the tool with answers

After receiving feedback through the 3LSP answers, the tool automatically generated a preliminary classification (Fig. 8).

The cut established to show the carriers with the best results index was consensual among the sourcing team members. Out of the 20 selected, only 9 managed to reach an acceptable index.

Fig. 6 Defining LSPs participants—Wishing list x preliminary filters.



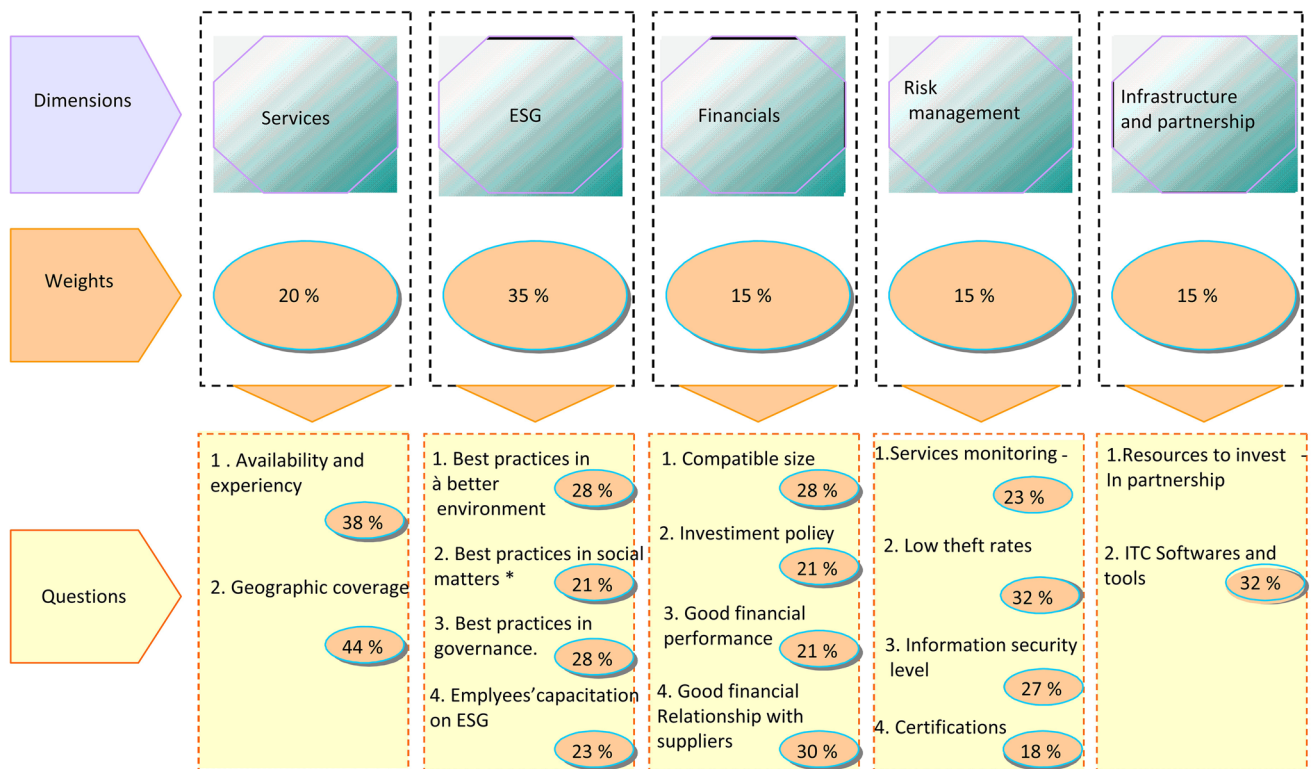


Fig. 7 Setting up MCDA with dimensions and weights

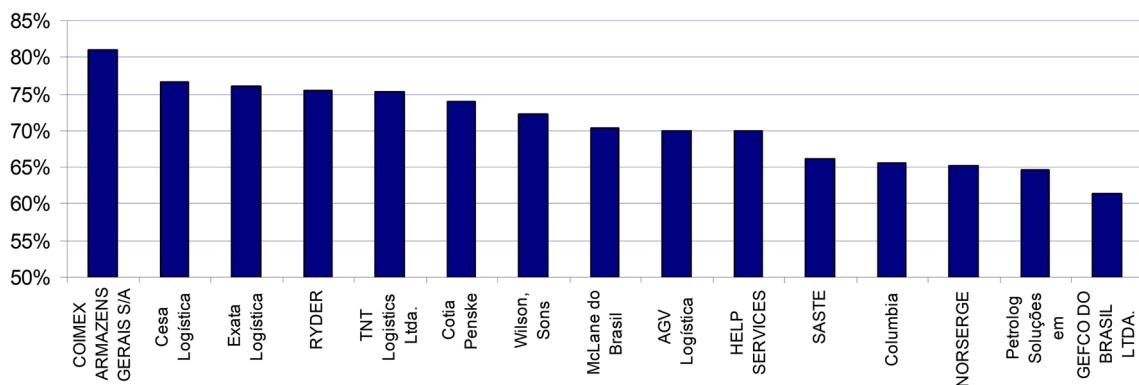


Fig. 8 Results from MCD tool—Request for Information classification

Then, the next step in phase 5 took place—workshops. A very important activity because the answers in the tool did not require objective evidence. Therefore, now, each LSP will receive a visit from the team that will investigate this evidence in loco. It is characterized as a documentary conference of the answers.

4.8 Checking the answers

After receiving RFI (via MDA) from Suppliers, it is time to check consistency and accuracy of all answers, like, field was numeric and has letters, wrong copy pastes, and others.

- Interaction with LSPs to minimize “not available” responses or inconsistencies in responses.
- Check the LSP’s ESG culture.
- Check of services provided to clients.

- Assess the technical quality of the team and infrastructure.
- Check the gaps (team expectations versus LSP's performance);
- Check of financial debts;
- Deepening the critical issues of outsourcing.

During this phase, back and forth efforts to clarify answers and avoid low scores to any suppliers.

The process ends with the inclusion of the team's opinion in the tool after the presentation of the evidence. The top five were selected and taken to the final stages of sourcing because of the process (Fig. 9).

The study by Çankaya [23] was used as a reference for comparison between the model used and the dimensions suggested by it. The questions used were selected from other sourcing strategy processes carried out in Brazil and other global sources, in addition to the participation of the sourcing team and senior managers involved in the project. It is believed that the care taken characterizes the inclusion of this study as a contribution to the academy.

5 Conclusions

The scope of this qualitative research brought an innovative structure to evaluate logistics service providers during the sourcing strategy process, using a MDA tool, with predefined parameters approved by stakeholders and the procurement team.

The study included a real case of the selection of logistics operators based on the mentioned dimensions. The five finalists of the fifth stage are appointed, where the decision tool has its parameters adjusted after they are approved by the stakeholders and the sourcing team.

It was found that the result of main objective of the present study, which aimed to prove MDA's effectiveness awarding the best LSP during a procurement's strategic sourcing in a Brazilian pharmaceutical company process through predefined dimensions was achieved. Comparing the Literature review and steps managed by MDA during the real case study involving a multifunctional team from Pharmaceutical and Consultants, at the end, the LSP with higher Score in ESG was awarded, proving MDA effectiveness. The secondary objective was demonstrated on how current sustainability challenges can be overcome by the organization and generate value for its stakeholders, and society, showing responsibility and commitment to environmental, social, and corporate governance issues. Finally, it is remarkable to mention that the high costs with LSPs, mentioned before, was reduced in 50% after the sourcing project.

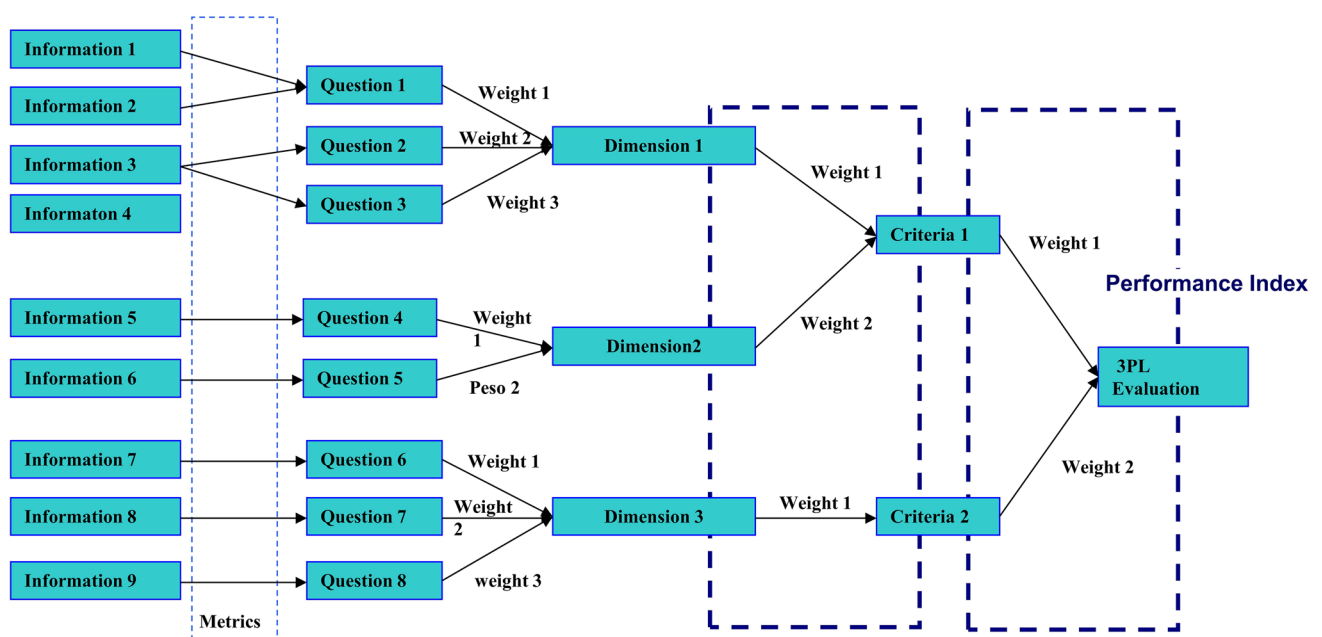


Fig. 9 Sourcing methodology via MCDA Tool—Resumed

In addition, the results showed the following:

- Investments in sourcing strategy through a flexible analysis and decision-making tool (MDA) can effectively contribute to sustainability, allowing us to support outsourcing decisions of logistics operators supporting the strategies of the companies' supply chain in this area.
- The internal and external drivers of the strategic sourcing project contribute to cost reduction, greater focus on the core business, better service to customer requirements, use of best practices, better competitiveness through savings in negotiations with partner suppliers, and lower risk of product shortages for customers.

It was emphasized that the members of the organization's top management must be attentive and consider the sourcing strategy initiatives as an integral part of their strategies in search of obtaining competitive advantage. Strategies are complex practices that demand coordination and integration between the different stakeholders of the company, so the best practice companies are the ones that successfully apply their strategies and outperform the competition.

In the current circular economy business environment, sustainable quality of service has become a strategic priority for the stakeholders involved; therefore, the selection of suitable logistics providers will greatly influence the performance of supply chains in terms of sustainability indicators, which justifies the importance of the article for the academy.

The relevance of the study consisted of being able to assist managers in the implementation of decisions related to these activities.

Finally, suggestions for future studies emphasize the expansion of the sample to all pharmaceutical companies in Brazil and show how the tool can be used in categories, other than freight, such as IT material, packaging, and services associated with marketing.

Regarding the limitations and gaps of the present study, the application only to a Pharmaceutical may be considered insufficient, although the results achieved can serve as evidence that subsidize application in other companies in the segment. Another point shows that although the sourcing strategy has been in use long enough to be considered consolidated and indispensable to best practices in acquisition companies, its relationship with the supply chain has been partially examined in the literature. Another limitation lies in the fact that, in emerging markets, the application of knowledge about sourcing strategies is still limited.

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Data availability The data supporting the findings of this study are available from [OMC System Consulting Ltd], but restrictions apply to the availability of these data, which were used under license for the current study and are not publicly available. Data are, however, available from the authors upon reasonable request and with permission of [OMC System Consulting Ltd].

Declarations

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

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