

Selection of Method for Supplier Development and Ranking in a Company Providing IT Outsourcing Solutions.

J. M. de Oliveira Júnior¹, R. L. R. Gomes²

¹ Bachelor of Business Administration from the University of Fortaleza; Postgraduate student in MBA Supply Chain Management at IEL – Euvaldo Lodi Institute, Ceará Branch; Purchasing Officer - CSI Rentals.

² Professor of the Methodology of Scientific Work Discipline (Advisor) – Euvaldo Lodi Institute; FBUNI; Ph.D. in Biological Sciences - FICL; M.Sc. in Phytotechnics - Federal University of Ceará; Specialist in Science Teaching Methods - UECe; B.Sc. in Agronomy - UFC; Licentiate in Natural Sciences, Mathematics, and their Technologies - UVA; Additional Training Courses in People Management, Project Management, Education, Leadership, Auditing, and Health at: HARVARD; IDB; FIOCRUZ; JOHNS HOPKINS UNIVERSITY (JHBSPH); International Consultant for Scientific Laboratories at the World Bank. Scientific Consultant
Corresponding Author: R.L.R. Gomes; <https://orcid.org/0000-0001-6101-9571>.

ABSTRACT

The conception of a supplier management model for an outsourcing services company arose from challenges related to delivery deadlines and lack of planning. Material procurement was carried out with local suppliers after the contract closure with the client, resulting in no timeframe for negotiation or selection of alternative suppliers. Following an examination of the purchasing sector, it was discerned that there was a need to broaden the spectrum of suppliers and establish new partnerships to enhance excellence in the supply chain processes. The research was conducted through a qualitative approach, employing a bibliographic review that delved into the investigated theme, focusing on research sources such as books and articles. The overarching goal of this research is to demonstrate the significance of selecting a method for the development and ranking of suppliers within a company specializing in Information Technology (IT) outsourcing solutions. The study was conducted utilizing the multicriteria supplier development model, and throughout the article, the rationale behind choosing this method and the benefits it brings were elucidated.

Keywords: Suppliers; Purchasing Sector; Supply Chain; Multicriteria Model.

Date of Submission: 23-02-2024

Date of Acceptance: 04-03-2024

I. INTRODUCTION

The present article addresses the selection method applied to supplier selection and qualification and the importance of the relationship between the supply sector and the supplier to achieve the objectives aimed at by business management.

Outsourcing is a service provision for the client who seeks to enhance their own results, and the company providing these services needs to ensure good service to the contracting party. Therefore, the relationship between the supply chain and the supplier must be in constant harmony. In today's business world, the establishment of supplier development in companies of this segment requires a more effective method of monitoring and ensuring the quality of goods and materials. This ensures that the final product meets customer specifications, resulting in increased competitiveness in the market.

The multicriteria method of supplier development is one of the most commonly used by companies. Despite being old, it remains highly efficient because it allows us to establish crucial criteria for developing logistical processes, from receiving the goods to delivering them to the customer [1].

In the realm of business, companies interact with their competitors, who can be seen as adversaries, as both parties compete for customers and the necessary resources in the organization's external environment [2].

The work was developed through qualitative research, the procedure of which was a bibliographic review addressing the investigated theme, focusing on research sources such as books and articles. The general objective of this research is to demonstrate the importance of the selection method for the development and ranking of suppliers in a company providing IT outsourcing solutions.

The specific objectives of this research are as follows: to discuss the main concepts of supply management; address the importance of supplier selection; discuss supplier development methods, and address strategic competitiveness.

This article is structured in four sections, where the first is the introduction, explaining the objectives of this research; the second is the theoretical framework, where a dialogue between the opinions of the researched authors is developed in association with the opinions of this researcher; the third section indicates the methodological procedures adopted for the development of this research, and the fourth elaborates on the final considerations.

II. MATERIAL AND METHODS

The work was developed through qualitative research, with the procedure being a bibliographic review addressing the investigated theme, focusing on research sources such as books and articles, aiming to justify the need for effective supplier development for the procurement sector in an outsourcing services company.

Defining a strategy requires a model and criteria that prioritize the improvement of supplier selection and development, with quality as a key factor. This analysis will delve into this notion.

Examining the execution of the research is at the forefront of the objectives of this study. Its main focus is on the research execution process, which is a defining characteristic of this research. Following this initial stage, further exploration was conducted in subsequent procedures. In-depth explanation and description are provided regarding data collection and analysis processes.

To conduct this investigation, research sources were sought in various articles and books, among which the authors who stood out the most were Joana Coelho Viana and Luciana Hazin Alencar with their work "Metodologias para Seleção de Fornecedores: Uma Revisão da Literatura" (Methodologies for Supplier Selection: A Literature Review). In this work, the most recommended model for supplier selection was found: the multicriteria model. Also noteworthy is Martin Christopher's book "Logística e Gerenciamento da Cadeia de Suprimentos" (Logistics and Supply Chain Management). The article "Gestão de Relacionamento com Fornecedores" (Supplier Relationship Management) by authors Ronan de Brito Murad, Renato da Silva Lima, and Mario Sacomano Neto was fundamental for understanding the importance of maintaining a good relationship with the supplier, advocating the need for institutions to develop incentive policies and joint actions.

III. THEORETICAL FRAMEWORK

This theoretical framework aims to demonstrate how to evaluate and classify suppliers of products and services, ranging from equipment, parts, and inputs to maintenance and service provision. It is organized into four subsections. The first refers to supply chain concepts, the second addresses the importance of supplier selection, the third discusses the criteria used to define which supplier is ideal for a particular product, and the fourth addresses strategic competitiveness.

3.1 Supply Management

According to Christopher (2019), supply chain management focuses on cooperation, trust, and recognition that establishing a good relationship with the supplier will drive objectives. However, it may happen that one of the parties acts for their own benefit, wearing down the relationship over time. The supply chain is composed of a complex network of interconnected organizations through various channels. The various procedures and ventures contain interdependent connections that can be categorized as "upstream and downstream [3]."

In recent years, companies in the production sector have been working to evolve logistics processes, considering that the market is becoming increasingly competitive and broad. With this, there is a wide variety of suppliers for the same product, from supply management to building partnerships with suppliers to enhance the efficiency of both parties.

Riccardi et al. (2010) mention that decision-making for purchases occurs in various processes, involving all individuals related to the supply chain. The supply chain requires steps, from transportation to the transformation of raw materials into final products, and finally reaching the shelves for the consumer [4].

2.2 Importance of Supplier Selection

According to Murad, Lima, and Neto Sacomano (2015), in the 1980s, suppliers were selected based on pricing, which made other strategies like supplier development and selection less considerable [5]. Thus, the work of Supply Chain Management was superficial compared to what it is today. Over the years, the strategic vision of the purchasing sector has evolved, leading to well-thought-out decision-making in the acquisition of goods and services, aiming to acquire products with the best cost-benefit for the company, and this being the greatest responsibility of the purchasing sector [6].

The advantage of supplier selection is to increase product and delivery quality, ensure competitive prices in the market, raise added value, and consolidate the supply chain. As the company and its partners become familiar with each other and cultivate their connections, their operations become more synchronized and integrated.

According to Silva, Ferreira Filho, and Ignácio (2008), most of a company's costs come from the purchasing sector; therefore, there is a need to work on strategic ways to reduce costs and impact the quality of services provided [7].

Krause, Handfield, and Tyler (2007) identify two key elements that solidify the importance of the construction industry. Establishing lasting relationships with strategic suppliers and buying companies is crucial to ensuring long-term success in business operations. Establishing links between the participating agents in these processes and their impact is crucial. Nurturing and sharing knowledge among participating companies are crucial for the growth and development of generated knowledge [8].

3.3 Supplier Development Method

The multicriteria model is the most suitable for supplier evaluation, involving systematically deciding and evaluating a set of alternatives against various criteria [9].

The multicriteria decision support process involves the use of paired comparison as a means of various criteria. Among the various criteria and alternatives, one of the most recognized approaches is the analytic method [9].

AHP, also known as Analytic Hierarchy Process, is a method used to establish a hierarchy of criteria or alternatives. This method consists of four steps: modeling the problem, establishing priorities, synthesizing judgments, and final decision-making [10], [11].

Multicriteria methods are decision support techniques that assist in solving problems with multiple, sometimes opposing, objectives, numerous potential courses of action, uncertainties, multiple stages, and multiple parties influenced by the decision [9].

After analysis, upon verifying the main inputs used in machine maintenance, it was found that the main criteria to be used are price, geographical location, payment terms, and delivery time. Due to the services provided for IT equipment rental, the payment term is crucial for decision-making, as rental gains are medium to long-term, affecting the purchasing power of the supply sector.

Below is Table 1, which presents various supplier selection models, with a brief description of each, as well as mentioning authors who have researched each cited method.

Table 1 - Supplier Selection Methods

Method	Description of the Method	Author(s)
Linear Weighting	This method entails the allocation of weights, emphasizing various factors in the evaluation and selection of suppliers.	Pinho (2019) [1]
Mathematical Programming	Utilization of mathematical algorithms to optimize the selection of suppliers according to specific requirements.	Lopes (2020) [14]
Multicriteria Model	Methodology that takes into account a variety of criteria to evaluate and rank suppliers.	Solana-González et al. (2022) [15]
Total Cost of Ownership - TCO	Assessment of the total cost of a good or service over its lifecycle.	Lima; Rezende (2023) [16]
Data Envelopment Analysis - DEA	Efficiency analysis technique that compares the inputs and outputs of various suppliers.	Lima; Rezende (2023) [16]
Fuzzy Theory	To address uncertainty and imprecision in supplier selection, fuzzy logic is employed.	Lopes (2020) [14]
Artificial Intelligence	Artificial intelligence technologies are used to enhance the supplier selection process.	Leonesi; Terazzi (2020) [11]
Analytic Hierarchy Process - AHP	This process is used to solve multicriteria decision problems and includes evaluation measures both objective and subjective. A hierarchical process is provided by the method to ensure consistency of evaluation measures and options chosen by the decision-maker, reducing bias in the decision-making process.	Corsi, A.; Barbosa, D. H.; Moro (2020) [10]
Competitive Advantage Criterion	This method is exclusively applied to strategic suppliers of the company. Business criteria may be used to select other suppliers.	Terriaga (2019) [17]

Source: Developed by the researcher

It should be noted that the preference for certain methods may be influenced by changes in market demands, advances in technology, and the availability of more complex data.

3.4 Strategic Competitiveness

Contador (2008, p. 39) defines competitiveness as: "The ability of the company to achieve sustainable results superior to its competitors, measured by a market growth indicator and ensuring satisfactory profitability, through the achievement of one or more competitive advantages [12]." By this definition, competitiveness is measured in relation to competing companies, concluding that it is limited within an economic segment.

When considering competitiveness in supplier development, we often think of price. However, when we use this aspect as the sole evaluation tool, we assume a risk that impacts quality and productivity. If there is a misalignment with delivery times or product quality, all subsequent processes will be compromised.

According to Berger and Lazard (2018), to address the challenges of highly competitive environments, companies must cultivate strategic suppliers with experience in emerging competencies, leveraging the opportunities presented by new technologies. In recent years, there has been a noticeable increase in the establishment of collaborative partnerships between suppliers and manufacturing companies [13].

The primary underlying objective that strengthens these partnerships is to effectively respond to customer demands and sustain the competitiveness of partner organizations in a challenging business landscape. In this context, the strategic selection of suppliers becomes a critical activity.

IV. DISCUSSION AND CONCLUSION

There are various ways to implement a supplier development plan within an organization, and it is evident that supply management plays a fundamental role in this process by having direct contact and possessing knowledge of the company's main products and services.

All the criteria presented are of utmost importance for the research, as despite the existence of numerous suppliers for such products and services, what will differentiate them will be the ranking.

Multicriteria methods are decision support techniques that help solve problems with multiple often conflicting objectives, multiple possible actions, uncertainties, multiple stages, and several individuals affected by the decision.

In conclusion, we have reached the understanding that the multicriteria model is highly relevant for the company, as it can provide strategic information to assist in the sales plan of the services provided. By following the rules for supplier development execution, deliveries will be made on time, pricing and payment will be suitable for the company, and the supply chain will be consolidated.

REFERENCES

- [1]. Pinho, R. R. de. (2019). Multicriteria decision support model for the selection of tinplate suppliers - A case study at CAN company. (Master's thesis, Polytechnic Institute of Porto- APNOR).
- [2]. Donnelly, J. H., Gibson, L. J., & Ivancevich, J. M. (2000). Administration - Principles of Business Management. Portugal: McGraw-Hill.
- [3]. Christopher, M. (2019). Logistics and supply chain management. São Paulo: Cengage Learning.
- [4]. Riccardi, R. Q., Silva, D. da, Garcia, M. N., & Rossi, G. B. (2010). Construction and validation of a scale for the selection of suppliers in the Brazilian electrical sector by companies based in Latin America. *ESPM International Business e-Journal*, 5(2), 91-116.
- [5]. Murad, R. de B., Lima, R. da S., & Neto Sacomano, M. (2015). Supplier relationship management in local productive arrangements: The case of Vale da Eletrônica. *Production*, 25(1), 1-12.
- [6]. De Faria, B. P., & Ferreira, A. (2018). Total Cost of Ownership: The variables and implications of the purchasing process in a company. (Master's thesis, University of Porto).
- [7]. Silva, J. B. N. da, Ferreira Filho, V. J. M., & Ignácio, A. A. V. (2008). Total cost of ownership model: Application example. In *Proceedings of the XL Brazilian Symposium on Operations Research - SBPO*. Retrieved from <http://ws2.din.uem.br/~ademir/sbpo/sbpo2008/pdf/arq0156.pdf>
- [8]. Krause, D. R., Handfield, R. B., & Tyler, B. B. (2007). The relationships between supplier development, commitment, social capital accumulation and performance improvement. *Journal of Operations Management*, 25(2), 528-545. <https://dx.doi.org/10.1016/j.jom.2006.05.007>.
- [9]. Viana, J. C., & Alencar, L. H. (2012). Methodologies for supplier selection: A literature review. *Production Magazine*. São Paulo, 22. ISSN: 1676-1901.
- [10]. Corsi, A., Barbosa, D. H., & Moro, A. M. K. (2020). Application of the analytic hierarchy process methodology for supplier selection in a clothing industry. *Navus*, 10, 01-20. <http://dx.doi.org/10.22279/navus.2020.v10.p01-20.987>.
- [11]. Leonesi, T., & Terazzi, L. F. (2020). Identification and hierarchization of criteria and subcriteria for supplier selection in a highway concessionaire using the analytic hierarchy process (AHP) method. *Revista Interface Tecnológica*, 17(2), 693-705. <http://dx.doi.org/10.31510/infa.v17i2.897>.
- [12]. Contador, J. C. (2008). *Fields and Weapons of Competition: A new strategy model*. São Paulo: Saint Paul Editora.
- [13]. Berger, R., & Lazard Automotive Teams. (2018). *Global Automotive Supplier Study 2018: Transformation in light of automotive disruption*. Munich.
- [14]. Lopes, A. C. B. (2020). *Integrated Purchasing Management: A Supplier Selection Process Model Based on Fuzzy Logic*. (Master's thesis, Federal University of Pará).
- [15]. Solana-González, P., Wachtmann, M. M., Vanti, A. A., & Ribas, A. (2022). Decision-making in supplier selection: Implications for logistics and product disposition. *Perspectives in Management & Knowledge*, 12(1), 61-79. <https://dx.doi.org/10.22478/ufpb.2236-417X.2022v12n1.55613>.
- [16]. Lima, A. M. T. de, & Rezende, M. C. (2023). *Adaptation of a management methodology for improvement in the supplier selection process of a retail microenterprise*. Monograph, Institute of Exact and Applied Sciences of the Federal University of Ouro Preto.
- [17]. Terriaga, K. de A. (2019). *Supplier Selection Based on Competitive Advantage: An application in the clothing industry*. (Master's thesis, Faculty of Campo Limpo Paulista).
- [18]. Inova Civil.
- [19]. Maffezzoli, E. C. F., & Boehs, C. G. E. (2016). A reflection on the case study as a research method. *Revista da FAE*, 11(1). <https://revistafae.fae.edu/revistafae/article/view/262>.

- [20]. Saint Jean, G., Longo, O. C., & Lima, G. P. (2022). Sustainability and planning applied in civil construction from the perspective of professionals. *Research, Society and Development*, 11(5), e9611527864. <https://doi.org/10.33448/rsd-v11i5.27864>.
- [21]. Moreira, S. G. (2019). Best practices to reduce cost deviations and delays in civil construction projects. *Revista Eletrônica Produção & Engenharia*, 9(2), 754–763.
- [22]. Boeriz, T. A., & Gonçalves Filho, M. (2021). Quality management in waste prevention at a civil construction site. *Brazilian Journal of Production Engineering*, 7(3), 71–84. <https://periodicos.ufes.br/bjpe/article/view/35827>.
- [23]. Dornelles, N. F., Lemes, M. E. A., & Nunan, C. S. (2021). Sourcing 4.0: A case study on the challenges of implementing electronic supplier management in a steel company. *XLI Encontro Nacional De Engenharia De Produção, Foz do Iguaçu*.
- [24]. Bezerra, R. R. R., Mendes, B. G. R., Melo, A. C. S., & Castro, G. S. (2020). Proposal of a methodology for evaluation and selection of suppliers in a timber industry: An approach based on Analytic Hierarchy Process. *XL Encontro Nacional de Engenharia de Produção, Foz do Iguaçu*.
- [25]. Araujo Junior, C. A., & Silva, R. F. (2022). Lean construction philosophy for reducing losses of ready-mixed concrete applied in a project in the city of Paulista – PE. Instituto Federal de Pernambuco. Retrieved from <https://repositorio.ifpe.edu.br/xmlui/bitstream/handle/123456789/943/Filosofia%20lean%20construction%20para%20redu%C3%A7%C3%A3o%20de%20perdas%20de%20concreto%20usado%20aplicada%20em%20uma%20obra%20na%20cidade%20de%20Paulista%20E2%80%93%20PE.pdf?sequence=1&isAllowed=y>.
- [26]. Azevedo, C. D. (2022). Knowledge management and lessons learned in civil construction: A case study. Retrieved from <https://repositorio.ufpe.br/bitstream/123456789/48603/1/DISSERTA%C3%87%C3%83O%20Clarissa%20Dalia%20de%20Azevedo.pdf>.
- [27]. Menezes, L. L. F., & Marinho, F. J. E. (2023). Lean construction: The use of quality management through the implementation of planning and control tools in civil construction. *Revista FT*, 28(128). Retrieved from <https://revistaft.com.br/construcao-enxuta-o-uso-da-gestao-da-qualidade-atraves-da-implementacao-de-ferramentas-de-planejamento-e-controle-na-construcao-civil-2/>.