

The Aim of Primary and Secondary Sources in International Supply Chain Selection Process

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Abstract

The role of supply logistics has become increasingly important over the years in meeting customer requirements. In supply logistics, supplier selection is one of the most important tasks. In modern companies it is evaluated as a critical factor to be successful in competition conditions, starting with purchasing of raw material which is the first step, ending with delivering the products. As a main objective in the supplier selection problem, we find the strengthening of the relations between suppliers and buyers, in the long run, respecting the principles of optimizing the supply costs and maximally reducing the risks involved. The aims of the paper are to study the theoretical concepts of supply logistics process and the aspects of raw materials supplier selection and to integrate them at the practical level through analyzing a relatable study case. Methodology includes several economic methods: logical methods (analysis and synthesis), quantitative and qualitative methods, modelling.

Key words: supply logistics, global trade, supply chain management, criteria of suppliers' selection, supply-delivery

J.E.L. classification: M21, F14

1. Introduction

Logistics represents an essential area of modern company's activity. In fact, in the last 15-20 years, more and more reference is made to the term logistics, its field registering truly spectacular mutations (Adeinat & Ventura, 2015). All these changes that are reflected both from a practical and conceptual point of view materialize at the level of the entire internal logistics system, starting from basic functions and ending with the specific operations that ensure added value in the supply-delivery system.

The supply chains of some industries are becoming more and more complex, and the flows of materials that are slipping into them are becoming more and more voluminous, as conclude other researchers (Chamodrakas, et.al. 2010; Lee et.al. 2009; Mithat, et.al. 2011; Segura & Maroto, 2017). Due to the globalization of markets, industrial and business markets also receive more or less commercial markets. Thereby, new ways of gaining or maintaining the customers are developed. The main direction is to reduce costs through progressive enterprise management systems and through long-term socio-economic sustainability and environmental protection (Aksoy & Ozturk, 2011).

These systems should meet the requirements of flexibility, stability, resilience and security, in connection with the development of the contemporary supply chain (Bowersox & Closs, 2010). The important part of the management systems of the information enterprise is, in the context of the development of the current supply chain, the integrated logistics management system.

2. Literature review

Supply logistics is the management of material flows in the process of providing the enterprise with raw material resources (Amin et.al., 2011, p.335). The purpose of supply logistics is to meet production needs with raw materials at minimum costs (Bulat & Ciaikovskii, 2020, p. 69). The objective of supply logistics is to ensure the complete, complex and timely provision of the economic unit with material resources at the established place and term.

Supply logistics can be divided according to its forms of realization (Chai, 2012, p.452):

- *Direct supply* represents the partnership relations formed directly with the supplier of raw materials, involving making payments and transfer of material resources from supplier to consumer directly.

- *Indirect supply* represents the partnership relations that involves working with one or more intermediaries (subcontractors, agents, retailers, etc.) in order to provide the material resources required by the consumers. (figure 1, annexes)

The tasks of supply logistics are (Zymonik, 2019, p.277):

1. Respect the schedule of purchasing raw materials. If the delivery is done before term maintenance, it involves additional costs and the delay could disrupt the production process.

2. Respect the balance between quantity delivered and the required production process - incorrect calculation of the optimum volume of purchases causes difficulties in organizing production.

3. Guarantee the quality in the supply process of raw materials.

Supply logistics performs the following functions:

- Adopting strategies for purchasing raw materials and forecasting their demand;
- Evaluation and selection of suppliers;
- Adopting acquisition stock management strategies;
- Negotiating prices and fulfilling procurement contracts;
- Quality control of the maintenance of the supply and maintenance of raw materials in the production till their use.

The problem of supplier selection is a process by which economic entities identify, evaluate and contract with suppliers at optimal cost. The selection of the supplier depends on various criteria, including there are several methods for evaluating them, since there is no standard of this process (Rezaei & Ortt, 2013, p. 79). Each selection method is different, which allows a multi-criteria analysis of the selection values taking into account the price, the quality of the product, the delivery conditions, the conditions of transport, etc. Respectively, it is important to know what method should be used in different situations.

Supplier selection methods can be classified into quantitative and qualitative:

• Quantitative research combines mathematical and statistical tools to assess strengths and weaknesses. Quantitative studies involve collecting data in numerical form to quantify the size of the problem so that we can obtain classified and measured quantities in concrete units. As a rule, samples are used on the basis of which hypotheses with a degree of probability are established.

• Qualitative methods refer to tools for representation and systematization of results, as well as brainstorming techniques or other alternative solutions. Qualitative research has a representative character and is used to clarify alternative situations in the representation of the proposed solutions. The usefulness of qualitative methods is to determine the depth and extent of phenomena, as well as the importance of phenomena associated with the problem of supplier selection. The method involves a high level of subjectivity, based on the situation in which the researcher is directly involved in the process.

Quantitative methods are usually more structured than qualitative ones (Büyüközkan & Göçer, 2017, p. 2228). In the literature, both methods are used in an integrated way to generate solutions to the problem of supplier selection. These methods generate indicators of the effectiveness of procurement decisions and systematically implement the decision-making mechanism.

A great importance on the fulfillment of the task of supplier selection have the contracts already signed, based on which the statistics of the selection criteria are established (Bulat, 2020a, p.69). Accordingly, the control system of contract compliance has the ability to store information needed

to assess supplier and establish a final rating. In order to establish the rating of a supplier, it is necessary to establish, firstly, what are the basic criteria for evaluating suppliers.

The criteria of selecting supplier that usually are taken into account (Bulat, 2020b, p.35):

- *Quality* – the ability of meeting quality features (material, size, design, durability), variety, production quality (lines, techniques machinery) and continuous improvement;
- *Delivery safety* – the ability of meeting delivery schedules, terms of delivery, returns management;
- *Price level* – unit price, pricing terms, exchange rates, taxes, discounts;
- *Performance history* – the past experiences in the financial, economic, social, organizational area;
- *Financial position* – the status of financial well-being, current balances of assets, liabilities, equity of the supplier;
- *Production facilities and capacity* – the volume, assortments of products or services;
- *Communication system* – the level of providing the exchange of information between the supplier and the firm (progress data of orders, flexibility);
- *Management and organization* – the reputability of the management team and the efficiency of their decision making process and dealing with issues.
- *Procedural compliance* – the ability to follow all the requirements (conditions of payments, repair services, professionalism, etc.);
- *Reputation and position in industry* – a ranking of the brand, product, company comparing to its competitors in the same industry;
- *Reliability* – the quality of being trustworthy and dependable on the buyers’ feedback, financial stability, past and current partners, cultural awareness, etc.

3. Research methodology

The study analyzes the efficiency of supply logistics in order to achieve the main propose of supply selection criteria. The presented data are based on the concrete aspects taken from official sources of the 47th Parallel LLC company (the subsidiary of Moldova, Republic of) and specialized bibliography. For research, were used the methods of analysis and synthesis, of comparison, statistical method.

4. Findings

In the literature we can find numerous criteria for selecting suppliers and each economic entity must individually determine the criteria that best meet its expectations from suppliers (Hamed and Brard, 2019). The general tendency is to create a greater complexity in the field of determining the selection criteria, taking into mind the realities of the social, political and economic environment in meeting the requirements of consumers, respecting the quality criteria, delivery conditions, costs and adjacent services. Contracting more suppliers offers more considerable flexibility due to the diversification of the offer of products and services, which favors the development of a healthy environment of competitiveness between alternative suppliers.

The joint venture 47th Parallel LLC owns the supermarket network “Nr.1” from the Republic of Moldova. The company was registered on 10.01.2011.

The main objects of its activity are:

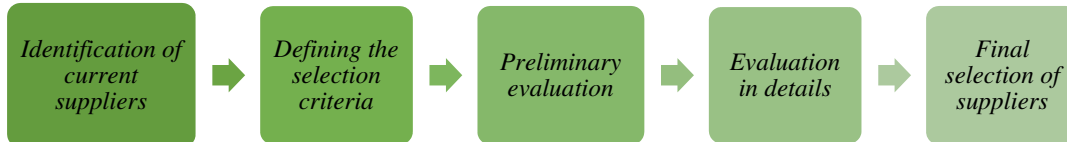
- 1) Retail sale in non-specialized stores with food, beverages or tobacco predominating
- 2) Wholesale in non-specialized stores with food, beverages and tobacco products
- 3) Retail trade in stands and markets
- 4) Wholesale of raw agricultural products and live animals
- 5) Retail sale of alcoholic beverages and other beverages
- 6) Retail sale of tobacco products
- 7) Other services rendered to enterprises
- 8) Restaurants and Bars
- 9) Canteens and ready food sales

10) Wholesale of non-food consumer goods

The supply of 47th Parallel LLC aims to meet these conditions and offers customers a wide range of high quality products and services.

Inventories are inventoried at the beginning of each week. Based on the existing stocks in the warehouse and following the analysis of consumer behavior and sales history in the previous period, the quantities to be purchased are established for each product category, after which orders are placed with suppliers. The suppliers are to bring the goods to the supermarket warehouses the next day, between 12.00 and 15.00. The goods are received, the transport documents and invoices are checked, the products are checked qualitatively and quantitatively, and the goods receipt documents are signed. At the same time, an entry-receipt note is drawn up and the differences are found if they exist.

Figure no. 1. Supplier's selection process



Source: Designed by authors

Storage is a very important activity that ensures continuity and efficiency of business. In the case of 47th Parallel LLC the establishment of stocks helps to respond promptly to the requirements and needs of consumers, so the satisfied demand will increase, by the fact that the product is available when the customer wants it. The purchased products are stored in the warehouses of the supermarkets, which has an area of approximately 60 square meters. Also, the storage is static, using shelving with light shelves, and is done vertically. In the warehouse, the products are constantly checked from a qualitative point of view, taking all measures of the storage conditions and promptly remedy any technical problems.

For stock control, the company 47th Parallel LLC uses the JIT (Just in Time) method, whose purpose is to maintain the required amount of material in the right place, at the right time in order to guarantee the right amount of products in the warehouses.

The main features of the JIT method applied at 47th Parallel LLC company are the following:

- Close relations with a small number of suppliers and carriers;
- Sharing information by customers and suppliers;
- High frequency of buying and transporting small quantities
- Removing uncertainty in the supply / delivery channel, whenever possible;
- High quality objectives.

The 47th Parallel LLC company also uses the FIFO (First in, First out) method. At the same time, the record of the validity terms is kept, but also of the sales and inventory flow, so that when the minimum stock limit is reached, a new order is placed to the suppliers.

At the level of firm, inventory management is the most important logistics activity and the one that raises certain problems at the management level, due to the current lack of an efficient management system. It ensures that the needs for monitoring and information related to the physical flow of goods stored within the unit are met. It also allows the prompt resolution of customer requirements, by the permanent existence in storage of a certain quantity of products for each category.

At this enterprise, the management of stocks is established by the decision of the Administrator of the enterprise. Within the management process, the following operations take place: reception of documents, preparation of accounting documents according to the type of management, release from management, inventory, process of information.

Within the 47th Parallel LLC company, daily, weekly and monthly stock analysis are performed, as well as periodic inventories. Daily and weekly stock analysis are mainly carried out on finished products to ensure optimal manufacturing planning based on sales estimates. Monthly stock levels are reported on all product categories, especially on raw materials, materials and finished products, on each product range.

The product categories for which the supply is made are: beverages, food, cosmetics products, household products, crockery, flowers.

The act of choosing suppliers is based on a series of selection criteria, such as: price levels, delivery conditions, market position, conditions of payment, product quality, flexibility and openness to negotiation, financial condition and managerial organization.

Further, we will consider analyzing a study case on the example of 47th Parallel LLC at the level of which we present *the best optimal decision of the supplier selection problem*, according to *evaluation of the suppliers rating*.

Table no. 1: Evaluation of the suppliers rating at the 47th Parallel LLC company.

Criteria of evaluation	Importance weight of criteria (W)	Initial data (d)			Evaluation rating (R)		
		S1 (extern source)	S2 (regional source)	S3 (local source)	S1	S2	S3
1. Delivery safety	0.25	9	9	8	2.25	2.25	2.0
2. Price levels	0.15	5	4	3	0.75	0.6	0.45
3. Quality of products	0.13	4	7	6	0.52	0.91	0.78
4. Conditions of payment	0.13	7	1	2	0.91	0.13	0.26
5. Assortment of products	0.1	3	2	7	0.3	0.2	0.7
6. Additional delivery	0.07	6	3	4	0.42	0.21	0.28
7. Financial condition	0.07	8	5	3	0.56	0.35	0.21
8. Image on the market	0.05	5	4	2	0.25	0.2	0.1
9. Managerial element	0.05	4	3	1	0.2	0.15	0.05
TOTAL (T)	1	-	-	-	6.16	5.0	4.83

Source: The 47th Parallel LLC company

According to the method, firstly, it was distributed the importance weight of each selection criteria at this company so that when summing the data to obtain the value 1. Secondly, it was calculated the evaluation rating of each criterion on each supplier.

It could be concluding that the supplier S1 is the best optimal decision for providing raw materials at the warehouse of 47th Parallel LLC because it has the best rating of 6.16 in comparison to the supplier S2 (5.0) and the supplier S3 (4.83).

The guarantee of the dynamic development of the network of stores "Nr.1" owned by the company 47th Parallel LLC is based on relationships with partners, honesty and trust. For 20 years of activity of the company, good relationships have been established with responsible suppliers, partners have been selected that fully meet the requirements and standards of the company. This approach allowed 47th Parallel LLC to develop and follow a flexible retail pricing policy, achieving a considerable increase in turnover and, as a result, a strong economic performance.

The success of the enterprise 47th Parallel LLC is attributed to the mutually beneficial relations with the suppliers of the enterprise. A good example of this is the fact that 47th Parallel LLC shares a long-term partnership with most companies that provide goods for the network "Nr.1". The 47th Parallel LLC is always open for new partnerships with suppliers able to ensure the necessary volume of quality products at optimal prices and reasonable conditions.

The 47th Parallel LLC considers efficient those product suppliers with which a close collaboration is established from all aspects of the supply chain, in order to cover the needs and expectations of current and future markets and customers. The 47th Parallel LLC carries out relevant activities, focused on strengthening partnerships with such suppliers.

The 47th Parallel LLC requires from their suppliers to be proactive, ready to change their way of thinking and working and to be interested in looking for more efficient solutions. It is important that the supplier adopts a long-term strategy that defines the objectives to be achieved, the paths to be followed and the required resources.

Sales professionals often say that "every company has the suppliers it deserves." Supplier performance reflects how customers treat the supplier and the grade of fulfilling the expectations of buyers towards the suppliers. As a result of the process of choosing the supplier, the company 47th Parallel LLC goes through five specific stages. (figure 3, annexes)

At the moment, the 47th Parallel LLC company has stable suppliers from Russia, Italy, Germany, Poland, Ukraine, Greece, the Netherlands, Austria, Belarus, Romania.

In order to accumulate information regarding the suppliers, the company 47th Parallel LLC uses primary and secondary sources.

Estimate the rating of suppliers from: primary source (S1) and secondary source (S2) according to the following criteria: price (0.5); quality (0.3); security of deliveries (0.2); who delivered products A and B, if known the following informations:

Table no. 2. Dynamics of prices, rejections and delivery delays of suppliers S1 and S2

Period	Supplier	Product	Delivered volume Unit/month	Price eur/unit	Nr.of rejections, unit	Nr.of orders	Total retentions, days
1 st period	S1	A	2000 1000	10 5	89	8	28
	S2	B	9000 6000	9 4	555	10	45
2 nd period	S1	A	1200 1200	11 6	69	7	35
	S2	B	7000 10000	10 6	564	12	36

Source: The 47th Parallel LLC company

1. Estimating the rate of price increase. For the evaluation of suppliers according to the criterion price, the average rate of price increase for each supplier shall be calculated after formula:

$$Tp = Tpi \times \delta_i; \quad (1)$$

where:

Tp - average rate of price increase;

Tpi - rate of increase in the price of product i ;

δ_i - share of the product i and of the total orders delivered;

n - number of types of products delivered.

The rate of price increase of the product is calculated according to the formula:

$$Tpi = \frac{Pi1}{Pi0} \times 100\%; \quad (2)$$

where:

Pi_0 - price of the product i in the previous period;

Pi_1 - price of the product i in the current period.

Share of the product I from the total orders delivered is calculated according to the formula:

$$\delta_i = \frac{Si}{\sum Si}; \quad (3)$$

where:

Si - total cost of the product delivered.

Using these formulas, determine for S1:

Tpi_A = - rate of increase of product A: 110%

Tpi_B = - rate of increase of product B: 120%

δ_{i_A} - share of product A from the total orders delivered: 0.60

δ_{i_B} - share of product B from the total orders delivered: 0.40

Tp_{S1} - average rate of price increase for S1:113.5 %

According to the same methodology, the average rate of price increase for S2 is calculated:

Tpi_A - rate of increase of product A: 110%

Tpi_B - rate of increase of product B: 120%

δ_{i_A} - share of product A from the total orders delivered: 0.60

δ_{i_B} - share of product B from the total orders delivered: 0.40

Tp_{S1} - average rate of price increase for S1:127.83 %

It could be concluding that according to the criterion price,supplier S1 has priority because registered an average rate of price increase lower than supplier S2 (113,5%<127,83).

2. Estimation of the rate of increase of rejections. For the evaluation of suppliers' after quality criterion, the rate of increase of rejections is calculated for each supplier, by formula:

$$T_q = \frac{\delta r_1}{\delta r_0} \times 100\%; \quad (4)$$

where:

δr_1 - share of rejections from the total product delivered in the current period;

δr_0 - share of rejections from the total product delivered in the previous period;

Using the input informations of the problem, determine the share of rejections in the total of the product delivered for each period, structuring the informations in a table:

Table no. 3. Estimation of the share of registered rejections

Period	Supplier	Total delivered volume, Unit/month	Share of rejections from the total volume,%
1 st period	S1	3000	2,96
	S2	15000	3,70
2 nd period	S1	2400	2,90
	S2	17000	3,32

Source: The 47th Parallel LLC company

Determine the rate of increase of rejections for S1: $Tq_{S1} = 97.97 \%$

Determine the rate of increase of rejections for S2: $Tq_{S2} = 89,73 \%$

It could be concluding that according to the criterion quality , supplier S2 has priority because registered a rate of increase of rejections lower than supplier S1.

3. Estimation of the frequency of delays. For the evaluation of suppliers after the criterion of security of deliveries,is calculate the rate of increase of the average retentions of an order, for each supplier, according to the formula:

$$T_R = \frac{R_1}{R_0} \times 100\%; \quad (5)$$

where:

R_1 - average retention of an order in the current period;

R_0 - average retention of an order in the previous period.

Using this formula, determine:

$T_{RF1} = 142.86\%$ - rate of increase of the average retentions for S1:

$T_{RF2} = 66.67\%$ - rate of increase of the average retentions for S2:

It could be concluding that according to the criterion security of deliveries, supplier S2 has priority because registered a rate of increase of the average retentions lower than S1.

4. Estimation of the rating of suppliers S1 and S2. The informations obtained in points 1-3 are structures in a table based on which the rating of suppliers is determined:

Table no. 5. Rating estimation for suppliers S1 and S2

Selection criteria	Share criterion	Criterion evaluation		Product estimation	
		S1	S2	S1	S2
Price, T_p	0,5	113.5	127.8	56.8	63.9
Product quality, T_q	0,3	97.97	89.73	29.39	26.91
Security of deliveries, T_R	0,2	142.86	66.67	28.57	13.33
Total	1,00	-	-	114.8	104.14

Source: The 47th Parallel LLC company

It could be concluding that this method analyzes the increase dynamics of the negative characteristics of suppliers. Thus, priority will be given to the S2 supplier that has registered the lowest rating of negative characteristics then S1.

Primary sources within the organization are considered specialists in the field of production, sales force, technical staff, design engineers, etc.

Secondary sources within the organization offer the possibility to obtain information quickly and at minimal cost. This category includes: databases created within the organization, related to suppliers (which contain files about current suppliers, suppliers approved by the company, suppliers rejected in previous evaluations, etc.); internal notes; company publication.

Primary sources outside the organization are as follows:

- *Exhibitions.* For 47th Parallel LLC represents the possibility to compare the offers of different competing suppliers and to discuss with the representatives of the selling companies. The catalogs of specialized exhibitions provide details about the main suppliers in a certain field and constitute a reference element for the specialists responsible for purchasing.
- *Sales agents.* Their framing in the category of primary sources is determined by the fact that the sales agents of the supplier companies know very well the products and after-sales services of the company they represent. In addition, they possess valuable information on the offer of competing suppliers, their strengths and limits.
- *Purchasing agencies.* A potential informal source is professionals from other companies, who are responsible for the purchasing activity. They have the advantage that they can direct efforts to identify suppliers in the right direction.
- *Specialized companies.* The necessary information can be obtained on a commercial basis, with the help of specialized companies. For example, for foreign markets, Dun and Bradstreet provides product identification and credit check services to potential suppliers.
- *Potential suppliers.* Current and accurate information can be obtained directly from possible suppliers. To purchase a new product, you can also contact the company's current suppliers, from whom it already buys a number of necessary products.

Secondary sources outside the organization. Depending on its objectives and purchasing strategy, the company 47th Parallel LLC also uses the sources related to the internal market:

- *Producers' own catalogs.* The information presented refers to the company and its offer. Some catalogs contain detailed technical information. Suppliers create either a compact catalog, which includes their entire offer, or a series of separate, individualized catalogs for each line of goods or services.
- *Company directories.* In the case of new products, occasional orders or urgently needed products, existing suppliers on the market is obtained from sources specifically published for this purpose. The data presented in the directories are very general, these sources being used as a starting point in any research on the identification of potential suppliers.
- *Specialized publications.* Articles in specialized journals are used as a source of information about new products appearing on the domestic and world market, the existence of substitute materials, trends in the supply market, the performance of companies and their hierarchy.
- *Databases.* 47th Parallel LLC uses online databases, because they contain up-to-date information and allow a more efficient use of the space previously used for large reference collections.

A correct interpretation of these “situations”, characteristic to the supply market, represents the basis of conceiving an appropriate procurement strategy, which takes into account the hypothetical reactions of the opponents (competitive suppliers or buyers, depending on the case). Failure to take such situations into account, as well as non-compliance with the principles of action and analysis in the elaboration of strategies in material supply, all these can later lead to the formation of the “feeling of dissatisfaction in the purchase of resources”.

5. Conclusions

The basic concepts of supply logistics help in explaining the strategic role of the enterprise supply department: establish the form of realization of supplying, ensure the need for material resources in the short, medium and long term, provide information on the characteristics of market demand and supply through fulfilling the tasks and functions of supply.

The solutions obtained in the problem of supplier selection offer us opportunities and perspectives for allocating resources, reducing the risks associated with the acquisition and minimizing costs by optimizing the time, financial resources and effort made. Each assessment in the issue of supplier selection is very flexible, starting from the existing alternative situation. Due to the diversity of the suppliers' offer, we cannot identify a single way of selecting the supplier. Therefore, the analysis of possible positive and negative phenomena assessed within suppliers allows to strengthen long-term relationships to ensure a sustainable development of partnership with suppliers.

The supply activity within the 47th Parallel LLC is carried out weekly, following a preliminary analysis of the stocks and following each stage of the receipt of the goods. The logistics within the company 47th Parallel LLC includes several categories of services, being closely related to the main activities of the company: services related to the supply activity; services related to the storage activity, the logistical activities in this category referring to the actual storage and inventory management; services related to transport activities.

Analyzing the elements of the supply activity of the company 47th Parallel LLC, we notice that the company is supplied from multiple sources that ensures the high quality of this process. This also reflects their willingness to invest enough resources for a vast research on the market through hiring specialists in the area and exploring their own collected information. We can mention that the company 47th Parallel LLC uses the method of direct supply from providers that ensures the quality of the products supplied and a long-term collaboration.

On the example of 47th Parallel LLC, the supplier selection final decision is directly depending on the criteria of evaluation and the methods used. The methods chosen are extremely important to the overall selection process and can have a remarkable influence on the selection results. Then, with those set criteria, the company is able to make a ranking and draw conclusions in order to find the best supplier, according to their economic situations.

Taking into account the high dependence of economic entities on the procurement process, we can conclude that the issue of supplier selection is one of strategic level for organizational development. It is essential to be aware that the good solution to the problem of supplier selection can make a strategic difference in improving the ability to meet the needs of consumers by identifying new and creative ways of selecting suppliers.

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