

## **Analysis And Evaluation Of A Project Of Technological Innovation For The Transport of Petrochemical Bulk Resins via Model Rail**

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### **Abstract**

*The changes that are occurring in all areas, forcing organizations to fit the constant search for new ways to plan and conduct business. An organization must be prepared to pursue new ideas, products, markets, and ways of accomplishing tasks, creating an environment that encourages new developments and allows ideas and concepts that might turn into future business. As for distribution of petrochemical resins in bulk form in Brazil, we see the need to check the possibility of new alternatives for optimizing the processes, and therefore the competitiveness of companies. Thus, this study aims to verify the feasibility of using aluminum containers in the distribution of petrochemical resins in bulk form in Brazil. Issues on competitiveness logistics, project analysis and the theory of real cases have been discussed in order to provide the study with theoretical basis. The study was carried out in two steps: the first one a market research was performed through interviews with those responsible for logistics companies that took part in the research, and the second step consisted of the calculation of economic and financial indicators for the implementation of the project to build containers for an aluminum company located in Caxias do Sul. Thus, we can conclude that through market research and the calculation of the economic and financial viability for the Alfa. It is feasible to implement the project of manufacturing of aluminum container.*

**Key words:** *Viability, indicators, logistics, petrochemical resins, container*

## 1. Introduction

The business world is currently being treated by a greater tendency to increasing global competition, which has provided a period of great uncertainty for companies (Amran, Kulatilaka, 2000). The convergence of these factors, according to these authors, has encouraged the pursuit of strategic frameworks and tools that can help administrators to assess the opportunities and faced with uncertainty.

According to Fleury, et al (2003), globalization of business is providing a large increase in the rate of change in the production of goods and services, and in designing and implementing innovations. For these authors, the projects technological innovation have their own characteristics, and often difficult monetary quantification, therefore, require specific procedures and suitable for the correct economic assessment.

With regard logistics, organizations increasingly need to develop this functional area for competitive advantage (Arnold, 1999). According to Ballou (1995), transport represents the most important element of logistics costs in most companies.

Therefore, this study seeks to verify the feasibility of using a new for transport of petrochemical resins. The intention with this is to identify ways to optimize the logistics process in organizations working with resins petrochemical bulk.

With the economic changes in recent times, as the process of globalization, have forced business organizations to adapt continuously to meet the challenges of remaining in a competitive market. This requires special attention to the proper planning of the companies involved in activities production process in order to improve the flow and allocation of information, materials and people, and satisfactorily meet the demand for their products and become competitive (Mintzberg, 1993).

With such frequent changes that are occurring in the business world, the competitive capacity of enterprises constitutes a fundamental element in determination of its future performance, making the same conduct frequent revaluations of market trends and a thorough knowledge and its positioning in this market.

For Ferraz, et al (1995), "competitiveness is the ability/competence of the company to formulate and implement competitive strategies, which enable it to expand or maintain, a lasting, sustainable position in a market environment in their operation.

Harrison and Hoek (2003) define strategic management of logistics and procurement, handling and storage of stocks of materials, parts and finished products and their flow of information throughout the organization and its marketing channels in so that current and future profitability is maximized through the execution of requests purchase effectively in terms of cost.

Thus, by managing logistics, companies or regions may provide a source of competitive advantage, ie a position of superiority lasting over competitors in terms of customer preference.

So to meet the needs of customers seeking their satisfaction and still be profitable, Lambert, et al. (1998) says "the efficient administration of the logistics effort complements marketing company, providing an effective product direction and customer placing the product in the right place at the right time ", thus have a differential provision of services in the market.

Transportation is the means by which inventories are moved along the various stages of a supply chain. This has a strong influence on the level of services and efficiency in the supply chain.

The option for faster shipping reduces the time delivery and quantities resupply, but increases the cost of shipping. Transportation also affects the inventory levels and location of facilities in the chain of supplies (Chopra, Meindl, 2003).

According to Ballou (1995), transport is a primary activity, as are primary importance to the achievement of the objectives of logistics cost and service level. These key activities are in addition to transportation, inventory maintenance and processing applications.

Transport for most companies is the most important logistics activities simply because it absorbs, on average, a two-thirds of logistics costs. It is essential, because no modern company can operate without providing the movement of their raw materials or finished products of his somehow (Chopra, Meindl, 2003).

Considering the evaluation of a project through a systemic analysis (Senge, 1990), notes that the feasibility study for a project should not only consider the strictly financial assessment, but also focus on an operational assessment and marketing of the enterprise.

In this context, understanding the business prospective is through the analysis of interactions between its components, ie, the system as a whole.

For Etzioni (1993, p. 35) "an organizational goal is a desired situation that company seeks to achieve ", ie refers to desired positions to be achieved in over the years and anticipate changes in the external environment using the existing strengths and remedying the weaknesses of the company.

For Drucker (1994) is considered a technological innovation that can change change or create a new product, process or service.

When the organization adapts, or changes the way that produces or produce or even the way in bringing this product to the consumer, it is innovating. However, the Innovation is not just a reactive nature. It can arise from within the organization through an analysis of the market need, but will always have as a guideline, or limiting the organizational strategy (Rothberg, 1976; Tidd, 1997).

With the latest technological research in logistics is expected to increase revenue and reduce costs (Kobayaski, 2000).

## **2. Materials And Methods**

This research is characterized as a qualitative and quantitative research, research qualitative in order to enable a better understanding and comprehension of the phenomenon analyzed in the present case to verify the feasibility of using a new product to transportation of petrochemical resins in bulk form in Brazil.

In this work we used the case study, which is characterized by a type of research whose object is a unit that is deeply analyzed (Tripodi et al., 1975). According to Yin (1994), the option of multiple case study as research strategy is justified when the study focuses on the scope of decisions, that is, trying to explain why decisions were made, they were implemented and what results.

## **3. Results And Discussion**

### *3.1 Market Research*

Of the companies surveyed, 50% have in their distribution companies of petrochemical resins in bulk truck, big bags to their customers, 25% of surveyed firms carry out the distribution through an operation of five 20-foot container per month to Manaus - AM in Seabulk, and the remaining 25% of companies do not buy container, for m when you need to rent equipment.

Data analysis shows that (50%) have a project for implementation for the new product in a short period of time (up to 06 months).

Of the companies surveyed (25%) if they need to use the new products will use the method of rent, and (25%) still have not study design for the new product.

Data analysis shows that the quality, price, payment terms, credit lines, business and market coverage are the attributes with the highest rating, representing 100%, followed by technology and services representing 80% after the brand represents 60 % and the sequence is the delivery and design with 40%, 20%.

Observing the average score given to the attributes shows that the quality, price and technology are extremely important attributes, followed by the attributes line of credit, trade and market coverage and service delivery considered very important. The other attributes, such as payment terms, and design are important.

### 3.2 Analysis of economic viability and financial

To calculate the economic feasibility analysis, we used data from the Alfa, it will be so treated for strategic reasons, located more than 40 years in the state of Rio Grande do Sul, has been investing in technology to ensure a high standard of quality , trying to meet the needs of its customers, both in Brazil and other South American countries. The company operates in the mineral water, food, chemical, pharmaceutical, beverages, tanks, roads and special projects.

Specializing in the manufacture of carbon steel, stainless steel and aluminum, its team of employees is trained to produce high quality and durability, always aiming at total customer satisfaction.

Certified quality system ISO 9001, using specific software for calculations of pressure vessels, lids, tanks and agitation systems. This software issues reports with all dimensions and volumetric tanks, drawings and development of weight lifting plates.

Allows calculations used most of the agitators in the market for both laminar and turbulent regimes, and perform extrapolations of prototype test equipment to industrial scale. We use a 3D CAD software to develop engineering projects, focused on meeting all project phases.

With this technology, the Alfa has the ability to stay one step ahead, reviewing with the client the best design of equipment to meet their needs. Possessing resource for advanced part modeling, motion simulation and automatic generation of 2D detailing, assists in creating highly targeted equipment needs of its customers.

The Alpha company started its activities for more than 40 years, having built its own facilities with an area of around 5,000 m<sup>2</sup> and number of employees around professionals.

Were considered for the project development (new product), which for strategic reasons his name is not yet defined, the following information:

- a) estimated weight for the new product 20': 1,200 Kg;
- b) estimated weight for the new product 40': 2,550 Kg;
- c) made of aluminum profiles;
- d) investment in fixtures and devices;
- e) estimated prices with taxes;
- f) estimated costs are 80% for raw - material and 20% for the hand - to - work;
- g) production capacity is 01 products of 20 'and 01 40' per day;
- h) projection of the capacity of market penetration for the product of 20 feet and 40 feet will be as follows:

- First Year: 15%;
- Second Year: 30%;
- Third Year: 50%;
- Fourth Year: 50%.

Thus, based on data from the Alpha Company and information obtained through questionnaires in the companies surveyed, the rates were calculated to analyze the economic feasibility of production of the new product.

The annual demand expected in the first year is 300 units 20 units 75 feet and 40 feet, remaining a constant demand for the next three years from 250 units to 20 units and 75 feet to 40 feet.

For the projection of the capacity of market penetration, we define for the first year a market - share of 15% for the second year 30% for the third year and fourth year raising the stake to 50%.

The projection of prices that if you want to play the market with all taxes, included \$ 156,000.00 to is the product of 20 feet and \$ 242,400,00 to 40 feet of the product.

### 3.3 Analysis of returns of the Project

Every investment requires a return to be determined by the applicator, which must be equip to evaluate which option is the value or index that suits you.

In this study the methods of analysis of investment projects were: Net Present Value (NPV), Internal Rate of Return (IRR) and Payback, as they are the methods most often used to illustrate an analysis of an investment project.

### 3.4 Internal Rate of Return

Internal Rate of Return is the interest rate that makes zero net present value of the project, ie, an interest rate where revenues and expenses are equal. In this project, the internal rate of return is 227.59%.

### 3.5 The Payback

The payback is characterized by simplicity and because of the time in which capital will be recovered, that this project will be 2 years.

### 3.6 The break-even point

The break-even point is the point where total revenues are equal to total costs (considering the structural costs). The break in values is the total amount of fixed expenses, divided by the% of contribution margin, this case will be 30% contribution margin.

### 3.7 Identification of the operational benefits provided by new product

Based on the responses of the companies surveyed can identify the operational benefits provided by new products.

- a) the use of the new product can optimize the distribution of petrochemical resins in bulk form in Brazil;
- b) there is interest from petrochemicals.

Thus, the analysis of the results shows that there is market for new product capacity of 20 and 40 feet and the potential for product development capabilities to 30 feet with 25 tons of resin.

## 4. Final Cosideration

Organizations need to qualify to win the rapid changes imposed on them. Among the more generic qualifications are the ability to work faster and be more flexible, creating a new product or ordering a new market.

This is in line with the need of organizations to mechanisms of discovery of new opportunities and establishing new products and businesses.

However, evaluating new products and markets is one of the toughest challenges for the organization. It is essential that the organization is a combination of skills to achieve their goals. Successful organizations know that identifying the business potential for their products and services, the identification of new opportunities, is one of the most promising avenues for growth.

Reducing the cycle time of new discovery opportunities that lead to the establishment of new products and business will enable the organization more competitive and increase their survivability in the face of clashes with its main competitors.

Speed is essential to surprise the competition. Success is the ability to sustain speed and provides the impetus to explore the market.

This study addressed the issue analysis and evaluation of a technological innovation project and production management for the transportation of petrochemical resins in bulk via railroad, seeking to identify the possibility of a new product to make the logistics of petrochemical companies located in Brazil, generating new opportunities for the organization, as well as calculation of economic indicators of financial company Alfa.

As mentioned, in business and industry, speed is essential for an organization to survive and prosper in business, competitive and global.

An organization must move quickly and relentlessly, and for this she should be able to identify market opportunities.

The application of market research has proven to be fast to do all necessary to conduct surveys of the expected results, demanding an opportunity for manufacturing and marketing the new product for the transportation of petrochemical resins in Brazil.

It is reinforced not just an organization to identify the most promising opportunities. It will only be able to take advantage of this knowledge when they have the capabilities to exploit them and protect them.

In the market, especially petrochemicals good techniques have evolved quickly and consistently, because in our country in the emergence of the first Brazilian petrochemical logistics and distribution began with 25 kg sacks with good techniques developed for the distribution of petrochemical resins through Big Bags, which are big bags with a capacity of around 1,200 kg and has recently been operating in bulk form, ie, through distribution and logistics trucks and semi - trailer silos road trucks to bring products to customers and store in bins stationary that are installed at the factory on the outside.

The petrochemical market is extremely demanding, competitive and global vision and clear sense of cost savings and revenue opportunities in the logistics process and particularly of scale and market share that values and makes the necessary investments to achieve their goals are in line with the main trends of technological innovations presented and made available to the market.

From what has been exposed so far, it appears that through market research and calculation of economic and financial viability for the company Alfa, which is feasible to implement the project of construction of the new product for the transport of bulk petrochemical resins. Thus, it can be concluded that the feasibility study allows the organization to identify existing opportunities in the petrochemical market to start providing the new product in Brazil, and a proposal for the Alfa.

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