

CREATION OF PROSPECTIVE SCENARIOS FOR THE TRANSPORT OF LOADS THROUGH OF GRUMBACH METHOD**UiliamHahnBiegelmeier****University of Caxias do Sul, Graduate Program in Management
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Caxias do Sul, Brazil****ABSTRACT**

This biographical article related to the creation of prospective scenarios of transport of loads, to Corede region Serra Gaucha. These scenarios provide the subsiduos sector companies to make predictions and swapping competitive strategies aligned with predictions. To achieve the proposed objectives, two surveys were conducted, with experts and other transport undertakings. In the analysis of the data was evidence that various factors impact directly in the operations of transportation companies. PUMA software was used for the construction of the scenarios and predictive statistical techniques to analyze the macroeconomic environment variables.

Keywords: logistics, transport, prospective scenarios.

INTRODUCTION

The Council of Supply Chain Management Professional (2010) defines logistics as part of the process of supply chain management that plans, implements and controls efficiently and effectively the flow and storage of materials and products along with the services and associated information, meeting the needs of the consumer.

Transport activity makes the link between suppliers, industry, distributors and consumers. Ballou (2006) notes that the transportation cost can switch between 30% and 60% total logistics costs. The transport logistic systems has a fundamental role by allowing the flow of materials and products between the distribution channels and still represents a good portion of total logistics costs. It, operationally, has a high complexity.

Organizations are seeking efficiency in the productive sector on the basis of a number of factors such as competitiveness, globalized economy, consumption patterns change, the product life cycle that gradually is reduced. This all brought changes in the system of production, quality and management. Continuing the changes came to the logistics area reaching the supplies, materials and drive finally coming to transport (NOVAES, 2001).

Referring to employees in transport modal National Confederation of transport (CNT) States that the distribution of cargo flows inside of Brazil is divided as follows: 0.4% by air modal; 4.2% by modal dutoviário; 13.6% the waterway modal; 20.7% the rail modal and finally by the road modal expressive

percentage of 61.1% (CNT, 2011). In this context Kato (2005), States that Brazil needs to modernize their fleets in relation to aspects such as: increase security, reduce energy consumption and pollutant emissions and their operating costs.

When it examines the context in which businesses are currently inserted, it turns out that becomes increasingly difficult the development of strategies to ensure their survival in the new globalized society, based on knowledge and technology, where the competitiveness increases more and more, and the volume of information to be monitored grows exponentially (SHIFTAN; KAPLAN; HAKKERT, 2003).

This is happening because the variables that characterize this new society and this new competitive environment generate a very large environmental uncertainty, where the ancient methods of definition of strategies based on trend analysis no longer apply (SHIFTAN; KAPLAN; HAKKERT, 2003). The purpose of this article is to prospect scenarios for the future of road haulage sector loads in Corede Serra, Rio Grande do Sul, in the period from 2013 to 2018.

2. REFERENCIAL TEÓRICO

The use of prospective scenarios in business strategy date of mid-50, with the scenarios developed by Kahn (1969), and in Brazil the first studies date back to the late 80 with the article "alternative scenarios for the Brazilian economy in 1983" published in the journal analysis (BETHLEM, 2002).

2.1 Logistics

Logistics studies how management can provide the best level of profitability in distribution services to customers and consumers through effective planning, organization and control of the procurement activities, storage, handling and distribution aimed at dealing with the planning and control of the flow of materials from suppliers to end users (JONES; HERSTELY; BORGATTI, 1997).

Also the logistics, studying the way the management can improve the profitability of distribution to customers and consumers using for this a planning and control of activities related to the supply, storage, handling and distribution with the purpose of working, planning and controlling transactions of raw materials and finished products (TUCEN, ALPAN, 2010).

The function of logistics system is to ensure that the pre-defined service levels are attained. If they are not achieved, there will be an imbalance in marketing planning, causing a customer dissatisfaction. If the levels are exceeded, this may generate additional costs for the company (HIJJAR, 2001).

Gracht and Darkow (2010) there are some items that enhance the logistics in a sense of greater complexity, as the big growth in the number of products, a life cycle of ever-smaller products, the increase in segmentation of markets, globalization itself and the consequent imposition of services associated with the products.

The broader concept of logistics is to deliver the right product at the right time in the right place, and with lowest possible cost (SILVA NETO, 2004). Says Christopher (2007), that logistics is conceptualized as a process to manage strategically the acquisition, handling and storage of materials, parts and finished products, as well as related information flows, through the Organization of your

marketing channels, so that you can maximize profitability and present and future profitability through attendance of requests at the lowest possible cost (KOPCZAK.1997).

Fawcett, Ellram and Ogden (2007), the supply chain was much more complex, with the most suitable supplier, standing on the other side of the world. For Yin and Dayong (2000), the competition becomes only one company against another company, but rather a supply chain versus supply chain. It is important to insert itself in a more competitive to achieve long-term sustainability.

2.2Transport

Important sector of logistics and economy also is the cargo transport, because producing sources and market League. Initially makes the transport of raw materials and to the distribution of the finished product (SAMSON, 1984). According to the author, some things justify the choice by road transport at the expense of other modes: flexibility and ease of access for places of loading and unloading, shipping door to door (door of producer to consumer port), more streamlined documentation clearance and finally, fast delivery of the product.

Generation of reliability is the factor that triggers the decision to purchase the service. If the customer is sure will receive the contracted service within the agreed time limit surely this factor will unleash new purchases. It supports the sale of services. In this way a kind of service is the transport, because it has a potential to add value to the production chain. This value is from the dimensions of time, place, quantity and better customer service, faster and reliable deliveries and could even eliminate processes that do not generate customer value (NOVAES, 2001).

Jacson (1985) puts relationships between companies and their customers, are usually not long lasting. This is due to the costs of changing supplier of this type of service are not high. The author also States that whenever we change low costs is more difficult to establish formal relations and lasting. On the other hand, Day and Wensley (1983), advocate the differentiation of the service, aiming to enlarge its participation in client and gradually create barriers to entry of competitors, thus obtaining a competitive advantage.

2.3Prospective scenarios

In Porter (1998), the scenario is considered an internally consistent vision of what could be the future in which has great importance for the strategic planning, because the organization facilitates the understanding of uncertainties, especially in the value chain. To Schwartz (2003) the construction of scenarios is considered by the author, a tool so that it can order their perceptions about alternative environments in the future in which the consequences of their decisions will occur.

According to Davis (1998) the scenario is a tool with very large power geared toward the future. Historical scenarios are acceptable, appropriate, and which can offer a choice about the future.

The prospective scenarios do not seek simply hit what will occur in the future, but to create the possibility of elaborating strategies that can be winners regardless of the adverse environment that the

Organization could face. Are projected trends breaks that can generate opportunities or threats (BLOIS et al., 2007).

Second Buarque (2003), studies of scenarios use a set of techniques and processes of systematization and organization of the information and hypotheses. There is a diverse set of techniques used to the process of building scenarios.

The central idea of the prospective analysis to Herrera et al. (1994) is to build a future desirable between the various possible futures options and identify the strategic actions that will be needed to reach the goal of the desired future.

2.4 Método Grumbach

Among the methodologies of study of prospecting, what else fits in this case is the objectives of Grumbach. From 1996, Raul Grumbach developed the method and in Spain conducted studies of prospective scenarios. The method can be considered in a strategy for the elaboration of strategic planning with a vision of the future based on prospective scenarios

The software Pointwise Unconstrained Minimization (PUMA) automates the procedures set forth in each of the phases of the methodology. Here there is also a systemic approach, in which there is an interaction with the environment, because the strategic planning and the prospective scenarios are treated as an open system (ZANETTINI, 2006).

According to Zanettini (2006) the structure of the method has three basic elements. The strategic decision-maker, which determines the realization of the study, the control group that leads the whole process and experts who are people with great to know about the issue at hand and when consulted give its opinion.

The identification of the system characterizes the company along the environment to which it belongs and which actually turns out to direct the strategic planning of the organization. She defines as will be the extent of the system that will be parsed and establishing the time horizon that will be worked. In addition to this, the control group which will be meeting in the brainstorming activity. It can be affirmed that the identification of the system consists in registering in software Puma history, the mission, the critical factors and policies.

A control group will be meeting in brainstorming activities to make a survey of events. This group will be composed of professionals from companies of transport of loads and persons who conduct research in the area (MARCIAL; GRUMBACH, 2002)

Martial and Grumbach (2002) imply that if they adopt three scenarios: the ideal setting, the trend scenario and the scenario most likely to occur. The most likely scenario, among the possible, takes the higher possibility to accomplish the ideal scenario is defined by the strategic decision-maker. Is an evolution of the status quo, until the situation is more convenient to the system. The trend scenario is simply the evolution of the current system, but without occurrence of system rupture. The authors recommend that the minimum method of experts for the development of 7.

A research on the problem of research, it is lifting the endogenous or exogenous variables that affect the system being investigated, i.e., one should look for cause-and-effect relationships for the

observed problem. Then the data tab are held and the identification of potential future events in the system. This step is divided into three sections: understanding, design and evaluation.

As Martial and Grumbach (2005), the number of preliminary events should not be too long, so that the analysis can be carried out so as not to escape the control of the analyst and the experts, still suggest that definitive events numbers should not be higher than the 10 events, due the complexity to analyze, because these generate 1024 scenarios for final analysis (being that the conventional formula for generating scenarios is 2^n , i.e. 2^{10}).

The procedure for calculating the cross-impact matrix is similar to that of Delphi, ie, the experts should assign notes to the influence (Motricity) that the event exerts on the likelihood of occurrence of the other.

The evaluation process ends with the analysis of the scenarios. At the end of the array of cross-impacts, this in turn generates the array of median impacts, which already appears in the note where experts can calculate the degree of dependency and Motricity of the events.

3. METHODOLOGICAL ASPECTS

According to Lakatos and Marconi (2011), this work is characterized as the goals as an exploratory research, being operationalized through a survey. With regard to the processing of data, Gil (2002) quantitative method was used, which according to Roesch (1996) stresses in that search situations in which the goal is to measure relations between variables, which in this case was the creation of scenarios

Sixty (60) managers participated in the research of businesses (small, medium and large) affiliated to the Union of cargo vehicles of Caxias do Sul (SIVECARGA), and seven (7) experts, the segment of the road freight transport chain, which is the minimum number recommended by Grumbach.

The application of the questionnaire was closed when it noted that there was consensus on the answers from the experts. Statistically, it is considered that there was consensus when the difference between the 1st and the 3rd quartile of measure evaluated for each event is less than 25% of its maximum range and the coefficient of variation (CV), which is the quotient between the average and standard deviation is less than 30% (CARDOSO, 2004).

Were drawn two data collection instruments. An instrument for experts, and other instrument for managers of the companies participating in the survey. After the elaboration of these questionnaires were presented to an expert in the field of transport, which suggested modifications, being accepted and implemented. The data collection instrument was a questionnaire with closed and open questions and drawn up in accordance with events that if

The preliminary events that if wanted to quantify are: appreciation of the dollar; fuel price increase; price increase of tolls; increasing the value of freight per kilometer shot; increase in the use of rail transport; theft of cargo vehicles; greater oversight on the scales; modernisation of the fleet; increased profitability in agriculture; delay in the payment of freight; greater use of crawlers; retraction of the world economy; retraction of the economy in Rio Grande do Sul; installation of a larger number of industries; increase in the cost of vehicle maintenance; creation of a cooperative of carriers; change in legislation on the part of businesses and Government; increasing the professionalism of the category; better conservation of federal and state roads; unification of laws on federal and state roads.

4. ANALYSIS OF THE RESULTS

4.1 Identification of positive and negative points that involve the industry dynamics of transport of cargo

These positive and negative points are according to what four of the seven experts said. Strengths: agility and speed in delivery of the commodity in short periods to go; the charging unit comes to the merchandise, while in other modes the goods shall meet the loading unit; sales that provide delivery at the door of the purchaser; the goods can be delivered directly to the client without having to go pick her up; a smaller movement of goods, thus reducing the risk of damage.

.Negative Points: its cost of chartering is more expressive than the other competitors with next characteristics; its ability to traction loads is very low; the vehicles used for traction possess a high degree of pollution to the environment; the roads must be in constant maintenance or construction, generating costs the taxpayer, since there are privatized roads that charge tolls.

4.2 Analysis of the effect of the global crisis on supply and demand in the sector

Considering that the carriage of cargo represents about 63% of the array of national cargo handling, this analysis becomes important. Taking the reference between supply and demand, it can be affirmed that in 1990 there was a vicious cycle for the carriage of cargo.

The offer was higher than the demand, and the barriers to entry were low (low requirement of shippers). The freights had values flattened, generating low investment capacity and fleet maintenance, leading to overweight and about workday, spending back into the high offer of transport and creating barriers of exit, for lack of options or condition on the part of the carrier, often as driver or aggregate.

4.3 Research with companies belonging to the logistics sector of Corede Serra

The vast majority of respondents with 71.5% agree that the regional market is already at the limit of structural capacity, with excess vehicles and lack of infrastructure that can accommodate the traffic.

It was found that respondents consider that 28.5% there's room to grow in this segment, consider big market for fractional charge, as well as stress that seasonally the market for all charges warm enough. Some respondents state that there is difficulty in obtaining skilled labor, that there is a large oscillation and latent opportunities and unseen by most entrepreneurs in the business.

It is evidenced the search result where 83.7% respondents who refused to ratify proposals for transport services due to the price, and for lack of vehicles to meet the clients ' request.

The cheap price is what afflicts more entrepreneurs in the business claiming that daily receive proposals that are far below what is necessary to adequately remunerate the services performed. This is accentuated in some periods when the market is retracted. Many companies who hire the services try to take advantage of the situation to increase its profitability to the detriment of transport companies.

According to the survey, 15.9% of the respondents believe that to improve the company's contribution margin should simply pass it on to customers. Already a 33.3% believe to be at the best efficiency improvement solution. But to achieve this requires investment, normally high.

When questioned concerning the billing designed in a time span of five years, it was found that 46.9% believe that will be above the current level, because they trust that the market will increase with the investments made by them.

36.7% of respondents expect sales to be at the same level today. Considering the pessimistic scenario, 16.3% of respondents replied that revenues will be below the current level, mainly due to changes in legislation, as the new law of truck drivers that will restrict the transit of cargo vehicles. Concerning the renewal of the fleet, 7.51% of respondents claim they have the intention and 49% don't wish to renew the fleet.

As the expectation of heating of the logistics industry, in which 49% of respondents trust that the market will have heating, and 51% don't believe in warming.

4.4 Research with the experts

All the experts replied that the economic aspects as the heating of the market, the tariff level of freight, the gross domestic product (GDP), the exchange rate has influence in the construction of prospective scenarios.

Experts understand relevance in terms of the offer of transport, because as affirmation of each interviewee, the supply of transport is currently above the need of the market, thus creating an excessive competition, which ultimately result in very low freight rates.

Another important factor pointed to concerns about the alternatives to road modal, that effectively still participates with more than 60 transport everything that is produced, since several decades the incentives by the Government practically line up for this alternative.

4.5 Construction of prospective scenarios for the period 2013-2018

The prospective analysis consists in the search for the identification of various possible futures of the environment (prospective scenarios), within a specific timeframe, with the purpose of defining strategies capable of change, in favor of the Organization, the probabilities of occurrence of events covered by its sphere of competence and prepare it for coping (or exploitation) of events outside of its jurisdiction.

The scenarios should be interpreted in seeking to identify, for each future event, its possible consequences, also located in the future and, from these, proactive manner, establish measures, at present, able to cope with these consequences.

In this step, the seven experts were requested to complete a framework describing future scenarios, covering the economy, the society, the Government and the market. This description was held taking up based on three scenarios: recessive (pessimistic), intermediate (realistic) and expansive (optimistic), as defined in the logic of the scenarios. It was also requested that each respondent kind about the probability, in percentage terms, of each scenario become real in the coming years.

Only the actor bookie in the opinion of the experts has a minor role in the chain of the carriage of cargo, the other actors have an important role, and also was the element that presented greater variation in responses between respondents, i.e. the coefficient of variation was 41.99%.

The array of transportation was thus described by experts:

- a) The low value of the fare) freight by road: the main causes are: low barriers to entry, high output, low barriers of maintenance and renewal of vehicles, overweight shipments, excessive workdays and defaults in the sector;
- b) few alternatives to the road modal: low availability and the operational limitations of the rail modal, cabotage and interior navigation make it difficult to use these as real alternatives to road transport modal;
- c) barriers to inter modality. Multimodal transport operator (OTM) is the legal entity responsible for the transportation of loads from source to destination, through the use of more than one modal. One of the barriers for intermodal operations more simple and efficient is the viability of the OTM, facilitating intermodal operations with a single transport document;
- d) prioritization of the road modal by the Government: for several years, public investments prioritized road freight sector, allowing the modal to develop on a structure built without direct charge to the industry and without charging for its use;
- e) inadequate legislation and supervision): absence of operation rules and competition;
- f) infrastructure deficiency: absence of a comprehensive policy of continuous collection and analysis of its key performance indicators;
- g) insecurity in the way: lack of joint actions of the police and the absence of integrated information, contribute to insecurity on the roads.

Respondents presented the suggestion of competitive strategies for each of the scenarios (recessive, intermediate, expansive), as Table 1.

Table 1-Suggestion of competitive strategies

Recessive scenario	Direct efforts for retention of most current customers, reducing operational costs and seeking to maintain the quality of services.
Intermediate scenario	Direct sales efforts aimed at the retention of current customers and service expansion to other regions, while maintaining the quality of services, low cost and adequate prices
Expansive scenario	Direct sales efforts targeting expansion in all regions, with differentiation in competitive services and application in information technology.

Source: Prepared by the authors

Based on the results it was possible to describe the three scenarios and their probabilities. The probability of each scenario was calculated from the arithmetic mean of the views of respondents:

- a) Expansive scenario with probability of 43.50.
- b) Intermediate scenario with probability of 41.75;
- c) Recessive scenario with probability of 14.75.

After the construction of preliminary events with the answers obtained by seven experts, were used for the estimation of the final event, through the computational program PUMA 4.0.

The experts responded to cross-impact matrix following the guidelines set out in the methodology. The fill generated in turn another array, called the matrix of Median Impacts or Crusaders, which allows the calculation of Motricity and dependency of each final event.

4.6 A matriz motricidade x dependência

In this step, the events were classified as binding events, explanatory, and standalone result according to its location in the quadrants graphics.

In quadrant I (binding events) – very influential and very independent – the events ten thirteen. These events deserve all the attention, because they have high probability of occurrence, showing maximum values of Motricity and dependence, i.e. influence and are influenced by the occurrence of other events.

In quadrant II (explanatory events) – very influential and little-dependent events appear two, twelve, nine, one and nineteen. These events influence greatly and are little influenced by other events.

In quadrant III (stand-alone events)-little influential and little-dependent event appears five, i.e. is not determinant of change because it is little dependent and little motive, that is, the offset system event.

In quadrant IV (result events)-little influential and very dependent on-appear the event eight and fifteen event. Are less likely to occur and are explained by the events of the quadrants I and II.

4.7 Generation of prospective scenarios

In software PUMA 4.0 system calculated the possible scenarios and generated the median impact matrix consistent, according to Bayes' theorem (combination of occurrences or not, the events).

A total of 1,024 prospective scenarios were generated, being selected only the top ten, because they reflect the total probability of 38.17% occurrence of the scenarios. According to the results of the PUMA 4.0, the most likely scenario (scenario 1) is the one who has most likely to occur (9.38%).

For martial and Grumbach (2005), after the description of future events, analysts must find three types of events in that scenario:

- a) the adverse events the Organization) within its sphere of competence;
- b) unfavourable events, organization) outside its sphere of competence;
- c) events in favour of the organization.

4.8 Interpretation of the scenarios

The interpretation for the most likely scenario has occurred under the analysis of three events as:

a) the adverse events outside the jurisdiction of the object of study: event two (fuel price increase);

b) favorable events outside the competence of the object of study: event a (dollar value): event nine (greater profitability in agriculture): thirteen event (installation of a larger number of industries): fourteen event (increase in the cost of vehicle maintenance) event eighteen (better conservation of federal and state roads);

c) favourable events within the competence of the object of study: eight event (fleet renewal): event ten (late payment of freight): twelve event (retraction of the Rio Grande do Sul economy).

5. CONCLUSION

In the Corede Serra road transport is the most commonly used modal to unite the productive markets and consumer markets, thus creating the development of the whole region. The focus of this work was to build prospective scenarios, with the aim of analyzing the threats and opportunities, strengths and weaknesses that the transport of loads in Corede Serra will face in the next 5 years.

So that the industry can obtain an expectation of growth is required a set of integrated actions. Companies need to make investments in technology, in quality, people and strategies training your customers ' loyalty.As a result of three separate scenarios, with an expansive setting, an intermediate and a recessive companies can establish competitive strategies that match each scenario.

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