

NUMBER OF ABSTRACT: 015-0780

Inducement to multimodal strategy into the sustainable management of *Modal Shift*

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POMS 21th Annual Conference

Vancouver, Canada.

May 7 to May 10, 2010

Abstract

To sustain the best outcome related to innovations in logistic projects, operational goals are made necessary and they may be controlled by applying a Balanced Scorecard to the management of railway transportation services. In this article, the authors demonstrate that it is possible to promote and boost up the practice of multimodal strategy through the use of express container train services from railway concessionaires, thus justifying the necessary investment in new warehouses and multimodal terminals in order to rebalance the national transportation matrix as to the use of the railway transportation mode. Methodology: This article is a case study of the management strategies used to control the performance indicators of such a mode, with cargo Modal Shift practice. Technically, the goals are applied to the Balanced Scorecard – for the management of outsourcing transportation suppliers' services assuring continuous costs control during displacement of cargo via railway in the multimodal system.

Key words: Railway. Logistic Costs. Balanced Scorecard. Multimodal System. Modal Shift.

1 Introduction

In this article, the application of the BSC methodology intends to propose indicators that might be used when hiring cargo railway transportation services for the complementary execution of logistic services, aiming at developing multimodal strategies in the private management. The main constructs of the literature about the *Balanced Scorecard* (BSC), still remains scarce concerning innovation in multimodal management operations for transportation systems.

In the internal process of an extremely innovative system, basically, the goals are made necessary for their being variable according to the level of the operational complexity as to the several local characteristics in the *Modal Shift* operation (Modal Displacement) by means of the Brazilian transport infra-structure.

In the businesses' administrative context of the multimodal strategy, indicators can be extracted from three essential courses: the first is the one that guides the eco-development through new tools that must be taken into consideration as marginal options, by restructuring costs generated by activities of the environmental impact assessment (Sachs 1993, p.71); the second is established with the profitability indicators applied to a process of strategic planning of the cargo *modal shift*, whose view from a wholesale perspective of logistic services is presented, in an innovative way, based on public policies of the transportation sector, such as Law 9611/98 – regulating the activity of Multimodal Transportation Operators (MTO); and finally, the third is the systemic view of the market per business' cost and opportunities, which, in the case it is not well controlled, by exploiting railway transportation in an environment of concession, may yield risks to the multimodal management in the absence of investments in the infra-structure of warehouses and terminals from public institutions.

In the investigation into such a corporative environment, the courses of the interdisciplinarity of actions are verified from the important part that the *stakeholders* might take, and they constantly interact throughout the whole chain of the multimodal logistic activity.

The planning efficacy of the strategic mapping must align the main items of control to the BSC in all levels of the company whether there is an activity or not from the outsourcing company.

In such kind of management, the multimodal strategy is, in the practice of cargo *Modal Shift*, the main solution regarding a hindrance from the port system, such as the barriers of access to the export corridor, and such problems are not directly solved by the railway concessionaires and, therefore, they do not have to be solved by the carrier, but by forwarder or MTO – Multimodal Transportation Operator themselves.

In such a model, a forwarder works as a wholesale entrepreneur, because hiring the services from concessionaires depends on the economic feasibility obtained with the necessity of the economy of scale in transportation services. This way, it is important to observe the model of profitability or of ideal operational cost, in order to implement the appropriate planning system of the main indicators, before hiring the volumes pre-established by the railway concessionaires, and to make multimodal transportation economically practicable at all stages of physical distribution of cargo.

To do so, it is essential to bind the financial aspect and the objectives of the internal processes together, in order to identify the main external indicators of demand, per industrial kinds or segments and afterwards find out more homogeneous necessities for logistics in the sector, consequently constituting a “cluster” of demand necessities that sustains risk agreements.

For a complex logistic system, just like in the example of the multimodal strategy, the *shareholders* depend on the performance and involvement of all actors in the concept of multimodal transportation.

In other words, basically, the efficacy does not depend only on proposing investments in tangible assets (wagons), as well as embracing the intangible assets through investments in training and development of employees and collaborators of the logistics operator itself. The proposal is the continuous improvement of the productivity and the quality that increase value generation, according to Tinoco (1996), Cho and Moon (2000) and Antunes *et al.* (2006). As for the Brazilian realistic context, there is a slight intensity of researches linked to the outsourcing process, but still scarce is the scientific production of the BSC practice in multimodal processes embracing the plan concerning the global process to implement outsourcing for the railway transportation with public concession.

In such a perspective, this article aims at pointing out possible indicators for planning a BSC with the concept of organizational innovation. Inherently to the practice of the multimodal strategy, the indicators of such a sustainable management are considered essential and may also be efficient in the logistic process management, such as qualitative and quantitative methods which are the most appropriate to assess the results.

2 Methodology

In the elaboration of this article, the methodology can be understood under three courses: as to the objectives, as to the procedures and to make the problem explicit. Regarding the objectives, it can be considered as an exploratory research.

Beuren (2003, p.80), clarifies that an exploratory research bears as an objective “conhecer com maior profundidade o assunto de modo a torná-lo mais claro” (*to apprehend the subject in a deeper way in order to make it clearer*) and adds up: “explorar um assunto

significa reunir mais conhecimento [...], bem como buscar novas dimensões até então não conhecidas” (*exploring a subject means to gather more knowledge [...], as well as search for new unknown dimensions*).

With regard to the procedures, a broad bibliographical research was carried out, comprising both national and international authors who have given some significant contribution to the subject.

According to Yin (1994), the research should identify some situations where all its strategies are relevant. "How" and "what"-questions are formulated about a present set of events in which the investigator has little or no control. This investigative study tried to identify "how" it happens in the logistic chain where the factors "what" are affected. As this study seeks for such questioning, it suggests the adoption of an exploratory methodology (Yin, 1994, p. 21). Yin (1994) also reminds us that exploratory studies are primarily useful to the generation of hypotheses centered on the phenomena under investigation. For this reason, the researchers have also anticipated that the research would result in the rise of hypotheses and an additional theory to lead future researches in the area. The identification of behaviors from a phenomenon is essentially an exploratory activity where the main objective is to refine the idea of the research itself to give way to a broader research (Kervin, 1992). Considering such a premise, the stage of information gathering can be considered as a preliminary investigation according to Emory and Cooper (1991), and it becomes an essential method in conducting the research. Although it is usual, in an exploratory research, to trust the opinions of specialists and to put the focus on the groups of the starting stage, such was not considered in the present case.

3 Theoretical Reference

Dietschi and Nascimento (2008) have made evident the contribution of researchers for the implementation of such a development – see Figure 1: it was elaborated from the creation of a chronological inventory of constructs by the main authors with techniques of implementation in the elaboration of a BSC:

Audit Checklist

Researchers	Year	Inventory of contributions to the BSC	Check-in actions
Kaplan and Norton	1992	Found performance indicators with four perspectives	To establish elements of 4 perspectives: a) Financial; b) Client; c) Internal Procedures; d) Learning and Growth
Kaplan and Norton	1996	Introduce the concept of cause and effect	To create relations of "if-then" hypothesis for better outcome
Kaplan and Norton	1996	Infer the performance indicators aligned to strategy	To harmonize the Performance Indicators and Strategy
Kaplan and Norton	2000	Establish the concept of strategic mapping	To foment relations of cause and effect among the Strategic Objectives
Kaplan and Norton	2000	Criticize the traditional systems of performance evaluation	To avoid decisions targeting short-term financial aspects
Kaplan and Norton	2000	Model the Strategic Mapping in order to generate Value	To generate value to the shareholder is the organization's top objective
Banker, Potter and Srinivasan	2000	Check up on the outcome of the relation between non-financial indicators and financial performance	To suggest that the use of non-financial indicators do contribute to the organizational performance
Norreklit	2000	Analyzes such a tool from different angles	(i) To validate such a tool to the cause/effect relation (ii) To align such a tool to the value relation with the stakeholders
Malina and Selto	2001	Follow up the efficacy for communication and strategic alignment, in the motivation and outcome	To communicate and align the organizational strategy successfully
Ittner, Larcker and Randall	2003	Investigate the relation between the use of several financial and non-financial indicators, and organizational performance	To correlate financial and non-financial indicators with organizational performance
Davis and Albright	2004	Investigate the capacity of the financial performance	To improve the organization's financial performance
Pessanha and Prochnik	2004	Check up on the problems derived from whatever model proposed to be adopted	To emphasize the participation of all levels of strategic planning
Davis and Albright	2004	Investigate the capacity of the financial performance	To improve the organization's financial performance

Source: DIETSCHI and NASCIMENTO (2008) – Adapted by the Authors

For Beuren (2003, p.92), in the qualitative research, more profound analyses are conceived related to the phenomenon under research. That is why the conception of the approach to the problem lies deliberately as a research with either quantitative or qualitative features.

3.1 The *Balanced Scorecard* in the internal process of business management

Created by Kaplan and Norton (1997), the *Balanced Scorecard* is itself a system that, based on past situations (outcome), aims at complementing such outcome by adopting measures that end up propelling the company towards a future performance comprising the four dimensions pointed out by the authors: a) the financial dimension; b) the dimension of market and clients; c) the dimension of internal processes, and d) the dimension of growth and learning. It is an important system to assess the performance and helps through the decision making process by establishing goals to be met and designed through the adoption of indicators targeting the best level of fulfillment of the previously-established goals.

According to Kaplan and Norton (1997), in business planning the main executives must establish, in the BSC, goals with a horizon of three to five years to properly direct an organization through the right path, together with a strategy supporting the expected objectives. From such a long-term horizon, short-term goals (twelve months) must be established.

From the strategic perspectives that generate the indicators, in the BSC mapping, reconciling all issues related to business should be a target so that the managing staff might be able to face the challenge of developing the shared understanding of the business context with all the organization.

The BSC, inside the organizations, creates the strategic awareness among their collaborators, once such organizations demand that their employees know it well and conduct their daily activities towards contributing to success.

Kaplan and Norton (1997) have identified, after several researches, the principles of a strategy-oriented organization:

- To translate the strategy into operational terms;
- To align the organization to the strategy;
- To transform the strategy into everybody's task;
- To convert the strategy into a continuous process, and
- To mobilize the change by the leadership.

The Performance Prism in external process by stakeholders

The Performance Prism is a concept used to clarify and to structure the complexity of relations within an organization. In such kind of structure, the organization finds its identity during the association with their multiple intervening elements inside the operational context, and its objective is to constitute and add "Value" to the stakeholders involved in the management environment of the corporation (NEELY *et al.*, 2002).

These authors state that the best way for the organizations, trying to be profitable or not, to survive and prosper in the long term is to try to fulfill the needs of the intervening *stakeholders*, or at least, to try to hand the appropriate value out to each one of them.

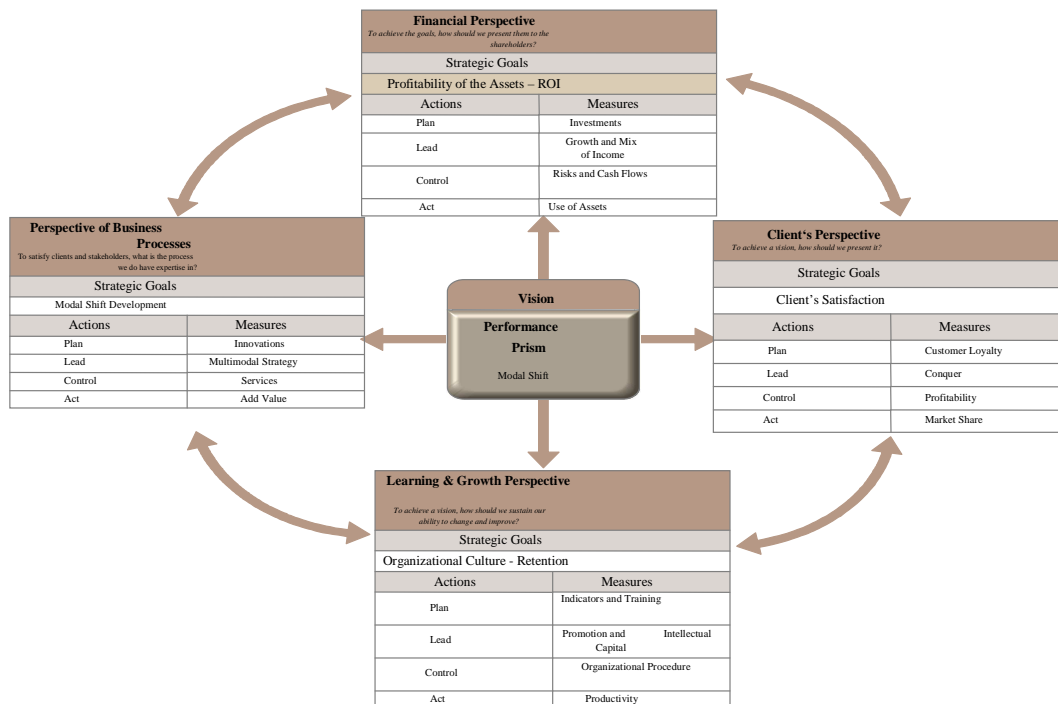


Figure 2 Definition and mapping - Source: adapted by the authors from Kaplan and Norton (1997)

According to Mintzberg (1994), in the mid 1960's, another management tool that showed up in the specialized literature, with horizon in the long term, was the Strategic Planning.

As to Ackoff (1973), planning is a process that is intended to project future situations, and it may or may not occur, unless under a very specific circumstance something is done. And such a process turns either towards the prevention of incorrect actions, when exploiting the opportunity, or towards minimizing the reduction of the company's failure frequency. Although the BSC and the strategic planning present some similarities, both management tools intend to propel the organization in the direction aimed by its directing board.

According to Mintzberg (1994), the most notable similarity between the traditional Strategic Planning and the BSC lies in the fact that both are willing to establish the necessity

of long-term guidelines, and after that, actions must always be followed sustaining the range of the goals aimed by part of the organizations.

3.2 The customer perspective

In the Generic Model proposed by Kaplan and Norton (1997), for the elaboration of a BSC oriented to add “value” to the customer in the multimodal logistic chain, some factors, such as product attributes or logistic services, must be observed, as specified in Figure 2.

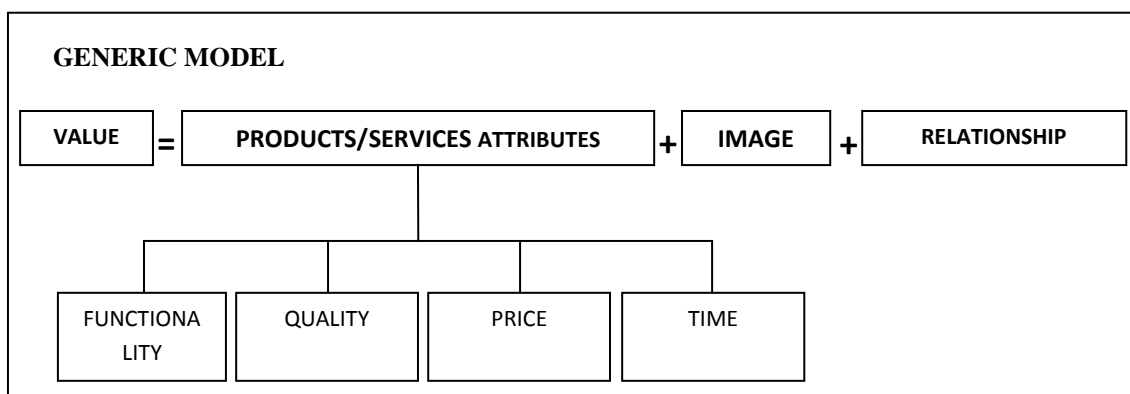


Figure 2 – Generic Model
Source: Kaplan and Norton (1996, p.74)

To illustrate the market of multimodal strategy users, Japanese companies pioneer the set of companies with advanced stage of maturity for such development. Sinclair (1996) demonstrates that the reconstruction of the post-war Japanese manufacturing industry provided a new opportunity for the world to catch a glimpse of a catalyzing environment generating countless innovations and changes because the challenges faced by the Orientals are usually broadly different from the ones Occidentals may encounter.

A lot of Japanese companies conducted the production development always in the quest of new practices and principles to continually reduce the consumption of environmental resources in the processes.

To demonstrate the application of such concepts in the practice of qualitative principles related to logistic services, Sinclair (1996) demonstrates that, in general terms, some characteristics of such philosophy occur in a complementary way, in the customer perspective, but in the BSC they must reflect what is called perspective of processes in businesses where:

- The customer is the one that defines the VALUE. A LEAN company worries more about creating the value for their CUSTOMERS than accelerating the machinery to absorb the work and the general expenses.
- The focus remains in the unblocked PROCESS to understand the activities, flow, itineraries and connections that require the creation of a specific product or service, to align the process with the customer necessities.
- The CONTINUOUS IMPROVEMENT is necessary to achieve the objectives. The activities of improvement must advance beyond the daily work projects.
- The LEAN production requires synergy of all the people in all levels of the business. In such an aspect, it is settled that only the people can provide continuous improvement.
- The quest for means to achieve PERFECTION is infinite, as is the search for opportunities for the systematic waste elimination.

3.3 Perspective of Growth and Learning

The Toyota's principles sustain the production system 'reinvented' and captured with a vision of *Lean* production. "The main 'inventors' of such practices, Toyoda and Ohno, precursors of the Toyota's Production System, developed and defined it, upon Silva (2002, p.28) "que o objetivo deste sistema está em minimizar o consumo dos recursos que não adicionam valor ao produto com esforços rígidos para encontrar soluções de eliminar o desperdício" (*that the objective of such a system lies in minimizing the consumption of resources that do not add value to the product with harsh efforts aiming at finding solutions to eliminate waste*).

Also according to Silva (2002, p.24), changes from the handcraft production mode to mass production, and later to lean production, started in the motor-car manufacturing segment, have modified the performance of such and several other economic sectors, influencing the way of life throughout the world.

However, one of the greatest difficulties is to convince *shareholders* about the radical necessity for organizational changes based only on simple goals of learning, or implementation of the *Lean* culture, which basically depend on: a) establishing a scenario for the future; b) authorizing resources to achieve such a scenario; c) studying the set of causes leading to the present methods; d) proposing a new solution; e) putting the new solution into practice; f) quantifying the results and searching better in the future.

In an environment of organizational changes, the D-M-A-I-C is utilized for a better reading of the processes that depend on suggestions, or new proposals of improvement. The initial letters stand for: (D) Define the problem and the impact to the organization; (M)

Measure the performance chain of the organization; (A) Analyze the performance to identify the causes; (I) Improvement (proposition) to attack the causes of the problems; (C) Control (sustainability) the continuous improvement of the process.

3.4 The Perspective of the Financial Process in the management by Income Mix

On the part of the logistics operator, the multimodal strategy will depend on an effective financial management in the process of service production, mainly because the BSC must focus on managing financial risks in the business practice.

In such an aspect, the adequate management model must focus on the dimension of the risk of such strategy to contemplate the countless variables of demand for services and at the same time to establish options to promote and boost up resources from strategies in the business with the possibility of the income mix.

According to Kaplan, the financial objectives can considerably differ according to the phase or life cycle of the company and that shall be emphasized in the strategy: Growth – with focus on the increase of sales (innovation); Sustainability – with focus on the action of traditional financial measures; Harvest – with focus on obtaining the balance in the culture of the cash flow. The financial characteristic by Income Mix is important because it does not operate with one single source or origin of income, mainly, to avoid dependency on one single source of services or income (one single customer), if not so, operationally in the unimodal system, there is more risk in function of the management dedicated to one single modal in a plain way.

3.4.1 Forms of negotiation about the remuneration of logistics operators' services

Presently, the forms of remuneration of logistic service providers are being altered. Simpler forms constantly arise and they are based upon unitary charges from price lists, or even more complex forms, such as the hiring of services from railway concessions.

As an example, the customized transportation operations in the exploitation of a container shuttle (daily express trains), in *take-or-pay* agreements (contractual condition), make explicit that service providers' costs and profit margins are determined in function of their capacity to increase operation efficiency through the productivity of the wagon fleet dedicated to the logistics operator's activity, which will be correlated to the Total Contribution Margin based on the sale price.

To Lacerda and Ribeiro (2003), in the analysis of the commonest forms of remuneration for outsourced services, the three most well-known modalities are: a) the negotiation is based upon unitary charges; b) the negotiation is based on the operation's cost plus a margin; c) to the negotiation of the remuneration is added, in the operation cost, a fixed managing rate. Such authors state that the differences between each one of the modalities are obtained after the analysis of advantages and disadvantages of each negotiation model. Still, in the use of the transportation via railway concession, the simplest forms result from the division of the total costs of an operation by a specific expected volume – which turns into fixed cost.

A standard measurement unit of quantity, named TEU (*Twenty Feet Equivalent Unit*), is applied as a monthly goal, and it is used to illustrate the quantity, or better, the "*Break-Even Point*", to the user contracting the railway system in order to comply with the public service.

To make the understanding of such a practice clear, the quantity of TEU's transported in the assets (wagons) are monthly registered in the books and applied under mandatory contract by the railway concessionaire, based on the assurance of the customer demand volume.

This is the main indicator used to determine the level of economic efficiency of the investment operation in future cargo freights.

Nevertheless, during periods of seasonality, when the operation volume lies below the break-even point of the monthly handling, the actual cost increases for the user of the railway system jeopardizing the contribution margin of the service provider responsible for the hiring in such conditions, because there is no monetary correcting trigger whatsoever. So, in order to avoid financial losses, it is necessary to identify KPI mechanisms (Key Performance Indicators) in the BSC management that are able to identify or predict such seasonality. The forecasting report is important during seasonality when significant changes occur regarding cargo behavior, thus, the concessionaire's contracting party can identify the KPI in the BSC to minimize the operational costs.

Diagram for the Indicators of the BSC of the Multimodal Management's variables				
Business Perspective	Customer Perspective	Financial Perspective	Learning Perspective	Growth Perspective
Dedicated Fleet of Wagons	Sourcing / Retail	ROIC	Performance Prism	Innovation
Transportation Capability (wholesale) in the TOP	Forecast of Future Demand Sales	Rm	KAIZEN Training	Information Technology
Frequency of Trains	Customer Retention	EP	Sustainable Development	Modal Shift
CPM - Lead Time per process	Inventory Cost Reduction	WACC	OTIF Inventory Turn	IP = Loading and Unloading Time Reduction
Cargo Focus (%) 20' Container or 40' Container	Unitary Price of FREIGHT / Leased Wagon	ILC	Specialization / Sales Marketing	Market Share
Assets Availability (wagons)	Customer Satisfaction	EVA	Motivation in the D-M-A-I-C Model	Double Stack

Figure 3: The Indicators to create Multimodal Management's BSC – (Soares, ITRI,2009)

Yet, not to make it into a tiresome process, the monthly negotiation can be carried out on a periodical basis at each proposal of the change of efficiency KPI indicators, provided that such possibility of revision is not formally defined in a previous contract or agreement with the railway concessionaire.

3.4.2 Assets for sale and outcome indicators in the BSC of the Multimodal Strategy

The economic environment requires changes mainly after the beginning of globalization. To analyze the companies' patrimonial and outcome indicators, the main concepts and techniques of the companies' economic performance assessment should be utilized, considering the attractiveness and the economic feasibility.

According to Assaf (2009), the main financial decisions of a company are the Decisions on Investment and Decisions on Finances. Such decisions are interdependent, that is, the decision of finance is linked to a decision of investment of such resources, the same way every decision of investment must have previously-hired “funding” to finance such a decision (Assaf, 2009).

Therefore, if the economic feasibility of a company depends on the outcome produced for the decision of investments, we can infer that, in the multimodal strategy management, the outcome is sufficient to remunerate the opportunity cost to finance trucks, for instance, in the physical distribution service, when necessary to improve the performance of the service quality. Assaf (2009) demonstrates that it is not the accounting profit that determines the economic feasibility, but the remuneration of the opportunity cost of the investment risk. However, in the practice of such a case study, the operational analysis of the TCM (Total Contribution Margin) is utilized to distinguish the correlation of the variable dependant of the outcome related to the amount of services to illustrate the emerging profitability of the period in the multimodal management.

On the other hand, the paradigms are countless and volatile when the focus is on measuring profitability within the formation of a business financial strategy. Ross, Westerfield and Jaffe (1995) state, based on the theory of the Capital Market, that maximizing the ROI (*Return On Invested*) makes a company’s market value increase if there are investments in projects when the ROI stands superior to its WACC (*Weighted Average Cost of Capital*) or in the hypothesis of divesting of projects or assets with ROI (*Return On Invested*) inferior to the WACC. Like the indicators utilized in the financial perspective, the VBM (*Value-Based Management*), created by Copeland, Koller and Murrin (1995), can be an indicator utilized in the management of the BSC for logistic services.

As to the creators of such a management tool, the main indicator of the VBM is the EP (*Economic Profit*) that is practically identical to the formula of the EVA. Despite the similarity, there is a difference in the terminology of one of the components, because, instead of using the term ROI to identify the outcome on the investments, the authors of the VBM name it ROIC (*Return On Invested Capital*). Dietschi and Nascimento (2008) point out the observation of the fact that the VBM can be unfolded into a tree of mathematically-related indicators, while the EVA does not possess such a characteristic. As an analogy, the example of the interpretation of investments in capital markets, the choice for regular indicators, just like the economic profit, can be a profitability indicator of service activity management, once, in a way, they guide the actions of short term investments. For instance, the model suggested **EP = [(ROIC – WACC) x Invested Capital]**.

3.4.2 Analysis of the break-even point

The decisions that are frequently based on “trade-offs” of cost among the several options of transportation services depend on a more balanced analysis. The *Break-Even-Point* (BEP) is a quantitative technique used by part of the managing staff, and it can be applied in the hiring of railway transportation services in a wholesale manner to acquire minimum freight volumes, usually defined as fixed costs via agreements with railway concessionaires.

In such a trading condition, such a technique helps estimate the break-even point of any sales systems, when the relation between fixed expenses, variable expenses and sales (in this case, transportation service freights) should be considered. The analysis of the break-even point concerning Atkinson *et al.* (2000, p.193) “determina o volume de produção (fretes) no qual o lucro do negócio se iguala a zero” [*determines the production volume (freights) in*

which the business profit equals to zero]. The results of the calculation predict the required freight volume as a minimum volume, to cover fixed and variable expenses.

The BEP can be an indicator of the BSC and defines that any service production below the break-even point will not be profitable; and any production above the break-even point will be profitable. The other form of analysis of the break-even point in services is the one that should observe the expenses of alternative service production, of railway transportation hired in the form of retail, to decide if the service hired wholesale covers each option, and if the hiring of services in wholesale is in fact valid and more efficient.

The basic formula is:

$$\text{BEP} = \frac{\text{FC}}{\text{P} - \text{VC}}$$

Where: FC = fixed cost; P = price of the freight, and VC = variable cost.

Planning of indicators of the BSC per transportation outsourcing for 4500 (TEU's)

$$\text{Outsourcing Model - RAILWAY SYSTEM - BEP (Monthly)} = \frac{\text{R\$}600,000.00}{600.00 - 250.00} = \mathbf{1714 \text{ Teu's}}$$

$$\text{Outsourcing Model - ROAD - BEP (Monthly)} = \frac{\text{R\$}1,800,000.00}{800.00 - 250.00} = \mathbf{3272 \text{ Teu's}}$$

$$\text{Outsourcing Model - MIX-MULTI - BEP (Monthly)} = \frac{\text{R\$}2,400,000.00}{\{(800.00 - 250.00) + (600.00 - 250.00)\}} = \mathbf{2667 \text{ Teu's}}$$

Figure: Simple Method of Inducement for Multimodal Strategy via Outsourcing - (Soares, CBC, 2009)

3.4.4 The risk calculation in the cash flow management

In the construction of the BSC, the focus must be centered in the dimension of the strategy risk to include the countless variables in the service diversification. On the basis of such a point of view, the risk management of the *Modal Shift*, upon the financial perspective of the cash flow of a BSC, will depend on encompassing indicators not only of profit, but also of risk in the cash flow management, mainly when there is low performance of the assets (wagons) available in the transportation operation.

The index of investment risk involves, among other factors, the opportunity cost wasted in the maintenance of the cash flow level. To sustain the capital during the current transactions of businesses oriented, for example, to hiring leased assets from the outsourcing business of railway transportation in the multimodal system, it is suggested that the rate of return aggravated to the risk should be calculated by the formula below, where the rate calculation adjusted to the risk is represented:

$\text{TADR} = R_f + [I_r * (K - R_f)] \text{ where:}$ <p>Rf = Risk free rate; Ir = Index of Risk; K= Cost of Capital</p>

Source: GITMAN, Lawrence J. *Princípios de administração financeira*. 10. Ed. São Paulo: Addison Wesley, 2004.

3.4.5 The analysis of the capital structure - the formation of indicators in the BSC

Once again, the accounting indicators are relevant in the BSC to represent the desired levels by indicators of Current Liquidity, or Indebtedness Level, in the logistic business management of railway transportation in a wholesale manner.

For example, in the analysis of the decision making in the short term, from the financial and accounting point of view, it is possible in such kind of management, to evaluate the Working Capital via percentage extracted from the analysis of the capital structure.

3.4.6 The analysis of the Total Contribution Margin (TCM) to find the management IP

Kaplan and Norton (1997), state that both groups of non-financial and traditional financial indicators should start up from the long-term focus to afterwards bring forth short-term goals. This way, the respective administrative tools used for the decision making based on indicators of the BSC can explore the accounting model in the analysis of the kind of capital structure.

To add value at the strategic level, Ross, Westerfield and Jaffe (1995) inform that the optimal capital structure must produce the highest value for the company, because it is the structure itself that maximizes the returns of the shareholders. From a tactical point of view, in outsourcing services, it is common to search for indicators of simple understanding, the example of the TCM, to objectively illustrate the understanding of the collaborators regarding minimum profitability in the short term, to infer long term capacities.

Gitmann (1997) has made explicit that regarding the decisions of capital structure other important factors must be considered: stability and predictability in the incomes, contractual duties and restrictions in future businesses and the management's preferences. The author suggests the assessment of the external reflections that the new position of indebtedness can cause, besides circumstantially considering the level of the interest rates at the moment of hiring.

Copeland and Weston (1992) emphasize that the decisions of an optimal capital structure does not refer only to the reason of the debt structure, but also to the expiration structure of the debt. Thus, it is necessary to set out which part of the debt should be short term and which should be long term, as well as to verify if the company should use debts with variable or fixed rates. To the understanding of those authors, it is also important to consider

if the long term debt should be amortized at the end of the period or by equal periodical payments or installments.

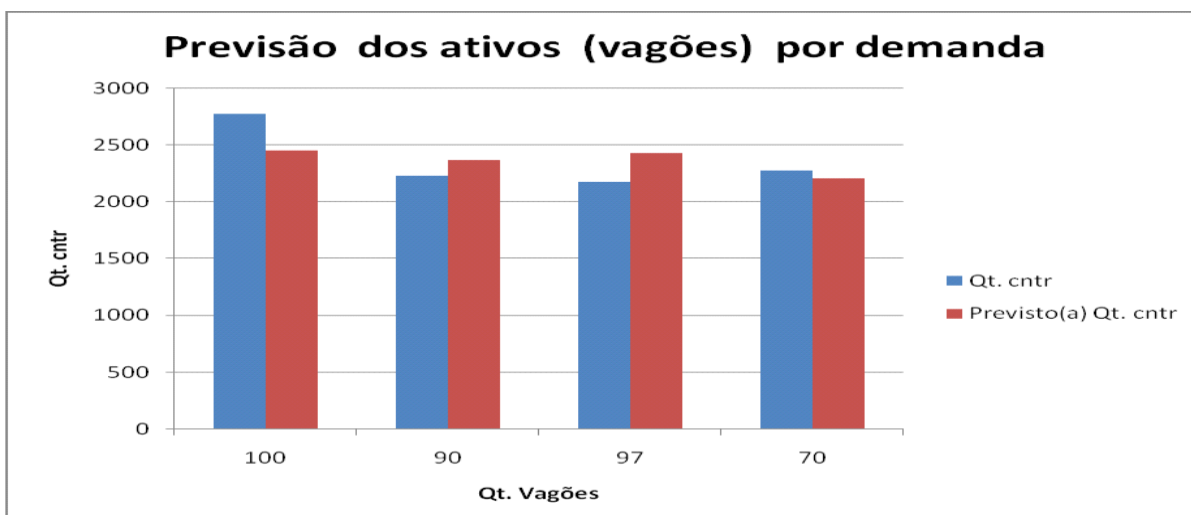
Barclay and Smith (1999) classify the difficulties in the researches, related to the optimal point of the capital structure, into three main aspects. Firstly, the models of decisions on the capital structure are still not precise, that is, the several mathematical models are still under tests and being refined, because an ideal model has not been found yet. Besides, the theories of capital structure are not mutually excluding, that is, rejecting a theoretical approach does not necessarily imply the acceptance of another. And, finally, the countless variables concerned in the studies and researches are difficult to quantify.

When the variable dependant of the TCM is a set of indicators of the kind of capital structure, we can infer a positive correlation corroborated with the variation of the TCM and of the Profitability of the assets, mainly when there is increase of the indebtedness level. Therefore, the variables dependent of the TCM are dependant of external factors, such as possible actions of the stakeholders to the business, and consequently, they make the price policy formation vulnerable, usually static, per kind of operation.

Case study: The management strategies of KPI's for Modal Shift which are applied to developing the Balanced Scorecard



The case study of the multimodal management strategies used to control the performance indicators of such a mode, with cargo Modal Shift practice. Technically, the goals are applied to the Balanced Scorecard – for the management of outsourcing transportation suppliers' services assuring continuous costs control during displacement of cargo via railway in the multimodal system. The indicators of productivity are defined with the calculation of the assets (wagons) made available during the period, correlated with the amount of cargo handled by those same assets.



Essay to development KPI's Operational

KPI's – Key Performance Indicators of the assets (wagons) per demand

KPI's - Quantity by wagons in transit “on time”

KPI's - To apply measures for transporting container TEU'S

KPI's – Distance on transport by railway versus roadway

The equation figures out the marginal cost of the direct acquisition of railway transportation services from companies, in the hypothesis of hiring railway transportation without volumes of warranties per public service concessions:

$$Pf (1+ I) + \frac{[(Cpt+Cf) \times Qpf] + Coe + Ca}{Da} (1)$$

Da

Economic perception of cost by distribution channel per TEU:

A option – Operational hypotheses in agreement by concessionaries with participation by MTO:

$$R\$ 250,00 + \frac{[(250.00+284.09) \times 40] + 93.90 + 21.46}{400 \text{ Teu's}} = R\$ 303,69 / \text{Teu} \text{ (freight railway)}$$

B option - Operational hypotheses in agreement by concessionaries for sales on retail to users:

$$R\$ 568,18 + \frac{[(250.00+284.09) \times 02] + 93.90 + 21.46}{02} = R\$ 1159,86 / \text{Teu}$$

Where the economical parameters are:

Pf : Price of average unitary railway freight in the form of (retail) up to 70Km

I: Tax burden (PIS + COFINS +ICMS + ISS) + (IR)

Cpt: Cost of contract requisition/Teu

Cf: Freight cost

Qpf: Quantity of requisitions (minimum volume) of the concessionaire

Coe: Opportunity Cost of the inventory

Ca: Cost of Capital (Cash Flow)

Da: Actual Retail Demand

In the financial analysis of the unitary price of the railway concessionaire, the average price is taken as a parameter with the intention of equalize variations during the months. The rate used to simulate the proposed minimum opportunity cost can be diverse, and in such a case study, encompasses the calculation in the order of 12% per year. Such is necessary because the additional investments of wagons will depend on the *Multimodal Transportation Operators*, whose interest in such an area is founded on a minimum remuneration of the opportunity cost of 1.0% per month. Consequently, adjusting the above considerations to the reality of the logistics operator management, the yearly total cost of requisitions of railway freight services includes expenses and costs of labor to information issuing and processing in the sale price formation after the sharing in the cost center system.

The opportunity cost of the inventory in the wholesale railway freight hiring derives from the calculation of the flow history of the transported volumes, deducted from the minimum monthly handling, always discriminated in the contract, and that bears as a starting point the total transportation capacity to all the railway vehicles available to the operator. This way, the transported volumes via railway system are monthly collected and compared to the minimum handling volumes. And, finally, the collection of such an indicator in the BSC must be the same number established as BEP, which is also important as a goal indicator in the negotiation of minimum volumes of future contracts.

At last, such an analysis of future indicators depends on the continuous handling history recording and controlling, with such data the manager efficiently utilizes the linear regression method which is used to estimate the profile of the deseasoned demand, quarterly.

3 Conclusion

The quantitative methods applied are necessary for the perception of the quantity of fleet wagons, and the operational performance is founded on the relation of such assets to the total transportation of the demand. The main variables of the cash flow are identified, but are not static and can be substituted at each revision of the internal process of the BSC management in the financial perspective. For multimodal transportation services, when there is participation of the railway modal in cargo transportation, the profitability warranty of the assets (wagons) is connected to a specific period or future demand. Therefore, if the volumes hired are overestimated in the wholesale, by the railway company concessionaire, incompatible with the actual demand, the operational cost will make business in the

management of the multimodal enterprise logistics impracticable. That is why the importance of choosing the right indicators in the formation of the BSC is fundamental for the multimodal transportation sector, mainly for the trading condition, mandatory, under contract of the railway concessionaire. We can conclude that the innovation for controlling tools in indicators in the *Balanced Scorecard*, in logistic processes, favors swiftness during the decision making in order to safeguard the *railway system users'* profitability, and facilitates the management of administrators and operators because it identifies the levels of control in the outsourcing with the leasing of assets (wagons) to the multimodal logistics. Finally, it was noticed that the development of the *Balanced Scorecard* of a logistics operator favors indicators advantageous to the sustainability. When well selected, they can be fundamental make viable the cost reduction of the railway transportation services that are usually subcontracted from railway concessionaires.

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