

Strategic planning as a competitive differential: A case study of the Sealed Sources Production Laboratory

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ABSTRACT

Strategic planning has always been and continues to be one of the most important management tools for decision making. Amidst the uncertainties of the 21st century, public, private and third sector organizations are steadily struggling to improve their strategic plans by using more effective results management tools such as BSC-Balanced Scorecard. Nuclear research institutes and research centers around the world have been using more and more these types of tools in their strategic planning and management. The objective of this article was to recommend the use of the BSC as a strategic tool for decision making for the Sealed Sources Production Laboratory located in the Radiation Technology Center, at Nuclear and Energy Research Institute (IPEN/CNEN-SP), in São Paulo, Brazil. The methodology used in this academic article was a case study, which considered the object of the study, the Sealed Sources Production Laboratory, from January 2014 to August 2016. Among the main results obtained with this study can be cited: the improvement of the information flow, the visualization and proposition to change the periodicity of analysis of the results, among others. In view of the expected results, it was possible to conclude that this study may be of value to the Sealed Sources Production Laboratory for Industrial Radiography and Industrial Process Control and also to other research centers, as it will allow and contribute with an additional management support tool.

1. INTRODUCTION

This article is about strategic planning involving BSC - Balanced Scorecard, whose doctoral research had as the object of study the Sealed Sources Production Laboratory for Industrial Radiography and Industrial Process Control in the Radiation Technology Centre, at Nuclear and Energy Research Institute (IPEN/CNEN-SP), in São Paulo, Brazil.

The selection of the object, the Sealed Source Production Laboratory, as a case study was relevant, since the object of this research is one of the Radiation Technology Centre

laboratories responsible for the production of sealed sources for industrial radiography and surveys carried out on radiators, cables of command and guide tubes and holder of a monopoly of the Union in the Brazilian territory.

A brief contextualization of the global scenario and the need for effective evaluation tools for the management area such as the BSC - Balanced Scorecard and aimed at improving both the private and the public decision - making process and management is necessary.

Nowadays, it is very common to approach urgent and recurring issues when it comes to management, either in private and the public institutions, because

“Increasingly, companies [and institutions around the world - our griffin] face challenges, difficulties, threats and opportunities, processes that have never had to go through. Today, the external environment becomes present and active, being marked by a set of complex variables.” (TORRES AND TORRES, 2014, p. 17)

And these variables, whether in the economic, market, among others, have forced companies and institutions to modernize their management techniques in order to survive a market of so many inconsistencies.

Still, as pointed out by SILVEIRA-MARTINS; ROSSETTO; AÑAÑA (2013, p. 2),

“The environmental inconsistencies faced by companies direct strategy researchers to the development of studies on actions that help decision makers to be effective in formulating and implementing strategies, thus generating superior performance to competitors.”

These challenges in modern business environment¹ require changes in posture in relation to the management practices adopted, and research institutions linked to state or federal universities are not out of this context.

The overall objective of this study was to recommend the use of a strategic plan guided by a valuation model and strategic tool, the Balanced Scorecard (BSC), in order to facilitate the visualization of the Sealed Sources Production Laboratory strategies of the Radiation Technology Centre, based on the current institutional strategic plans.

¹ In the economic, technological, market and others.

Among the reasons for which the feasibility study carried out were a practical and easy viewing for monitoring a faster decision-making and help the management process, indicator improvement, among others.

Although, public sector organizations are not "driven by profitability or the return of capital", it is worth mentioning that, the purpose of public organizations is to use the resources received correctly, and, whenever possible, reduce costs. Public organizations should adopt "standards of efficiency and effectiveness comparable to those applied in the private sector."
(TAFFAREL, 2012)

The management requirements of public, private and third sector organizations in the 21st century require a more aggressive, innovative manager profile that seeks a strategic alignment focused on results.

It is, therefore, necessary for these managers to look for "performance evaluation systems that are capable of adapting to organizational strategies [...]" (BEUREN AND SPESSATTO, 2010a) and to seek to reinvent themselves constantly as an organization.

In this direction, the need for organizations to make use of more modern techniques of measuring and evaluating their performance through management tools using indicators or performance indicators emerges.

The methodology used was a case study, given that there are no studies on this topic in the Sealed Sources Production Laboratory of Radiation Technology Centre.

Among the main instruments used for this research are technical articles, theses, dissertations, books, documents related to planning, technical reports and more.

The basic authors used include: Beuren and Spessatto (2010a), Gassenferth (2012), Grönroos (2009), Hammel and Prahalad (2005), Kaplan and Norton (2004), Las Casas (2006 and 2012), Mansur (2008), Padilha and Nascimento (2015), Silveira-Martins, Rossetto e Anãã (2013) Torres and Torres (2014) among others.

2. THEORETICAL FRAMEWORK

In order to support the theory of this article, some concepts together with their definitions and references to relevant scholarly literature were addressed on the subject under this study in order to build up this theoretical framework and facilitate the understanding of why the research problem under this study exists.

In relation to the concepts discussed in this article it is difficult to find a single concept that meets the expectations of all those that directly or indirectly are linked to the business world, such as: Strategic planning, BSC - Balanced Scorecard and Indicators.

2.1 Strategic planning

We live today in a very competitive and globalized world where not only companies, but also research institutes throughout the world must excel in good strategic planning. In this way, having a strategic planning with an effective organizational performance measurement system has become a key issue for the survival of any organization.

This strategic planning should use analytical tools that provide good decision-making tools to develop new products, markets and clients, processes, improve existing and already implemented processes, or even markets and customers they currently have.

Strategic planning is:

[...] an administrative technique that, through the analysis of an organization's environment, creates awareness of its opportunities and threats of their strengths and weaknesses for the fulfillment of its mission and through this consciousness sets the direction that the organization must take to get advantages of the opportunities and avoid risks. (YAMAGUTI, 2006, p. 297)

However, it is worth pointing out that, there are times when planning becomes strategic, because as "it is an administrative function" that guarantees the means to achieve the objectives of a precise organization, the planning needs to be very well analyzed for the establishment of the future situation desired by its managers.

It is important to emphasize that in planning, "the focus of actions will seek to highlight the strengths of the company towards its consumers and will try to excel by attacking the weaknesses of competing companies." (YAMAGÜTI, 2006, p. 297)

The Fig. 1 shows some of the basic requirements to have a good strategic planning.

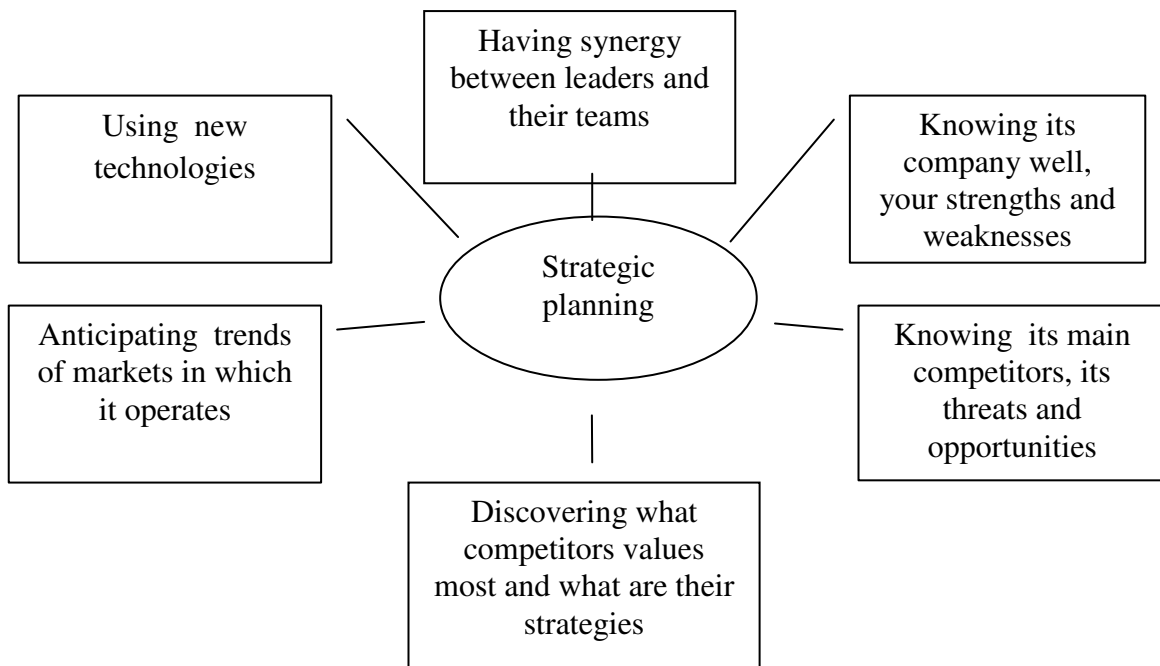


Figure 1: Demands of a good strategic planning. Source: Vieira, Imário (2015).

There are many requirements of a strategic planning, the manager needs to:

- a) Knowing its company well, your strengths and weaknesses, in order to make good use of their competitive advantages that your organization have and make the necessary changes to correct possible flaws;
- b) Knowing its main competitors, its threats and opportunities, in order to avoid losing market share by having well-planned strategies;
- c) Discovering what competitors values most and what are their strategies, this information will be of great help to correct strategic plans;
- d) Anticipating trends of markets in which it operates, because by doing so, it will put the organization ahead of its competitors;

e) Using new technologies, since the current market demands for innovative technologies;

f) Finally, the manager needs to have synergy among them, the leaders and their teams, well-defining which strategy is short, medium and long term, because all organization members have to be lined up and implement the necessary actions.

In this context, among the many challenges ahead for today's organizations in a globalized world are found: the evolution of management, the intensification of competition, consumers changing habits, the technological revolution in all sectors of the economy, connecting markets by Worldwide Web among others.

In other words, strategic planning opens a range of options and opportunities in promoting a direction or redirection of organizational strategies, helping them to meet the expectations and new trends of their clients and markets, as OMAE (1982) already said, "the only objective of strategic planning is to enable the company to earn, in a most efficient way, a sustainable margin over its competitors."

It is important to mention that all of these challenges have required increasingly modern practices of planning and measurement of financial and non-financial performances in all organizations worldwide. In order to further clarify one of the strategic tools, the BSC, Fig.2 shows challenges for the company before a globalized world.

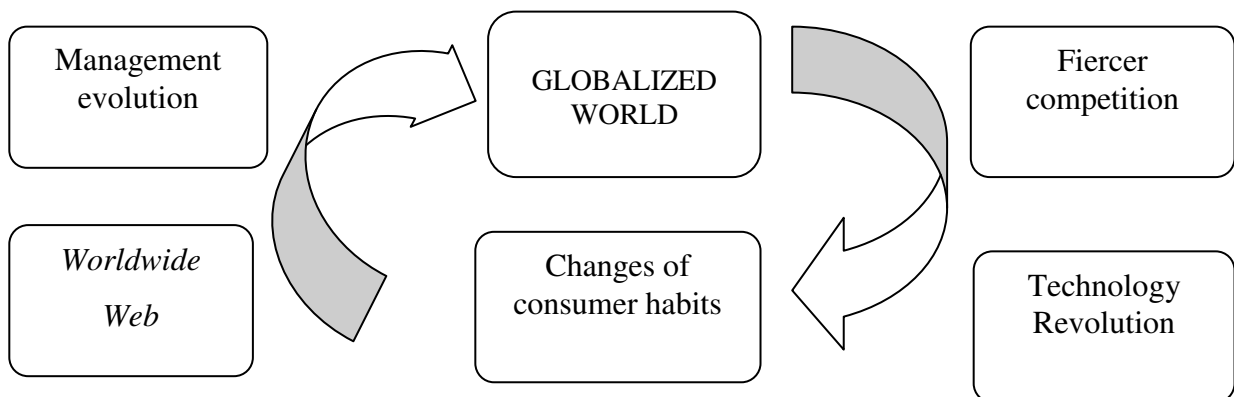


Figure 2: Challenges for the company before the globalized world. Source: Vieira, Imário (2015).

In this context and in some specific cases, this revolution depends on the nuclear area which has brought new technologies in those last decades such as: cancer treatments, wire, cable, gems and seeds processing and food irradiation, preservation of human tissues, wastewater treatment and many others.

These new applications of the nuclear area have brought changes in consumer habits, and somehow, it contributes to a better acceptance that these consumers can no longer live without these new uses of nuclear technologies.

Thus, the emergence of new areas of expertise in nuclear research has led to fiercer competition, especially with the breakdown of barriers in trade transactions because of the emergence of the Worldwide Web. Therefore, the methods and management tools must also follow the speed of those changes. One of those tools is the BSC.

2.2 The BSC - Balanced Scorecard

There are several ways of defining the BSC, according to Silva (2012, p. 97), it is an information system for management of business strategy.

On the other hand, Mansur (2008, p. 02) defines BSC as a system of performance measurement considering the results and causes. However, Kaplan and Norton says that,

Initially the BSC was considered only as a performance measurement system, but subsequently, organizations began to implement it as an instrument for monitoring the company's strategy, electing indicators based on organizational strategy (KAPLAN AND NORTON, 2004).

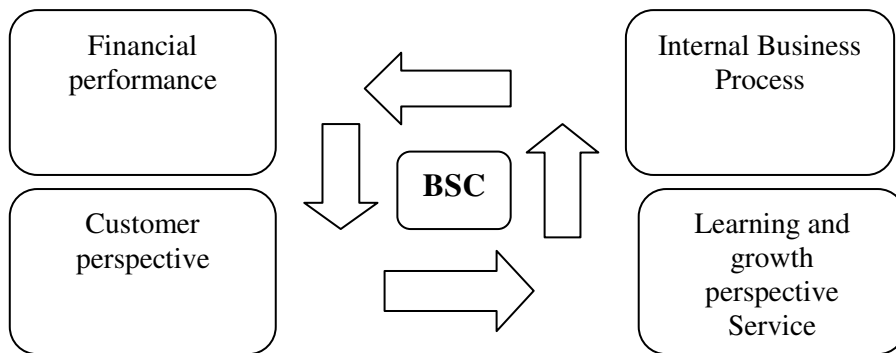
In this way, optimizing decision-making based on strategic planning that uses evaluation methods, such as the BSC and strategic tools, to ensure and optimize results has become crucial these days.

It is worth mentioning that BSC main function is to align the results of an organization by comparing its performance with the goals that were drawn and achieved and, in this way,

identifying possible failures in the process, as a whole, and evaluating how its performance was in order to provide the best possible results.

So, it is worth pointing out that, BSC, besides translating the mission and strategy into a measurable performance, it provides not only a financial analysis, but also includes other operational performance of spheres such as customer satisfaction, innovation, participation, among other things (KAPLAN, NORTON, 2004).

Fig. 3 shows the perspectives of the BSC, as a performance management tool for organizations.



**Figure 3: The four original perspectives of BSC based on Kaplan and Norton.
Source: Vieira, Imário (2015).**

So, it is important to say that, BSC serves to integrate the company's vision at all levels (strategic, tactical and operational) making use of four perspectives: "financial or results, customers or markets, internal processes, learning and growth."(GASSEFERTH, KRAUSE, MACHADO, 2012, p. 120).

It is important to mention that within each perspective an organization must define: a) Objectives – what needs to be achieved in that perspective; b) Measures - how that particular objective will be measured; c) Targets – the target value that the organization is seeking for each measure and d) Initiatives – what will be done in order to reach the target, as shown in Fig. 4.

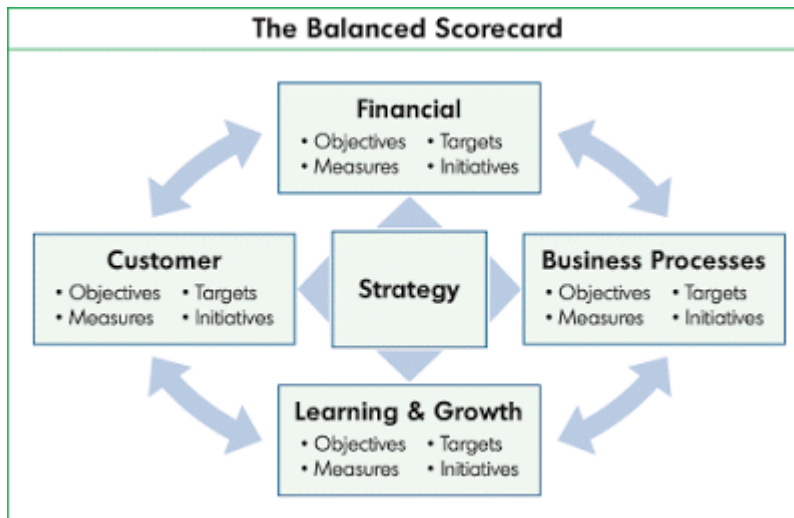


Figure 4: The Balanced Scorecard. Source: Vieira, Imário, 2017.

Once the perspectives have been defined, the BSC can be adapted to the new perspectives to be analyzed by the organization. In this case, regarding the Sealed Sources Production Laboratory it was suggested to divide the areas into other four perspectives: financial, internal process, market & clients and Learning and growth – Services. And finally, establish the indicators that will be analyzed by the management team of the laboratory.

In other words, the BSC is nothing more than a strategic management methodology to monitor the performance of strategies implemented through the use of indicators or performance indicators².

3. INDICATORS

In the area of management, the use of indicators is "[...] preponderant in society, for helping in decision making" (PADILHA, NASCIMENTO, 2015, p.37). Or, it is defined as "tools whose purpose is to assist in the verification of a situation and decision making." (PADILHA, NASCIMENTO, 2015, p.39)

"An indicator should be a kind of identity card for anyone to be able to identify, understand and use as a basis for decision-making on actions to improve business planning [or institutions - our emphasis], improve performance of their operational and corporate processes, increase the degree of motivation and qualification of the people to grow the level of use of the

² The NATIONAL FOUNDATION OF QUALITY (2012) defines a performance indicator as "a numerical data to which a goal is assigned and whose periodic translation is subject to the attention of the managers of an organization."

resources available in their projects. This identity card serves both quantitative and qualitative indicators ... "(GASSENFERTH; KRAUSE; MACHADO, 2012, p.132)

Indicators can help answer the questions, such as: what milestones have been achieved? How far were the results from the goals achieved? After the results, what needs to be done to shift actions towards goals? How was the standard deviation? In relation to the average of the period, the results were above or below the average obtained?

According to NBR 16001: 2012, p. 44 "indicator is a qualitative and quantitative information related to the organization [...]. And it can be used to monitor or evaluate the achievement of the objectives [...]." Good indicators "develops a leading role in society, assisting in decision making. "(PADILHA AND NASCIMENTO, 2015, p. 37).

Indicators can also be used to measure many areas of knowledge, such as administrative, economic, educational, health, environmental, demographic growth, among others.

Therefore, when using the term "indicators", it is necessary the usage of them not only in absolute way to promote an analysis of performance as currently used by many laboratories such the object of this research, but in a relational way, using indicators that make comparisons or crossing data such as: production of scientific papers per student of master's and doctorate, attendance of seminars and conferences per master and doctoral students, research compiled by patents registered with the National Institute of Industrial Property (INPI), and some other examples. Thus, based on this, it was elaborated a proposal (with some relational indicators) such as shown in Table 1.

Thus, it is shown in Table 1, the proposal of these new indicators.

Table 1: Proposal of new indicators (relational ones)

AREA	INDICATORS	MANAGING REPORT PAGE
A) FINANCIAL		
	Total turnover of the previous year / total revenue of the current year x 100	32
	Previous received total assets x total funds received in the current year x 100%	32

	Funding agencies capture last year / current year x 100%	32
B) INTERNAL PROCESS		
Teaching	Number of Doctors / publications in journals, books etc. x 100%	9
	Number of Masters / publications in journals, books etc. x 100%	9
	Number of experts / publications in journals, books etc. x 100%	9
	Number of employees with higher level / publications in journals, books etc. x 100%	9
	Number of articles published in international periodicals of the previous year / current year x 100%	32
	Number of full papers published in proceedings of international scientific events of the previous year / current x 100%	32
	Patent applications in Brazil / Number of research carried out x 100%	32
	Patent applications abroad / Number of research carried out x 100%	32
	Number of master's and doctoral guidelines (completed) / number and teachers and doutroes x 100%	32
	Number of completed guidelines (scientific initiation, master's and doctoral) / number of masters and doctors x 100%	32
	Number of completed post-docs / students that have entered in the Post-doc program x 100%	32
Awards	External awards o nuclear field / external awards received x 100%	32
Technology	Number of technology developed in the previous year / number of technology developed in the current year x 100%	34
C) Market and clients	Market share in radiopharmaceuticals in Brazil last year / current year x 100%	34
D) Learning and growth - Services	Requested products and services / requests attended x 100%	34
	Number of new products and services sold in the previous year / current year x 100%	34

Source: Vieira, Imário, 2015 based on Director Plan 2011-2020 and Management Report 2008-2015.

It is worth pointing out that, indicators which compares data, or relational indicators as shown in Table 1, are much more practical and easier for the visualization of what has been done and what still remains to be done in order to improve performance of an organization, that in this case study is the Sealed Sources Production Laboratory.

4. THE SEALED SOURCES PRODUCTION LABORATORY

The Sealed Sources Production Laboratory for Industrial Radiography and Industrial Process Control, located at IPEN-CNEN/SP is responsible for the production and marketing of more than 350 sealed sources of ^{192}Ir and ^{60}Co annually. And besides of that, this laboratory also supplies sealed sources of ^{75}Se that are distributed to radiators GammaMat and Sentinel.

Currently, the Laboratory of Production of Sealed Sources for Industrial Radiography and Control of Industrial Processes responds by the attendance of 26 private companies.

5. RESULTS OF THIS STUDY

Main results of this study: an improvement of the flow of information inside and outside the institute; an easy viewing of these indicators presented in a comparative or relational form, which gives higher subsidies for decision making for both tactical and strategic level managers. It also shows for its employees and for society actions that were taken and the progress that this Brazilian laboratory and research institute has had in a period o time.

One of the consequences of these small changes in the way of presenting its main indicators was the alignment of strategies around the pursuit of better results year by year and thus, by showing them in a comparative way and crossing data. By doing so, it facilitates the viewing of improvements and deteriorations that the institute has had.

Another consequence of this change is the increasing visibility of this educational and research institute, especially, in relation to research published, increased interaction between the Sealed Sources Production Laboratory and the world's leading laboratories and research centers, increasing academic production of technical articles, among others.

6. CONCLUSIONS

It is worth pointing out that, indicators that compare data, such as those presented in this research, are much more practical and easier to visualize what has been done and what remains to be done in order to improve the performance of an organization.

The use of these indicators will facilitate a faster decision making process and one of the consequences of these small changes in the way of presenting its main indicators is the alignment of the strategies around the search for better results year by year and, with this, to show in a comparative way, an improvement or worsening of these indicators.

The proposal of the use of the BSC initiated a debate on the importance of adapting this system of performance to the public and research sector, facilitating the visualization of actions (taken and future ones) in a simple and understandable way to the stakeholders of this laboratory.

This doctoral study also has shown through actions that the use of BSC as an important tool for the management and accountability, can contribute to a greater visualization of what has been done by this laboratory during the period provided by such indicators.

It is interesting to note that there is no need for profound changes in any organization in order to show that it is possible to promote administrative and strategic modernization. The BSC tool is also a provision of cost to society showing through indicators what this Research Institute and Producer of Sealed Sources, specifically, the Sealed Sources Production Laboratory of Radiation Technology Centre have been doing with the public money.

Finally, it was verified some other important points to be improved and suggested as proposals for future studies and given the expected and obtained results, it concluded that this study was and will be of great value to the showing how practical and easy it can be its management. Thus, constituting an additional strategic tool for the analysis of the capabilities and limitations of the Radiation Technology Centre's Sealed Source Production Laboratory with the use of many other indicators that this research has not contemplated.

ACKNOWLEDGMENTS

We would like to extend our sincere esteems to all staff in Sealed Sources Production Laboratory for Industrial Radiography and Industrial Process Control, in the Radiation Technology Centre, at Nuclear and Energy Research Institute (IPEN/CNEN-SP), in São Paulo, Brazil for their timely support for the preparation of this research, with important data for our analysis and results and everyone who directly or indirectly have contributed to this research.

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