

Balanced Scorecard as a Tool for Sustainable Management Control: A Case Study of the Brazilian Air Force

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Abstract—The amount of waste generated in the current society has undertaken the necessary balance between the economic, social and environmental objectives. The law number 12.305, from August 2, 2010, which instituted the National Solid Waste Policy (PNRS) was regulated by Decree 7.404 of December 23, 2010, originating the Inter-ministerial Committee of solid waste policy. Its approval has initiated a process of seeking solutions to reduce the amount of solid waste and the impacts generated by it. In view of the paucity of studies on sustainability policies adopted by the public sector and multiplicity of waste generated by the Brazilian Air Force, this institution has been chosen for this case study. The method chosen for this research makes it possible to identify the holistic characteristics of an organization. The investigation relied on direct observation, semi-structured interviews, bibliographical and documental research as secondary sources of information. As a result, the paper presents a map of strategic goals and a map of tactical objectives, defining sustainability policies and the design of a sustainable Balanced Scorecard to drive a sustainable vision to be deployed in the Brazilian Air Force.

Index Terms—Sustainability, solid waste policy, sustainability policies, balanced scorecard, Brazilian Air Force.

I. INTRODUCTION

The concern with sustainability extrapolated academic borders to become the main ingredient for the development of institutions that have as their goal the balance between the economic, social and environmental objectives. Today, the public and/or private institutions need to spread the idea and make a commitment to reduce the volume of waste generated in society, since production and consumption are two faces of the same problem: the need to reduce the amount of waste and inefficient management of environmental resources.

The multiplicity of environmental waste from the Brazilian Air Force (FAB) and the necessary enforcement of legislation for the integration of sustainable development principles sparked the need to conduct a research to identify and monitor the impacts generated, aiming at environmental quality control. The provision of guidelines and strategies for policy action can add value to waste increasing the competitive capacity is established within the National Solid Waste Policy (PNRS) culminating in August second, 2010 and in the Public Administration's Environmental Agenda (A3P) of the Ministry of Environment [1].

In this context the research seeks to answer: how

sustainability policies relating to law n. 12.305 which deals about the Brazilian Solid Waste Policy (PNRS) and the Public Administration's Environmental Agenda (A3P), through the Directorate of Aeronautical Engineering (DIRENG), the Central Organ of the Brazilian Air Force Engineering, can be implanted in the Brazilian Air Force (FAB) [1]-[2]?

The overall objective of this study was to introduce, through the making of strategic maps and the drawing of a Balanced Scorecard (BSC) sustainable character, within the framework of the Brazilian Air Force (FAB), sustainability policies relating to law n. 12.305 which deals about the Brazilian Solid Waste Policy (PNRS) and the Public Administration's Environmental Agenda (A3P), through the Directorate of Aeronautical Engineering (DIRENG), Central body of Engineering System of the Brazilian Air Force [1]-[2].

In order to achieve the desired objective, the following specific objectives were established:

- Define strategic goals related to sustainability national policy to be implemented in the Brazilian Air Force, through the Directorate of Aeronautical Engineering;
- Suggest a plan of action based on law n. 12.305 which presents the Brazilian Solid Waste Policy (PNRS) and Public Administration's Environmental Agenda (A3P) [1]-[2];
- Suggest a plan of targets based on compliance with the law n. 12.305 which present the Brazilian Solid Waste Policy (PNRS) and Environmental Agenda of Public Administration (A3P) for the Brazilian Air Force, to be implemented by the Directorate of Aeronautical Engineering (DIRENG) [1]-[2]; and
- Create measurement Indicators and Evaluation to the suggested goals.

The following steps have been fulfilled in the case study on DIRENG: bibliographical and documental analysis; qualitative, exploratory and content analysis technique; interviews (semi-structured) with the managers and servers of Aeronautical Engineering (DIRENG). The ultimate goal is to propose a strategic map setting sustainability policies and the design of a balanced sustainable character Scorecard, under the Command of aeronautics.

II. THEORETICAL FRAMEWORK

Historically, sustainability has been discussed since the decade of 60 in the Club of Rome, where politicians, industrialists and scientists who felt frightened with the impact that economic growth could cause society established

this landmark discussion.

The first major discussion of sustainability was the Stockholm 72 [3]. Twenty years later Rio 92 takes place, which, in addition to the environmental approach, also addressed the social question. The main document generated from this meeting was the agenda 21. This way, every nation would have its agenda that would be linked to their needs and desires.

Discouraged with the impartiality of Rio 92, Rio+10 took place in Johannesburg. Little publicized, yielded a great unease among the participants before the United States refusal to sign the Kyoto Protocol on the reduction of CO₂ emissions until 2012.

Given the above, the changes in the paradigms of competitiveness, globalization, new technologies and issues focused on the environment, society and the economy have meant that companies needed to be sustainable and therefore seek a balance between the economic, environmental and social dimensions, with the purpose of generating profit for their business by producing more efficient and sustainable goods, corroborating with the concept of corporate sustainability.

This way, the information age has brought to the corporate world the emerging need of an organizational change that will outlast many of the premises of industrial competition. According to Kaplan (1997) the organizations as a whole can no longer obtain sustainable competitive advantages only with rapid implementation of new technologies and fixed asset, or with the excellence in effective management of financial assets and liabilities [4].

The new business scenario requires organizational sectors, public and private, methodologies each time more modern and efficient management, suggesting new techniques which allow a better orientation not only focused on the financial aspect, but also to the social and environmental aspects, seen today by businesses as competitive differentiators.

Kaplan and Norton (2001) argue that only financial data cannot determine if a firm or organization is or is not on the right track. In this sense, the BSC system seeks to work its analysis in four dimensions: financial, customer, business and learning and growth [5].

The reality of the worldwide environment of organizations, both in Brazil and in the world, goes through an identity crisis between growth and sustainability, having as main paradigm the pursuit of economic growth through social and environmental responsibility. According to J. E. Santos (1996: 41) "The humanity of today has the ability to develop in a sustainable manner however we need to ensure the needs of the present without compromising the ability of future generations to meet their own needs" [6].

According to Kaplan and Norton (1997, p. 25), "the Balanced Scorecard reflects the balance between short-term and long-term objectives, between financial and non-financial measures, between indicators of trends and events". These two theorists defined initially in the BSC as a performance measurement system and later as a strategic management system [4].

The Balanced Scorecard was born in 1990, through a study and has since been perfected as a tool for management of many companies. It is presented within the context of enterprise as a management system of financial and

non-financial resources and not as a simplistic view that used to see the Balanced Scorecard as a set of methods or measures. This innovative system allows the company a clearer vision and objective of the strategies that must be adopted through actions, respecting the performance indicators according to four perspectives: financial (such as profitability and earnings per shares), customers (market size, growth in participation, consumer satisfaction and retention index), processes (efficiency, costs and services) and learning and growth (training knowledge management and future prospects).

For Canevarolo and Martins (2005) the Balanced Scorecard stands for three basic functional moments: as performance measurement system, then as a strategic management system and, finally, as the system for guiding the Organization's strategic focus [7].

The definition of sustainable development within the Balanced Scorecard methodology falls from a systemic vision that includes environmental development along with the economic development and growth. This term was first used in the year of 1987, the Brundtland report (1999) as described below in an excerpt from the report [8]:

"The development that seeks to meet the needs of the present generation without compromising the ability of future generations to meet their own needs, means enabling people, now and in the future, reach a satisfactory level of social and economic development and human and cultural achievement, making at the same time, a reasonable use of the Earth's resources and preserving species and natural habitat".

Western society is characterized for being a consumerist society that seeks at all times to meet their immediate needs, but much of its needs or desires may not be supplied to the extent that a large part of this population requires assistance policies that directly or indirectly terminate complementing the sustainable growth of the economy.

Law n. 12.305, August 2, 2010, establishes the national solid waste Policy, featuring on its principles, objectives and instruments, as well as on the guidelines for the integrated management and solid waste management, including hazardous waste, the responsibilities of the generators and public authorities and to the relevant economic instruments [1]. It was regulated by Decree n. 7.404, December 23, 2010, which, among other things, establishes the Inter-ministerial Committee of the Brazilian Solid Waste Policy.

According to the Ministry of health/2011, this marked the beginning of a strong institutional articulation involving the three federated entities - the Union, the States and municipalities, the productive sector and the civil society in the search for solutions to the serious problems caused by waste, which is compromising the quality of life of Brazilians.

Currently, 13% of municipal waste is recycled, however, the potential for recycling is much larger. Recent study of the "Institute of Applied Economical Search" (IPEA) and the Federal Government, indicates that the country loses R\$ 8 billion annually by burying recyclable materials that may come back to the industrial production. Besides the economic aspects, recycling saves natural resources, like water, in addition to providing the rational use of energy and less emission of greenhouse gases. From these environmental

challenges, allied to social issues, the new legislation points out the responsibility of organizations in manufacturing packaging and more easily recyclable products or that generate less environmental impacts. Measures to reduce waste, start from the design of the products and permeate throughout its whole life cycle, including also transportation and final disposal.

According to the Brazilian Institute of Geography and Statistics (IBGE), held in 2000 (National Survey of Basic Sanitation - PNSB), of the 5.507 Brazilian municipalities, 4.026, there is, 73.1% have the population to 20.000 inhabitants. In these municipalities, 68.5% of the waste generated are leaked in landfills and/or flooded. However, if we take as a reference the amount of garbage they generated by this set of cities in relation to the total of the Brazilian production, the situation is less severe, because they collect only 12.8% of the total (20.658 t/day). This is less than the waste generated by the 13 largest cities with population over one million inhabitants that collect 31.9% (51.635 t/day) of all the urban garbage, and have their final disposal in controlled and sanitary sites: only 1.8% (832 t/day) is destined to dumps, the remainder being deposited in controlled landfills or sanitary.

The problem of the final disposal takes on an alarming scale. Considering only the public and municipal waste, what we see is a widespread action of local governments, over the years, just away from the urban areas the garbage collected, depositing it sometimes in places absolutely inappropriate, such as wooded slopes, mangrove swamps, rivers, bays and valleys. More than 80% of the municipalities in their local waste leak in the open, in watercourses or environmentally protected areas, most with the presence of scavengers – among them children, denouncing the social problems that the mismanagement of garbage.

To manage waste in an integrated manner demands unabridged work with the social aspects of work with the technical and operational planning of urban cleaning system. The statistical data of urban cleaning are deficient because the city halls have difficulty in presenting them, since there are various patterns of measurement of various services. The only national-level information is a result of the National Survey of Basic Sanitation (PNSB), its last edition in 2000. With respect to the costs of various services, the information also are not reliable, because there are no parameters to set values that identify each task performed, in order to compare it with data from other cities.

Despite this picture, the garbage is the most developed segment within the urban cleaning system and which presents the greatest breadth of care by the population, whereas is the system activity that demand a higher percentage of resources on the part of the municipality. This fact is due to the pressure exerted by population and by Commerce to run the collection on a regular basis, thus avoiding the hassle of coexistence with the trash on the streets. However, this pressure usually has a selective effect, namely, the municipal administration, when it has no means to offer service to the entire population, prioritizes trade sectors, health units and the highest-income population. Expansion of coverage of services rarely reaches the really needy areas, not least because the lack of road infrastructure requires the adoption of alternative systems, which have low efficiency, therefore, higher cost.

Another point of great importance was the emergence, in Brazil, in 1981, of the law of the National Environment Policy (Law n. 6.938), a landmark in the development of environmental law, establishing legal definitions on the topics: environment, environmental quality degradation, pollution, polluter and environmental resources. Established an important mechanism of environmental protection – the prior Environmental Impact Study (EIA) and its report (RIMA), Modern Instruments in Environmental Terms.

The Federal Constitution of 1988 dedicated in its title VIII, of the Social order, in chapter VI, article 225, directional standards of environmental problems, setting environment as well of common use by the people [9]. On the other hand, the law n. 9.605, February 12, 1998, which deals with environmental crimes, is considered a milestone in effective protection of the environment.

In turn, the UN Conference on Environment and Development held in Rio de Janeiro, the ECO-92, corroborated in global terms the concern with environmental issues, strengthening the principles and the rules for combating environmental degradation, elaborating the Agenda 21, sustainable development policy instrument.

In the face of the Brazilian legal system, it is understood on being feasible the implementation of a more sustainable consumption policy by the Public Administration.

According to the Ministry of Environment the Environmental the Public Administration's Environmental Agenda (A3P) is a program that aims to implement sustainable social and environmental management of administrative and operational activities of the Government [2]. The A3P has as principles to integration of environmental criteria; ranging from a change in investments, purchases and contracting of services by the Government; until a proper management of waste generated and natural resources used as main objective the improvement of the quality of life in the work environment.

The A3P is a voluntary decision responding to the understanding that the Federal Government has a strategic role in the review of production and consumption patterns and the adoption of new benchmarks in pursuit of social and environmental sustainability. The program has as public managers awareness of guideline for environmental issues, encouraging them to incorporate environmental management principles and criteria in administrative activities, through the adoption of actions to promote the rational use of natural resources and of public goods, the proper management and the decrease in the volume of waste generated, sustainable procurement actions/green purchases and still in the process of continuing education of public servants.

The Agenda is based on the recommendations of Agenda 21, chapter IV, which indicates to the "establishment of programs focused on the examination of unsustainable patterns of production and consumption and the development of national policies and strategies to encourage changes in unsustainable consumption patterns"; in Principle 8 of the Rio/92 declaration which says that "States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies"; and even in Johannesburg Declaration establishing the "adoption of sustainable consumption as basic principle of sustainable development".

The A3P is an invitation to individual and collective

commitment to the changing habits and the dissemination of the action.

III. METHODOLOGY

In view of the shortage of approaches with regard to sustainability policies to be incorporated in the public administration, the methodology to be used is the case study, since according to Yin (2001, p 77) "... the case study allows an investigation capable of retaining holistic and meaningful characteristics of real-life events, such as individual life cycles managerial and organizational process (...) international relations, and maturation of enterprises " [10].

Was selected as the Organization to analyze the Brazilian Air Force and further your Engineering Department. Will apply, in the realization of the study, the following techniques:

- 1) Direct observation, semi-structured interviews conducted with managers of the Board of Aeronautical Engineering (DIRENG);
- 2) Direct documentation technique by means of bibliographical research and documentation.

The desired end result is to propose, with the use of these techniques, a map of strategic and tactical goals setting sustainability policies and the design of a Balanced sustainable character Scorecard, under the Command of Aeronautics (COMAER).

IV. RESULTS

Followed the steps of case study with the Board of Aeronautical Engineering (DIRENG) — literature and document analysis; qualitative research, exploratory and content analysis of interviews, semi-structured interviews with the Manager and with the servers of DIRENG, was a map of strategic goals and a map of tactical objectives, defining sustainability policies to be used as part of the Air Force Command. As a conclusion, of this work was drawn the Balanced Scorecard of sustainable character to that organization.

Upon completion of the interviews, we can see that on the chart drawn for the Brazilian Air Force, the sustainability Division that would be created to regulate, supervise and monitor sustainability policies to be implemented, should be made subject, initially, to the Board of Directors of Engineering (DIRENG) who is responsible for the control of all the works of the Organization as well as ancillary tasks such as looking after the heritage, taking care of the fire and structure to ensure the institution's fleet. Respondents unanimously attributed to this board the subordination of the sustainability Division. In this context all maps constructed, as well as the Balanced Scorecard proposed Sustainable, were based on the proposals set out in the interviews and documentary analysis of the Law n. 12.305 and the Agenda (A3P) [1]-[2].

The strategic plan aims to steer the Organization through a path that it can achieve a competitive advantage in front of the market it serves, it is necessary for the analysis of organizational environment so that those strategies are well directed. In this research, the first map orients the company through strategic objectives that will be divided into the

dimensions proposed by the Balanced Scorecard. However since this is a government organization where his primary focus is not on profit, it was decided on the basis of the interviews put as top customer perspective, which in this case it is the society and is the reason to exist.

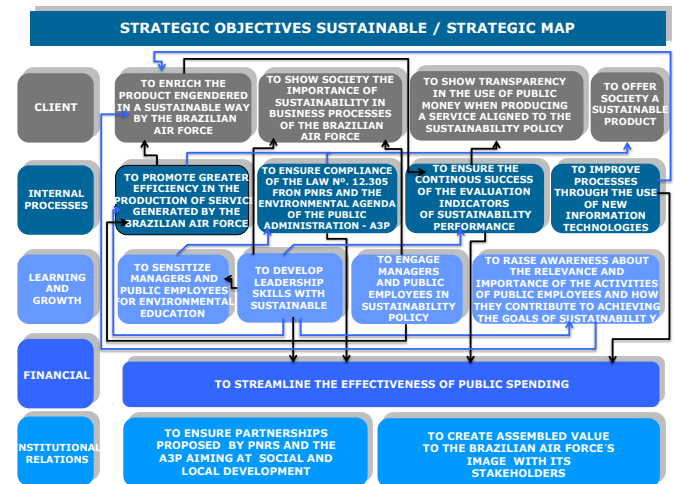


Fig. 1. Strategic objectives sustainable / strategic map..

Conducted strategic studies, was pieced together a team composed of two members of researchers and a SDE/DIRENG boss. After several discussions based on interviews, tactical goals were constructed taking into consideration each strategic objective as defined in Fig. 1.

Fig. 2-Fig. 5 present the tactical objectives so grouped by strategic objective in each perspective. Fig. 6, presents the synthesis of these goals translated into Sustainable Balanced Scorecard design for the Brazilian Air Force.

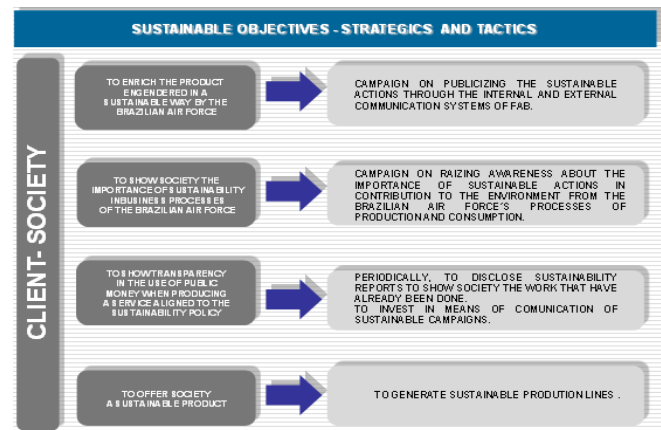


Fig. 2. Sustainable objectives/strategic and tactical perspective – Client

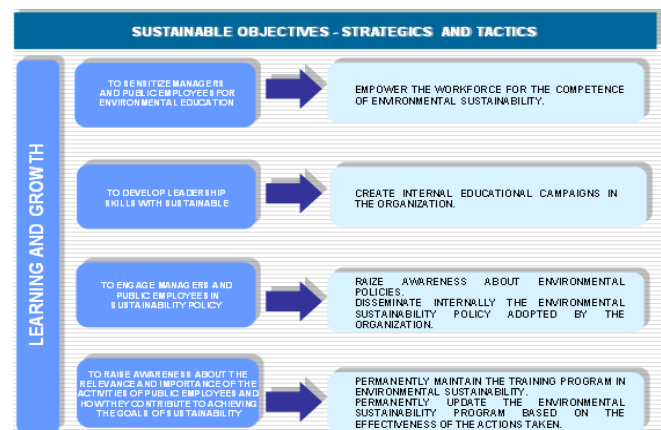


Fig. 3. Sustainable objectives/strategic and tactical learning and growth perspective.

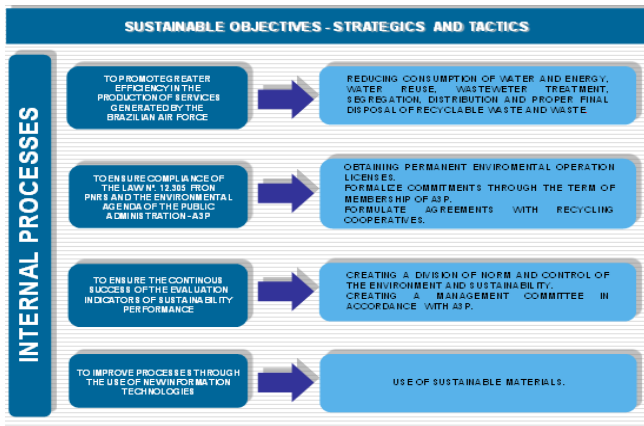


Fig. 4. Sustainable goals – strategic and tactical internal processes perspective.

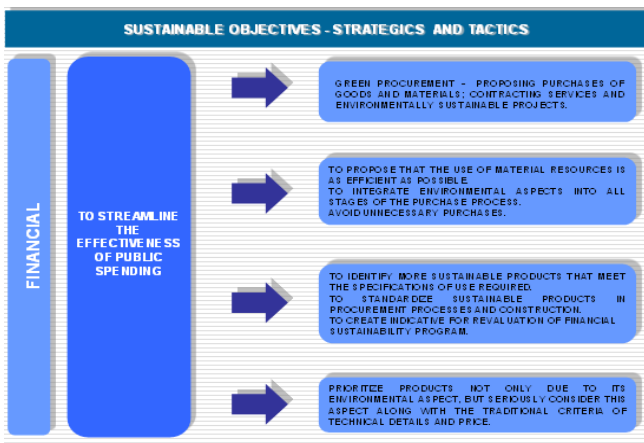


Fig. 5. Sustainable goals – strategic and tactical financial perspective.

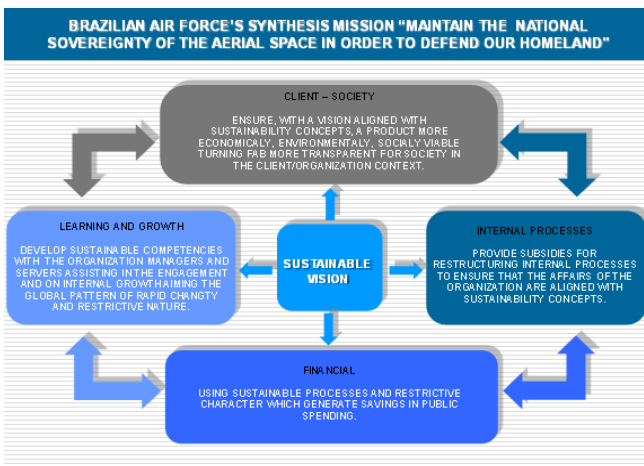


Fig. 6. The balanced scorecard sustainable for the Brazilian Air Force.

V. CONCLUSION

The growing need for sustainability policies in the governmental sphere, the multiplicity of environmental waste from the Brazilian Air Force (FAB), and the necessary enforcement of legislation for the integration of sustainable development principles sparked the need to conduct a search to identify and monitor the impacts generated, aiming at environmental quality control.

The provision of guidelines and strategies for policy action can add value by increasing the competitive capacity is established within the National Solid Waste Policy (PNRS) culminating in August second, 2010 and in the Public

Administration's Environmental Agenda (A3P) of the Ministry of the Environment [1]-[2].

Thus, the present case study made it possible to carry out, through the interviews and documentary and bibliographical analysis performed, the production of maps of strategic and tactical goals, as well as the application of Balanced Scorecard in order to contribute, within the framework of the Brazilian Air Force (FAB), for the implementation of sustainability policies related to n. 12.305 Law, that focuses on the National Solid Waste Policy (PNRS) and the Public Administration's Environmental Agenda (A3P) [1]-[2].

REFERENCES

- [1] Brazil. Ministry of the Environment. *A3P. Environmental Agenda in Public Administration* - Program of the Ministry of the Environment. [Online]. Available: <https://www.mma.gov.br.htm>. Accessed on: 14 nov. 2009.
- [2] Brazil. Ministry of the Environment. *Law n. 12.305*, National Solid Waste Policy – PNRS, sanctioned in August 2, 2010. [Online]. Available: <https://www.mma.gov.br.htm>.
- [3] Sweden. Stockholm Conference. [Online]. Available: pt.wikipedia.org/wiki/Conference_of_Stockholm
- [4] R. S. Kaplan and D. P. Norton, "The Strategy in Action: Balanced Scorecard," Translation by L. E. T. F. Son, Rio de Janeiro: Campus, 1997.
- [5] R. S. Kaplan and D. P. Norton, "Organization-Oriented Strategy: How Companies Adopting the Balanced Scorecard Thrive in the New Business Environment," Translation of A. C. S. Cunha, Rio de Janeiro: Campus, 2001.
- [6] J. E. Santos, T. P. Jesus, H. C. Oliveira, and M. V. R. Ballester, "Perceptual characteristics of the Ecological Station of Jataí" *Annals. VII Sem. Reg. Ecology*, VII: 309-353, 1996.
- [7] M. E. P. Canevarolo and R. A. Martins. Case study on Implementation of Balanced Scorecard, in: *Annals. XXV ENEGEP*, Porto Alegre, RS, Brasil, PUC/RS-ABEPRO, 2005.
- [8] Report Brundtland-Our Common Future. [Online]. Available: <http://pt.scribd.com/doc/12906958/Relatorio-Brundtland-Nosso-Futuro-Comum-Em-Português>.
- [9] Brazil. Presidency of the Republic. Civil House. *Constitution of the Federative Republic of Brazil*. [Online]. Available: http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm.
- [10] R. K. Yin, "Case Study: Design and Methods," 2nd ed. Porto Alegre: Bookman, 2001.



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