

Integration between environmental management and strategic planning in the oil and gas sector

Alessandra Magrini, Luiz dos Santos Lins*

Administration and Accounting College (FACC), Federal University of Rio de Janeiro, Rua Araguaia, 1215, bloco 2, apto 405-Freguesia-Jacarepaguá, Rio de Janeiro, CEP: 22.745-271, Brazil

Available online 8 June 2007

Abstract

For activities that have a high possibility of causing environmental accidents, like in the oil and gas sector, it is reasonable to expect the environmental management to be an important variable within the company's strategic planning. However, this is not always true. In some cases, a change in the companies' attitude, abandoning a reactive position and assuming a proactive one, only happens upon the occurrence of serious environmental accidents with strong repercussion in the media. For the company that was the object of study, these accidents gave rise to deep changes in its environmental management, culminating in investments of approximately US\$ 2.6 billion in environment, health and security, from 2000 to 2004. This was the highest amount to date invested on these areas by an oil company.

This case study seeks to discuss the integration between environmental management and strategic planning in the oil and gas sector over a period of 10 years (from 1995 to 2004) in order to make a contextual analysis of the period before and after the environmental accidents possible.

© 2007 Elsevier Ltd. All rights reserved.

Keywords: Strategic planning; Environmental management; Environmental accidents

1. Introduction

Since the end of the 1980s, the major world corporations have been paying more attention to the environmental issue, whether because of the strictness of regulations or because of the awareness and subsequent demand from society for more commitment to the environment. Besides these legal and social issues, financial specialists foresee that the environmental concerns from large organizations—which are interested in attracting new investors—are going to increase a lot and will be an important distinguishing factor, influencing investors' choices as well as resulting in financial returns. It is interesting to observe that—even if only the financial returns in the December 1993–June 2004 period are considered—companies' stocks included in the *Dow Jones Sustainability Group Index (DJSGI)* had an appreciation of 146% versus 108% of the *Dow Jones* general index (Exame Guide, 2004).

A way of trying to evaluate the importance of the environmental issue within these large organizations is to estimate the interaction level between the environmental management adopted by the company and its strategic planning. The analysis of this interaction becomes even more relevant when the occurrence of serious environmental accidents has a strong repercussion in the media. In 2000, the studied company was responsible for two serious environmental accidents, with a total oil spill of about 5.3 million liters. The accidents made the company change drastically both the strategic plans and, mainly, the environmental management.

Traditionally the oil and gas sector is one of the most harmful activities to the environment. The World Bank, using the database of *Industrial Pollution Projection System (IPPS)*, presents the petrochemical sector as highly risky polluting agent for several types of different pollutants (Young, 2000/2001). We should also remark the high risks of oil and its derivatives spills mainly during pumping and transportation operations. The chart below shows the main polluting gases emissions from the petrochemical sector among others.

*Corresponding author. Tel./fax: + 55 21 87288078.

E-mail address: llins@facc.ufrj.br (L.S. Lins).

Table 1
Pollutants proceeding from oil activity and others

Pollutant	Industrial sectors
Sulphur dioxide, SO ₂	Metallurgy of not ferrous; oil refinery and petrochemical industry
Nitrogen dioxide, NO ₂	Oil refinery, petrochemical industry and siderurgy
Carbon monoxide, CO and volatile organic composites, COV	Oil refinery, petrochemical industry, siderurgy and chemicals

Source: Adapted from Young (2000/2001).

According to Table 1, we can see the importance of the oil and gas sector in any discussion related to environment preservation. Besides this, in respective literature (Ghobadian et al., 1995; Azzone et al., 1997; Ahmed et al., 1998; Sharma, 2000; Banerjee, 2001; Faulkner et al., 2005), there are still some questions that can be explored such as the integration between strategic planning and environmental management.

Contributing to this discussion, by presenting how environmental management has evolved in 10-year time, its relation and integration with strategic planning before and after serious environmental accidents, the possible effects on the financial performance during this period of the largest Brazilian company and one of the 14 large companies in this sector of the world constitute the relevance of this research. So, the aim of this study is to discuss the integration of the environmental management with Petrobras—Petróleo Brasileiro S/A strategic plans, as well as measure the changes that occurred after the environmental accidents in the 1995–2004 period.

2. The strategic planning and the environmental management

For Anthony and Govindarajan (1998), strategic planning consists of the process through which the programs that will be adopted by the company are selected, and the approximate quantity of resources that the company will reserve for each program is determined in the following years. They also point out that the strategic planning is systematic; there is a process of annual planning, with definite procedures and deadlines. However, the strategic formulation is not systematic. The strategies are always reexamined when opportunities and risks appear.

Strategy can also be understood as a company's "choice and commitment" to its goals and practices. The incorporation of environmental management to strategic planning can be evaluated according to the priority of its implementation, maintenance and update, besides the resources invested on the area (Lee and Rhee, 2007).

The correct implementation of strategic planning shall be capable of foreseeing obstacles and preparing possible solutions before the problem appears. Besides this, it is necessary to monitor its execution so that any conduct

Table 2
Strategic planning advantages and limitations

Advantages	Limitations
It provides a suitable structure for the elaboration of the annual budget	Strategic planning may end up changing into a bureaucratic activity, divorced from strategic thought
It provides an executive improvement tool	
It makes a long-term foresight possible	High executives consume too much time for the elaboration of strategic planning
It aligns the executives with the company's strategy	
It helps in the determination of the short-term necessary steps for the accomplishment of the long-term strategies	It can only be used in companies that are able to make reliable projections of the future

Source: Adapted from Anthony and Govindarajan (2002).

deviation is identified and corrected before creating greater problems. The strategy shall be flexible enough to adapt itself to external scenario changes, by keeping it competitive in the market (Kumar et al., 2006). One of these important scenario changes are the increasing requirements, both legal and from the society itself, regarding the environment preservation.

Among other advantages, the correct use of strategic planning makes it possible for all the employees to understand how they can contribute to the success of the company as a whole. However, when the strategic planning is not correctly implemented and used, it also presents limitations as per table below.

From the points presented in Table 2, some aspects can be pointed out. Regarding strategic planning advantages, a long-term vision and its relation with short-term measures are vital issues for the integration between strategic planning and environmental management, as a great part of the strategic decisions, which have effects both in short and long terms, go through an evaluation of possible effects on the environment preservation, specially in high-risk activities such as oil and gas. Regarding the limitations, the strategic planning transformation into a bureaucratic activity, when integrated with environmental management, makes both simply figurative pieces, without any operational usefulness.

Although the issues related to environment have been the center of several current discussions in the world, there is still a long way to go regarding the relationship between environmental management and strategic planning. Some researches done in the past decade identified the existence of environmental issues influence on companies' strategic planning (Ahmed et al., 1998; Azzone et al., 1997; Ghobadian et al., 1995). However, 10 years later, a research done in the United Kingdom identified the existence of a certain distance between environmental management and the business strategic planning. This distance is more significant than the distance between the creation of environmental management and its implementation.

Although there is a constant trend to reduce this distance (Faulkner et al., 2005). Considering North American companies it has been observed that industries that have high environmental risks present a greater integration between environmental issues and strategic actions than other sectors that have a lower risk (Banerjee, 2001).

For large organizations, mainly the high risk sectors (the oil and gas sector, for example), the environmental issue has become increasingly more important, both for the reduction of costs and, especially, for the improvement of the institution's public image (Sharma et al., 1999; Miles and Covin, 2000; Toms, 2001). Large corporations' concern about institutional image, notably in highly risky activities, has made these companies spend large sums of money on sponsoring, propaganda and partnerships with non-governmental organizations, aiming at improving their image and legitimacy before society using these organizations' credibility (Yaziji, 2004).

The image issue becomes even more relevant if we consider that, according to Kaplan and Norton (2000), tangible assets book value represents, at the moment, only 10% of the organizations' market value. Among the assets considered intangible, the organization's public image is one of the most important factors.

On the other hand, the environmental strategies depend strongly on how the administration office views the environmental issues, either as opportunities or threats (Sharma, 2000). When seen as an opportunity of increasing its profitability, the company assumes a proactive position, and the administration office becomes more open-minded with respect to the investment of budget resources. When seen only as threats or costs, the company assumes a reactive position, with a tendency of following the established legal regulations to avoid penalties. However, the environmental issue has ceased to be considered only as a legal requirement and started to be considered as another important variable within the managerial competitiveness; in some companies, it became a fundamental and definitive part of the highest hierarchical levels of strategic planning. Donaire (1999) points out that, when the environmental excellence is not achieved, it can be disastrous, and the environment, unrecoverable. Alternatively, when the environmental excellence is achieved and well explored, this may be converted into profit and growth opportunities. Another point raised by the author is regarding organizations where environmental accidents have happened. In these companies, the environment sector usually shows a high level of functional authority.

There are several factors that make the companies invest on environmental policy. In Table 3, the main reasons why companies worry and invest on issues related to environment are listed. Please note that the institutional image has more emphasis. It is interesting to observe that the motivation for environmental investments, besides image improvement, passes by performance improvement at the same level of importance as the legal imposition. This fact may indicate that a greater legal imposition does not

Table 3

Main factors that motivate investments on environment (%)

Factors that stimulate investments in environment	Moderate or important	Very important
Institutional image improvement	46	45
Legal imposition	44	43
Environmental certification	34	40
Performance improvement	44	32
Competitiveness	39	28
Costs reduction	33	16

Source: Adapted from Real (1999).

exclude companies' performance improvement (Porter and Linde, 1995).

According to Ingar (2001), the correct integration between environmental management and company's strategic planning necessarily involves the following points:

1. integration between environmental management and managerial goals;
2. integration between environmental information and the financial and administrative information systems;
3. integration of environmental considerations in the whole production process;
4. integration between environmental performance and the existing performance appraisal systems.

The author also emphasizes the benefits of an efficient integration, highlighting the following benefits:

- (a) better knowledge of the environmental effects caused by the company's activities;
- (b) costs decrease and competitive advantages increase;
- (c) institutional image improvement;
- (d) identification and reduction of the environmental risks and impacts of the products and processes.

For Coral et al. (2003), dealing strategically with environmental and social issues brings to the company advantages in identifying new business opportunities, through the use of its environmental performance as a source of competitive advantage; this helps the company to assume an increasingly proactive attitude. Tachizawa (2002), in his turn, says that the inclusion of environmental management as a part of the strategic planning has been influencing the long-term decisions in various large organizations, such as Xerox, Toyota, Carterpillar, Dow Química among others.

It is possible to verify an increasing trend for *stakeholders* to try to identify, in the long-term, profit opportunities and competitiveness increase, as well as to evaluate the business risks under the economical, environmental and social optics (Ingar, 2001).

Specifically regarding performance appraisal, the strategic planning can present three basic elements: strategy implementation, internal and external controls. According

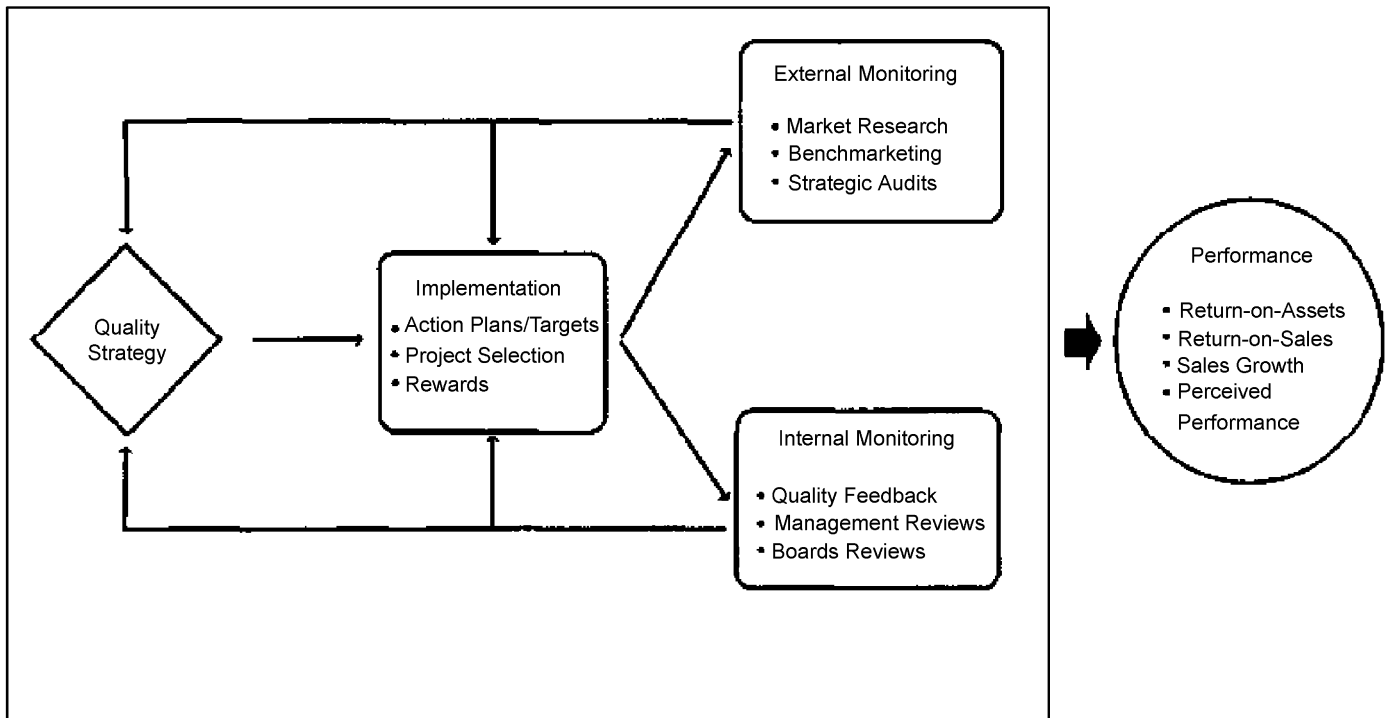


Fig. 1. Conceptual model linking quality strategy and strategic control practices to organizational performance. Source: Ittner and Larcker (1997).

to Table 1, the effective implementation controls include the development of action plans and objectives for the chosen strategic goals to be achieved, besides the involved execution agents' responsibilities. Internal and external controls guarantee the follow up of what has been forecast and what has been executed (Ittner and Larcker, 1997). The same authors also identify the four possible limitations in the formal strategic controls systems listed below (Fig. 1):

- lack of focus in the strategic action plans;
- limitations in performance measurements;
- bureaucracy increase;
- strategic controls systems inflexibility.

Companies' financial performance nowadays is also increasingly affected by the costs and opportunities presented by environmental issues. In this direction, companies' administrators and business analysts could use environmental issues in the following aspects, among others:

- Discovering environmental liabilities or risks in possible negotiations for new investments acquisitions.
- Evaluating necessary investments for the reduction of risks of environmental accidents.
- Evaluating and comparing the best practices in the market to the main competitors (Repetto and Austin, 1999).

The same authors emphasize some main aspects that have to be considered in the relationship between strategic

planning and environmental management: (a) identification of important future environmental issues; (b) establishment of possible scenarios and their possibilities of action; (c) evaluation of company's risks for each of the established scenarios; (d) calculation of possible financial impacts for the most likely scenarios; (e) develop measures to mitigate possible impacts and expected risks.

According to *Corporate Environmental Performance 2000 Survey*, quoted by Gee (2001), the investors and the other members of the financial community reveal the need for more information related to environmental issues. Among them, we can highlight the following:

- the adopted environmental policy,
- improvements in the long-term environmental policy,
- projects and financial investments focused on environmental issues,
- observance of the legal aspects related to environment and inherent to the company's activity.

Regarding the possible incompatibility between the growing strictness of the environmental regulations and the companies' competitiveness, Porter and Linde (1995) consider that the implementation of a suitable environmental management system to comply with these regulations implies in the restructuring of the production process through the search of constant innovations. This results mostly in a more efficient use of inputs in the production process (energy, manpower and raw materials) and also in a relevant cost economy, immediately improving the cost/benefit ratio of the investments on the environment, and

consequently, increasing productivity and competitiveness. One of the causes the authors pointed out to explain this relationship comes from the fact that the large organizations, which have a better efficiency in the production process mainly because of up-to-date technology usage, present, in general, better indicators related to environmental pollution.

Some researches (Karagozoglu and Lindel, 2000; Cohen et al., 1997) demonstrated that there is a direct and positive relationship between the company's environmental performance and financial performance as well as between environmental innovation and competitiveness.

3. Case study

Aiming at achieving better details regarding the level that the research proposes to reach, the case study has been considered as the most appropriate research methodology. The choice of this methodology comes from the fact that a case study is more appropriate when searching for answers to "how" and "why" questions, when the researcher has little control over the events and when the focus is on contemporary phenomena inserted in any context of real life (Yin, 2001). According to the same author, in general, a sole case study is justifiable, for example, where the research serves to a revealing purpose regarding a certain fact.

The essence of a case study, the main trend in all types of case study, is that it tries to clarify a decision or a group of decisions: the reason why they have been taken, how they have been taken and which results have been obtained (Schramm, 1971).

The following three types of research data collecting were used:

- (a) *Bibliographical review* where books, periodicals, articles, dissertations, theses and internet were consulted. We searched for the current vision on the main aspects related to strategic planning, environmental management, environmental accidents and a possible relationship between them.
- (b) *Documentary research where the following sources were used:* financial statements, strategic plans, annual reports, social balance sheet, besides other information published by the company regarding the period under evaluation. Financial statements were used to verify the investments made on environment, besides the accidents possible effects upon the company's economical and financial performance. We verified in the strategic plans how quotations related to the environmental variable were presented in the strategic context, more specifically in the company's vision and mission concepts. To achieve this research objectives the following definitions were used: vision is what the company aims to be or become. Mission is the aim or the reason for an organization's existence (Alday, 2000). In other words, vision represents how the

company sees itself and mission shows the path to be continuously trailed in the long-term, besides representing how an organization wants to be seen by society. In this direction, it is possible to consider that the way the vision and the mission are presented constitutes a relevant way to evidence the company's objectives and commitments before society as a whole and specifically regarding the environmental issue.

The main objective of verifying the strategic plans was to highlight the frequency that expressions related to environment were evidenced in the strategic plans, as well as to state the existence or not of any relationship between the occurrence of these expressions and the increase in investments on environment before and after environmental accidents occurred.

The other documents, specially the social balance sheet, were used to complement and/or rectify information obtained during the interviews; and

- (c) *c) Field research:* The research was conducted after semi-structured interviews with each of the responsible managers for Health, Safety, Security and Environment (HSSE), Strategic Planning and National Communication areas.

According to the company's organization chart (www.petrobras.com.br), the interviewee for National Communication reports to the Institutional Communication Director who reports to the company's Chief Executive Officer. The interviewee for Strategic Planning reports directly to the CEO and the HSSE manager interviewed reports to the Services Director who reports to the CEO. It is important to mention that the authors themselves submitted the questionnaire in the researched company's buildings, thus causing a rate of 100% of devolutions. The semi-structured interviews were used because they offer a broader field of interrogatives, deriving from new hypotheses that occur as the interviewees answer the questions (Triviños, 1987).

A questionnaire was used aiming at detailing the strategic planning and the environmental management as well as verifying senior management's perception regarding the integration of both. The interviews based on the questionnaire application were made between May 2005 and June 2005. The questionnaire had 23 questions and most of them were open. For all the interviewees' answers the possibility of partiality and how this could distort the analysis was considered. Therein, when it was necessary and possible, all the answers were compared to the information in the financial statements, strategic plans and other documents.

In brief, the research analyses is divided into three basic sources or investigation fields: (1) the strategic plans in effect or elaborated in the periods 1990–2000, 2000–2010, and 2005–2015; (2) the financial statements properly audited; and (3) the company's perception through the

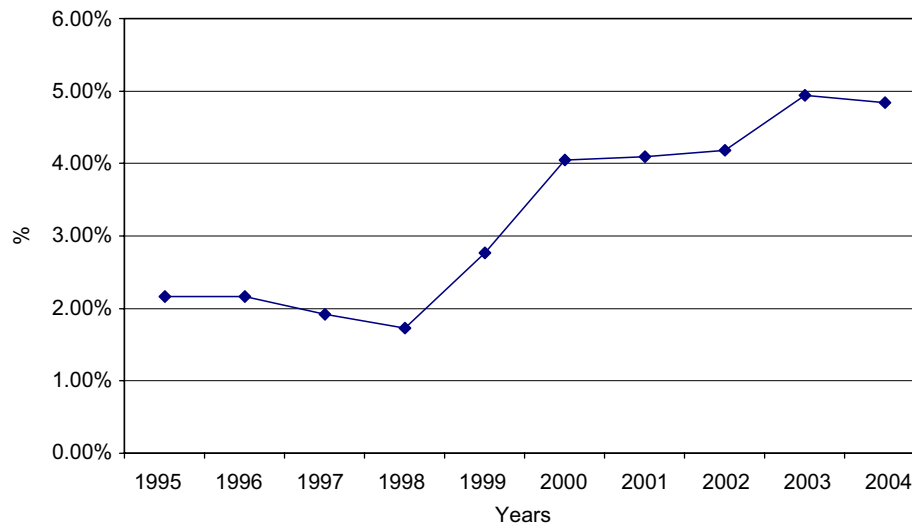


Fig. 2. Relation between Petrobras' Net Revenue and Brazilian GDP. Source: Adapted from www.ipeadata.gov.br and Petrobras' accounting statements.

use of semi-structured interviews using a questionnaire given directly by the researchers. Note that insider or confidential information was not considered for analysis.

Petrobras, which was created in 1953, is a mixed-capital company, with government control over 41% of the shares, the rest of the shares being distributed among Brazilian (23%) and foreign (36%) investors. The company acts, together with its subsidiaries, in the exploration, production, refinery, transportation and distribution areas. Nowadays, it has 95 production platforms, approximately 16,000 drilling wells; 900 are deep-sea wells with an estimated production of 1.7 million barrels of oil a day; 16 refineries have a primary processing capacity of about 1.9 million barrels a day and pipelines of 30,318 km. The company acts in approximately 15 countries such as The United States, Mexico, China, Bolivia, Nigeria, Argentina, and others (www.petrobras.com.br).

Its importance to the Brazilian economy can be verified through the analysis of the percentage ratio between its net income and Brazilian Gross Domestic Product (GDP) in the period under analysis as per Fig. 2.

In a ranking of the 50 biggest and most important oil companies, the company was ranked as the 14th biggest oil company in the world by the specialized publication *Petroleum Intelligence Weekly—PIW* (www.energyintel.com), according to 2004 data. Considering only the open capital companies with shares negotiated in the stock market, Petrobras was on the 8th position in 2004, according to the PIW ranking.

Oliveira (2003) points out two important moments that made Petrobras seek for a new and better relationship with its stakeholders and society as a whole: (1) the end of government monopoly in oil exploration (1998); and (2) the occurrence of oil spills (2000). However, according to the author, only the second one effectively influenced upon the development of a new attitude towards environmental management.

3.1. Strategic plans

In Petrobras, the whole planning, according to the interview with the strategic planning manager, starts by the elaboration of a corporate panel, that is, a map on which there are, besides the corporate strategy, indicators, goals and strategic initiatives. For the strategies operationalization, the strategic development panels of the businesses areas and unities, elaborated in accordance with this corporate panel, are reviewed. The interviewee points out that, in addition to the objectives and indicators considered in the corporate panel, others are also developed at the various company levels in order to best integrate, communicate and follow the implementation of the strategies defined in the company's global strategic plan.

Within the 10-year research period, Petrobras divulged and implemented three strategic plans (1990–2000, 2000–2010, and 2005–2015). These plans are re-evaluated and published every 5 years and always embrace a 10-year period. In the comparative analysis of Petrobras' strategic plans (Table 4), it is possible to verify that the integration of a long-term strategy with the environmental management implemented by the company is perceived as more effective only after 2000, with the introduction of Program of Excellence in Environmental Management and Operational Security (PEGASO). This program involved US\$ 2.6 billion investments from 2000 to 2004, according to the financial statements, having projects that contemplated from systems revision, installations construction and enlargement, to automation of the company's main pipeline network. Nine centers of environmental defense were also implemented next to the areas where the company acts.

According to Table 4, it is also possible to verify that the environmental issue only starts to be evident in the company's mission, although timidly, in the 2000–2010 plan; only in the plan concluded in 2004, referring to the

Table 4
Comparison between the strategic plans

Description	Mission	Vision
1990/2000	Guarantee the supply of oil, gas and derivatives to the national market, through the activities defined in the constitution and Law 2.004, in a profitable way and lower costs to society, contributing to the development of the country	Not published
2000/2010	Act in a profitable way in the oil and gas industry activities, and in the related businesses, in the national and international markets, supplying quality products and services, <i>respecting the environment</i> , considering shareholders' interests and contributing to the development of the country.	Petrobras will be an international energy company and a leader in South America, focusing on services and free to act as an international corporation
2005/2015	Act in a <i>safe</i> and profitable way, <i>with social and environmental responsibility</i> , in the oil, gas and energy industry activities, in the national and international markets, supplying products and services that meet its customers' needs and contributing to the development of Brazil and countries where it acts	Petrobras will be an energy-integrated company strongly present in the international market and a leader in South America, focusing on profitability and <i>social and environmental responsibility</i>

Source: Strategic plans.

Table 5
Importance of environmental management inside the strategic planning

Anos	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Importância	2	2	2	2	2	4	5	5	5	5

Source: Questionnaire.

2005–2015 period, the environmental issue is cited both in the company's mission and vision. The changes occurred in the strategic planning are in agreement with the answers given by the strategic planning manager. According to the interviewee, the integration between environmental management and strategic planning only effectively occurs after the accidents in 2000, when the company changes from a reactive to a proactive attitude (Table 5).

After the latest strategic plan, the company also started to publish its corporate goals in a Balance Scorecard (BSC) format. In this BSC, within the internal process perspective, only two goals of reduction of leakages and SO_x emissions are presented. Although still timid, the fact that

the environmental goals were published as part of the corporate goals can indicate, at first, an advance in the evidence of the integration between environmental management and strategic planning.

3.2. Accounting statements and other documents

Through the financial statements, data obtained allowed, besides the measurement of investments on environment (Fig. 6), the evaluation of the company's economic performance in the analyzed period, whether it was negatively influenced by the accidents or not. Petrobras' economic performance can be evaluated, in general, with the analysis of the behavior of three important performance indicators strongly used by the financial market that are: income, net profit and proposed dividends (Fig. 3).

As we can see in the indicators evolution during the 10-year period (Fig. 3), although the economic and financial performance was not significantly affected by the environmental accidents occurred in 2000, we can note that the stock market responded immediately with a reduction of share value in 2000, recovering itself over the period under analysis (Fig. 4). This fact may show that, at first, the market did not forecast great economical repercussions on the accidents that had happened; however, it is also possible to consider that the market is sensitive to the environmental issues.

Performance decreases in 1998, 2001 and 2002, in profitability (Fig. 3) and share value (Fig. 4), derived from the negative variation of international oil price in these years. In 1998, besides this fact, it was the end of the oil monopoly in Brazil.

It is also interesting to notice a strong increase in expenditures on sponsoring and marketing starting from 2000, as we can see in Fig. 5. At first, this fact demonstrates that the company was concerned about reducing the possible negative effects caused by the accidents on its institutional image. The environmental sponsorships, according to the national communication manager, received more funds in relation to the total sponsorships in the period.

3.3. Environmental management

Petrobras' environmental management can be divided into two distinct moments: before and after the environmental accidents that happened in 2000. According to the manager that was responsible for the HSSE sector, until the occurrence of the environmental accidents in 2000, the issues related to the environmental management were not considered as important as other company areas such as, for example, production and finance. When asked about the importance of the company's environmental management in the 1995–2004 period related to the strategic planning, the interviewee gave the following answers (1 means less or not important, and 5, extremely important):

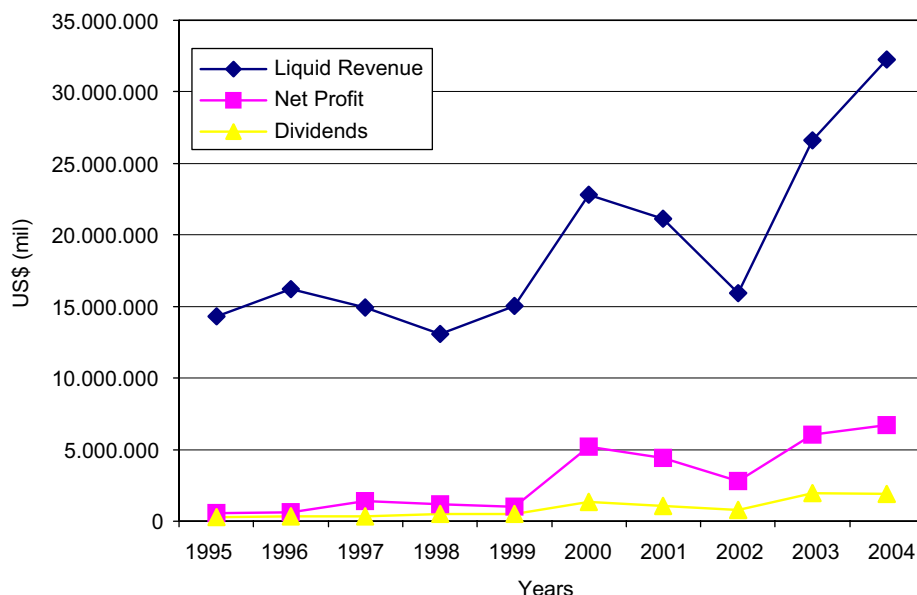


Fig. 3. Net revenue, net profit and dividends. *Source:* Accounting statements.

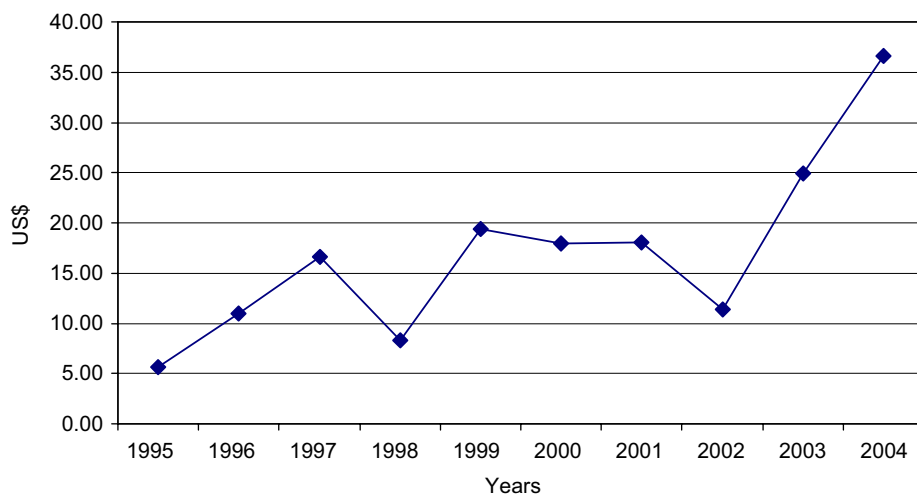


Fig. 4. Petrobras' stocks rates. *Source:* São Paulo State Stock Exchange (BOVESPA).

According to Table 5 and as rectified by the interviewee, Petrobras had an eminently reactive attitude with respect to environment until 2000, assuming an effectively proactive attitude after 2001; actually, this process fully started in 2000 with high investments on environment and safety and with the implementation of PEGASO.

The process of elaboration of the environmental management and its importance within the company were also radically modified after 2000 with the creation of two important committees related to environmental issues. According to the HSSE manager's answer to the question "please, describe the environmental policy elaboration process", the company has two committees related to environmental management since 2000: the Environment Committee, since 2001, considered as strategic and directly subordinated to the Administration Council, and the

HSSE Management Committee, since 2000, considered as more operational than strategic. The reason for creating an Environment Committee directly subordinated to the Administration Council may signal to the whole company that environmental management started to have a higher level of relevance than before.

Regarding the second committee, the objective was to better integrate all the company's areas around environmental issues. It was also pointed out that the business areas became responsible for the environmental results; this fact, beginning in 2000, caused changes in the managerial attitude, and these areas started to take the environmental issue more into consideration in their decisions. This change in the managerial attitude can be confirmed in Fig. 6. It can be noticed that investments on environment decrease in the 2 years preceding the environmental

accidents, 1998 and 1999, and in 2000, there is an abrupt positive variation, from US\$ 100,000.000 to around US\$ 310,000.000, notably regarding the implementation of PEGASO. This program made investments on several areas, specially the following: pipelines integrity (29%), process security (18%) and systems automation (14%) (Arroio, 2005).

The investment effects (Fig. 6) and the PEGASO implementation were immediate. According to Fig. 7, it is possible to compare the behavior of the leakages that happened in 2000, the year the program was implemented, to the following years. Although an abrupt decrease from 2000 to 2001 and from this year to 2002 is observed, it can be seen that there is a tendency towards an increase after 2002.

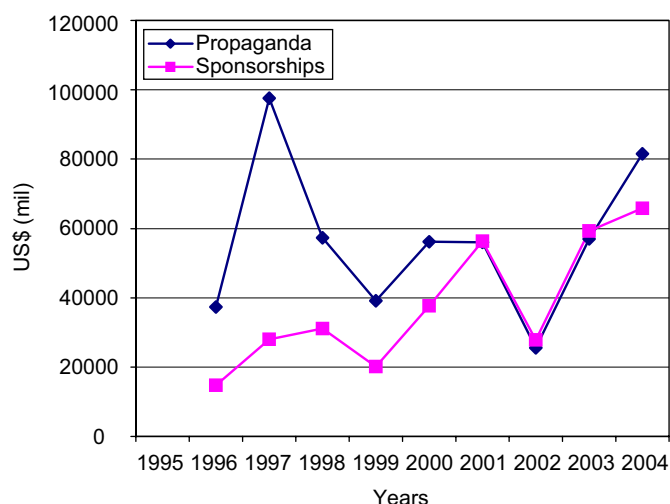


Fig. 5. Expenditures on marketing and sponsorships. Source: Questionnaire.

4. Conclusions

According to obtained data and considering the environmental attitude from the company object of the case study, it is possible to conclude that over the analyzed 10-year period, from 1995 to 2004, environmental issue was not a priority. Thus, the company did not present an eminently proactive attitude during that period. Its attitude drastically changed only after the serious accidents occurred in 2000 when high investments were made in Health, Safety, Security and Environment (HSSE). In this direction, it is possible to split the analyzed period into two distinct phases: one before and the other after these accidents.

Over the analyzed 10-year period (1995–2004), Petrobras' environmental management started to have a proactive attitude, more integrated with strategic planning, only after the accidents that happened in 2000. Therein, it is possible to divide this period into two distinct phases: before and after these environmental accidents. Until the year 2000, no accident involving the company had been so widely broadcasted by the press like the one that occurred in 2000. The changes in the environmental attitude

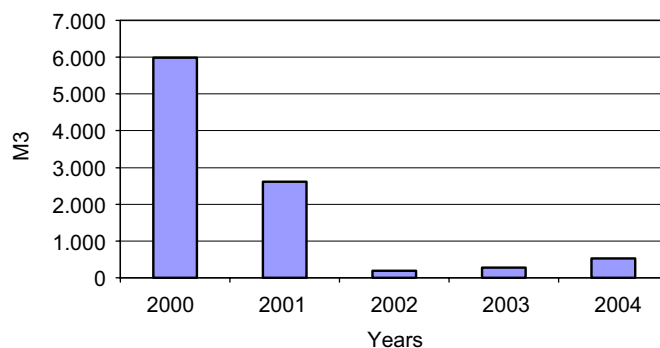


Fig. 7. Petrobras' leakages after PEGASO. Source: Arroio (2005).

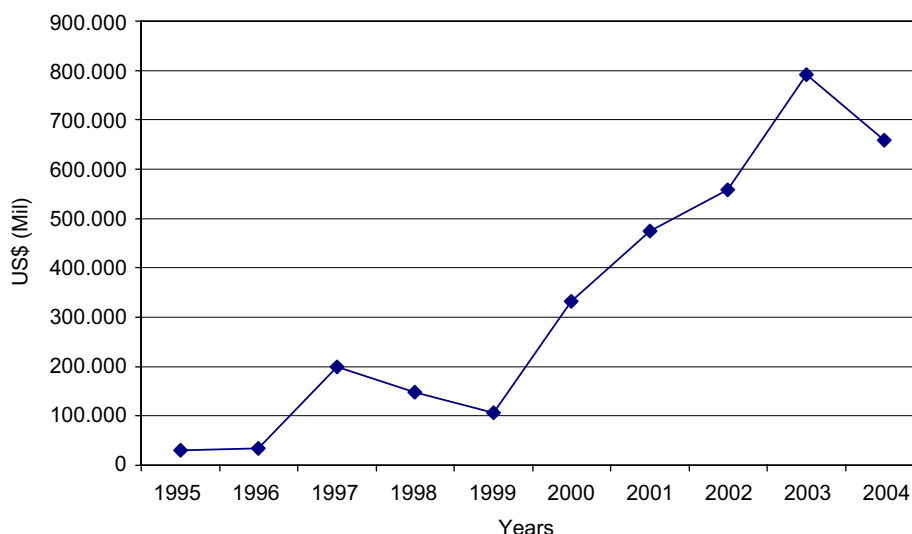


Fig. 6. Investments on environment. Source: Financial statements and data obtained through the questionnaire.

impacted from the strategic plans to the company's business areas, causing a strong increase in environmental investments. Regarding the strategic plans, it is possible to perceive more evidence of environmental issues, both in the company's vision (2000/2010 plan), and in its vision and mission (2005/2015 plan). It is a fact that these attitude changes had an immediate positive effect on the reduction of the level of reported spills, but it is also possible to verify an increase of leakages starting from 2002.

Another important point that ratifies these changes was the creation of two committees related to environmental management: The Environment Committee (since 2001), directly linked to the Administration Council, and the HSSE Management Committee (since 2000), responsible for the integration of all the company areas around environmental issues.

Since relevant or lasting economic and financial effects were not observed in the financial statements or in the company's share value, it is reasonable to conclude that the possible negative effects of the accidents on the institutional image were the main factors that forced the company to make immediate and radical changes in its environmental attitude. This fact can be observed in the increase of investments on environment, marketing and sponsoring in the 2 years that followed the accidents.

Finally, it should be highlighted that, even considering the strong positive evolution of the company regarding its environmental management after the accidents in 2000, the 4-year term (2000–2004) may not be enough to conclude definitively if the measures taken by the company were conjectural—only with the intention of giving an immediate response to society—or structural—effectively focused on a permanent integration between the company's strategic planning and environmental management.

References

- Ahmed, N.U., Montagno, R.V., Firenze, R.J., 1998. Organizational performance and environmental consciousness: an empirical study. *Management Decision* 36 (2), 57–62.
- Alday, H.E.C., 2000. O Planejamento Estratégico dentro do Conceito de Administração Estratégica. *Revista FAE. Curitiba* 3 (2), 9–16 maio/ago.
- Anthony, R.N., Govindarajan, V., 1998. *Management Control Systems*. The MacGraw-Hill Companies, Inc., New York.
- Arroio, L.A., 2005. Gerente de Meio Ambiente—Petrobras. *Gestão Ambiental da Indústria do Petróleo*. Palestra ministrada no curso de Doutorado COPPE/UFRJ.
- Azzone, G., Bertele, U., Noci, G., 1997. At last we are creating environmental strategies which work. *Long Range Planning* 30 (4), 562–571.
- Banerjee, S.B., 2001. Corporate environmental strategies and actions. *Management Decision*, (London) 39 (1), 36–62.
- Cohen, M.A., Fenn, S.A., Konar, S., 1997. *Environment and Financial Performance: Are They Related?* Vanderbilt University, Nashville, TN.
- Coral, E., Rossetto, C.R., Selig, P.M., 2003. O Planejamento Estratégico e a Formulação de Estratégias Econômicas, Sociais e Ambientais: Uma Proposta em Busca da Sustentabilidade Empresarial. In: ENANPAD, 2003, Atibaia/SP/Brasil.
- Donaire, D., 1999. *Gestão Ambiental na Empresa*. São Paulo: Atlas, quarta edição.
- Faulkner, D., Carlisle, Y.M., Viney, H.P., 2005. Changing corporate attitudes towards environmental policy. *Management of Environmental Quality: An International Journal* 16 (5), 476–489.
- Gee, D., 2001. *Business and the environment: current trends and developments in corporate reporting and ranking*. Technical Report No. 54, European Environment Agency.
- Ghobadian, A., Viney, H., James, P., Liu, J., 1995. The influence of environmental issues in strategic analysis and choice: a review of environmental strategy among top UK corporations. *Management Decision* 33 (10), 46–58.
- Guia Exame, 2004. *Boa Cidadania Corporativa*. Editora Abril S/A. Dezembro/2004.
- Ingar, N., 2001. Integrating environmental management to improve strategic decision-making. Master Thesis. Environmental System Analysis, Chalmers University of Technology, Göteborg, Sweden.
- Ittner, C.D., Larcker, D., 1997. Quality strategy, strategic control systems, and organizational performance. *Accounting, Organizations and Society* 22 (3/4), 293–314.
- Kaplan, R., Norton, D.P., 2000. *A Estratégia em Ação—Balance Scorecard*. Rio de Janeiro. Editora Campus.
- Karagozoglu, N., Lindel, M., 2000. Environmental management: testing the win-win model. *Journal of Environmental Planning and Management*. Abingdon, v.43.
- Kumar, R., Markeset, T., Kumar, U., 2006. Implementation and execution of industrial service strategy: A case study from the oil and gas industry. *Journal of Quality in Maintenance Engineering* 12 (2), 105–117.
- Lee, S.Y., Rhee, S.-K., 2007. The change in corporate environmental strategies: a longitudinal empirical study. *Management Decision* 45 (2), 196–216.
- Miles, M.P., Covin, J.G., 2000. Environmental marketing: a source of reputational, competitive and financial advantage. *Journal of Business Ethics*. Dordrecht 23, 299–311.
- Oliveira, J.A.P.de, 2003. Understanding organizational and institutional changes for management of environmental affairs in the Brazilian petroleum sector. *Utilities Policy* 11 (2), 113–121.
- Porter, M.E., Linde, C.van der, 1995. Green and Competitive Ending the Stalemate. September–October, vol. 73 pp. 120–134.
- Real, G., 1999. A questão ambiental como fonte de vantagem competitiva na estratégia das empresas industriais. *Dissertação de Mestrado em Gestão e Estratégia Industrial*. ISEG, UTL. Lisboa, Portugal.
- Repetto, R., Austin, D., 1999. A quantitative approach to strategic environmental risk management. *Journal of Business Administration and Policy Analysis*, 199–212.
- Schramm, W., 1971. Notes on case studies of instructional media projects. Working Paper, the Academy for Educational Development, Washington, DC.
- Sharma, S., 2000. Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal* 43, 681–697. Briarcliff Manor, Academy of Management.
- Sharma, S., Pablo, A.L., Vredenburg, H., 1999. Corporate environmental responsiveness strategies: the importance of issue interpretation and organizational context. *Journal of Applied Behavioral Science* 35, 87–108.
- Tachizawa, T., 2002. *Gestão Ambiental e Responsabilidade Social Corporativa*. Editora Atlas, São Paulo.
- Toms, S., 2001. Eco-logical. In: *Financial Management*. FMAI, London.
- Triviños, A.N.S., 1987. *Introdução à Pesquisa em Ciências Sociais a Pesquisa Qualitativa em Educação*. São Paulo, Editora Atlas.
- Yaziji, M., 2004. Turning Gadflies into Allies. *Harvard Business Review*, pp. 110–115.
- Yin, R.K., 2001. *Estudo de Caso: planejamento e métodos*, Second ed. Porto Alegre. Editora Bookman, Brasil.
- Young, C.E.F., 2000/2001. *Alca e o Meio Ambiente: possíveis impactos sobre o Brasil*. Proposta No 87. Dezembro/Fevereiro. Trabalho preparado para o Projeto ALCA e Meio Ambiente da FASE.