



HAL
open science

Social Environmental Assessment in the Oil and Gas Industry Suppliers

Hamilton Boa Vista, Fábio Ytoshi Shibao, Geraldo De Oliveira Neto, Lúcio T. Costabile, Marcelo K. Shibuya, Oduvaldo Vendrametto

► **To cite this version:**

Hamilton Boa Vista, Fábio Ytoshi Shibao, Geraldo De Oliveira Neto, Lúcio T. Costabile, Marcelo K. Shibuya, et al.. Social Environmental Assessment in the Oil and Gas Industry Suppliers. IFIP International Conference on Advances in Production Management Systems (APMS), Sep 2015, Tokyo, Japan. pp.647-654, 10.1007/978-3-319-22756-6_79 . hal-01417630

HAL Id: hal-01417630

<https://hal.science/hal-01417630v1>

Submitted on 15 Dec 2016

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Social environmental assessment in the oil and gas industry suppliers

Hamilton Aparecido Boa Vista¹, Fábio Ytoshi Shibao¹, Geraldo Cardoso de Oliveira Neto²,
Lúcio T. Costabile³, Marcelo K. Shibuya³, Oduvaldo Vendrametto³

¹ Ninth July University-UNINOVE, Master Program in Environmental Management and Sustainability, Francisco Matarazzo Avenue, 612, São Paulo, Brazil

² Ninth July University-UNINOVE, Master Program in Production Engineering, Francisco Matarazzo Avenue, 612, São Paulo, Brazil

³ Paulista University-UNIP, Graduate Program in Production Engineering, Dr. Bacelar St. 1212, São Paulo, Brazil

{Geraldo Cardoso de Oliveira Neto, geraldo.prod@ig.com.br}

Abstract. The aim of this study was to determine whether the adoption of social environmental qualification affects the environmental performance of companies operating or seeking careers in the oil and gas sector as suppliers or potential suppliers, through a survey of companies based in the ABC region in São Paulo, Brazil. The results showed strong agreement in relation to meeting social and environmental requirements for oil and gas operators. Another finding was that the certifications influence positively the environmental, economic and social performance of companies.

Keywords: Supplier Qualification, Social and Environmental Performance, Oil and Gas

1 Introduction

The Brazilian equatorial margin is one of the most promising areas for exploration and production of oil and gas as part of the so-called “Golden Triangle”, composed with the Gulf of Mexico, west coast of Africa and Brazilian coast. The discovery of oil deposited in the open sea (offshore), exceeds this layer of salt on the ocean floor, called “pre-salt”, reaches depths of more than 7000 meters below the sea level. Moreover, it can lead Brazil to become a leading oil producer [1].

The exploration and production of oil and gas in the pre-salt area is an opportunity for expansion and diversification of the Brazilian economy; therefore, in order to improve technical and productive knowledge, it is essential to develop efficient and competitive suppliers in the supply area of goods and services for this chain [2].

The Brazilian government adopted the Law number 12.351 in December 22nd 2010, creating the bidding system for the activities in the pre-salt area. This was the starting point for the development of local suppliers policy for the oil and gas sector in Brazil [3]. For Petrobras Oil Company, increasing local suppliers is a priority

because it aims to increase its business in the long term, create a sustainable perspective, create new jobs and strengthen the national economy [4].

The literature review identified several studies about environmental qualification of suppliers studying several variables such as: green supply chain management [5, 6, 7], social environmental responsibility [8, 9, 10, 11], qualification of suppliers [4, 11, 12, 13], social practices [4, 14, 15], environmental practices [5, 7, 14], social environmental investments [16, 17], business performance [18], social performance [19, 14], environmental performance [7, 18, 20, 21], economic performance [7, 17, 22] and environmental proactivity [7, 16, 20, 23]. By analyzing the existing articles about environmental qualification of suppliers, it was found the need to study the relationship between these variables together, because some studies consider some of these variables; however, they did not find any study to present all variables simultaneously.

Thus, the aim of this paper is to verify that for the Brazilian oil and gas industry suppliers the social environmental qualification has provided a better performance for the both. The study was considered relevant because of the risk associated with the environmental impacts of exploration activities and the oil and gas production as well as the social-economic importance of the activity for the Brazilian society. Furthermore, it was considered the fact that this sector has been pioneer in the preparation of guidelines for corporate environmental management.

It has been also considered the relevance of oil activity and the social and environmental impacts of the exploration and production of offshore oil and gas fields of the "Tupi" and "Libra" that make up the Santos Basin, near the defined region for research. Therefore, it is important to the study the issues related to social and environmental performance of companies in the area of goods and services installed in the ABC Region, which is economically important for the State of São Paulo, Brazil.

In this context, this study is expected to make sure that the adoption of qualification practices established by major operators in the sector in Brazil, positively affect the social environmental performance of companies participating in or aspiring to participate in business opportunities in the oil and gas supply chain, considering the degree of risk of the activities and planned investments for the development of an oil and gas local industry, being able to meet the ongoing expansion in the sector.

2 Methodology

To achieve the proposed objectives, a methodological procedure conducted a descriptive research of the quantitative type, in which the objective is to evaluate the structural relationships of the proposed measurement model based on improved theoretical findings and validated by experts [24].

The operationalization of the variables was used as the unit of analysis for companies of goods and services that provide or intend to provide for oil and gas sector in which, are interested in obtaining their qualification criteria according to Petrobras Oil Company regulations in Brazil.

Were considered as subjects of the research the directors or managers to develop activities related to procurement, engineering, environment, social responsibility, safety, logistics, human resources and other related.

For the operation of the measurement model was designed a data collection instrument, based on the theoretical foundation [25], for the constructs: social practices, environmental practices, social environmental investments, social performance, environmental performance, economic performance and social environmental proactivity.

As a result of bibliographic research we developed a conceptual framework for the development of research, as shown in Figure 1.

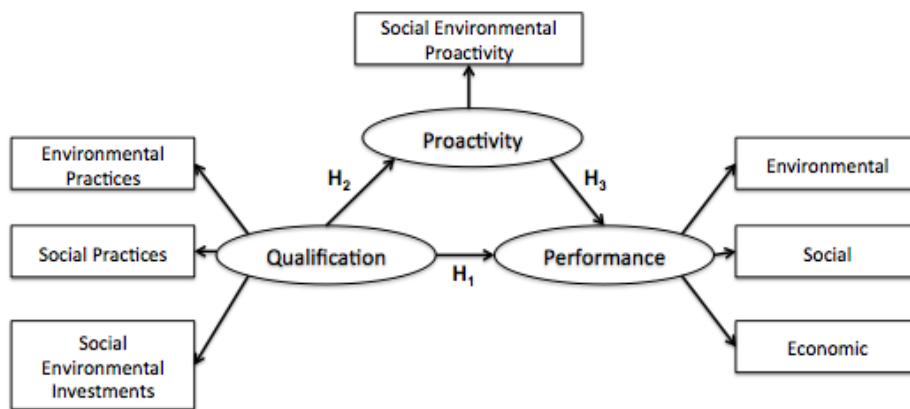


Figure 1: Conceptual framework

The requirements of the market and its growing environmental expectations put pressure on suppliers to qualify for improving the performance of the contractor. Specifically, environmental practices, social practices and social environmental investment provided with products and/or services to the Brazilian oil and gas sector [26]. Based on the expected relationship between quality and environmental performance the first hypothesis arises.

H₁: The qualification process for oil and gas operators positively affects the social and environmental performance of companies in the ABC region.

Proactive companies typically implement environmental practices beyond the requirements of laws and regulations, while the reactive companies only seek regulatory compliance of these requirements [7, 27].

Therefore, in the conceptual framework the environmental proactivity is a second interdependent variable that can have a significant contribution or contingent effect on the relationship of the variable independent qualification and variable dependent performance; moreover, its influence has mediating effect and its role in relation depends on the initial hypothesis. Thus, the second hypothesis is:

H₂: The qualification process positively affects the social and environmental proactivity of companies in the ABC region.

After, the third case emerged:

H₃: The environmental proactivity positively affects the social and environmental performance of companies in the ABC Region.

In social surveys collecting data on people through observation is difficult; therefore, the researcher can use the questionnaires that have the advantage of being less expensive for its implementation, avoid biased judgments and allows respondents feel comfortable to respond due anonymity [29].

The research instrument was submitted for consideration by the respondents. Eighty questionnaires were collected; however, it was found the existence of 15 missing data; therefore, the data were considered not acceptable. Then, it was used 65 samples to treatment according to the statistical techniques using the software IBM SPSS version 22. Additionally, the test Komolgorov-Smirnov (K-S) was applied and Shapiro-Wilk to assess the normal distribution [30].

As the result of the test showed no normal distribution, and considering that the usual statistical methods for data processing that do not have normal distribution based on multiple regression, discriminant analysis, cluster analysis, experimental analysis and cross-tabulation [29]. From this observation was carried out running tests for nonparametric data Kruskal-Wallis and the main results are presented in Table 1 [25].

For the reliability of the data was carried out the Cronbach Alpha test, because it represents the ability to reproduce the results as needed, which showed 0,974, that is, greater than 0,05 and around 1,00 maximizing reliability and reproduction of research data [25].

3 Results and Discussion

It was observed that the majority of respondents were in the age group from 31 to 60 years (83% of respondents) and there was greater participation of professionals aged between 31 and 40 years (33,8 % of respondents), and that most of the respondents have higher education and graduation (86,1% of respondents) which may indicate a prerequisite for the position of this person in the company.

It was noted that the vast majority of respondents within the hierarchy of the companies is situated from the range of professionals with seniority (86,2% of respondents). The corporate function in the company 38,5% of respondent exercised executive position in the company, which provides conclusion that the subject matter the board of the organizations participated of the survey.

In addition, most respondents worked in the company three years or more (87,7% of respondents). The largest shares were professional with over 10 years in the company (35,5% of respondents). The company time leads us to infer that respondents have sufficient knowledge of the company's management processes.

It was subsequently performed testing normality K-S and Shapiro-Wilk, in both tests all had lower values assertions 0,001 indicating non-adherence normal curve [25] and Cronbach Alpha test to verify the reliability of data [25] that presented 0,974.

Then the test was performed for non-parametric data [25]. The main results are summarized in Table 1.

Table 1 – Summary Cross-tabulation

	Assertive	n¹	A²	N³	D⁴	Chi-Sq⁵	Df⁶	Sig⁷
Age group (31-40 years)	Provides its customers with information on product safety	22	19	1	2	10,719	4	0,30
Worked in company (10 years more)	Performs audit environmental performance of suppliers	23	4	5	14	9,404	3	0,24
Worked in company (10 years more)	Meets social and environmental requirements of oil and gas operators	21	17	4	0	8,126	3	0,43

¹ Number of events (n)

² Number of respondents who agree with the assertive (Agree)

³ Number of respondents who do not agree nor disagree with the assertive (Agree nor Disagree)

⁴ Number of respondents who disagree with the assertive (Disagree)

⁵ Chi-square

⁶ Degree of freedom

⁷ Significance (p)

Regarding H₁, respondents showed strong agreement in relation to meeting social and environmental requirements for oil and gas operators. Noted that the greatest degree of agreement occurred in respondents that work time above 10 years in the company. The treatment to social and environmental requirements of the operators is directly related to the qualification construct [12, 13].

It is emphasized that the age group 31-50 years old had the highest degree of agreement in relation to financial resources as important for the environmental performance of companies [16, 17]. Regarding the initiative to provide safety information of products and/or services to your customers can be considered an environmental proactive measure contributing positively to the businesses performance, supporting the findings of [16, 23].

On the other hand, there was a discordance of the respondents regarding the practice of environmental audits of suppliers regarding time spent in the company. Despite the practice of holding environmental audits of suppliers was positive for environmental performance [18, 20, 21], the data were inconclusive.

Referring H₂, it was observed that the Mann-Whitney test made the cross-tabulation of the responses to the variable “Your company already provides for the oil and gas sector”, the results as the existence of the commitment to the fundamental rights worker safety by the company you work, promote respect for the fundamental rights of its employees and meet all the social and environmental requirements for oil and gas operators, the most respondents agreed (36 respondents), even those who work in companies that do not provide for the oil and gas sector (23 respondents), denoting that the sample respondents agree that for the environmental qualification is important the Social and Environmental Practices [14, 15]. Thus, the process for social environmental qualification of suppliers encourages the adoption of the practices for this purpose [15].

The cross-tabulation of the variable certifications in relation to the other assertions made possible show a high degree of agreement of respondents, and not related to the fact of the companies they own certification. Therefore, the variables

related to social environmental practices and performance were confirmed positive [7, 14, 17, 18, 19, 20, 21, 22].

Regarding H_3 , it was identified about ISO 14001 certification, it was found disagreement regarding environmental performance audits of suppliers. It should be noted that most of the responding companies were not certified and certified companies have strong agreement. Showing that environmental certification influenced the degree of agreement of the sample. Therefore, the environmental certification should be encouraged to improve the environmental performance of companies located in the ABC region. The suggestion is that a more detailed research would be better in the future.

The certification for the finding affects the environmental proactivity of enterprises, confirms the assumption [22], as a “win-win” situation, in which, both the environmental and the organizational performances of companies would be favored with effective environmental management.

4 Conclusions

The process of qualification of operators does not affect the environmental performance of companies according to the sampling plan of the survey, that is, the central hypothesis was not confirmed (H_1), because the respondent companies consider that the qualification is associated only to the process of highlighting the safety information of the products and/or service and not the need to be certified. Thus, these companies do not achieve control practices through audits, due to the low quantity of certified companies, showing a weakness in relation to performance.

In relation to (H_2), it was found that companies understand that the use of social and environmental qualification process for suppliers drives the adoption of practices for this purpose. However, they do not consider that the most important is the fact they have certification, but if the supplier has environmental practices in routine work. Therefore, the certification has not been confirmed as proactive for environmental qualification of suppliers.

However, it was observed effect of the environmental proactivity of business (H_3), trusting that the environmental certification should be encouraged as a practice and not as necessary documentation. The most important is to verify that suppliers have environmental practices adopted proactively, improving performance.

An important aspect of this analysis is the lack of control through social environmental audits on suppliers. Due to this finding, suppliers located in the ABC region should consider the implementation of the practice of holding social environmental performance audits of its suppliers, because the literature review indicated positive results regarding the improvement of environmental performance and necessary for the insertion of the company in Green Supply Chain.

The conceptual framework that was tested can be used to provide managers and researchers with constructive support to managerial decision-making and for future academic research. A limitation of this study was unable to generalize the results by sample, which happened only with suppliers located in the ABC region.

Moreover, it is suggested to further studies in order to obtain a larger sample, another point is to verify that the practice of social environmental audit in suppliers can improve social environmental performance.

References

1. ANP. Agência Nacional do Petróleo, Gás Natural e Biocombustíveis. (2014). Brasil esta ente as mais atraentes oportunidades exploratórias do Mundo. <http://www.anp.gov.br>. (accessed in: January 30, 2015).
2. Guimarães, E. A. (2012). Política de conteúdo local na cadeia de petróleo e gás: uma visão sobre a evolução do instrumento e a percepção das empresas investidoras e produtoras de bens. Confederação Nacional da Indústria [CNI]. Brasília. <http://www.portaldaindustria.com.br/cni/iniciativas/eventos/2012/08/1,5241/seminario-internacional-conteudo-local-e-politicas-para-a-competitividade-na-cadeia-de-petroleo-e-gas-p-g.html> (accessed in: March 20, 2015).
3. Brasil. Presidência da República. (2010). Lei Nº 12.351, de 22 de dezembro de 2010. Dispõe sobre a exploração e a produção de petróleo, de gás natural. Brasília: Presidência da República (accessed in: January 09, 2015).
4. Petrobras. Petróleo Brasileiro SA. (2014b). Incentivo ao Desenvolvimento. <http://www.petrobras.com.br/pt/sociedade-e-meio-ambiente/sociedade/incentivo-ao-desenvolvimento/> (accessed in: January 28, 2015).
5. Falatoonitoosi, E., Leman, Z., & Sorooshian, S. Modeling for green supply chain evaluation. *Mathematical Problems in Engineering* 1-9, (2013).
6. Pires, S. R. I. Gestão da cadeia de suprimentos (Supply Chain Management): conceitos, estratégias, práticas e casos. São Paulo, Atlas (2009).
7. Srivastava, S. K. Green supply-chain management: a state-of-the-art literature review. *International journal of management reviews*, 9(1), 53-80, (2007).
8. Barbieri, J. C. & Cajazeira, J. E. R. (2013). Métodos para integrar a responsabilidade social na gestão. <http://www3.ethos.org.br/cedoc/metodos-para-integrar-a-responsabilidade-social-na-gestao/#.U6SplPldVch>. (accessed in: January 20, 2015).
9. Bobsin, M. A. & Lima, G. B. A. Gestão de segurança, meio ambiente e saúde: proposta de estrutura de sistema e metodologia de avaliação de desempenho. *Boletim Técnico Organização & Estratégia*, 2(3), 357-377, (2005).
10. Elkington, J. Canibais com garfo e faca. Makron Book (2001).
11. Petrobras. Petróleo Brasileiro SA. (2014a). Relacionamento com Investidores. <http://www.investidorpetrobras.com.br/pt/indice-de-sustentabilidade-da-dow-jones-djsi.htm>. (accessed in: January 18, 2015).
12. Rao, P., & Holt, D. Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25(9), 898-916, (2005).
13. Vanalle, R. M., Lucato, W. C., & Santos, L. B. Environmental requirements in the automotive supply chain—an evaluation of a first tier company in the Brazilian auto industry. *Procedia Environmental Sciences*, 10, 337-343, (2011).
14. Ministério do Meio Ambiente [MMA]. Cartilha A3P: Agenda ambiental na administração pública. 5. ed. Brasília, DF. (2009)

15. Pinto, L. F. G., Rodrigues, A., Macedo, D., & Girardi, E. A. Contributions of socio-environmental certification to the sustainability of the citrus industry in Brazil. *Citrus Research and Technology*, 34(1), 9-16, (2013).
16. Nyaga, G. N., Whipple, J. M., & Lynch, D. F. Examining supply chain relationships: do buyer and supplier perspectives on collaborative relationships differ? *Journal of Operations Management*, 28(2), 101-114 (2010).
17. Surroca, J., Tribó, J. A., & Waddock, S. Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal*, 31(5), 463-490, (2010).
18. Bowen, F. E., Cousins, P. D., Lamming, R. C., & Faruk, A. C. Horses for courses: Explaining the Gap Between the Theory and Practice of Green Supply. *Greener Management International*, 35, 151-172, (2001b).
19. Melo Neto, F. P., & Froes, C. *Gestão de responsabilidade social corporativa: o caso brasileiro*. Rio de Janeiro: Qualitymark Editora Ltda, (2004).
20. Jabbour, A. B. L., & Jabbour, C. J. Are supplier selection criteria going green? Case studies of companies in Brazil. *Industrial Management & Data Systems*, 109(4), 477-495, (2009).
21. Kannan, D., Jabbour, A. B. L. D. S., & Jabbour, C. J. C. Selecting green suppliers based on GSCM practices: Using fuzzy TOPSIS applied to a Brazilian electronics company. *European Journal of Operational Research*, 233(2), 432-447, (2014).
22. Porter, M. E. & Van der Linde, C. Toward a new conception of the environment-competitiveness relationship. *The journal of economic perspectives*, 97-118, (1995)
23. Jabbour, A. B. L. D. S., Jabbour, C. J. C., Latan, H., Teixeira, A. A., & de Oliveira, J. H. C. Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects. *Transportation Research Part E: Logistics and Transportation Review*, 67, 39-51, (2014).
24. Diehl, A. A., Tatim, D. C. *Pesquisa em ciências sociais aplicadas: métodos e técnicas*. São Paulo: Prentice Hall, (2004).
25. Hair Jr, J. F., Blach, W. C., Badin, B. J., Anderson, R.E., Tatham. L. R. *Análise Multivariada de Dados; tradução Adonai Schlup Sant'Ana*, 6. ed. Porto Alegre: Bookman, (2009).
26. Zhu, Q., Sarkis, J., & Lai, K. H. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, 19(2), 106-117, (2013).
27. Chandraker, R., & Kumar, R. Evaluation and Measurement of Performance of GSCM in Chhattisgarh Manufacturing Industries (INDIA). *International Journal of Application or Innovation in Engineering & Management (IJAIEEM)*, 2(6), 240-249 (2012).
28. Selltiz, C., Wrightsman, L. S. & Cook, S. W. *Métodos de pesquisa nas relações sociais. Medidas na Pesquisa Social*. São Paulo: EPU 2, (2005).
29. Silva, D. Garcia, M. N. Farah, O. E. *Métodos quantitativos na pesquisa de marketing*. In: Pizzinatto, N. K. Farah, O. E. (Org.). *Pesquisa pura e aplicada em marketing*. São Paulo: Atlas, (2012).
30. Conover, W. J., & Iman, R. L. Rank transformations as a bridge between parametric and nonparametric statistics. *The American Statistician*, 35(3), 124-129, (1981).