GOVERNANCE STRUCTURE OF THE BRAZILIAN VOLUNTARY CARBON MARKET

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Abstract

Given the international discussions on global warming, in 1997 signed the Kyoto Protocol (KP), having as one of the principles to protect the climate system for the benefit of present and future generations, based on the common principle but differentiated for each signatory. It is in this context that the regulated market for carbon credits, which trades carbon credits that work like a new "currency", a tonne of carbon equivalent reduced.

In this scenario, also emerged a parallel market, called the voluntary carbon market (VCM). Initially used by companies and individuals from countries not signatories to the KP - as the United States - over time the VCM has also become an alternative to strict criteria of the regulated market. Driven by different objectives, users of this system are moving a significant number of active carbon.

The existence of an alternative market to the market is regulated by KP in environments in which negotiations of carbon credits, called Verified Emission Reduction (VER), occur through a variety of agents such as governments, businesses, nongovernmental organizations (NGOs), individuals, etc. (Simoni, 2009).

Both carbon markets (regulated and voluntary) operate under the same conceptual basis, but with different governance structures. The operation and interests of actors operating in them are different resulting in changes in terms of property rights and production costs. Particularly the VCM, in the absence of a central governing body, has a distinct structure and functioning of the regulated market and little known.

In this study intends to understand the governance structure of the Brazilian voluntary carbon market. To achieve this goal, the methodology of this research combined (i) primary sources, obtained from face and telephone consultations with key actors in that market (consultants, NGOs, companies and proponent organizations, etc.) with the support of a structured questionnaire, with (ii) secondary sources, including reports and websites of institutions that deal with the subject and specialized references and literature review on the New Institutional Economics.

Understanding the role of state actors and non-state on the VCM part of the understanding that the goal is to create a structure that facilitates the interaction of interests, from the establishment of rules, regulations, contracts and laws, making it possible for business transactions of these assets occur efficiently. Although behavioral changes related to the environment are being internalized by society, instruments of enforcement are necessary to give the speed demanded by the global ecosystem, being legitimized the importance of institutions to regulate this market.

Scholars believe that the carbon market is in one of the most effective tools and lower transaction costs to generate demand for cleaner technology, while also grants a price on polluting act of promoting incentives for the actors to stop polluting (ECOSYSTEM MARKETPLACE, 2009). This occurs because the carbon market allows channeling resources more cost-effective for the reduction / mitigation of GHG emissions.

Key words: *Voluntary Carbon Market ,Governance Structure, New Institutional Economics, Brazil.*

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1. Introduction

Given the international discussions on global warming, in 1997 the Kyoto Protocol (KP) was signed, having as one of its principles to protect the climate system for the benefit of present and future generations, based on the principle of common but differentiated responsibility for each signatory. It is within this context that the regulated carbon market was created in order to trade carbon credits: a new "currency", the Carbon Equivalent Reduced (CER).

The KP, through its rules and definitions, establishes property rights on emissions, setting targets and mechanisms to achieve them. The ownership of the offset is granted to the company that reduces their emissions and such ownership might be transfered to a buyer willing to buy it (Godoy, 2010).

In this scenario, a parallel market also emerged, called Voluntary Carbon Market (VCM). Initially used exclusively by companies and individuals from countries which are not signatories to the KP – e.g. the United States – as time went by, the VCM has also become an alternative to the regulated market. Driven by different objectives, users of this market - such as governments, businesses, non-governmental organizations (NGOs), individuals etc. – have negotiated a significant number of carbon credits, called Verified Emission Reduction (VER) (Simoni, 2009).

Both carbon markets (regulated and voluntary) operate under the same conceptual basis, but with different governance structure. The operation and interests of their actors are different, resulting in changes in terms of property rights and production costs. Due to the absence of a centralized governance, the VCM displays a structure and functioning system rather decentralized from the regulated market.

This study intends to understand the governance structure of the Brazilian Voluntary Carbon Market (VCM), identifying and characterizing their different organizations, institutions and transaction costs.

2. New Institutional Economics

Understanding the role of the institutions within the economic environment favors the analysis of market structure. Therefore, the New Institutional Economics (NIE) is an important theoretical framework to evaluate the efficiency of the exchange systems applied by the markets, because it takes into account the social value and the governance structure (Santos, 2007).

According to North (1990), the institutional environment is composed by rules, which the author defines as institutions. These rules can be sorted out into two categories: the formal and informal ones, which are characterized by the fact that they are based on behavioral, value and belief codes. The author highlights the great power of the informal rules to restrict individualistic behavior. This is so, because they reduce the uncertainty concerning the interaction among people, establishing a belief/rule foundation, which allows economic transactions at a lower cost. The informal rules also play a role in the shaping of the formal ones, because they influence the decisions of the political agents (North, 1981, Gala, 2003).

The role of the institutions is to diminish uncertainties by establishing a structure to guide human behavior, that way reducing the costs of the products. The institutions define the "game rules" and that distinguishes them from the organizations, whose actors are subordinated to these rules (North, 1990). As the institutions manage to reduce the costs of the economic transactions among the organizations, the competition environment becomes more efficient, leading the actors to lower-cost solutions, maximizing the benefit (Coase, 1960).

In search of answers to reduce the costs inherent to such transactions, the market gave birth to a network of individuals within organizations (firms), guided by specific interests (Gala, 2003; Godoy, 2010). The firm is an optimization solution to be applied when the costs of administration outnumber the costs of internal organization (Zylbersztajn, 2002). In the 1930's, Coase (1960) concluded that the activities developed by the firm went beyond the production itself, encompassing the costs with data collection, negotiation, elaboration and establishment of contracts ruled by legal institutional mechanisms. Such processes were defined as transactions.

The transaction costs can be divided into measurement and enforcement ones. The former is associated to the buyer's difficulty of having *ex-ante* knowledge of the object to be negotiated. The latter is due to the uncertainty concerning the effectiveness of the transaction system of property rights (North, 1990). Based on the analysis of transaction costs, the elements regarding the structure of the market have become more evident. The relationship between organizations and efficiency is highlighted, making it possible to identify how the structures deal with this aspect, as well as the level they might reach.

The analysis of market transaction costs is based on three principles: institutional environment, opportunism (*ex-ante* and *ex-post*) and limited rationality (Santos, 2007). The transactions take place within an institutional environment. Thus, the institutions influence their costs and the transfer operations of property rights. In this case, it is necessary to limit this environment.

The opportunism is a result of the anti-ethical behavior of the economic agents, which aim at maximizing their benefits at the expense of others. Such behavior increases the transaction costs and generates the creation of contracts in order to prevent it. The opportunist behavior can be classified as *ex-ante*, when it takes place during the pre-contract period, or *ex-post*, when it occurs after the contracts are established. The *ex-ante* opportunist behavior can be noticed when there is a variation concerning the quality of the products that are offered in the market, though it can be barely seen by the consumers before the purchase. Whenever that occurs, product quality increase is not stimulated, leading to adverse selection. The institutions might attenuate the quality subjectivity issue through the establishment of trade marks or focusing on the reputation of the parts, for instance. The *ex-post* opportunism occurs when one of the parts involved in the transaction benefits from a piece of information which is not known by the others. This reinforces the existence of moral risk due to the asymmetry of information (Santos, 2007).

The limited rationality can be observed when the individual is not able to exercise his/her full analytical capacity. Simon (1972) defines it as limited rational behavior. Thus, this author counterpoints the assumption of unlimited rationality meant to maximize the benefit, an assumption supported by the neoclassic school. The more restricted the rationality is, the more uncertainty there will be in the market.

Taking into account the existence of opportunist behavior among the agents and the fact that the contracts are incomplete due to limited rationality, Williamson (1975) developed the Transaction Cost Economics (TCE), which deals with three dimensions that influence transaction costs and the organizational structure of a market: uncertainty, frequency and specificity of actives (Santos, 2007; Zylbersztajn, 2002).

The uncertainty is due to the incapacity to know the necessary information in order to improve decision making. Issues such as unpredictability of the agents' behavior and changing realities within the environment jeopardize the anticipation of future events and the market balance (North, 1990).

Therefore, the organizations make their decisions based on "approximated" realities. Frequency has to do with how often the transactions are made. The greater the amount of transactions, the more mutual trust there will be and the fewer the chances of opportunist behavior to occur.

The specificity of actives deals with the onus of redirecting the investment to other activities. It means that the more representative these costs are to the parts involved, the greater the specificity, as well as the interdependence. Such issue should be taken into account when examining the bargain process among agents (Santos, 2007).

Monitoring and control mechanisms ought to be established in the market to allow the organizations to operate and cope with the existing risks during their transactions. The outcome of the interaction between institutions and organizations can be partially measured by observing the current costs of transaction. Hence, it is an important indicator of how efficiently the market manages its uncertainties (Zylbersztajn, 2002).

3. **Carbon Market**

Considering the fact that industrialized countries are, undoubtedly, the main responsible actors for the historical GHG emission into the atmosphere, a negative externality, and taking into account the arguments that developing countries can not be a match for the developed ones, running the risk of having their own growth harmed (Conejero, 2007).

The UNFCCC, when thinking out the KP, sort out the countries into categories for the establishment or exemption of goals. The so-called "Annex A" is composed by 39 countries divided into two subgroups: the "Annex B", composed by the wealth nations, very similar to the group that forms the Organization for Economic Co-operation and Development (OECD), regarding the members; and the countries named "Economies in Transition", comprising Eastern Europe countries and most of the countries of the former Soviet Union. Such countries have reduction goals, with fixed deadlines, the rule is to reduce an average of 5.2% gas emission, between 2008 and 2012, considering the levels in 1990. The principal institution of this market, the KP also presents the so-called "Non-Annex A", a category formed by developing countries, of which Brazil is part, without established GHG emission goals (Seiffert, 2009; Limiro, 2009).

In order to reach the goals, the climate governance has created flexibilization mechanisms which allow the purchase and selling of the CERs: (i) the Emissions Trading (ET), which unleashed free trading of emission reduction rights at a global level; the Joint Implementation (JI), which allows countries that have goals established by the KP to obtain Emission Reduction Units (ERU)[1], whose aim is to capture and/or kidnap GHG and, finally, (iii) Clean Development Mechanism (CDM), which is the only KP mechanism that allows the participation of developing countries and their organizations, which do not possess compulsory GHG reduction goals. Thus, CDM is an additional mechanism to accomplish the goals used by developed countries and their respective companies, by purchasing carbon credit. Moreover, this mechanism is regarded as the most striking effect KP has brought about to the international negotiations, since it makes it possible to trade actual emission reduction (Seiffert, 2009).

Thus, the carbon market (CM) can be defined as an economic instrument in which emission licenses (or "right to pollute") were distributed by a regulatory institution or, yet, the organizations emission reduction (offsets) generated by GHG emission reduction projects are purchased and sold (Ecosystem Marketplace, 2011). Carbon credit negotiation places companies and productive activities at an outstanding position in relation to market strategies to face climate change. As stated by Okereke *et al* (2012), companies and government are concurrently being pressured to reach reduction in their emission and development, within an arena of profound connections between political and economic domains.

The regulated market has the KP as its legal starting point and it is an institutional instrument in which the organizations are under national or global regulation and norms, which establish standardized criteria and rules to conceive projects and the trading of CER generated by CDM projects. In both markets, the main interest is in the purchase of carbon credits (Mackenzie, Ohndorfy, Palmer, 2012).

The implementation of the CDM project involves high transaction costs. In addition to the risks and uncertainties, the process is very bureaucratic and time-consuming (Souza, Paiva, Andrade, Goulart, 2011). The project cycle in the regulated market requires the action

[1] Equal to one ton (metric) of Non-CO2 (reduced or kidnapped), through joint implementation project, among countries of Annex B.

of multiple institutions and organizations, incurring transaction costs, as detailed in the Table 1.

STEP	Duration	Responsible	Activities	Costs (US$)
Preparation and approval of the methodology	6 mths. or more than 1 year	Consulting firm	Develop. new methodology (if necessary) and calculating baseline	Up to $ 100 th
Preparation of Project Design Document	6 a 10 weeks	Proponent company and consulting firm	Initial tech. Evaluation, risk assessment and docs.	$ 15 th. to 80 th
Comments from stakeholders	4 a 8 wk	Proponent company and UNFCCC	Send invitation letter and publication on the website of UNFCCC	Depends on the strategy chosen
Approval	2 a 5 mths.	ICGCC in Brazil	Authorization by CIMGC	$ 0
Validation	1,5 a 2 mths	DOE	Process and documents	$ 10 th ao $ 40 th
Registry	3 a 8 mths	EBCDM	Registration fee	$ 5 th to $ 30 th
Contract	-	-	Contracting consultants	$ 10 th to $ 20 th
Monitoring	Continuous	Prop.Comp. and Consult. Firm	Project monitoring	$ 5 th to $ 10 th per year
Verification and certification	1 or 2 times/year	DOE	Verification and certification	$ 15 th a $ 25 th per year
Issuing CERs	24 to 54 days	EBCDM	Adaptation fund, percent. proceeds from CER´s	2% of CERs issued

Note:
DOE - Designated Operational Entity
EBCDM - Executive Board of the Clean Development Mechanism
ICGCC - Interministerial Commission on Global Climate Change
UNFCCC - United Nations Framework Convention on Climate Change
Table 1: Project Cycle – Regulated Market
Source: Bogo (2012)

The transaction costs in the voluntary market are usually lower as compared to the costs in the regulated one, even though the total cost will depend on the type of International Standard chosen for the project. It is estimated that a Golden Standard project will have a transaction cost of approximately U$ 25,000.00, whereas a low-scale CDM project costs U$ 65,000.00 and a large-scale one U$ 160,000.00 as detailed in the Table 2 (Green Markets International, 2007).

Activity	Estimated Example Cost $US		
	Full Scale CDM Project	Small Scale CDM Project	Voluntary Golden Standard*
Project Design Document Preparation	45.000,00	20.000,00	7.500,00
Stakeholder Consulatation and Host Country Aproval	10.000,00	5.000,00	2.500,00
Validation	30.000,00	12.500,00	5.000,00
Registration Fee	30.000,00	5.000,00	NA
Transaction Negotiation & Contracting	20.000,00	10.000,00	5.000,00
Project Monitoring (Periodic)	varies	varies	varies
Initial Verification	15.000,00	7.500,00	2.500,00
Periodic Verification (Cost Per Verification)	10.000,00	5.000,00	2.500,00
Approximate Total	**>160.000**	**>65.000**	**>25.000**

Note: Actual costs will vary considerably depending on several factors.
(*) This illustration is for a micro-scale project <5.000 tCO2/YEAR. The costs for large scale projects would tend to be substantially higher.
Table 2 - Market Participation Costs
Source: Green Markets International (2007)

The VCM can be seen as an instrument in which the rules for the elaboration and approval of projects emerge from the relations among the actors of this market, whose mitigation and/or GHG reduction projects are subordinated to International Standard, which establish their own rules for conceiving the projects (Souza; Paiva; Andrade, 2011). According to Guigon (2011), the VCM was inspired by the regulated market and relies on the acquisition and retirement of carbon credits generated by GHG emission reduction projects.

The negotiation of the carbon credit certificate within the VCM - called VER - is performed by different actors, such as governments, companies, non-governmental organizations (NGOs), individuals, etc. (Carbon Finance, 2011), having different interests, since they are not under the KP demands. According to Haigh & Shapiro (2012), in the carbon market, the investors generally do not have clear and concrete information about the investment that they want to accomplish, if carbon credits are purchased. Among Brazilian companies that have developed projects in the CDM, 54% reported that the more clarity of information in other programs is a reason to get into the regulated market (Godoy, 2010).

In general, what concerns the VCM investors and buyers is the management of their impact on climate change, their image, reputation, interests in technological innovations to reduce GHG, legitimacy, the need to prepare themselves for future regulations and/or plans to resell carbon credit, profiting with the trade (IBRI, 2009). Companies seek to have a good position within their market, through the implementation of socio-environmental responsibility actions and, as a result, increasing their competitiveness. The participation and/or migration of new companies to this market is also due to a greater celerity in the project validation procedures as compared to the regulated one, which increases the gain of the investment (Carbon Finance, 2011).

However, UNEP (2011) has been pointed out as being responsible for the lack of transparency of the VCM. Details about the structure and operation of this market are concentrated in the hands of few specialists. Although some institutions provide an evaluation

of the market segments (like Ecosystem Marketplace and Carbon Positive), there is no institution providing real-time information. "This is a massive contrast to the mandatory market systems where high liquidity and standardized contracts lead to real-time publication of prices free of charge" (UNEP, 2011 p. 21).

Thus, among the projects developed in the VCM are: a) small-scale methodology projects, which would not be economically viable in the regulated market; b) projects that do not fit the criteria established by the CDM and; c) projects that have already computed active credit, that is, credit computed even before the project registration (Simoni, 2009).

The cycle of project development in the VCM in order to obtain registration and approval implies in several steps, as shown in Table 03:

Step	Activities	Responsible
1	Verification of the potential of the project and its feasibility	Proponent companies/Consulting firms
2	Elaboration of the Project Design Document (PDD)	Proponent companies/Consulting firms
3	Validation and Verification of the information and figures in the project	Audit firms
4	Approval and Registration	International Standard connected to the project
5	Monitoring of all the necessary data to estimate GHG emission reduction	Proponent companies/Consulting firms
6	Certification	Audit firms
7	VER Granting	International Standard connected to the project

Table 03 – Cycle of Projects in the Voluntary Carbon Market
Source: Souza (2012).

In step 1, economic feasibility studies are carried out in order to check the project potential to fulfill the objectives of the proponent companies and consulting firms, depending on each case. The proponent companies that take part in the voluntary market are mostly small and medium-sized companies. Because of that, the technological and financial support provided by the specialized consulting firms is essential for the investment decision process. Some of the interviewed market agents point out that it is possible to reduce the risks by establishing partnerships. In that case, the resulting bonus and onus of the development of the project and of the credit trading are shared with the consulting firms. The consulting services are only paid after the trading of the credits.

The step 2 involves the elaboration of the document with the basic description of the project. Such document – Project Design Document (PDD) – brings information about the methodology to be applied, the IS chosen, the estimated GHG reduction, and so forth.

Once the project meets the rules set by the chosen IS, in step 3, it is necessary that the project be validated by an audit firm accredited by the chosen IS. In this step, the information in the PDD is validated. In step 4, the project is registered in the IS. At this point, some mechanisms are used to provide transparency to the process, traceability of the validated projects and of the credits to be traded.

As the project is carried out, it is necessary that the amount of generated credit be accounted (step 5). This requires monitoring from the part of the proponent company, supported by the consulting firm. The aim is to verify whether the rules set by the IS have

been met. In step 6, an authorized audit firm should carry out the credit certification process, periodically attesting the truthfulness of the information generated during the monitoring process.

In step 7, the IS emits the credits and they can be commercialized. Their traceability is fundamental. Therefore, the record/registration done by the IS and by specific websites is important to avoid double accounting, which provides more credibility to the market.

3.1. Brazilian Voluntary Carbon Market

The Brazilian voluntary carbon market has its starting point in 1998, in the Tocantins State, through the activities developed by the Instituto Ecologica and its partnership with indigenous communities on the Bananal Island. They started developing research on the social impacts associated to carbon kidnap projects (Instituto Ecologica, 2012). The association of environmental and social benefits was part of the genesis of the Brazilian voluntary carbon market (Social Carbon, 2012). The first carbon reduction project in Brazil was developed with the funds raised from Charles, Prince of Wales, and the United States Agency for International Development (USAID).

In 2007, Stefano Merlin, co-founder of the Instituto Ecologica, convinced three ceramic industries located in the surroundings of Palmas (capital of the Tocantins State) to develop GHG reduction projects with social co-benefits. That was possible due to the combination of the VCS Standard with the Social Carbon one, which aims at measuring the generation of social co-benefits. The news about the great success concerning credit trading radiply spread among the other Brazilian ceramic industries and, four years later, forty projects had been developed in this sector.

Even though the VCM still represents a small amount of the global carbon market, its participation has been increasing yearly (Table 04).

Market	***Volume (MtCO2e)***		***Price (U$ million)***	
	2009	2010	2009	2010
Regulated	7,437	6,692	127,642	123,954
Voluntary	98	131	415	424
Total	7,535	6,823	128,057	124,378

Table 04 – Comparative of the volume and price traded in the regulated and voluntary carbon markets.
Source: Adapted from Ecosystem Marketplace (2011)

Currently, the research has traced 170 Brazilian projects registered in the VCM. Taking into account the sectors, 52% of the projects concern the handling and processing of animal waste in the swine, 20% concern the replacement of fuel that comes from native woods in the ceramic industry, and 12% fossil fuel replacement, as shown in Figure 01:

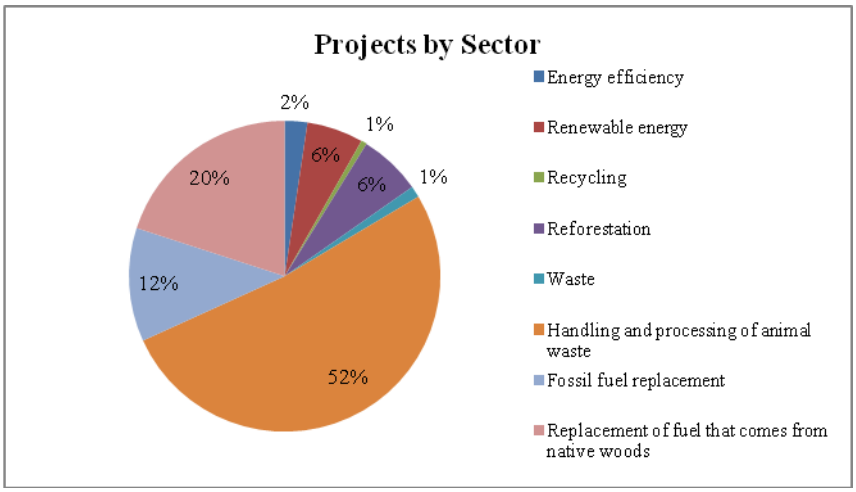

Figure 01 – Projects by Sector
Source: Own elaboration (2012)

As to their scale, the GHG reduction and /or mitigation projects developed in the VM are classified as small-scale or large-scale ones. According to the MCT - Science and Technology Ministry - (2011), there are three types of activities that identify a small-scale project: 1) activities related to renewable energy project (capacity of up to 15 megawatts); activities related to energy efficiency improvement projects (which reduce energy consumption to 60 gigawatt/hour a year); activities related to projects whose emission reduction is less than or the same as 60 kilo tons of equivalent carbon dioxide a year.

4. Procedures

The methodological procedures for this study are divided into three phases. The first phase has an exploratory trait, aiming at building up an adequate and robust analytical network to answer the problem of the research. In this phase, an empirical research was performed concerning the GHG emission reduction projects traded in the Brazilian voluntary carbon market in order to build up a preliminary database. The existing projects were identified (type, geographic distribution, activities) and the institutions and organizations involved. A profound review of the literature concerning the object of the study, that is, voluntary carbon market and NIE, was also performed in this first phase.

In the second phase, an analytical matrix was built up based on the concepts of NIE, the data collected during the exploratory analysis and the literature (national and international) on the object of study, as shown in Table 05. During this phase, data collection instruments were elaborated to be used in the interviews with the institutions and organizations, based on the analytical matrix.

Concept	Dimensions	Components
Market Structure	Formal institutions	International Standards
	Organizations	Proponent companies/sectors
		Consulting firms
		Audit Firms
	Transaction Costs	*Ex-ante*

	Ex-post

Table 05 – Analytical matrix
Source: Own elaboration (2012)

In the third phase of the research, the main organizations and institutions in the Brazilian voluntary market were selected to be interviewed, with the application of the developed research instrument. Through the application of the questionnaire it was possible to identify the structure of the voluntary carbon market regarding the Brazilian actors (institutions and organizations) and transaction costs.

5. Structure of the VCM in Brazil

5.1. Formal Institutions

The VCM is composed by different actors that perform different roles in order to guarantee its operationality. The institutions establish the working rules, guiding the action of the organizations (Paiva; Goulart; Andrade, 2012). Currently, the selling of emission compensations does not occur without the certification from any of the IS available in the market (Guigon, 2009).

In the regulated market, the United Nations (UN) plays the role of central institution for the establishment of rules. Whereas, in the VCM, the ISs perform such task. These institutions provide the guidelines for the choice of GHG reduction projects meant to generate carbon credit (Simoni, 2009). Among the ISs used in the Brazilian market, it can be observed the predominance of VCS (Figure 02), for it is the model adopted in 89% of the projects in Brazil. In 61% of the cases, it was the unique standard used and, in 27%, it was used in combination with the Social Carbon, which focuses on social co-benefits (Markit, 2012).

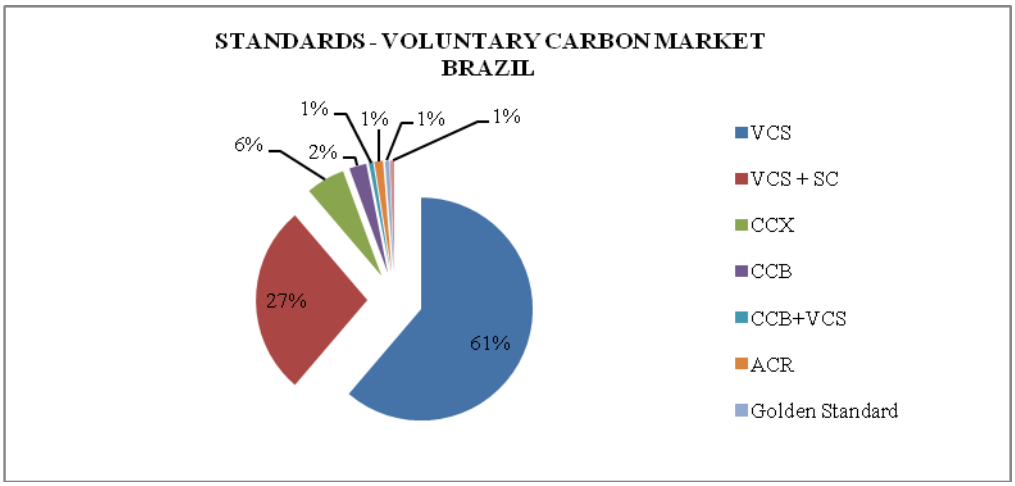

Figure 02 – International Standards market share in the Brazilian VCM
Source: Own elaboration (2012).

Based on the information collected during the interviews, it can be stated that the agents in the Brazilian VCM regard the VCS as the best standard technically speaking. Among the characteristics mentioned to justify such opinion is the fact that it can easily be used. They also pointed out that the main competitor of the VCS is the Golden Standard (GS),

which poses different demands for the choice of project as far as social co-benefits are concerned. It was explained that for a project to be a GS one it is required that the project shows high performance in social indicators since the very beginning. Such requirement influences the lower participation of this IS in the market, since it increases the market entry barrier. On the other hand, the VCS does not present among its rules the social aspects required by the GS and that increases its acceptability in the market, despite the fact that the average price of its credits is comparatively lower.

Another important characteristic that contributes to the predominance of use of the VCS in the international market is the similarity between its rules and the regulated market ones (Guigon, 2009). In the Brazilian market, this characteristic increases VCS participation, since the credits generated before the project is registered in the regulated market can be traded in the voluntary market at a lower transaction cost. Such aspect corroborates what was stated by North (1990), since the VCS fulfills its role as an institution by reducing the uncertainties through the establishment of a structure that guides human behavior, leading to the reduction of the costs associated to the products.

Among the projects developed in Brazil that use the VCS, an expressive amount also takes part in the regulated market, at a different moment. Such aspect reduces the specificity of actives pointed out by Williamson's studies (1975), because it reduces the onus of the non-acceptance of the project in the regulated market. Whenever that happens, it is possible to migrate the credits to the VCM at a lower cost.

Some studies that started in the late 1990's in Brazil led to the development of the SC, which specifically evaluates and validates co-benefits associated to carbon market projects. This process counted on the significant participation of the technical group that, nowadays, composes the Sustainable Carbon Consulting Firm. According to the data provided by this firm, the average investment to add the SC to the VCS increases the cost for the development of the project by 1/3, whereas the selling price of the carbon credit generated by this combination almost doubles. The success of the combination of these ISs in the Brazilian ceramic market has stimulated the use of the VCS in Brazil, expanding the number of technicians trained in developing projects using VCS rules. Other standards can also be found in the Brazilian voluntary market (CCX, CCB, ACR and Swiss Charter Standard), but presenting a smaller participation, as shown in Figure 02.

5.2 Organizations

Different from the institutions, which were characterized by North (1990), the organizations are represented by the agents who act under the current rules. The main organizations that compose the Brazilian VCM market are: proponent companies, which develop GHG emission reduction projects using their own structure; consulting firms, which support the proponent companies throughout the process, since the beginning of the development of the project until the commercialization of the credits; and audit firms, which must validate the generated credits, using as a guideline the rules established by the ISs.

The proponent companies of GHG reduction projects are one of the leading actors in the Brazilian VCM, since they are in charge of executing the project and generate the main active in this market – carbon credits. The proponent companies are divided into productive sectors, which are: food, cellulose, ceramics, conservation and restoration, energy industry; energy industry – process gas utilization; energy industry – small hydropower; energy

industry – power plants; energy industry – industry and timber trade; swine; recycling and textile.

In Brazil, swine is the predominant sector in this market, with a 52% share of the projects. Second by the ceramic industry, which presents a significant participation, with a 295 share of the developed projects, as shown in Figure 03.

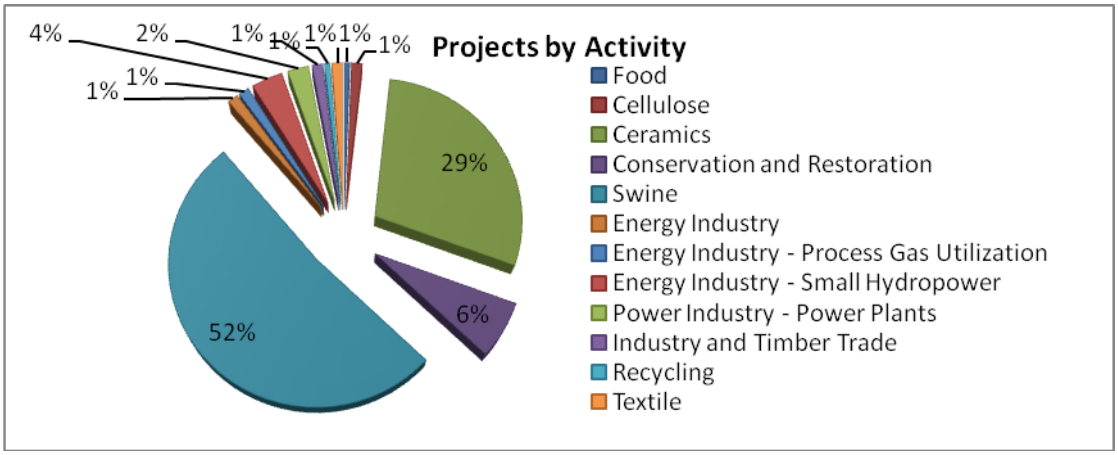

Figure 03 – Projects by Activity in the Brazilian Voluntary Market
Source: Own elaboration (2012).

The Brazilian projects in the VCM are located as shown in Figure 04 below:

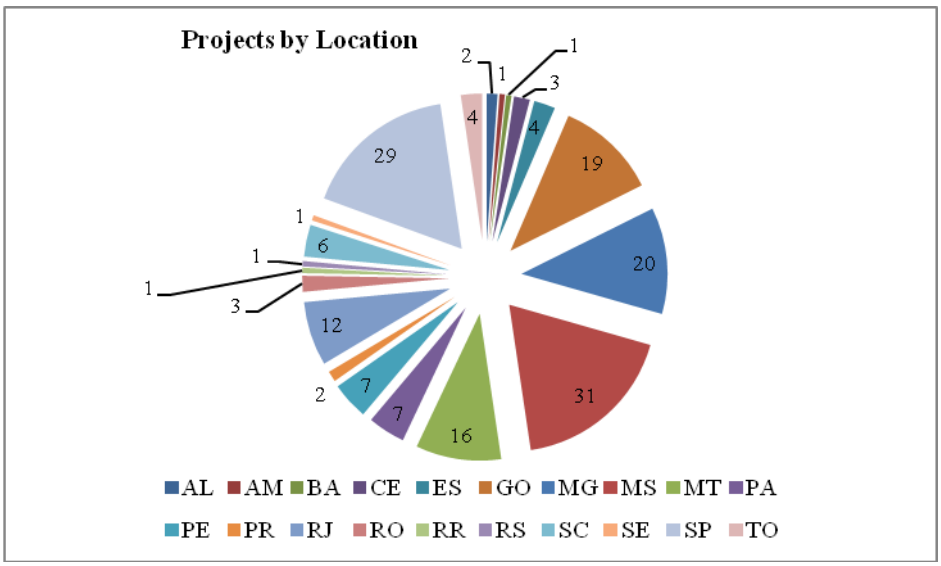

Figure 04 – Number of Projects by Location
Source: Own elaboration (2012)

It can be observed the great participation of the states of Mato Grosso do Sul (31), São Paulo (29), Minas Gerais (20), Goiás (19) and Mato Grosso (18), which together correspond to more than 70% of the projects developed and registered in the VCM in Brazil. Thus, the proponent companies in the Brazilian VCM are concentrated in the Mid-Western and Southeastern Regions and belong to the swine and ceramic sectors.

The consulting firms also play an outstanding role in the VCM. This is due to their constant participation since the very beginning until the end of the cycle. This is so because most of the proponent companies are small or medium-sized ones and do not possess within their structures the knowledge and availability to operate autonomously in this process.

Some of the activities performed by the consulting firms are: carrying out economic and technical feasibility studies, the choice of methodology and of the procedures to be adopted in order to prove GHG reduction; elaboration of the PDD and its submission for approval by the IS; monitoring of the generated reduction; and negotiation with foreign traders (Paiva; Goulart; Andrade, 2012).

In the Brazilian market, the Irish consulting firm AgCert used to be the one with the greatest participation (26% of the national projects). However, this firm withdrew itself from the global market in June 2012, due to the decrease of carbon credit prices. Nowadays, Sustainable Carbon is the consulting firm with the greatest participation in the market, with 24% of the registered projects in Brazil (Figure 05).

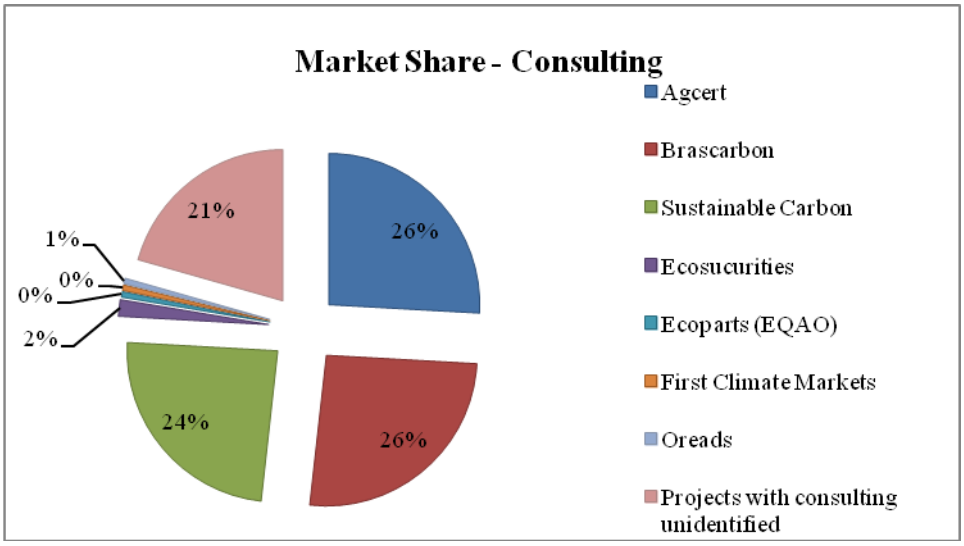

Figure 05 - Market Share - Consulting
Source: Own elaboration (2012)

The principal consulting firms that work in the Brazilian VCM have one characteristic in common: the similarity of their projects. Whereas the Sustainable Carbon Consulting Firm directed their activities to the ceramic market, AgCert and Brascarbon concentrated their actions in the swine sector. Working on a loan agreement, AgCert adopted as a business model the construction of anaerobic biodigestors for the treatment of swine manure. In these cases, VCS was used, due to its similarities to the rules established by the regulated market mechanism called CDM. As it was previously stated, such similarity allows the trading, in the VCM, of the credits generated before the registration of the project in the regulated one. The repetition of the project model and sector reduces the transaction costs. Other consulting firms present in the Brazilian market are Ecosecurities, EQAO (Ecoparts), Oreades and First Climate Markets AG, which have developed projects in different sectors, such as: small hydropower, cellulose and gas capture during refrigerator recycling process, however incipient.

Another organization essential for the operation of the market is the audit firm. The regular detection of carbon credit takes place yearly and it is a requirement for the GHG reduction to be converted into negotiable carbon credit. Carbon credit projects undergo independent audit processes registered at the adopted IS, but the choice of the audit firm is frequently directed by the consulting firm (Paiva; Goulart; Andrade, 2012). This can be observed in the projects developed by Sustainable Carbon, where the audit services of TUV NORD were predominantly used, in the projects developed by AgCert, which used TUV SUD, whereas Brascarbon mostly used the services of DNV.

The relationship between audit and consulting firms becomes even more evident after the analysis of the similarity of the participation share in the Brazilian VCM of the above mentioned audit and consulting firms. TUV SUD, TUV NORD and DNV have 29%, 25% and 22% participation share respectively (Figure 06). On the other hand, AgCert, Brascarbon and Sustainable Carbon have 26%, 26% and 24% respectively. The repetitiveness of such inter-organizational relationship reduces the transaction costs with the elaboration of contracts. The commitment bonding the parts becomes stronger and the moral risk resulting from *ex-post* opportunism is lessened.

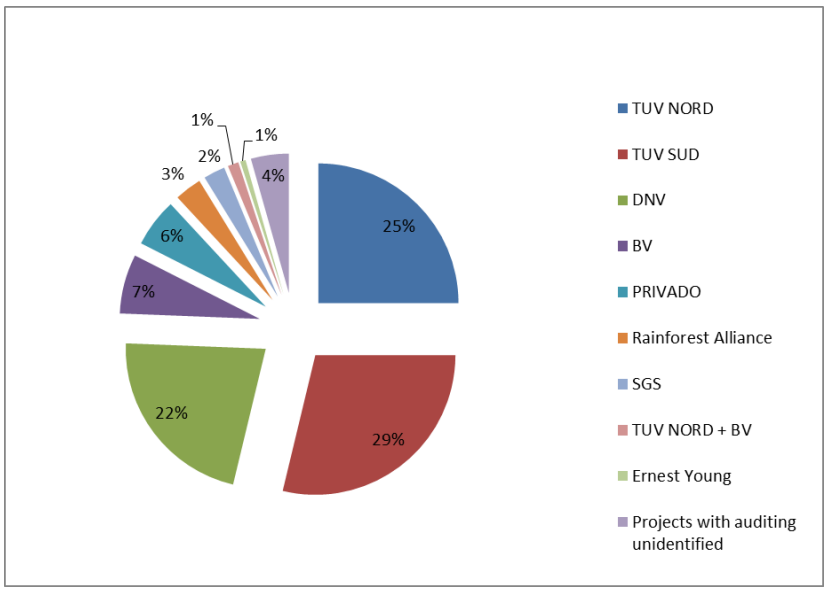

Figure 06 – Market Share – Auditing
Source: Own elaboration (2012)

The audit activity is meant to confirm that the adopted emission reduction process is compatible with the PDD, taking into account the rules established by the IS chosen. After the activities are carried out, the audit firm presents a verification report which brings the certification of the credits and their validation for the trading (Paiva; Goulart; Andrade, 2012). Besides the above mentioned audit firms, others can be found in the Brazilian VCM: Bureau Veritas, Rainforest Alliance, SGS and Ernest Young.

The audit firms also play the role of guaranteeing more transparency in the market. The legitimacy of the carbon credit is subordinated to following the rules established by the international standards. After the audit process, the transaction costs resulting from the uncertainty and from the limited rationality of the actors involved are minimized. This activity

makes the market more efficient, in accordance with the role of the institutions as defined by North (1990).

5.3 Transaction Costs

According to Godoy (20110), transaction costs are present in each step of the implementation process of a GHG reduction project. The same happens with the VCM, due to the asymmetry of information, the uncertainties, the costs of contract elaboration, even though they are lower when compared to the regulated market (Souza; Paiva; Andrade; Goulart, 2011). These costs involve: meeting the criteria established by the international standard; submitting to an external audit process, performing monitoring activities; tax payment throughout the cycle of the project; among others. The costs in each step may vary depending on the scale and the technology applied; on the structure of the proponent company, which might require financial support for consulting services or make use of its own funds; on price variation for audit services; etc (Guigon, 2009). Based on information collected from organizations present in this market, Table 06 below is meant to qualitatively summarize the main transaction costs involved in the development of a project. Coarse's study (1937) was also used as a basis for designing this Table 06, as well as the classification into the period before the implementation of the project (*ex-ante*) and after the implementation of the project (*ex-post*), as proposed by Williamson (1975).

Period	Types	Details	Intensity
Ex-ante	Costs of the generation and acquisition of information about the object	Costs to acquire information on how VCM works Understanding of the rules set in a foreign language Difficulty to access consulting services Difficulty to define the methodology Elaboration of the PDD in general Risk of not having investment payback	Very low Very low Medium Very low High Medium
	Contract costs	Costs to establish contracts with consulting firms Costs to establish contracts with audit firms Difficulty to obtain funding	Low Low High
	Costs related to activity intermediation	Costs with consulting services Cost with technology change Costs with PDD validation Costs with project registration Costs related to project certification Costs with audit services	High High High High Low High
Ex-post	Costs related to the monitoring of the project, after its implementation	Costs with project monitoring Difficulty with certification emission/granting	Low Very low
	Costs related to business/contract procedures	Costs to identify the traders in the VCM Costs with sale brokerage Delay in credit sale Delay in receiving credit payment	Very low Very low Medium High

Table 06 – Transaction Costs – Voluntary Carbon Market
Source: Own elaboration (2012)

Some uncertainties rely on the voluntary market. Since carbon credit is an intangible active, the lack of a compulsory standard, or one with legitimacy to encompass the market's amplitude, becomes critical. It is important to guarantee that the rules are sufficient and that

they are followed. Within this scenario, the lack of transparency is harmful, since good quality projects, which help preserving the environment and produce social benefits, are in the same market as others that have little or no relevant contribution (UNEP, 2008). GS seeks to reduce these uncertainties by adding to the certification process an evaluation performed by a staff of their own. Such initiative prevents the approval of projects which do not bring about benefits that are not compatible with their guidelines. This feature is in accordance with the role of the institutions as defined by Coase (1960), because it minimizes the chances of *ex-ante* opportunism to occur, what would cause adverse selection. The same does not apply to VCS, for the lack of such evaluation represents a vulnerable point for the performance of its institutional role. In the VCS, the development of high-contribution projects is not stimulated for it is not possible to distinguish them from the low-contribution ones efficiently.

6. Conclusion and Recommendations

This research had the objective to understand the governance structure and transaction costs in the Brazilian VCM, having the NIE as reference. An extensive field and bibliographic research about this object was carried out, including: a description of the VCM; its leading actors; the roles performed and the existing transaction costs. The literature about the NIE presented the concepts of institutions, organizations and transaction cost.

It was noticed that the structure of the Brazilian VCM is composed by several institutions and organizations that play specific roles to operate it. In the absence of a central institution that has the representativeness and the amplitude to encompass the whole market, ISs are in charge of defining the "game rules". This fact corroborates the arguments defended by North (1990) for the ISs bring about credibility, trust and transparency to the trading of carbon credits done outside the Kyoto Protocol.

Since there are several ISs acting in it, the VCM is characterized by a large variation of "game rules", as compared to the RCM, which is characterized by a unique and strict set of rules. In Brazil, VCS dominates most of the market. This is due to its similarities with the rules of the regulated market, regarding the possibility for credits generated before the registration in the CDM to be traded in the VCM. Another reason is the successful combination of this IS with the Social Carbon co-benefit in the Brazilian ceramic industry.

Among the most representative organizations, the consulting firms play a relevant role in the development of the market. The decision to enter in the VCM is connected to consultants' ability to persuade the proponent company. The sharing of risks is a strong argument for the project proponent companies. Once the initial phase is done, the consulting firms monitor the projects until the credits are traded, directly dealing with international traders and buyers. Based on the field research, it was also verified their role in decision making concerning the choice and hire of an audit firm, which should validate the project and certify the credits.

The audit firms perform activities that complement the role played by the IS. They guarantee the fulfillment of the rules of the market concerning the generation and account of GHG emission reduction, increasing its credibility.

The brief historic view of the development of the Brazilian VCM evidences the great participation of the swine and ceramic sectors. This characteristic is not the result of a higher concern of their managers with environmental issues. The explanation lies on the project models developed by their consulting firms, which prospect ways of reproducing them in specific sectors, reducing transaction costs.

Among the transaction costs pointed out by organizations that are present in the Brazilian VCM, the costs related to activities intermediation showed greater relevance during project development. The organizations face this issue by establishing partnerships and sharing risks. This initiative also contributes to reducing the transaction costs related to the generation and acquisition of information about the object, since the proponent companies gain more trust, because the chances of occurring moral risk resulting from the asymmetry of information is reduced.

This research presents as its limitation the absence of nominal average prices and deadlines for a more quantitative analysis of the transaction costs pertinent to the VCM in Brazil, especially concerning the development and implementation of GHG emission reduction projects and the trading of credits. In terms of a preliminary analysis, it is not possible yet to evaluate these prices qualitatively, since it is a work in progress that indents to analyze all the organizations present in the VCM in Brazil using case studies within a near future.

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