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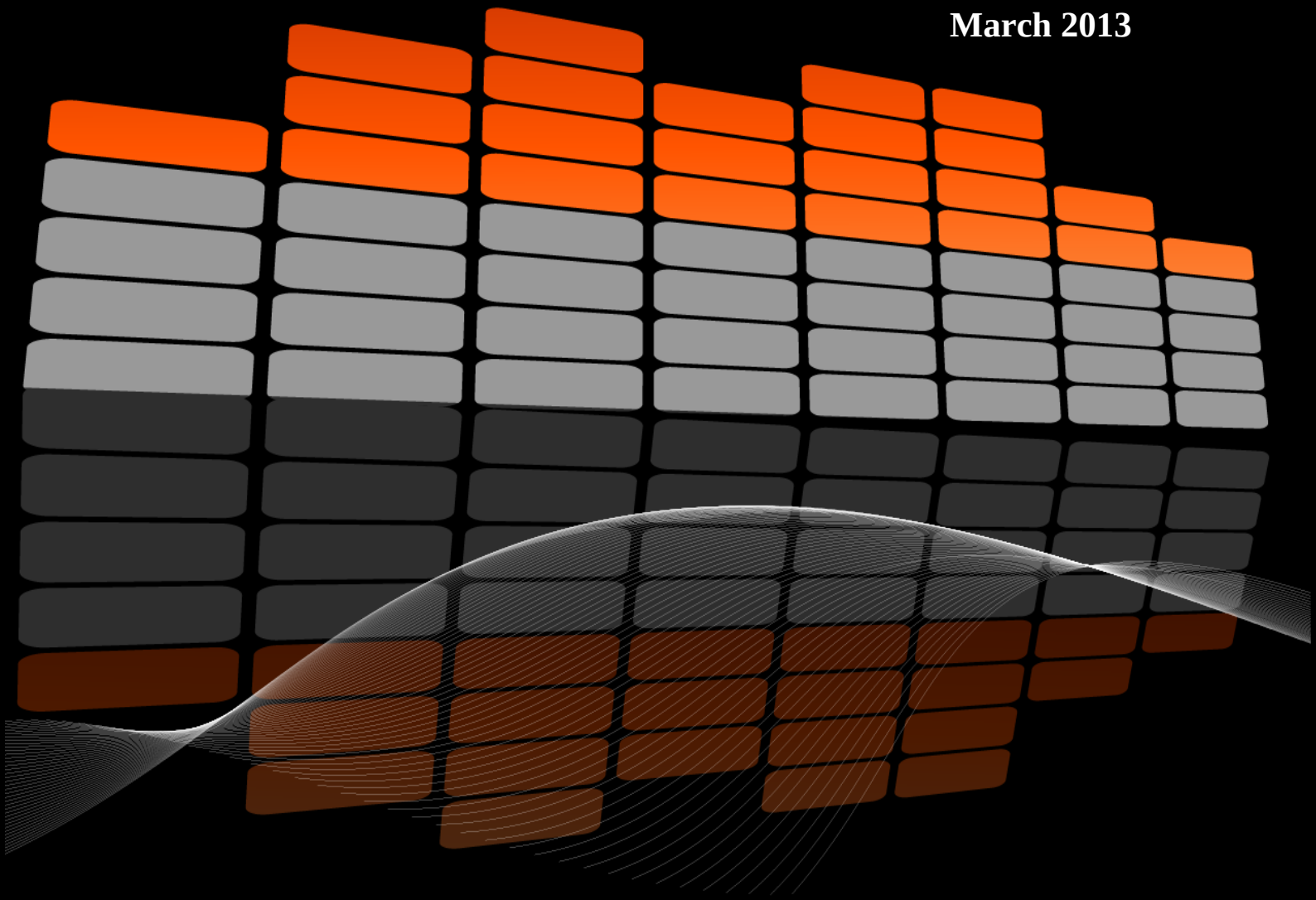

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The Clustering of Cork Firms in Santa Maria da Feira: Why History Matters

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Abstract - **This paper studies the reasons why most Portuguese cork manufacturing firms are concentrated in Santa Maria da Feira, a small municipality in the north of the country, whereas the bulk of the cork is produced in the south (Alentejo and Ribatejo*).* It starts with a brief introductory discussion of the advantages and limitations of clusters and industrial districts, together with an illustration of the recent theoretical findings of evolutionary economic geography. Next, a comparative analysis is made of the economic performance over the last decade of firms located in Santa Maria da Feira and other regions, leading to a powerful conclusion that points to the absence of any clear advantages for clustered firms. Finally, an attempt is made to discover the historical and socio-political reasons why so many cork firms are concentrated in Santa Maria da Feira. These are shown to be indispensable for understanding and substantiating the business location decisions of most Portuguese cork entrepreneurs.**

Keywords: *Cork industry; clusters; Portugal*

1. Introduction

The cork industry is an important economic activity in Portugal, a country which is by far the world's largest producer and exporter of manufactured cork products: it is responsible for 62% of the €804.7 million in value of the cork products exported worldwide. Cork stoppers for wine bottles are the leading product, representing about 70% of total exports (€563 million, of which €352 million represents exports of natural corks). Cork products contribute to more than 2% of total Portuguese exports and to around 30% of the exports of forestry products. The main export destinations are wine-producing countries, most notably France, Italy and the USA. (APCOR 2011).

The nearly 600 companies belonging to this sector employ more than 8,000 workers and produce about 40 million corks per day, of which 35 million are produced in Santa Maria da Feira, a small municipality in the North of the country, belonging to the district of Aveiro. The main purpose of this paper is to study the reasons why most Portuguese cork manufacturing firms are concentrated in this northern district, whereas the bulk of the raw material (natural cork) is produced in the southern regions of the Alentejo and the Ribatejo.

It starts with a brief analysis of the advantages and limitations of clusters and industrial districts, while also examining the recent theoretical findings of evolutionary economic geography, as well as the older perspectives of Porter and Becattini, largely based on Marshall (section 2).

In section 3, a quantitative assessment is made of the comparative economic performances of the firms clustered in Santa Maria da Feira and the firms scattered around other regions of the country, using the most recent data available from the Portuguese statistical office (INE) about this industry: production, employees, hours worked, labour productivity and international trade. This analysis covers the period from 2004 to 2010, and appears to show that there are no clear advantages for clustered firms.

With this result in mind, the main part of the paper (section 4) is dedicated to a careful search for the fundamental explanation as to why cork firms are clustered in the municipality of *Santa Maria da* Feira, together with a description of the historical and socio-political reasons shown to be indispensable for

understanding and substantiating the business location decisions of most Portuguese cork entrepreneurs.

Finally, section 5 ends the paper with the main concluding remarks and makes suggestions for future lines of research. The aim is to achieve a better understanding of this sector and to propose improvements for its better functioning. The sector is seen as vital for the Portuguese re-industrialising efforts currently in progress, a move believed to be essential for overcoming the serious macroeconomic and financial crises facing this country.

2. The importance of clusters and industrial districts

In the 1990s, Alfred Marshall's approach to external economies in his book *Principles of Economics* (1890) was updated by Michael Porter (Porter 1990, 1998) with the revival and popularization of the "cluster" concept. This concept is mainly based on Marshall's geographical agglomerations, and it shares many of the features present in the notion of Industrial Districts of Giacomo Becattini (Becattini, 1990). Clusters can be understood as geographical concentrations of interconnected companies, specialised suppliers, service providers and institutions, competing and cooperating in the same space, at a national or a regional level (for a detailed analysis of this concept, see Martin and Sunley, 2003). The clustered companies are connected to other companies and institutions also existing inside the cluster, through exchange relations and mutual interdependencies.

Clusters are important for economic development since the companies inside the cluster experience a stronger rate of growth, resulting from the competitive advantages created by the interaction of the four points of the "competitive diamond" (Porter 1991): factor (input) conditions; firm strategy, structure and rivalry; demand conditions; and related and supporting industries; all of them influenced by other factors (for instance, chance or Government policy). The geographical agglomeration of firms increases the potentialities of the diamond, reinforced by local economic and social history, which strengthens the links between companies and institutions located in that area.

The research carried out into clusters has mainly been marked by an analysis of its functioning, with less attention being paid to its origin, development or even decline. A more profound analysis of these aspects of the cluster may help us to understand the factors that underpinned its emergence.

Evolutionary economic geography has developed a new approach to clusters, paying attention to their "life cycle" (Boschma and Frenken 2006; Martin and Sunley 2011) and studying the evolution of clusters both from their origin and throughout the phase of their development and maturity, or even decline. In this context, the historical approach is very useful, since past (or historical) choices made in relation to productive specialisation, technologies, labour skills, the network of suppliers, etc., can create a path dependence and ultimately lead to "lock-in" situations. According to Martin and Sunley (2006), the possible sources of regional path dependence are: natural resources; sunk costs of local assets and infrastructures (facilities, machinery, etc.); local external economies of industrial specialisation; regional technological lock-in; economies of agglomeration; local institutions and socio-cultural features; dependencies on other regions or political decisions in other regions. The regional dependence explains the path dependence: the same factors that are responsible for the development of a firm or a small group of firms may lead to the creation of other firms in the same region. Moreover, some random and historical "accidents" or events may divert the cluster from the "first path dependence", leading it to adopt a self-reinforcing mechanism that could be either positive or negative.

But the results are still not predictable. The cluster presents endogenous and exogenous factors that shape the local productive system and it can learn certain lessons during its evolutionary process, under pressure from the competition or from exogenous (international or national) factors. As Belussi and Sedita (2009: 508) state, the cluster is an evolving complex system that exhibits some learning capacity.

According to the "life cycle" approach, the cluster initially experiences a rapid expansion and accumulation of capital resources in terms of expertise, knowledge and support institutions. In a second phase, it tends to stabilise in terms of its structure and shape. The degree of interconnection is high and this can make the cluster less resilient. However, the cluster may become mature, depending on its flexibility and the type of external shocks to

which it is exposed. Faced with a competitive shock, the cluster may disappear or diminish in size.

However, the transition to a phase of disappearance is not so linear. Resilience can be understood as the adaptation capability of a system. In the case of clusters, two trends are in conflict: on the one hand, clusters increase their internal interconnections; on the other hand, the growing interconnections reduce the system's capacity to adapt to external shocks. This means that there is a trade-off between resilience and interconnections: the more closely interconnected the parts of the system are, the more rigid it will be in structural and functional terms. The "adaptive life cycle model" seeks to reconcile these two trends, albeit with unpredictable results in terms of success and survival.

Martin and Sunley (2006) consider six factors relating to the evolution of a mature cluster: 1) the emergence of a new cluster that leverages the resources and capabilities inherent in the former; 2) the constant mutation of the cluster (and, in this case, it is constantly evolving) both for new sectors and for new activities (a high degree of resilience); 3) the stabilisation of the cluster over a long period, for example, by taking advantage of market niches, but always remaining under threat of disappearance (a modest degree of resilience); 4) the reorientation of the cluster, corresponding to the emergence of a new cluster; 5) the emerging failure of the cluster because it has not achieved the critical mass needed to exploit external economies; 6) the disappearance of the cluster, according to classical life cycle theory.

Also, according to Martin and Sunley (2006), these triggering factors could permit the end of the lock-in situation, i.e. the rigidity and inflexibility of the cluster when confronted with external challenges. Likewise, Belussi and Sedita (2009) highlight the qualitative aspects of the cluster in the several phases of its life cycle. Local endowments (input conditions: for instance, qualified or specialised workers; natural resources, etc.), institutions and anchor firms are some of the endogenous factors explaining the genesis of the cluster. In the development and maturity phases, several other endogenous factors may be important: technological innovation; universities, research centres and business networks; and aggressive strategies, such as a diversification of products and markets. Among the exogenous factors, the growth of demand and internationalisation and globalisation processes (for instance, when a local company becomes a multinational company) are determinant, simultaneously representing a challenge and a threat to the cluster. These factors bring the cluster into contact with outside customers, suppliers and institutions, competitors that may transform the cluster into an open and global system.

Menzel and Fornahl (2009) conclude that the cluster can also be distinguished by a quantitative dimension, which includes the number of firms and employees. Initially, the number of firms is small but growing, consisting mainly of small firms. In the development phase, the number of employees grows significantly, compared to the situation nationally. In the mature phase, the cluster is able to sustain its level of employment. The declining phase is marked by a fall in the number of firms and employees.

Identifying and explaining the factors that lie at the origin of the cluster's path dependence and its hypothetical lock-in certainly represents a considerable contribution towards finding possible solutions for bringing an end to the "lock-in" situation.

By adopting a historical approach, we seek to identify the factors that led to the formation of the Santa Maria da Feira cluster and to discover whether it has developed a "delocking mechanism" during its life cycle. We begin our empirical analysis by painting the picture over the last decade of the cluster of firms located in this and other regions, which we hope will show the importance of an empirical analysis based on a historical knowledge of the Santa Maria da Feira cluster.

3. Comparing the economic performance of firms from the Santa Maria da Feira cluster with that of other firms

According to the theory about clusters and industrial districts that has been briefly described above, one might expect that firms belonging to a strong and resistant cluster would show economic and financial advantages over the firms from the same sector located in other regions of the country.

It is an interesting exercise to compare the performance of these two groups of firms and see if the above expectation is confirmed. In order to do so, a diversified range of indicators is used, based on data provided by the Portuguese statistical office (INE) for the period from 2004 to 2010. This was a difficult time for the Portuguese economy as a whole,

and for the manufacturing sectors in particular, marked by two deep recessions in 2003 and 2009.

Of course, the cork sector in Portugal was able to avoid these global difficulties, as can be seen in Table 1, which shows the main indicators at the beginning and end of the period, namely the absolute and relative numbers, as well as the rate of change, of firms, employees, production, value added and investment, in the area of Santa Maria da Feira (around 80 per cent of the sector's firms) and in other regions of Portugal (mostly Setúbal and the Algarve).

Table 1. Main indicators of the Cork Industry in Portugal, 2004 – 2010

Year	**Firms**							
	S. M. Feira			**Other regions**			**Portugal**	
	Number	% of Total	R. Ch. (%)	Number	% of Total	R. Ch. (%)	Number	R. Ch. (%)
2004	1,062	79.9	-	267	20.1	-	1,329	-
2010	779	80.2	-26.6	192	19.8	-28.1	971	-26.9
Year	**Employees**							
	S. M. Feira			**Other regions**			**Portugal**	
	Number	% of Total	R. Ch. (%)	Number	% of Total	R. Ch. (%)	Number	R. Ch. (%)
2004	9,304	72.7	-	3,493	27.3	-	12,797	-
2010	6,169	67.5	-33.7	2,973	32.5	-14.9	9,142	-28.6
Year	**Production**							
	S. M. Feira			**Other regions**			**Portugal**	
	Million €	% of Tot.	R. Ch. (%)	Million €	% of Tot.	R. Ch. (%)	Million €	R. Ch. (%)
2004	1,163.8	75.8	-	330.5	24.2	-	1,494.4	-
2010	762.5	84.9	-34.5	353.2	15.1	6.9	1,115.7	-25.3
Year	**Value Added**							
	S. M. Feira			**Other regions**			**Portugal**	
	Million €	% of Tot.	R. Ch. (%)	Million €	% of Tot.	R. Ch. (%)	Million €	R. Ch. (%)
2004	265.4	83.8	-	51.4	16.2	-	316.8	-
2010	234.9	83.6	-11.5	45.9	16.4	-10.7	280.8	-11.4
Year	**Investment (Gross Fixed Capital)**							
	S. M. Feira			**Other regions**			**Portugal**	
	Million €	% of Tot.	R. Ch. (%)	Million €	% of Tot.	R. Ch. (%)	Million €	R. Ch. (%)
2004	25.6	66.3	-	13.0	33.7	-	38.7	-
2010	9.0	37.6	-64.9	14.9	62.4	14.6	23.9	-38.1

Source: INE and the authors' calculations

As we can see, the main trend between 2004 and 2010 was towards a significant decline in the Portuguese cork sector, with an almost 30% fall in the number of firms and employees, a 25% drop in production, an 11.4% drop in value added and an astonishing fall of 38% in investment.

However, some regional nuances are worth mentioning, namely that although there was a gentler fall in the number of firms in the Santa Maria da Feira region, the decline in employment was more than twice that of other regions, so that, by 2010, the 80% of firms remaining in activity corresponded to only 67.5% of the level of employment in 2004. And contrary to the expectations resulting from the analysis of evolutionary economic geography about the advantages of clusters and industrial districts, the production of firms in the Santa Maria da Feira region fell by 34.5% in this period, compared with a surprising growth of 7% in production outside this region. This situation is mirrored by what happened in the case of a crucial variable for the competitiveness and sustained growth of any industry, namely investment in gross fixed capital. In this case, we saw a worrying fall of 64% in gross fixed capital investment in the Santa Maria da Feira region and an appreciable growth of 15% in this variable at other firms. Even taking into account only the firms with the best performance in the Santa Maria da Feira region, it is still puzzling to note the huge and persistent importance of value added. The share of the value added generated at the firms in the Santa Maria da Feira region was more than 83%.

Thus, in order to better assess the relative performance of clustered firms (in the Santa Maria da Feira region) and non-clustered firms (scattered around the other regions of Portugal), it is necessary to look at other indicators, namely the evolution of productivity and exports in the period under analysis.

The best indicator of labour productivity is the value added generated by each hour worked, but, as the INE series does not include the number of hours worked in the cork industry by region, we will use instead value added by worker (Table 2).

Table 2. Productivity in the Cork Industry, 2004-2010

	S.M. Feira		Other Regions		Portugal	
Year	Prod	R.Ch. (%)	Prod	R.Ch. (%)	Prod	R.Ch. (%)
2004	28,521.6	n.a.	14,717.9	n.a.	24,753.9	n.a.
2005	30,378.2	6.51	13,889.3	-5.63	25,856.4	4.45
2006	29,844.9	-1.76	17,346.2	24.89	26,539.1	2.64
2007	31,174.8	4.46	23,462.3	35.26	29,159.8	9.87
2008	26,049.1	-16.44	19,607.8	-16.43	24,878.5	-14.68
2009	26,241.4	0.74	11,925.1	-39.18	21,640.2	-13.02
2010	38,070.0	45.08	15,441.3	29.49	30,711.1	41.92
2004-2010	-	4.93	-	0.80	-	3.66

Source: INE and the authors' calculations

Labour productivity tends to be a strongly pro-cyclical indicator, with an appreciable short-run variability. In fact, looking at the sector in Portugal, some years show a large increase, namely 2010, while others show a significant decrease, for instance 2008 and 2009. But it is also interesting to observe the large regional differences in this indicator. The firms lying outside the region of Santa Maria da Feira recorded an impressive increase in productivity in 2006 and 2007, but the recession of 2009 affected them tremendously, leading to a fall in productivity of almost 40%. Although the annual average rate of growth in this period was clearly greater for the firms in the Santa Maria da Feira region, this was mainly because they had shown particular resilience to this serious macroeconomic crisis and its aftermath.

Another important indicator of the strength, competitiveness and sustainability of an industry is the evolution of its exports. Fortunately, the INE has published detailed export data by region, already covering the year of 2011, both in quantitative terms (Kg of cork - Table 3) and in terms of their overall value (millions of € - Table 4).

Table 3. Cork Exports, quantities - 2004-2011

	S.M. Feira		Other Regions		Portugal	
Year	Kg	R.Ch. (%)	Kg	R.Ch. (%)	Kg	R.Ch. (%)
2004	134,921,579	n.a.	26,668,466	n.a.	161,590,045	n.a.
2005	120,450,643	-10.73	29,003,388	8.76	149,454,031	-7.51
2006	135,447,353	12.45	37,895,356	30.66	173,342,709	15.98
2007	133,896,916	-1.14	37,148,532	-1.97	171,045,448	-1.33
2008	131,713,506	-1.63	27,322,045	-26.45	159,035,551	-7.02
2009	118,661,613	-9.91	23,769,672	-13.00	142,431,285	-10.44
2010	131,013,062	10.41	23,620,193	-0.63	154,633,255	8.57
2011	134,678,911	2.80	30,144,848	27.62	164,823,759	6.59
2004-2011	-	-0.03	-	1.77	-	0.28

Source: INE and the authors' calculations

The exports of manufactured cork products in terms of quantity remained remarkably constant between 2004 and 2011, although there were some large changes in intermediate years. However, the firms outside the Santa Maria da Feira region behaved better, recording a slight increase of almost 2% in this period.

Table 4. Cork Exports, values - 2004-2011

	S.M. Feira		Other Regions		Portugal	
Year	€	R.Ch. (%)	€	R.Ch. (%)	€	R.Ch. (%)
2004	759,244,039	n.a.	99,138,104	n.a.	858,382,143	n.a.
2005	604,712,785	-20.35	95,074,739	-4.10	699,787,524	-18.48
2006	687,816,755	13.74	106,500,329	12.02	794,317,084	13.51
2007	707,779,078	2.90	110,511,072	3.77	818,290,150	3.02
2008	682,061,140	-3.63	90,404,401	-18.19	772,465,541	-5.60
2009	573,787,169	-15.87	73,549,222	-18.64	647,336,391	-16.20
2010	636,290,505	10.89	77,709,977	5.66	714,000,482	10.30
2011	677,184,734	6.43	94,365,659	21.43	771,550,393	8.06
2004-2011	-	-1.62	-	-0.70	-	-1.51

Source: INE and the authors' calculations

The trends in the values exported were similar, but with a slight fall in all the regions, with firms in the Santa Maria da Feira region once again having the worst performances. It is important to note that these are nominal values, and so the performance is much more worrying as far as the actual decline that took place is concerned. It was indeed a difficult period for Portuguese cork firms, and, all things considered, it would seem that the clustering of manufacturing activity in just one region does not bring any clear economic advantages, so that the explanation for why cork firms are clustered together in the Santa Maria da Feira region must be sought for in other (non-economic) domains.

4. The historical reasons for the clustering of cork production in the Santa Maria da Feira region

The Iberian Peninsula has both the quality of soil and climatic conditions that give Portugal and Spain an absolute competitive advantage in the production of cork. The western Mediterranean region enjoys excellent natural conditions for the growth of cork oak trees, and the south-western part of the Iberian Peninsula, in particular, is the most important region when measured in terms of the area that has been occupied by this tree for almost two centuries (Aronson, Pereira and Pausas 2009: 13), with Portugal being the world leader in the production of cork (APCOR 2011).

The Portuguese cork sector presents two historical features: firstly, cork production has been an export business since the very beginning; and secondly, the cork industry has always presented a high level of geographical concentration.

The export vocation of the sector signifies that globalisation and its different rhythms have always affected the cork business, making this an external factor that constantly challenges the survival of firms, which have become accustomed to playing the internationalisation game. Furthermore, cork is a natural renewable resource used for the production of cork stoppers for wine bottles, so that external demand is essentially limited to wine-producing countries.

The manufacture of cork – at least until the invention of agglomerated cork in the nineteenth century – was a labour-intensive process, making it easier for later industrialised countries to develop the cork industry. Since they operated in a low-tech sector dependent on a natural renewable resource, the firms in the cork industry were subject to two limitations in terms of their location: proximity to natural raw material and cheap labour. Nevertheless, the motivations underpinning the strategic options for the location of cork firms were also constrained by the type of cork production (Zapata 1996): cork planks, cork stoppers or agglomerated cork.

In the nineteenth century, Portugal exported cork planks, a semi-manufactured product, and the first firms were established in the south of the country, close to the raw material. This made the transport of raw cork much more expensive in comparison with labour costs (Mendes 2009).

The development of the manufacture of cork stoppers and agglomerated cork, coupled with the growth in cork exports (Mendes 2009) brought other constraints, namely, the need for proximity to sea ports and for a more specialised labour force, which changed the geography of the "new" cork companies. Throughout this process, the centre of Portugal was a growth pole of the cork industry for a long time, especially in the area around Setúbal, attracting international firms, like Mundet (1905), which became one of the largest cork companies in the world (Carrasco *et al.* 2010). Its proximity to the port of Lisbon and the region's industrial labour force made Setúbal an advantageous location for firms that produced manufactured cork (stoppers and agglomerates). Nevertheless, the presence of industries that produced agglomerated cork made Setúbal more vulnerable to international competition and, subsequently, to the technological innovation that was beginning to emerge, namely the production of plastics.

However, according to the *Boletim do Trabalho Industrial* (DGT, 1917), in 1917 the cork stopper industry in the district of Aveiro had 43 factories (41 in Santa Maria da Feira) and 880 workers (368 in Santa Maria da Feira), so that this was already one of the most important districts in terms of cork production. This means that the origin of the cluster can be traced back to the beginning of the twentieth century.

However, until the 1930s, the leading country in terms of manufactured cork exports was Spain, a position made possible by the Catalonian cork industry. Nonetheless, the cork business was still dominated by developed countries such as England, Germany and the United States, which, despite not having the raw material, benefited from a highly specialised labour force, technology, capital and international trading power.

The Spanish Civil War (1936-1939) was a turning point in the Iberian cork business, paving the way for the Portuguese domination of the cork trade. Together, the Great Depression, the Spanish Civil War and the entrenchment of the regime led by General Franco led to a decline in the Spanish control over the worldwide cork trade (Branco and Parejo 2008). The opportunity wasn't missed by either the Portuguese government or Portuguese entrepreneurs, although there was no immediate change in the specialisation adopted in terms of production and trade: semi-manufactured cork continued to be the most relevant cork export until the 1950s.

During the 1960s, the Portuguese cork business again benefited from a second important exogenous factor, which gave the final impetus to what was to become the Santa Maria da Feira cork cluster: the synthetic materials that replaced natural cork. Three main consequences resulted from this technological innovation. Firstly, the more developed countries abandoned the cork industry that had been concentrated in the Iberian Peninsula. Secondly, Spain and Portugal became specialists in the production of cork stoppers, changing the market for cork products, which was now totally dominated by wine producers. Thirdly, resulting from the previous two consequences, the cork business was "Iberianised", i.e. production, industry and trade became concentrated in the Iberian Peninsula (Zapata 2002; Zapata *et al*. 2009).

As far as the "Iberianisation" of the cork business was concerned, Portugal and Spain had the advantage because of their abundance of raw material. But now the roles of Portugal and Spain in the cork business were reversed: Portugal displaced Spain from its hegemonic position and became the world leader in the cork business, this time with a new specialisation: manufactured cork (Parejo 2010).

During this period, the geographical pattern of this industry changed and the north of Portugal, namely the municipality of Santa Maria da Feira, became the "cork stopper capital". Several authors classified Santa Maria da Feira as an industrial district or a cluster and we can point to the 1960s as the period when the cluster really began to develop (Mira 1994; Ruivo 1992, 1995, 1996; Branco and Parejo 2011). The *Boletim da Junta Nacional da Cortiça* (1970), one of the most important publications in the cork sector, confirms the rise of Aveiro, classifying this district as the most important in terms of manufactured cork.

Following Porter (1991) and the determinants of competitiveness presented in his "diamond model", we can find two key factors in the origin and development of the Santa Maria da Feira cluster, both of which were determined by local and historical conditions: the presence of craft workshops with a skilled and cheap workforce and the presence of an anchor firm. The combination of these two factors would never have produced such results if it hadn't been for the existence of another random exogenous

factor: the Spanish Civil War, which weakened the position of Portugal's most important competitor in the cork business, Spain.

According to Belussi and Sedita (2009), the existence of influential factors and the anchor firm (or firms) are always linked to the previous industrial history of a cluster. In the case of Santa Maria da Feira, the two exogenous factors were transformed into an opportunity for the cork industry located there, boosted by an institutional framework that favoured some of the region's most important endogenous factors.

The wealth of natural resources available was not an endogenous factor triggering the emergence of the cluster, since most cork production is concentrated in the south of Portugal, with the Alentejo region being the leader. However, Santa Maria da Feira already had an industrial tradition based on craft workshops producing cork stoppers. According to Mendes (2009), the firms located in the Santa Maria da Feira region had been small family businesses since the end of the nineteenth century. This feature was reinforced by the industrial policy of the Estado Novo or, at least, was not contradicted by one of the most significant measures of this regime's industrial policy, namely "Industrial Conditioning" (*Condicionamento Industrial*), which granted licences for a growing number of craft workshops in the Aveiro district (Branco and Parejo 2011).

Another important endogenous factor, which was again linked to institutional aspects, was the low wages paid in the north of Portugal, including the Aveiro district. Cork workers in Santa Maria da Feira were the worst paid in the country, a situation that was reinforced by several laws regulating wages in the cork industry (Branco and Parejo 2011) and brought another competitive advantage for Portugal, besides the abundance of raw material. Sampaio (1982) shows that cheap labour is a relevant factor in terms of competitiveness and the lower costs made all the difference when competing with other Portuguese regions, namely Setúbal, since the re-introduction of the democratic process in Portugal was marked by an upward trend in wages.

Finally, we can add the existence of a successful anchor firm. Since its formation, the Santa Maria da Feira cluster has been an open local/global system, although without any multinational company, unlike the clustering of firms in Setúbal. But Santa Maria da Feira had a local anchor firm – *Amorim & Irmãos*[1] – whose history is bound up with the cluster history. By acting as an anchor firm and adopting a "putting-out" strategy, *Amorim & Irmãos* stimulated spin-offs and the start-ups of new firms (Branco and Parejo 2011).

Amorim & Irmãos had financially encouraged its workers to open small workshops and developed strong ties with them. The close relationship with small stopper producers allowed the company to respond to fluctuations in the world demand for cork products without increasing the scale of production. In his study about the cork cluster (Monitor Company 1994: 74, 135), Michael Porter claimed that the success of the cluster was explained by the access that small firms enjoyed to certain phases of the production process, provided to them by the larger company, *Corticeira Amorim*.

Finally, the vertical integration and diversification of markets and production strategies implemented by this company explain the success of the *Grupo Amorim* (Branco and Parejo 2011), as well as the quasi monopoly position in the cork business acquired by the group: a 26% share of the worldwide cork market, a 65% share in the cork stoppers market, a 55% share in composite agglomerates and an 80% share in expanded agglomerates (Amorim 2011).

The internationalisation strategies of *Amorim & Irmãos, Lda* gave Portugal a favourable position in the cork trade in 1986, the year when Portugal and Spain joined the European Union (EU). During the 1980s, two trends were reinforced: the *Europeanisation* of demand – the important role of countries belonging to the EU that are wine producers, namely France and Italy – and the growing importance of trade between Portugal and Spain, with the latter country exporting mainly semi-manufactured cork to Portugal (Zapata *et al.* 2009).

These last features may pose a threat to the success of the Santa Maria da Feira cluster because they open the doors to a lock-in situation, not only in terms of a mono-specialisation in cork stoppers, but also in terms of trade partners, giving these a greater negotiating power, which could flatten export prices. Furthermore, the strategies that large-sized firms adopt to face this threat could lead to a demand for new suppliers outside the cluster, in order to react to

[1] The first firm in the *Grupo Amorim* was founded in 1922, namely *Amorim & Irmãos, Lda.*, which was to be the origin of *Corticeira Amorim*, founded in 1963.

the pressure of lower prices, since wages are increasing in the Santa Maria da Feira cluster.

5. Concluding Remarks

This paper studied the relative performance of clustered and non-clustered firms in the Portuguese cork industry, and the historical and socio-political roots of the Santa Maria da Feira cluster of cork firms, also known in the literature as the Aveiro cork industrial district.

The Portuguese cork industry provides an interesting case study on several levels. First of all, it must be stressed that Portugal is the world's leading country in this economic activity, not only in terms of production, value added and employment, but also in terms of international trade (representing more than 60% of the world's cork exports).

Moreover, there is a considerable geographical concentration of production in the municipality of Santa Maria da Feira, in what could be considered an industrial district, suitable for analysing and testing the Marshallian agglomeration economies and the competitive advantages of a cluster, as evidenced by Becattini and Porter, among many others.

However, from the analysis, at the regional level, of several mesoeconomic indicators quantified in this paper, the main conclusion is that there is no empirical evidence that unequivocally supports the economic advantages to be derived from the geographical concentration of cork production.

In fact, the economic performance of the firms clustered in Santa Maria da Feira is not significantly better than the performance of the cork manufacturing firms scattered around other regions of the country, and this applies both to relative labour productivity and to export growth.

This important result suggests that the reasons for the effective concentration of manufacturing cork activities in Portugal, over the last five or six decades, must be sought for not only in predominantly economic dimensions, but also in other dimensions of a historical, political and socio-institutional nature.

As is explained in the main section of this paper, the Santa Maria da Feira cork cluster is a mature one, formed at the beginning of the twentieth century and developing over the second half of this century, being associated with the installation in this geographical area of a key anchor firm, *Corticeira Amorim*. It is a mono-cluster, operating in a sector in which Portugal has absolute advantages based on the abundant availability of its main raw material (natural cork) and the comparatively low wages of an abundant and skilled labour force.

The relations between the companies forming this cluster are also based on the historical, cultural and social traditions of this region of Portugal, which are not so strong in other regions, namely the Alentejo and the Algarve. This last advantage can be subsumed into a comprehensive conception of the notion of social capital, which, for obvious reasons, is very difficult to assess quantitatively, and it is certainly an advantage that has justified the continuation and strengthening of this cluster in the past, and can continue to provide its resilience in the future.

Two main research questions need to be further addressed in the future. The first task is to make a comparative analysis of the economic performance of clustered and non-clustered firms over a much broader time horizon, linking it to the different phases of the cork industry's life cycle, as well as those of the Santa Maria da Feira cluster. The second task is to undertake a qualitative analysis of the knowledge and research networks, social capital, skill improvements, technological innovations, etc., that may prove to be crucial for sustaining the relative strength and world dominance of the cluster, and to avoid the eventual, and always possible situations of lock-in and decline. The economic and social importance of this industry, as well as its crucial role in guaranteeing environmental sustainability and biodiversity, certainly merit this research effort.

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Fisheries, Chaos and Ethics. A Note on India Status

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Abstract – **Historically in the world, since last century, fish stocks of many species have been overexploited. A good management of fisheries became essential to permit the preservation of species. Managing fisheries got increasingly complex, once many interests, often contradictory, are always involved. Moreover, through time, political will has not been enough to change things in many places around the world and overexploitation has remained for many species. In India, with a strong population density in many coastal areas depending on fishing, the situation is very severe for many species and new requirements for preservation are now being tried. In literature, fisheries have been analysed in contexts of uncertainty. Chaos theory is one of the theories that have been used to explain fisheries. This work intends to represent a reflection about fisheries overexploitation, considering the utilization of chaos theory and the understanding of the related problems taking into account ethics setting. The India situation is showed.**

Keywords - *Chaos, Fisheries, Ethics, Overexploitation.*

1. Introduction. The General Problem

States, governmental organizations, private organizations are involved in fisheries. They interact, and often they cooperate but not unusually they also show to exist conflicts in the relationships they have with each other (see, for example, Filipe *et al*, 2012a). One of the big questions involving fisheries is how to manage fisheries in order to guarantee sustainability of wild fish and to guarantee a financial rent to private organizations, especially to those profiting from the exploitation of sea resources, particularly the ones involving the coastal populations. Companies have to assure profitability and a hard work has to be done aiming that.

In the recent decades, there are many developments and writings in theoretical and empirical literature about this subject on fisheries management. Wild species have often been overexploited. National and international authorities rule fisheries in order to maintain balances. However these balances are very unstable and that is why authorities have large difficulties to manage fisheries in a sustainable way (see, for example, Filipe, 2006, Filipe *et al*, 2007, Filipe *et al*, 2008).

Considering that, many solutions may be presented to solve overexploitation problems and to preserve live sea resources. One of them is the approval of aquaculture projects that permit simultaneously to reduce the exploitation of live sea resources and allow organizations to find out an alternative way to guarantee interesting profitability levels for their activities. Often cooperation exists among organizations but also conflict is frequent to exist. And one of the reasons for this conflict in the sector of fisheries, in a large sense, is the divergent objectives existing for governmental agencies and private companies (Filipe, 2006). Another one is the delay of aquaculture projects approval due to many reasons. One of them has to be particularly highlighted in this paper: the bureaucracy (see for details, for example, Filipe *et al*, 2008; Filipe *et al*, 2008b; Coelho *et al*, 2009; Filipe *et al*, 2012b).

Evidently, ethic questions rise. And many problems result whichever they are for companies, for live sea resources, for governmental organizations. The existing interrelationships among the involved entities conduct also to the emergence of ethical questions. These matters are, for example, the overexploitation of live resources, companies losses, projects unapproved or loss of financial resources. If a

project is not approved in aquaculture area, it may work as a factor stressing the need of keeping the exploitation of sea resources (see Filipe *et al*, 2011). Consequently sometimes a single factor may represent the difference between the sustainability of a specie or its eventual extinction. In consequence, chaos theory may be also presented in this analysis to explain such kind of phenomena (for illustration, see, for example, Filipe *et al*, 2005; Filipe *et al*, 2008a; Filipe *et al*, 2009; Filipe *et al*, 2010; Filipe *et al*, 2010a; Filipe *et al*, 2010b) .

In effect, it is interesting to see that, historically, it is possible to find many simple facts, considered unimportant and irrelevant in the moment they happen but that would come to have big consequences in future developments (Ferreira *et al*, 2012; Ferreira *et al*, forthcoming; I Font and Régis, 2006). In fact in a completely unexpected way, they may have huge impacts that could not be guessed at the very initial moment and permit to see how often output is not directly proportional to the input. Chaos theory will be used in this paper to understand better some problems of fisheries exploitation.

2. Chaos and Fisheries

This section is based on Filipe *et al* (2010a). As can be seen in the mentioned paper, some characteristics associated with some species support strategic survival features that are exploited by the chaos theory. Its aim is to find the reasons and the way in which these strategies are developed and the resulting consequences. The species use their biological characteristics resulting from evolutionary ancient processes to establish defence strategies.

However, given the emergence of new forms of predation, species got weaker because they are not prepared with mechanisms for effective protection for such situations. In fisheries there is a predator, man, with new fishing technologies which can completely destabilize the ecosystem. By using certain fisheries technologies, such as networks of siege, allowing the capture of all individuals of the population who are in a particular area of fishing, the fishers cause the breakdown of certain species, particularly the pelagic ones, normally designated by schooling species.

To that extent, with small changes in ecosystems, this may cause the complete deterioration of stocks and the final collapse of ecosystems, which in extreme cases can lead to extinction. These species are concentrated in high density areas in a small space. These are species that tend to live in large schools.

Usually, large schools allow the protection against large predators. The mathematical theory, which examines the relationship between schools and predators, due to Brock and Riffenburgh (see Clark, 1974), indicates that the effectiveness of predators is a reverse function of the size of the school. Since the amount of fish that a predator can consume has a maximum average value. Overcoming this limit, the growth of school means a reduction in the rate of consumption by the predator. Other aspects defensive for the school such as intimidation or confusing predators are also an evidence of greater effectiveness of schools.

However this type of behaviour has allowed the development of very effective fishing techniques. With modern equipment for detecting schools (sonar, satellites, etc.) and with modern artificial fibers' networks (strong, easy to handle and quick placement), fishing can keep up advantageous for small stocks (Bjorndal, 1987; Mangel and Clark, 1983).

As soon as schools become scarce, stocks become less protected. Moreover, the existence of these modern techniques prevents an effect of stock in the costs of businesses, as opposed to the so-called search fisheries, for which a fishery involves an action of demand and slow detection. Therefore, the existence of larger populations is essential for fishermen because it reduces the cost of their detection (Neher, 1990). However, the easy detection by new technologies means that the costs are not more sensitive to the size of the stock (Bjorndal and Conrad, 1987).

This can be extremely dangerous due to poor biotic potential of the species subject to this kind of pressure. The reproductive capacity requires a minimum value below which the extinction is inevitable. Since the efficiency of the school is proportional to its size, the losses due to the effects of predation are relatively high for low levels of stocks. This implies non-feedback in the relation stock-recruitment, which causes a break in the curves of income-effort, so that an infinitesimal increase on fishing effort leads to an unstable condition that can lead to its extinction.

However, considering the fisheries as a broader issue, we may consider the modelling of the stocks of

fish on the basis of an approach associated with the theory of chaos instead of considering the usual prospect based on classical models. Indeed, the issue can be placed within this framework from two different prisms: the traditional vision and the vision resulting from theories of non-equilibrium. Around the traditional Newtonian view, the facts can be modelled in terms of linear relationships: involving the definition of parameters, identifying relevant variables and using differential equations to describe the processes that change slowly over time. For a given system, it should then carry out measurements in a context that remains stable during various periods. Moreover, we may have models based on the theory of chaos. These models are based on non-linear relationships and are very close to several disciplines, particularly in the branch of mathematics that study the invariant processes of scale, the fractals, and in a huge range of other subjects in the area of self spontaneous creation of order: the theory of disasters or complex systems, for example.

The first way is largely used by the majority of biologists, economists and environmentalists, scientists and technical experts that conduct studies in marine search and senior technicians from state and transnational agencies in the area of fisheries. It treats nature as a system, which has a regular order. But today there are many responsible for fisheries management who also base their decisions on models of chaos. The classical models highlight a particular system and depend on a local analysis, studying several species, age, class, sub-regions of the marine eco-niche, the various ports and their discharges, depending on the account of an even wider range of other factors. Probably, the classic expression of linearity on the dynamics of the population (the principle that nature is orderly, balanced and that has a dynamic balance) is due to Maynard Smith (1968), which argues that the populations either remain relatively constant or regularly vary around an alleged point of balance. In the specific case of commercial fisheries, biologists believe that the fishing effort is often relevant to explain the deviations of actual populations' values for the model. They say that, specially based on studies made in the last decade, fish stocks sustainability should be ensured by the control made through fisheries regulation.

Moreover, some people see nature as not casual and unpredictable. The natural processes are complex and dynamic, and the causal relations and sequential patterns may extend so much in time that may seem to be non-periodical. The data appear as selected random works, disorderly, not causal in their connections and chaotic. The vision provided by nature leads to consider the fish stocks, time, the market and the various processes of fisheries management as likely to be continuously in imbalance rather than behave in a linear fashion and in a constant search for internal balance. It is this perspective that opens the way for the adoption of the theory of chaos in fisheries. However, the models of chaos do not deny, for themselves, some of the linearity resulting from the application of usual bionomic models. What is considered is that there are no conditions to implement all significant variables in a predictive model. Moreover, in finding that a slight change in initial conditions caused by a component of the system may cause major changes and deep consequences in the system itself. So, the application of the theory of chaos to fishing is considered essential, by many researchers. The theory of chaos depends on a multitude of factors, all major (and in the prospect of this theory all very important at the outset) on the basis of the wide range of unpredictable effects that they can cause.

3. About Fisheries in India

India's fish exports reported $2.8 billion in 2010-11. The proposed target for 2015 is to raise to $6 billion, supported by 15 million people dependent on marine fisheries with 25 percent of discarded fish catch (Nandi, 2012). Over-capacity of marine fishing boats leading to over-fishing, an over-reliance on destructive fishing techniques such as bottom trawling, and continued government subsidies for mechanized fisheries are the main causes for over-exploitation. The use of unsuitable fishing gears result in a high level of wasteful bycatches and destruction of egg bearing and juvenile fish (Vijayan, 2000). Central Marine Fisheries Research Institute of India has proposed measures to preserve fisheries resources such as:

- banning the fishing activity during breeding season from September to February;
- banning the usage of gears with 30 mm mesh size to avoid exploitation of under sized clams;
- Restricting the grade of export of frozen clams meat to 1400 Nos./kg and above, and semi-culture or relaying of small clams by the fishers.

Besides, the sea ranching of pearl oyster spat in the pearl beds contributed to repopulate the stock to a certain extent viz. resource utilization, resource conservation, and marketing.

It can be demonstrated that fisheries in India are not easy to manage and there is a visible overexploitation of stocks for many species. By the other side, many coastal populations depend on fisheries. This situation contributes for a unstable state for many species and to reverse this state may be very difficult. This requires that not only considerable studies are required as measures of protection are urgently needed. A single step overpassing a specific situation may conduct to the destabilization of the ecosystem and may provoke a rupture on the species stocks. Chaos is evident once one single factor or incident may have huge consequences for the species.

In India, fisheries are managed by bringing the sector under state government control and all schemes are managed for fishers' folks across states of India by state governmentality.

Is the scenario of over-exploitation in India expected to be maintained in the future? In truth, there is now a scheme in vogue to try to reduce the pressure on some fish stocks. In the month of May a season of Fishing Holiday is declared with financial assistance scheme for fishermen for about Rs.4000 (73 USD) per family. In addition there is a scheme to facilitate fishermen and fisher-women co-operatives to help to create common resources for grouping fishing activities. This is a step in the direction of pursuing new mentalities that may also contribute to new sustainability requirements of many species fish stocks in India.

Also for the ornamental fishes, especially for wild and exotic fish varieties, a preservation scheme is also in operation. For example, the anemone and clown fish production in the aquatic lab is also promoted by National Fisheries Board in India. There is also a Rainbow scheme to promote ornamental fishes in the fresh water.

4. Ethics and Fisheries

Some of the ethical questions that are raised from the fisheries analysis come from overexploitation of resources. Some others result from the relationship among the stakeholders in the area of fisheries. Some others may result yet, for example, from the existence of conflicts in the approval processes of aquaculture projects. Many divergent interests are involved.

Some ethical issues may be expressed considering the conflicts that result from the relationship among private agents and public agents or also some others resulting from environmental policies that deal with the rights of individuals versus the rights of the state and that deal also with the rights of property owners versus those of the community.

The ways of dealing with the environmental issues may vary according to the organizations that intend to protect the environment and some conflicting situations may result from the way environment is faced.

Often, a private agent intending to exploit a resource for self interest may be contributing also with the project for the public good. This fact for itself permits, on these cases, to solve some ethical issues. When a private agent intends to implement an aquaculture project his interest it to make profit. Anyway, this will allow that sea live resources may be preserved (Filipe *et al*, 2011). Aquaculture fish offer in the market has increased, given an existing demand. This means that aquaculture can give a strong contribution for reducing sea fisheries.

Law is fundamental to conserve and to protect environment and so it is in this area of fishing resources. Rules should be precise and simple enough to be implemented and to be fulfilled. In aquaculture projects law often seems to arise too many procedures and to generate too many public agents involved in the decision process that complicate the final decision (and evidently bureaucracy is present). An anti-commons problem can emerge from this complex situation. In consequence, the multiple agencies and their work frequently frustrate worthwhile projects and economic growth (see, for details, Coelho *et al*, 2012).

5. Conclusions

Fisheries have been a much debated matter in the sequence of the overexploitation of wild sea species. A way to reduce fish catches may result from the process of fast approval of aquaculture projects. This will allow to increase the quantity of aquaculture fish in the market. Anyway, projects approval may depend on several entities and very often it also depends on arbitrary and discretionary decisions of the official entities. This implies that frequently many projects that are viable and profitable are not approved timely and are lost. A strong loss of value may be provoked by the project approval delay. It results from the so called "anti-commons". But the delay of approval of such kind of projects may imply significant and huge consequences for the future of the company that has proposed the project. There are also

significant consequences in terms of the impact on the exploitation on sea species that would be produced through the aquaculture project. The resulting situation may be the persistent exploitation of the species on the sea and consequently a significant problem of overexploitation of the species may remain. A problem of chaos may be also involved. And this has to continue to be studied very carefully.

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Marketing Strategies to Add Economic Value. Reactions on Corporate Social Responsibility Advertising in Print Media. *An Indian Company Case*

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Abstract - **Corporate social responsibility advertising (CSR Advertising) results from commercial advertising, having social dimensions. This concept works as a marketing tool of cause-related marketing (CR Marketing). In this study, the case of IOCL (an Indian oil company) is presented to show how the company creates innovative advertising ideas, serves the society, contributes to save environmental natural resources and allows to add economic value. In addition to the usual ways of commercial advertising, this kind of approaches on CSR-advertising is an advance to establish a positive image in the mind of customers. The slogan 'go green' is highlighted in order to contribute to save natural resources on Earth. Reactions of CSR-advertising are measured to test the effect of published messages and the manipulation of CSR advertising message and persuasive claims.**

Keywords *– CSR advertising, Print advertising, CSR communication, Green advertising, Cause related marketing ads.*

1. Corporate Social Responsibility (CSR): An overview

Corporate social responsibility (CSR) is a concept by which organizations have the obligation to consider the interest of customers, employees, shareholders, communities, and to have ecological considerations in all forms of interest in their operations. This obligation is extended beyond the corporations statutory obligation to comply with legislation.

CSR is a subject of interest that continues to attract a lot of attention to the vast array of writers who think that CSR is of strategic interesting.

This research proposal contributes to see how companies promote this insight by tracing the historical roots of the companies or corporations relating it with the environment and the societies' sphere in which organizations are based and operate.

CSR also involves business, by identifying its stakeholder groups and incorporates their needs and values within the strategic and day to day decision making process.

The majority of the studies on this subject are not concentrated on the concept of CSR itself. In most cases, researchers or practitioners simply refer to the CSR strategy. It is for this reason that this paper shows that it is important to make a more detailed study of the concept. Levels of CSR objectives viz., social, economical, environmental, using various advertising strategies, generate reactions' recalls and recognitions with three dimensions such as appeal attitude/image, intention-to-buy and message. Farache (2009) and Bowe (2009), for example, studied the role of advertising in the limitation of CSR actions.

This study about the evaluation of CSR advertising in print media spreads from 2009-2012.

2. Review of the Literature. Some CSR General Insights

2.1 General Considerations

The extensive collection of literature on the topic of study is presented for cause related marketing, CSR communication, CSR advertising, consumers' response to CSR advertising and other related studies. There are studies showing the effects of multiple messages in an ad or commercial vs. single messages. Consumers absorb multiple images and information elements simultaneously. Watch the crescent number of adepts moving their fingers across their keyboards like the fingers of a virtuoso violinist moving across the strings of his instrument. Wang and Nelson (2006) have studied the way by which advertising academics and practitioners frequently strategize about different ways of enhancing advertising effectiveness by incorporating publicity into campaigns.

This research examined the effects of identical versus varied advertising and publicity messages on consumers' perceived information diagnosticity and purchase intentions. This study argues that varying messages in advertising and publicity about a product or service in an intelligent way can be an effective technique in integrated marketing communications. It is convenient to not forget that, in a rapidly changing media environment, consumers obtain products' information from a wide variety of sources. This is significantly important for studying the way public choose products and services. A company needs to have this in account if it wants to keep competitive in the market and to increase economic value for the company.

2.2 CSR Ratings of India's Largest 500 companies in 2010 (June 2011)

Corporate companies have been observed by different rating agencies. Karmayog is one of these agencies that has a rating rank for CSR since 2007 in India.

India's 500 largest corporations have been studied on companies reactions perspective to global and local conditions that demand more responsible behaviour among all stakeholders, including specifically corporate social responsibility. All citizens of Indian nation know that corporate companies are using resources that are common to all living beings. There are companies that, for instance, pollute the environment, cut down green trees and forests. It is evident that such companies are accountable in this problem and it is important to exist a greater conscience toward building a better society and a better world.

The agencies' CSR rating, as per customers view, is presented below with five levels of scores among the first 500 largest companies. Results of the study indicated that twelve companies fall under the 4th level in the ratings' score. It is the case of Ballapur Industries HDFC, Infosys Technologies, Jubilant Organosys, Kansai Nerolac, Larsen and Toubro, Mahindra and Mahindra, Moser Baer, Tata Consultancy, Tata Steel, Titan Industries and Wipro. It is recommended by the rating agencies that a company should spend a minimum of 0.2% of its sales on CSR activities. In 2010, the largest 500 companies had total sales of Rs. 37 lakh crores (€5165.87mm), 0.2% of which is Rs. 7400 crores (€103.4mm) that should be spent on CSR activities. In 2010, considering these companies, the profit (before taxes) was Rs. 4 lakh crores (€5584.7mm), 2% of which is Rs.8000 crores (€111.7mm). Over the last four years, the number of companies undertaking CSR activities has gradually increased.

Results of the CSR Ratings Largest Indian Companies 2010

500 largest Indian companies - 2010			**India's Largest 38 companies in Tamilnadu– 2010**		
CSR Rating Level	**No. of cos.**	**%**	**CSR Rating Level**	**No. of cos.**	**%**
Level 5 (highest)	0	0	Level 5 (highest)	0	0
Level 4	12	2	Level 4	1	2.5
Level 3	66	13	Level 3	3	10.3
Level 2	161	32	Level 2	12	30.8
Level 1	148	30	Level 1	16	41.0
Level 0 (lowest)	113	23	Level 0 (lowest)	6	15.4
Total	**500**	**100**	**Total**	38	100

Source: http://www.karmayog.org/csr2010

2.3 CSR Ratings of India's Largest 38 companies in Tamilnadu in 2010 (June 2011)

In Tamilnadu, among the largest corporate companies, 38 companies have been observed by research from the list published by the rating agency. Titan Industries is alone in the fourth level of CSR rating 2010. In addition, four companies viz., Tamilnadu Newsprint, EID Parry, Apollo, Hospital and Ashok Leyland have been rated with level 3 CSR rating. In 2010, the largest 38 companies in Tamilnadu had total sales of Rs. 1.3 lakh crores (€1815.01mm), 0.2% of which is Rs.270 crores (€3.8mm), that should be spent on CSR activities. The profit (before taxes) of these companies in 2010 was Rs. 15 thousand crores (€209.5mm), and 2% of this is Rs.300 crore (€4.2mm).

2.4 CSR Communication

Morsing and Schultz (2008) alerted about the increased importance of CSR Communication in print, such as annual reports, non-financial reports and websites *versus* approaches such as corporate advertising and press releases. It is affirmed that the minimal release from reports and websites involve stakeholders in the construction of CSR Communication. Although corporate companies are aware of the minimal public exposure and possible number of channels, they claim that it allows greater flexibility and a better focus on content. Stoll (2002) pointed the fact that marketing good corporate conduct must be carried out carefully, arguing that many practices used in advertising are inappropriate for CSR, since advertisements are usually developed to appeal to emotions and superficial judgment instead of engaging in a consistent discussion. “These sorts of practices are far more morally troublesome when used to market good corporate conduct” (ibid: 121). These characteristics do not provide any character of a company.

On the other hand, McWilliams, Siegel and Wright (2006) recognize the benefits of CSR advertising, especially for corporate reputation enhancement and protection. The researchers also make a distinction between persuasive and informative CSR advertising. Persuasive CSR advertising tries to influence consumers regarding products with CSR attributes, whereas informative CSR advertising solely informs the public with regard to the CSR characteristics or CSR managerial practices of the company.

2.5 CSR advertising

In the recent years corporate companies are interested in creating innovative ideas in the business. Advertising provides persuasive information and positive associations designed to increase purchase probability (Kller, 1991) While a corporate image was formed from a variety of sources, few of which are controlled by the firm, corporate image advertising (Rossiter and Bellman, 2005) aims to generate awareness of preference for the corporate brand or master brand (Rossiter and Bellman, 2005). Corporate image advertising based around a CSR positioning appeals somehow for a commitment on non-economic goals to improve the quality of life of the local community and society as a whole by reducing the negative externalities and maximizing the positive externalities of the firms’ operations, as they affect social and environmental metrics.

2.6 Types of CSR Advertising

CSR advertising has been classified based on legitimization of CSR actions, effectiveness of CSR advertising claims, number of messages, etc. According to CSR actions, CSR advertisements use different as well as similar themes, appeals and images across the countries. Corporations communicate substantial information in CSR print advertising and also associate third parties to themselves. CSR advertising uses proactive impression on strategic and tactics’ management. In addition the number of CSR advertisements of corporate companies depends on the scrutiny (Farache *et al*, 2009).

The wide use of persuasive and informative CSR advertising is based on CSR claims (see Pomering, 2009). Depending on the number of messages in CSR advertising, single-message advertising and multiple-message advertising have also been created by ad agencies (Wang and Nelson, 2006).

2.7 Cause related marketing

Cause-related marketing (CRM) is a mutually beneficial collaboration between a corporation and a

non-profit organization, in which the respective assets are combined:

- to create shareholder and social value;
- to connect a range of constituents like consumers, employees, and suppliers;
- to communicate the shared values of both organizations.

American Express first used the phrase "cause-related marketing" in 1983 to describe its campaign to raise money for the Statue of Liberty's restoration. American Express donated one cent to the restoration every time someone used its charge card. As a result, the number of new card holders grew by 45 percent, and card usage increased by 28 percent.

CRM is distinct from corporate philanthropy because the corporate dollars involved in CRM are not outright gifts to a non-profit organization, so they are not treated as tax-deductible charitable contributions. Non-profit organizations potentially benefit from increased fundraising and exposure. Likewise, corporations that are socially involved potentially benefit from increased brand loyalty and employee morale.

Studies have shown that for products of similar quality, consumers will consider the company's image and reputation when choosing a brand.

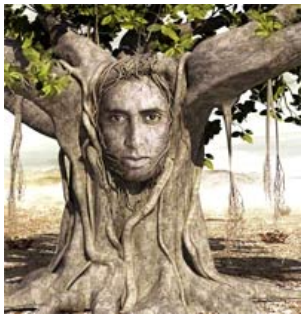
2.8 Successful CSR Advertising campaigns in India

There are two CSR ad campaigns presented for better understanding the application of the concepts in corporate image and brand reputation in the national and international experiences.

2.8.1 Idea Cellular's 'go green' campaign with a message 'use mobile, save papers'. Indian CSR Ad experience

Considering the consistent path to protect environment of planet Earth with green trees and the strategic approach of "go green", Idea Cellular has campaigned for the message "use mobile, save paper". In fact, Idea Cellular has adopted socially relevant advertisements. This campaign was developed by Lowe, which is the Idea Cellular's creative agency. The ad advocates the use of a mobile phone's value-added services to save paper and consequently protect Earth. The campaign has both informative and persuasive messages like tag line "What an Idea, Sirji!". The campaigns addressed subjects such as caste war, disability, education, democracy and health. The ad demonstrates how a cell phone has been used to read newspapers, generate e-bills, make payments and transactions, issue e-tickets and boarding passes; thereby saving tonnes of paper every day, thus reducing dependency on paper.

Pradeep Shrivastavan the marketing chief officer in Idea Cellular, has stated that "Environment as a subject touches all, but gets attention only at strategic forums." The common man gets to contribute little towards the cause, due to lack of direction and ideas. In line with the focus of ad, Idea Cellular has taken up the responsibility of educating the 500 million mobile phone users in the country. Abishek Bachchan, the celebrity brand ambassador, portrayed that role of an agonized tree in this advert. The tree urges people to use the mobile phone in lieu of paper and help to protect Earth. In the ad, as more and more people switch to their mobile screens, tree felling is reduced, and the Earth looks visibly greener. The agonized tree starts sprouting again and leaves the audience with a simple message: 'use mobile, save paper'.



2.8.2 An International experience: Levi's strauss Co's is "Go forth" campaign with the message "real work plus real people equals real change"

Doug Sweeney, Levi's vice president of brand marketing, stated that Levi's has partnered on the campaign with Wieden & Kennedy, an Oregon-based

independent ad agency. It all began by saying that "real work plus real people equals real change". "Go Forth" is a corporate social responsibility advertising campaign. Levi's is doing a charitable spending to back up its message, donating more than a million dollars over two years to fund the restoration of the town's community center and supporting a farm in Braddock that employs town people while supplying restaurants and the local farmers' market with its production.

3 Area of Study: CSR Advertising as a Marketing Tool for Cause-Related (CR) Marketing. The IOCL case

Indian Oil Corporation limited (IOCL) or IndianOil is the largest commercial enterprise in India and the 125th highest ranked Fortune Global 500 Company in the country. For over five decades, IndianOil has been the leader in the petroleum business in the country with presence in downstream petroleum refining and marketing and upstream exploration and production. A visionary plan to diversify into petrochemicals, Gas marketing and globalization has enabled the company to grow as a diversified, transnational energy major company. Today, IndianOil has a presence in Sri Lanka, Mauritius and the Middle East. Its subsidiary IndianOil Mauritius is one of the major players in the petroleum business in Mauritius. In Sri Lanka, its subsidiary Lanka IOC has established itself as a benchmark for fuel retailing besides expansion into other related areas. At IndianOil, corporate social responsibility (CSR) has been the cornerstone of success right from inception in the year 1964. The Corporation's objectives in this key performance area are enshrined in its Mission statement: "…To help to enrich the quality of life of the community and to preserve ecological balance and heritage through a strong environment conscience".

IndianOil has defined a set of core values for themselves – Care, Innovation, Passion and Trust – to guide the corporate in all they do. IOCL is able to claim all countrymen as their customers. That's why, they coined the phrase, "IndianOil – India Inspired", in their corporate campaigns. Public corporations like IndianOil are essentially organs of society deploying significant public resources. Therefore, they are aware of the need to work beyond financial considerations and put in that little extra to ensure that they are perceived not just as corporate behemoths that exist for profits, but as wholesome entities created for the good of the society and for improving the quality of life of the communities they serve as a constructive partner in the communities in which it operates, IndianOil has been taking concrete action to realize its social responsibility objectives, thereby building value for its shareholders and customers.

The Corporation respects human rights, values its employees, and invests in innovative technologies and solutions for sustainable energy flow and economic growth. In the past five decades, IndianOil has supported innumerable social and community initiatives in India. The company has performed by touching the lives of millions of people positively by supporting environmental and health-care projects and social, cultural and educational programmes. Besides focusing primarily on the welfare of economically and socially deprived sections of society, IndianOil also aims to develop techno-economically viable and environment-friendly products & services for the benefit of millions of its consumers, while at the same time intends to ensure the highest standards of safety and environment.

IOCL has had a task to prepare a 360 degree Media Campaign leverage IndianOil's CSR activities and to meet its marketing central goal. The problem perceived by IOCL as a large government owned company is that it takes a number of initiatives as part of its social responsibility program. However, it is not communicated to public at large. But, at a time when the new economy is in the forefront, IndianOil needs to project this aspect of the corporation for projecting a positive brand image and the same image can be leveraged to attain corporation's marketing objectives. The main objective of the company's CSR advertising campaign is to focus both on the core strength of the corporation as well as to create an emotional connection with public to enhance the image of the corporation and to leverage it to meet its marketing goals. Target consumers of the campaign are both male and female, general public, all India socio-economic classes. The advertising happens to be firstly in English language and further translated in various other official languages of India. In addition to print media, the campaign is inclusive of 360° branding proposal hoarding/ banner/ poster/ TV/ radio/ any other.

4 Research problem

Corporate companies use corporate communications approaches like CSR advertising. An examination of consumer response to CSR advertising claims at stage of processing evaluation, cognitive responses and attitude formation has already been initiated. It is noted that consumers are keen to know which firms are serious about CSR and which firms merely pay the concept as lip-service. As a social topic of CSR information, a message alone manipulated in a past study did not have a statistically significant influence on the dependent variable of reactions towards CSR advertising claims. Other social topics manipulated have not yet been tested. In the past studies, unfamiliar and fictitious brands were used. A research on using familiar brands that capture a range of brand loyalty strata also offers an important study. Depending on brands offers, opportunity for social identification and a sense of community, consumer's reactions toward CSR advertising claims are subjected to variations. The impact of positive and negative reputational influences has not yet been investigated, as known corporate reputation is expected to intervene between CSR advertising responses. It is reported that a positive reputation for CSR can provide a buffer against consumer retribution in the event of a crisis.

There are interesting meaningful criteria for segmenting consumers for whom more informative and persuasive advertising media have not yet been attempted. Hence, researchers have attempted to study the reaction on more focused multiple messages for a familiar brand and also profiling of consumer segment based on the positive and negative reactions to CSR advertising claims in both informative and persuasive forms.

5 Research gap

Having in account the insignificant consumer reactions to firm's advertised manipulated general message for unknown and fictitious brands' CSR advertising claims in print media, a gap in research was identified as manipulation of more focused multiple message for familiar brands. The researchers have considered a direction for research in order to investigate the positive and negative reactions among consumers with more focused multiple CSR advertising messages for a familiar brand. In addition, profiling of consumer segment in tune with CSR advertising is a new field of interest to identify the sizing of market.

6 Research objectives

The following objectives are the ones proposed for the study of reactions on CSR advertising in print media towards the promotion of corporate image of Indian Oil Corporation Llimited (IOCL) and attitude for IndianOil brand. So, the objectives are defined in order:

a. To create multiple-message CSR print advertising for IOCL's socio-economic and environmental actions.

b. To conduct aided recall test on experimental basis for multiple-message CSR print advertising copies.

c. To measure reactions on multiple-message appeal of CSR advertising, IOCL's corporate image and indianOil brand attitude.

d. To find out consumers' intention-to-buy attitude towards IndianOil brand/products.

7 Research Methodology and Research Design

Content analysis is adopted to identify advertising campaigns and categorize its proposition like socio-environment-economic (SEE) value propositions. Indian Oil Corporation Limited (IOCL) is one of the top most leading Maharathna corporate companies spending the highest share of profit toward corporate social responsibility. In addition, IOCL has adopted CSR advertising using more socially responsible messages. Using aided recall method, reactions on CSR advertising in print media have been studied among 480 consumers of IOCL. The proposal is aimed at identifying CSR-advertising and the reactions among users of motor vehicles. Four different CSR informative advertising print copies and four more CSR persuasive advertising print copies have been used in the study. The scale of measure about the reactions have been designed both in negative (-1&-2) and positive responses (+1&+2) equally in a five points scale with neutral point in the centre (0). The study focuses on promoting image of IOCL CSR attitude and INDIAN OIL brand using CSR advertising in print media. IOCL in the present

scenario create innovative advertising ideas, to serve the society, to save environmental natural resources and to add economic values. The approaches of CSR-advertising are made in addition to commercial advertising in establishing positive image in the mind of customers like 'go green' in order to save natural resources on Earth. Finally, reactions of CSR-advertising are measured in order to test the effect of manipulation of CSR advertising message and persuasive claims.

8 Research Propositions

CSR advertising is planned and practiced by corporate companies with a special focus on corporate image, brand image. Product image through advertising of social information and persuasion to feel proud for the company as loyal customer and trend, attitude towards intention to buy. The print form of advertising has appeal in terms of tone, headings, picture and message. The customer's reaction on CSR advertising with multiple messages has been studied. The study area has been selected in the advertising, published by IOCL in connection with its 50th year of celebration. There were three advertising copies published in the print media. The copies look alike in the format.

The objective of the study is to measure the reactions of customers on multiple messages.

The following is the list of CSR actions carried out by IOCL. The creative message connecting CSR activity are also listed below.

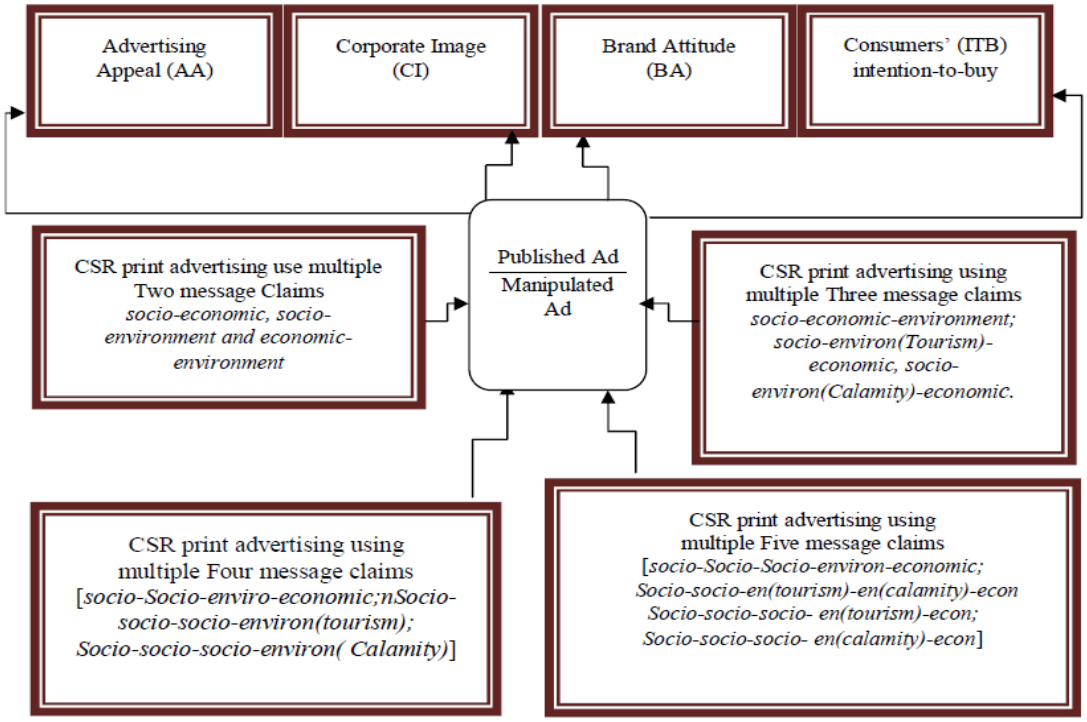
P1a: CSR print advertising use of multiple-message with published and manipulated (socio-economic, socio-environment and economic-environment) claims results on significant reaction upon advertising appeal, corporate image and brand attitude for both published and manipulated ads.

P1b: CSR print advertising use of multiple-message with published and manipulated (socio-economic-environment) claims results in significant reaction upon advertising appeal, corporate image and brand attitude for both published and manipulated ads.

P2a: CSR print advertising use of multiple-message with published and manipulated (socio-economic, socio-environment and economic-environment) claims results in significant reaction upon consumers' intention-to-buy attitude towards IndianOil brand/products.

P2b: CSR print advertising use multiple message with published and manipulated (socio-economic-environment) claims result in significant reaction upon consumers' intention-to-buy attitude towards IndianOil brand/products.

Figure 1 *Conceptual Framework of Reactions on CSR Print Ad Model*



Published and Manipulated - CSR Print Ad Copies of IOCL

PUBLISHED	MANIPULATED MULTIPLE MESSAGE AD
CSR - SINGLE MESSAGE AD	CSR – SOCIO-ENVIRONMENT MESSAGE AD
CSR – SOCIAL MESSAGE AD	CSR – ENVIRO-ECONOMICAL MESSAGE AD
CSR-ENVIRONMENT MESSAGE AD	CSR – SOCIO-ECONOMICAL MESSAGE AD

CSR – ECONOMICAL MESSAGE AD

Source: *www.indianoil.co.in*

CSR – SOCIO-ENVIRO-ECONOMICAL MESSAGE AD

Source: *Manipulated multiple print ads.*

PUBLISHED CSR - SINGLE MESSAGE AD

MANIPULATED MULTIPLE MESSAGE AD

CSR- S^2En^2Ec CSR – S^3En-TourismEc CSR-SEn-TourismEc

CSR-S^{2}Ec CSR-S^{2}En-CalamityEc CSR-SEn^{2}Ec

Source: *Corporate house journal of Indian Oil Corporation Limited. Vol. XLIX, No. 07, july 2012*

9 Description of reaction measure of marketing scale

The study focuses on promoting image of IOCL CSR attitude, INDIAN OIL brand and other brands of lubricants from IOCL using CSR advertising in print media.CSR advertising messages for IOCL's CSR activities have been manipulated in the form of print ad copy. Parallel to the three ad copies published by IOCL on social, economic and environment (SEE), during its 50th year of celebration. The appeal for whole CSR advertising, appeal for IOCL image, attitude for Indian oil brand, appeal/attitude for IOCL's CSR advertising reactions ,have been measured among IOCL customers. In accordance with the measures of advertising reactions the following metric variables have been incorporated in the study. The scale of measure about the reactions have been designed both in negative (-1&-2) and positive responses (+1&+2) equally in a five points with neutral point in the centre (0).

a. Learning from the CSR Ad social message;

b. Learning from the CSR Ad economic message;

c. Learning from the CSR Ad environment message;

d. CSR ad allows me to judge its appeal;

e. Companies corporate image appeal to me;

f. Brand demonstrates a genuine CSR attitude/intention-to-buy;

g. International CSR Ad standards;

h. Business responsibility for its impact and environment;

i. General attitude towards companies.

10 Pilot Study

Content analysis is adopted to identify advertising campaigns and categorize its proposition like socio-environment-economic (SEE) value propositions. The activities of IOCL's CSR have been studied and the key words for each activity have been extracted. Keeping the purpose of CSR activities, creative message have been designed and drafted into ad copies. Based on the test results of the creative CSR print ad copies with multiple messages for published and manipulated combinations, four combination with double message (Socio-Economic (SE); Socio-Environment (SEn); Economic-Environment (EEn)) and four with triple message (Socio-Economic-Environment (SEE), have been selected for multiple message CSR ad for a known brand. The best creative copies for published and manipulated combinations have been selected for the main study.

Lichtentein *et al* (2004) CSR Perceptions Scale [Cronbach's Alpha = 0.90; Dimensions Philanthropic]	Strongly Disagree						Strongly Agree
Indian oil is committed to using a portion of its profit to help non-profit organizations.	1	2	3	4	5	6	7
Indian oil gives back to the communities in which it does business	1	2	3	4	5	6	7
Local Non-profits benefit from INDIAN Oil contributions.	1	2	3	4	5	6	7
INDIAN OIL integrates charitable contribution into its business activities.	1	2	3	4	5	6	7
INDIAN OIL is involved in corporate giving.	1	2	3	4	5	6	7

Table 1: CSR Advertising Message

Advertising Message	Social %	Environmental %	Economic %
The smiles we multiply	77	17	6
IOCL #1 energy Brand	40	47	13
Healthcare in rural areas	57	43	0
Nurturing talent-scholarship	67	7	26
Women empowerment-Financial assistance	70	27	3
Preserving heritage and eco-friendly tourist	37	53	10
Serving nation-natural calamities	37	40	23
Green fuel	20	63	17
Literacy and financial support to rural areas	53	17	30
Tree plantation	30	67	3

Table 2: CSR Advertising Word

Advertising Word	Social %	Environmental %	Economic %
Tree	20	80	0
Women	74	13	13
Crore	10	27	63
Literacy	67	17	16
Women Empowerment	70	23	7
Greener earth	10	80	10
Tree plantation	23	70	7
Green Fuel	13	80	7

Cleaner Environment	30	57	13
Nurturing talent	70	13	17
Healthcare	50	37	13
Indian Oil Foundation	37	23	40
Serving nation	47	37	16
Community Initiatives	57	30	13
Natural calamity	40	50	10
Natural exigencies	30	60	10
Tourist Friendly Facilitation	44	43	13
Academic and sports scholarship	47	23	30
Drinking water facility in remote and rural areas	63	30	7
Financial support	20	27	53

Description of CSR Advertising Message. Pre-Test of Ad messages for Socio-Environment and Economic value

Based on the messages in the CSR Advertising, as a pre-test, the compilation of messages have been verified with respondents of about 30 persons as to whether each message belonged to social, environment and economic value. In the similar line of investigation, the words used in the advertising have also been verified for the identification and association of all three 'SEE' values. The results of the study are as follows.

In Table 1:

- Message #1 "The smiles we multiply" has been rated as "Social message" of CSR Advertising by 77% of the respondents.
- Message #2 "Indian Oil energy brand" has been rated as "Environmental Message" of CSR Advertising by 47% of respondents.
- Message #3 "Healthcare in rural areas" has been rated as "Social Message" of CSR Advertising by 57% of respondents.
- Message #4 "Nurturing talent-scholarship" has been rated as "Social Message" of CSR Advertising by 67% of respondents.
- Message #5 "Women empowerment-Financial assistance" has been rated as "Social Message" of CSR Advertising by 70% of respondents.
- Message #6 "Preserving heritage and eco-friendly tourist" has been rated as "Environment Message" of CSR Advertising by 53% of respondents.
- Message #7 "Serving nation-natural calamities" has been rated as "Environment Message" of CSR Advertising by 40% of respondents.
- Message #8 "Green fuel" has been rated as "Environment Message" of CSR Advertising by 63% of respondents.
- Message #9 "Literacy and financial support to rural areas" has been rated as "Social Message" of CSR Advertising by 53% of respondents.
- Message #10 "Tree plantation" has been rated as "Environment Message" of CSR Advertising by 67% of respondents.

In Table 2:

- Word #1 "Tree" has been rated as "Environmental word" of CSR Advertising by 80% of respondents.
- Word #2 "Women" has been rated as "Social word" of CSR Advertising by 73% of respondents.
- Word #3 "Crore" has been rated as "Economic word" of CSR Advertising by 63% of respondents.
- Word #4 "Literacy" has been rated as "Social word" of CSR Advertising by 67% of respondents.
- Word #5 "Women Empowerment" has been rated as "Social word" of CSR Advertising by 70% of respondents.

- Word #6 “Greener earth” has been rated as “Environmental word” of CSR Advertising by 80% of respondents.
- Word #7 “Tree plantation” has been rated as “Environmental word” of CSR Advertising by 70% of respondents.
- Word #8 “green Fuel” has been rated as “Environmental word” of CSR Advertising by 80% of respondents.
- Word #9 “Cleaner Environment” has been rated as “Environmental word” of CSR Advertising by 57% of respondents.
- Word #10 “Nurturing talent” has been rated as “Social word” of CSR Advertising by 70% of respondents.
- Word #11 “Healthcare” has been rated as “Social word” of CSR Advertising by 50% of respondents.
- Word #12 “Indian Oil Foundation” has been rated as “Economic word” of CSR Advertising by 40% of respondents.
- Word #13 “Serving nation” has been rated as “Social word” of CSR Advertising by 47% of respondents.
- Word #14 “Community Initiatives” has been rated as “Social word” of CSR Advertising by 57% of respondents.
- Word #15 “Natural calamity” has been rated as “Environmental word” of CSR Advertising by 50% of respondents.
- Word #16 “Natural exigencies” has been rated as “Environmental word” of CSR Advertising by 60% of respondents.
- Word #17 “Tourist Friendly Facilitation” has been rated as “Social word” of CSR Advertising by 44% of respondents.
- Word #18 “Academic and sports scholarship” has been rated as “Social word” of CSR Advertising by 47% of respondents.
- Word #19 “Drinking water facility in remote and rural areas” has been rated as “Social word” of CSR Advertising by 63% of respondents.
- Word #20 “Financial support” has been rated as “Economic word” of CSR Advertising by 53% of respondents.

11 Main study

Corporate social responsibility advertising (CSR Advertising) is a commercial advertising with social dimensions (Pomering, 2009) as a marketing tool of cause-related marketing (CR Marketing) – see Rosica, 1979. According to the Cone Millennial Cause Study in 2006, 89% of American citizens (aged 13 to 25) would switch from one brand to another brand of a comparable product (and price) if the latter brand was associated with a “good cause”. IOCL in the present scenario creates innovative advertising ideas, intending to serve the society, to save environmental natural resources and to add economic value. The approaches of CSR-advertising are in addition to commercial advertising in establishing positive image in the mind of customers like ‘go green’ to save natural resources on Earth. Finally, reactions of CSR-advertising are measured in order to test the effect of publishing and manipulation of CSR advertising message and persuasive claims.

11.1 Sampling method

Systematic sampling method has been followed in the selection of sample respondent further study.

11.2 Sample size

a) Based on type of consumers: CSR print advertisement copy test (2 copy test per sample)
   - Mopeds/two-wheeler user: 40 x 4 = 160
   - Light vehicle users: 40 x 4 =160
   - Heavy vehicle users: 40 x 4 =160
   - Total sample: 480

b) Based on expertise of consumers advertising experts and practitioners: a minimum of 50 people have been called for conducting focused group discussion.

11.3 Statistical tools

The following statistical tools have been selected to analyze data and to ascertain results; ANOVA Analysis of variance, Multiple step wise regression. Principle component analysis

12 Limitations of the study

The study has been restricted to only one largest Indian corporate company that limits the reference for similar results and its verification. The CSR message is much more concerned with social welfare and commercial pursuit becomes limited. However, the corporate image and attitude of users towards brand and product is expected to increase in the mind of consumers. The proportions of multiple messages have been limited to similarity and dissimilarity in the formation of varieties in CSR ad messages.

13 Conclusion

The studies on reactions on CSR print advertising with multiple messages for a known brand have been attempted and the results have also been expected to be very significant in favour of the companies' corporate and brand image. The age of growing economy needs variations in advertising approach and CSR advertising is proving positive results for the corporate companies. There are specific conditions that seek for companies to adhere to sustainability reports in all spheres of resources and final products. It is the right time to support strategists with new ways of advertising approaches with unique business applications. Considering that companies follow the new trends of sustainability concerns and CSR, new value may be got and companies can promote new stages in the relation with publics and new ways of sustainable settings.

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The Fundamental Analysis: An Overview

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Abstract - **In this paper we discuss the fundamental analysis by covering a number of studies in this field of research. This constitutes a useful tool to evaluate the companies' financial performance. Particularly, the discussion in this paper illustrates how this kind of approach can help in analyzing a companies' stock price. Additionally, a debate on its potentialities is also provided.**

Keywords – *Fundamental Analysis, Return on Equity, Return on Investment, Price Earnings Ratio, Price to Book Value*

1. Introduction

This paper focuses on the important issue of fundamental analysis, where a selection of ratios is discussed on a long-term basis. Our study aims to provide a critical analysis of the state of the art of the relevant literature.

Generally speaking, the fundamental analysis examines the companies' economic and financial reports, including all qualitative and quantitative information, in order to determine its value. While typically this method is used to evaluate the real value of traded stocks, it can also be applied to any other kind of assets. More specifically, it comprises an examination of the company's financial reports (such as profit and loss accounts and balance sheets) in order to analyze several financial indicators (such as, revenues, earnings, liabilities, expenses and assets). Such analysis is usually carried out by analysts, brokers and savvy investors.

While carrying out a fundamental analysis, investors usually use either or both of the following approaches:

i) Top-down approach: in this case, the analyst investigates both international and national economic indicators, such as, GDP growth rates, energy prices, inflation and interest rates. The search for the best asset then trickles down to the analysis of the total sales, price levels and foreign competition in a particular sector in order to identify the best company of the sector.

ii) Bottom-up approach: in this method, the analyst starts the searching analysis within a specific sector irrespective of its industry/region.

The fundamental analysis is carried out with the aim of predicting company's future performance. It is based on the belief that the market price of an asset tends to move towards its "real value" or its "intrinsic value". Thus, if the intrinsic value of an asset is higher than its market value, there may be a situation where it is time to buy. Otherwise, investors should sell.

In the next section, the theoretical framework of the fundamental analysis is reviewed. The paper ends with a section where the main conclusions are drawn.

2. Theoretical Framework

With the aim of determining which stock an investor should buy/sell and at which price, two basic approaches can be conducted:

i) Fundamental analysis, which postulates that stock markets may misprice an asset in the short-run but not in the long-run, where the "correct" price will be attained. Therefore, there is a long-term equilibrium to which every stock price will tend. Profits can be made by trading the mispriced asset and then waiting for the market to recognize its "mistake" and re-price it.

ii) Technical analysis, which considers that all information is already reflected in the stock price. In this situation, the investor believes that (i) "the trend is his friend" and that (ii) sentiment changes predict trend changes. More specifically, investors' emotional responses to price movements lead to recognizable price chart patterns. The price predictions based on the technical analysis are just extrapolations from historical price patterns.

Investors may use one of the above-mentioned approaches or combine both of them. For example, as many fundamental investors use technical analysis to decide entry and exit points, some technical investors use fundamentals to restrict their portfolios, only to "good and financially healthy companies" (Menezes, 2010).

The choice of which approach (fundamental or technical) should be applied is determined by the investor's belief in different paradigms for "how the stock market actually works". As noted above, the fundamental analysis bases itself on financial reports, which provide fundamental data for calculating financial ratios. In this context, each ratio allows for evaluating different aspects of the enterprises financial performance (Silva, 2009).

The fundamental analysis is mainly used by shareholders, who have largely surpassed the average annual return of the stock market. For example, the billionaire Warren Buffett, perhaps the most famous investor in the World, has repeatedly carried out this strategy, in opposition to the most commonly used investment strategies in Wall Street. He exploited bear markets and down stocks, a strategy that has made him the second richest person in the World. The reasons for the success of this strategy are five-fold:

i) It allows the investor to identify companies with durable or long-term competitive advantages;

ii) It is easy to implement;

iii) It is a structured and consistent process performed on the basis of the available financial reports;[1]

iv) It is useful to select potential stocks to acquire, thus, facilitating the make-up of an investment portfolio;

v) It allows the estimation of the intrinsic value or "real" value of the stocks. In fact, as stock markets are not perfectly efficient, there is always an opportunity to find undervalued stocks (Matos, 2009a, b).

Investors may use the fundamental analysis within different portfolio management styles:

i) Buy and hold investors believe that latching onto good businesses allows the investor's asset to grow with the company. The fundamental analysis allows them to find "good" companies, so that they can lower their risk and the probability of wipe-out.

ii) Managers may use the fundamental analysis to correctly evaluate "good" and "bad" companies. Eventually "bad" companies' stock prices may move up and down more often than the "good" ones, thus increasing the volatility of stock prices and, therefore, creating opportunities to profit.

iii) The economic cycle may also be useful to managers in order to determine the "right" time to buy or to sell.

iv) Contrarian investors acknowledge that "in the short-run the market is a voting machine, not a weighing machine". The fundamental analysis allows the investors to make their own decisions on the company's value, and to ignore the market.

v) Value investors restrict their attention to undervalued companies, believing that "it is hard to fall out of a ditch".

vi) Managers may use the fundamental analysis to identify companies with future high growth rates.

vii) The fundamental and technical analysis may also be combined together in order to get a broader picture of the company's performance.

Despite the above-mentioned advantages of the fundamental analysis, it is worthy to note that even in ideal conditions the fundamental analysis does not suggest a specific price but a range of prices.

Table 1 provides a brief overview of the most commonly used ratios in fundamental analysis while Table 2 reports the preferred methods used in USA.

Table 1. Most commonly used ratios in fundamental analysis

Prices	Shares	Profitability	Solvability	Efficiency	Market
PER- Price Earnings Ratio	EPS – Earnings Per Share	ROA – Return on Asset	CR – Current ratio	ART – Accounts Receivable Turnover	Free Float
DY – Dividend Yield	PBV – Price Book Value	ROE – Return on Equity	LR – Leverage Ratio	-	Index trading
PCF – Price Cash Flow	-	ROI – Return on Investment	LTD – Long Term Debt	-	Frequency Index
-	-	CT- Capital Turnover	IT – Inventory Turnover	-	-
-	-	EM – Earnings Margin	-	-	-

Source: Matos (2009a)

[1]Benjamin Graham and David Dodd are considered the "parents" of the fundamental analysis. For an overview, the interested reader is referred to Graham (2003).

Table 2. Preferred methods of analysis in USA

Prices	Shares	Profitability	Solvability
Preferred method	EPS – Earnings Per Share	ROA – Return on Asset	CR – Current ratio
Alternative method	PBV – Price Book Value	ROE – Return on Equity	LR – Leverage Ratio

Source: Matos (2009b)

A method used by many analysts focuses in companies with significant profits. For investors, the *EPS* – Earnings per Share – is one of the most commonly used ratios in the fundamental analysis. It is calculated by dividing the Net Income of the period under consideration *NI*, by the Average of Outstanding Shares in the stock market *AOS* that is:

$$EPS = \frac{NI}{AOS}. \quad (1)$$

An important aspect of the *EPS*, which is often ignored, is the level of equity which is necessary to generate the corresponding earnings (net income). For example, if two different companies have the same amount of *EPS* the most efficient one is the one which requires less capital to attain the same *EPS*. Additionally, investors need also to be aware of the accounting manipulation effects, which affect the earnings value. It is, therefore, important to rely not only on one specific ratio but also to combine all of them together.

Buffett and Clark (2008) argue that competitive advantages are crucial because companies with strong competitive advantages are more likely to generate higher earnings; hence, higher *EPS*.

Table 3 illustrates the historical evolution of the *EPS* for two different companies over ten years – Wal-Mart Stores Inc. (WMT) and Alcoa Inc. (AA).

Table 3. Evolution of *EPS* over 2000-2009 for Wal-Mart and Alcoa

Wal-Mart Stores, Inc Year	*EPS*	Alcoa, Inc. Year	*EPS*
2000	1.4	2000	1.79
2001	1.44	2001	1.04
2002	1.76	2002	0.61
2003	2.03	2003	1.2
2004	2.46	2004	1.56
2005	2.72	2005	1.43
2006	2.92	2006	2.54
2007	2.16	2007	3.24
2008	3.35	2008	0.28
2009	3.72	2009	1.06

Source: http://moneycentral.msn.com/home.asp.

As Table 3 shows, the evolution of the *EPS* of the Wal-Mart is more consistent than the Alcoa one. In fact, while Wal-Mart earnings have grown consistently every year, the same has not occurred to Alcoa, which has evidenced several oscillations in the *EPS* over the period under consideration. Volatility is, thus, higher in Alcoa than in Wal-Mart.

On the other hand, a competitive and long-lasting company usually presents a high *ROE* – Return on Equity – which is calculated dividing the Net Income – *NI* – of the company by the Shareholders Equity – *SE* , as given by:

$$ROE = \frac{NI}{SE}. \quad (2)$$

This ratio can be interpreted as a measure of the company's efficiency. However, it has also some drawbacks. For instance, when a company pays dividends, there is a decrease of its equity and a sharp increase in this ratio, which does not reflect the real value of the firm. In this case, it might be more appropriate to calculate the *ROI* – Return on Investment – in order to evaluate the efficiency of an investment or to compare the efficiency of a set of different investments. This ratio is expressed as:

$$ROI = \frac{GI - CI}{CI}, \quad (3)$$

where *GI* denotes the Gain from Investment and *CI* the Cost of Investment.

If an investment does not have a positive *ROI*, or if there are any other alternatives with potentially higher *ROI*, then the investment should not be undertaken. Given its versatility and its simplicity *ROI* became a very popular metric.

According to Buffett and Clark (2001, 2002, 2008), persistent and competitive companies show in general low debts in the long-run. They argue that

these companies would never contract debts five times more than their profits.

It is worthy to note that a company with long-lasting competitive advantages can increase prices as a result of the increase in the production costs. This means that the company's value and its stock prices keep pace with inflation.

Additionally, companies that do not pay dividends are more likely to keep their returns in the company and free to use them in order to increase future net earnings. This may yield to an increase in stock prices, leading to greater profits.

The best opportunity to buy a stock occurs when there is a negative reaction to bad news in the market. According to the literature and to practitioners, after purchasing investors should keep their positions, allowing the increase in profits accrue till stock prices rise. This is the method used by Buffett to create his fortune.

Another metric, the *P/E* – Price Earnings Ratio of a stock – is a measure of the price per share weighted by the annual net income per share. The *P/E* ratio can be, therefore, calculated by dividing the company's market value by its total annual earnings:

$$P/E = \frac{PS}{EPS}, \tag{4}$$

where *PS* denotes the price per share and *EPS* is defined in expression (1). Basically, it reflects the capital structure (equity *versus* liabilities) of a company and is mainly used for valuation. In this sense, a higher *P/E* means that investors are paying more per each unit of net income; thus, the stock is more expensive when compared with one with lower *P/E*. It can also express how many years will be required to pay back the discounted purchase price. Another interpretation of this ratio is as the demand for a company share.

The inverse of the *P/E* ratio is known as the earnings yield, which is an estimate of the expected return from holding the stock if certain restrictive assumptions hold. The earnings yield is quoted as a percentage, allowing easy comparisons with bond interest rates. Generally, earning yields are higher than the yield of risk-free treasury bonds, reflecting the additional risk associated with equity investments.

Finally, the price-to-book ratio, or *P/B*, is a metric used to compare a company's book value to its current market price. Book value is an accounting term, which refers to the portion of the company held by the shareholders; in other words, it corresponds to the company's total tangible assets less its total liabilities. It can be calculated according to two different methodologies. In the first one, it is estimated by dividing the company's Market Capitalization – *MC*, by the company's Total Book Value *TBV*:

$$P/B = \frac{MC}{TBV}. \tag{5}$$

The second method consists in dividing the Stock Price per Share – *SPS* by the Shareholders Equity per Share – *SES* (*i.e.* the book value is divided by the number of shares).

$$P/B = \frac{SPS}{SES}. \tag{6}$$

Like most ratios, *P/B* substantially varies across different sectors. Thus, a company which requires more infrastructure capital (for each dollar of profit) will usually trade at a much lower *P/B* ratio than, for example, a consulting firm. A sector where *P/B* is commonly used is in banking. The reason for this lies in the fact that most assets and bank liabilities are constantly traded in stock markets.

It is worthy to note that the *P/B* ratio do not, however, directly provide any information about the ability of the firm to generate profits or cash to shareholders.

For companies in distress, the book-value is usually calculated without the intangible assets, which would have no resale value.

This ratio is also known as the market-to-book ratio or the price-to-equity ratio (which should not be mistaken by the price-to-earnings ratio). Its reverse is called the book-to-market ratio.

3. Conclusions

This paper provides an overview of the fundamental analysis, stressing out the importance of long-term investing. As mentioned above, the fundamental analysis requires that the investor uses qualitative and quantitative information in order to identify companies which have good financial performance and, hence, strength to face the future. This is considered a cornerstone of investing.

Though technical and fundamental analysis bases on past events, they cannot however guarantee future results. Both appear to be important tools for investment decisions. However, since the fundamental analysis bases on a plethora of company's accounting reports, covering the most important financial aspects of a firm, we believe it is more suitable for long-term investing strategies.

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Assessing Online E-Marketing and Disposal in Neyveli Lignite Corporation Limited (India)

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Abstract – **Marketing function per se is undergoing a shift in managing transaction in a transparent e-marketing way (Kauffman *et al,* 2004) especially in Indian Public Sector Undertakings (PSU) – see Reynolds *et al* (2007). The effectiveness of e-marketing and disposal system of scrap and purchases in PSUs, namely NLC Ltd and ICF, have been studied. Factors such as e-auction offers, time of auction, experience, security deposit (EMD), basic rate per unit, allotment of bid, acceptance of bid; payment and delivery of successful bids on select items in two PSUs over a period of three to five years have been dealt with. The study adds strength to the concept of e-marketing as well as to the theory of marketing.**

Keywords – *E-auction, e-marketing, lignite, bid, reserve price, open price.*

1. Introduction

E-marketing and disposal system of sale has its own advantages. First and foremost, it is a convenient method of selling any product through internet based on online system, in which transparency and secrecy are ensured, apart from wider participation. Marketing function *per se* is undergoing a shift in managing transaction in a transparent way especially in the public sector.

In the traditional working auction system the buyer and seller have the power to negotiate the price in a sale. However, the ***e-auction system*** *of sale is a convenient method of selling any product through a net based online system, in which transparency and secrecy are ensured, apart from wider participation.*

There are three different types of e-auctions in Neyveli Lignite Corporation Limited (NLC Ltd):

- e-auction for the disposal of scrap,
- e-booking for the sale of coal/lignite and
- e-auction for the sale of raw lignite.

The materials sold through e-auction by NLC Ltd are:

1. Scrap materials;
2. Raw lignite;
3. Ball clay;
4. Dry fly ash.

Decisions regarding sales activities have been predetermined on the following parameters:

1. Setting sale target;
2. Setting financial target;
3. Analyzing the sales opportunities and threats;
4. Selecting the target buyers with their capacity to consume the products regularly and their financial stability;
5. Determining the lot size of the product for each e-Auction;

6. Finalizing the periodicity of sale;
7. Fixing of right reserve/floor price;
8. Decision on Payment terms (cash/credit);
9. Decision on delivery period.

1.1 E-Auction Registration and Participation

In this system, the auction is conducted online through Internet by the Auctioneer M/s. MSTC Ltd through the company's e-commerce portal (www.mstcecommerce.com). Both NLC and the bidders have to register on-line for participating in the e-auction, subject to accepting auctioneer's general terms and conditions.

1.2 E-auction Procedure

Initially, e-auction terms and conditions are prepared and are sent to MSTC (the auctioneer). Then, the material list is prepared by the Disposal Wing indicating the lot number, location, description of materials, quantity, unit of sale, applicable taxes, etc.. This list is sent to M/s. MSTC. They, then, host the details in the website's auction catalogue. M/s. MSTC issues Press Advertisement in all leading newspapers covering the entire country (India) as well as in their e-auction website, duly indicating the materials offered for disposal, inspection date, e-auction date, etc. The Guide Price Committee consisting of Disposal and the Accounts officials inspects the lot and fixes the Guide Price for each lot and enters it in the Guide Price Book. The approval of the competent authority is obtained for the above fixed Guide Price, before the commencement of the e-auction. The approved Guide Price is entered in the system on Confirmed or on Subject to Approval (STA) basis, before commencing the e-auction. This Guide Price page can be opened only by Disposal Wing Unit Head using secret password and this Guide Price page cannot be viewed either by M/s. MSTC or by the bidders. After entering the Guide Price, if any change is to be made, it can be made prior to the commencement of the e-auction. Once the e-auction starts, no change can be made anymore. Similarly, any change in the lot number, locations, description of material, quantity, unit of sale, tax rates, etc. can be done before the commencement of the e-auction. Suitably, Pre-Bid EMD[1] Clause/Caution Money Deposit can be stipulated in the e-auction terms and conditions. In such a case, the bidders have to send the Pre-Bid EMD to MSTC directly through DD[2], NEFT/RTGS[3] one day prior to the commencement of the e-Auction. On receipt of the above Pre-Bid EMD/Caution Money Deposit, MSTC will activate those bidders for participation in the e-auction. Other bidders, who do not remit the Pre-Bid EMD/Caution Money Deposit, cannot enter the e-auction floor. They cannot also view the e-auction process.

The Special Terms and Conditions of the e-auction normally contain the following conditions, among others:

1. Balance payment clause;
2. Penalty for belated payments;
3. Group insurance;
4. Delivery period;
5. Ground rent for belated delivery;
6. Force majeure conditions;
7. Termination of order;
8. Statutory variation clause;
9. Delivery procedure.

Normally, an inspection time of 7 days is given to the bidders. The inspection of the lots can be carried out by the bidders registered with M/s. MSTC alone or their duly authorized person on showing their photo identity card issued by M/s. MSTC. The e-auction process commences from 12.30 hrs and opens for bidding up to 18.30 hrs. This time can be altered. The actual bidding by the scrap materials buyers commences with on and above start price, i.e. Re.1= per M.T.[4]/Lot. If there is any increase in the bid, five minutes before the end of the e-auction time of 18.30 hrs, the closure time is extended further by 5 minutes automatically to give equal opportunity to the other bidders to remise their rates. For example, if there is an increase in the bid amount at 18.28 hrs, then the auction closing time is automatically extended up to 18.33 hrs. This process will conclude only when there is no further bidding within the extended time. Hence, there is absolute transparency in this e-auction. As the bid rates are the most

[1] EMD (Earnest Money Deposit)

[2] DD: Demand Draft

[3] National Electronic Fund Transfer (NEFT) and Real Time Gross Settlement (RTGS)

[4] MT: Metric Tonne

competitive, there is no scope for any negotiation with the H1[5] bidders. If the final rate remains static for the last 5 minutes after the scheduled closure time of the e-auction, then the auction closure status will appear on the screen. Bid sheet is generated showing lot wise details of the auction. Sale intimation letter will be sent to the successful bidders with a copy to the seller automatically by the system.

1.3 Post e-auction Steps

H1 bid is compared with the Reserve/Guide Price by the system and if the H1 bid is more than the Guide price it is automatically approved by the system and the Bid Sheet to be downloaded (in case of scrap, ball clay, etc.). If the H1 bid is less than the Guide price, then the option of accepting it lies with the seller. Automatic receipt of sale intimation letter by email to the bidder to submit the requisite payment within fixed time indicating bank details for RTGS/NEFT transfer will be generated. Sale order will be issued by MSTC after the receipt of EMD amount from the successful bidder indicating the last date for remittance of balance amount, penalty clause for belated balance payment remittance, last date of delivery of materials without ground rent and last date of delivery with ground rent. After the receipt of balance payment, delivery order will be issued against the production of photo ID card issued by MSTC, the Letter of Authority (in case of lifting by people other than the person to whom the photo ID is issued), the Insurance. The buyers arrange their own transport and lift the material by producing the delivery challan (DC) and invoices issued by NLC. In case of failure to lift the materials within the delivery period, even after the remittance of ground rent, the left over materials belong to the NLC and they can dispose them at their discretion.

2 Review of Literature

The study of e-marketing and disposal calls for various formats of research conducted across the world. It is essential to understand the contributions made over the years in the field of new format of marketing known as e-marketing that involves predominantly e-auction as the key tool for processing marketing transactions.

Kauffman and Wood (2005) studied online e-bay auction using reserve price shilling bid and its effect on premium bid occurrence. About 10260 e-bay auctions during April 2001 involving 322 sellers, 1583 bidders in to 919 auction using valuation signal were studied. 23% of auction has been categorized as premium bidding to prove that that item is working more. A weighted least square regression model was used to study winners curve and online selling through reserve price shilling bid. A ratio between selling price and average has also been reported in the study.

Reynolds, Gilkeson and Niedrich (2009) studied seller strategy on winning price in online sales, seller minimum opening price and auction length. A hidden reserve price, number of bidders and moderators were analyzed to test an e-bay auction as opening price and reserve price for the product. An analyzes data of four customer products through two batches studied revealed strong evidence of effect of minimum opening price and showed that the potential buyer rely more on signal as opening and reserve price.

Chu-Fen Li (2010) studied the effect of the factor on internet auction variant and stressed the bidder's need to stay about reliability. Seller's characteristics could affect evaluation. Employees collect e-bay data set to analyze the effect of bidder and seller characteristics of seller items for sale (SIFS) and bidders lifetime positive feedback (BLPF). Seller's lifetime positive feedback (SLPF) plays a major role in affecting the final price (51.2%) and both SLFS and BLPF play critical roles--20.1% and 28.1%, respectively. BLPF and SLPF also are important to affect the final price (4.5%). The duration of auction of the SLPF explains a variation of 62.8% seller performance on the duration of 1 auction or final price.

Ku, Malhotra and Murnishan (2005) studied public art exhibit of 300 life size fibre class cows. The participants were 140 internet and live persons who auctioned the cows almost seven times beyond their initial estimate. The final price provided impetus for model of decision-making competitive arousal. The internet bidding for survey data 21 auctions throughout North America were tested. Analyses provided considerable support for the competitive arousal. The labour market experiment investigated similar and difference b/w escalation & compressive arousal. The implication of these findings were visible on the broader use of competitive arousal and escalation and the impact on decision-making.

Fuchs, Eybl and Hopken (2011) studied low entry costs and low exit barriers that emerged as a valuable distribution channel. It effectively augmented the distribution potential of the whole

[5] H1: Highest 1.

business. It positively affected the final price level obtained in online auction. E-bay comprising of 53,406 auctions have been studied using linear structural equation modelling (SEM) considering the relationship between auction characteristics and the obtained final price.

Varolo kayhan, James A McCart. Anof bhattache (2010) studied cross bidding in online auction and the action of bidder simultaneously in order to monitor the advantage of price, outcomes of cross bidding, behavior and contingent. It was reported that there was significant price discount compared to non cross bidders.

2.1 Need for the study

It is evident that there are several factors emerging in the process of e-marketing and very specifically in the process of e-auction in order to encourage participation as well as price bids. The reserve price and open price, seller's characteristics and final bid price are various determinants to understand the effect of e-auction system. It is also understood that the input in the form of information to the sellers and buyers and products called for auction have been considered to be essential aspects of e-marketing to make it more competitive in a transparent manner. Hence, researchers are attempting to study the role of known and unknown determinants of e-marketing and disposal system in a public sector undertaking that deals with combinations of raw materials, components, consumable, etc. The research problem is to know about different known and unknown components of e-marketing and disposal system.

2.2 Objectives of the study

The objectives of the study are to evaluate the effect of e-marketing and disposal system in a public sector organization and are as follows:

1. To study the extent of the transparency of the process; the bidder's identity is kept highly confidential.
2. To measure the factors responsible for encouraging wider participation; there is a limited scope for Cartel formation.
3. To identify the possibility of bidder's to improve their bid prices online in a competitive way.
4. To assess the knowledge of bidder's clearly and to know whether bidder's win/lose in the e-marketing and disposal.
5. To determine time saving for both buyers and sellers.

3 Research Methodology

It is understood that the process is in vogue and therefore it is imperative to use descriptive method of study. There are three ways of e-auction conducted in the organization to enhance the performance of e-marketing and disposal system. The study is aimed at covering all the three methods of e-auction to assess effectiveness in all the five different objectives set for the purpose of study. It is proposed to use proportionate method of stratified random sample to identify the bidders in the process of marketing through e-auction. Initially, in the preliminary stage, desired number of sample bids will be selected to understand the intricacies of the process. Based on the outcome of the preliminary study, and the reported statistics, a reasonable size of sample will be chosen. The essence of e-auction performance is given for the purpose of confirming the scope for conducting research to measure its effectiveness in a public sector undertaking.

3.1 Components of e-marketing and disposal system

1. E-auction Offer [7 items]

a. Number of times e-auctions held
b. Time to participate
c. Requirement of experience
d. Secret code
e. EMD [Security Deposit]
f. Value of EMD
g. Documents

2. Promotion [2 items]

a. Information through advertising
b. Time of advertising

3. Pricing [5 items]

a. Pricing rate fixation
b. Basic rate per unit
c. Allotment of e-auction successful bid
d. Intimation to bidder
e. Formalities to accept the bid

4. Payment and Delivery [3 items]

a. Full payment
b. Conditions for delivery
c. Losing bidder's right

3.2 Key information required to fulfill the objectives

There are five key variables of e-marketing and disposal introduced for the purpose of study, namely transparency, participation, bid price, knowledge and time. The variable "transparency" is identified with e-marketing process in order to increase the extent of up biased approach in the public or specific process of marketing (see Table 1).

The variable "participation" is identified with the e-marketing process as a measure of the number of participants, participant details, approach in participation, process of the equality treatment among the bidders, etc. The variable "bid price" is identified in the e-marketing process as a measure of the opportunities, supplementary information, additional information related to number of bidders, time, initial price, etc. The variable "bidder knowledge" is identified in the e-marketing process as a measure of the knowledge about complete information and feedback analysis. The final variable "time saving" is yet to be identified in the e-marketing process of bid details, distance of bidders place from the place of auction and duration of participation in auction of e-marketing.

4 Results and Discussion

4.1 Performance of e-auction System: An Overview

E-auction system increases the 'Bid Prices': The sale price of ball clay got increased from RS.150/= per M.T. (conventional price) to Rs.1000/= per M.T. (e-auction price) within a short span of 1 year, due to wider participation (see table 1). The floor price of raw lignite increased from RS.1315/= per M.T. (conventional price) to Rs.2000/= per M.T. (e-auction price) within a short span of 2 years (see table 2). The iron scrap prices are obtained on par with the actual.

Advantages accrued to NLC Ltd. due to e-auction method:

1. The sale quantity increased;
2. Number of products were introduced for sale;
3. Higher bid prices were achieved;
4. Wider participation from all over India;
5. True market value of the products was obtained;
6. Sale revenue increased year by year;
7. During the current year (2010-11), NLC had crossed the sale revenue crossed Rs.100 Crore mark (non-power) Market Rate (see Fig 1).

Sales revenue of scrap material during /between 1995-1996 to 1996-1997 raised to Rs.276.25 lacs[6] (31%) in sales and then from 1997-1998 to 1998-1999 raised to Rs.119 lacs (12%) of sales. After one year, sales revenue raised 15% of sale. However, from 1999 to 2000 sales differed and decreased to 15%, and after 2000 continuously 15% to 20% decrease was seen in the sales amount up to 2003 (see table 2 and 3). After conventional price was introduced through e-auction sales method for scrap material 2002-2003 to 2003-2004 e-auction price has increased by 15% of scrap material. The e-auction sales rate continually rose from 83 lacs to 1517 lacs year by year up to 2011. Due to the introduction of the e-auction system, the price of raw lignite which was at Rs.1315/M.T increased to the current basic price of Rs.2000/M.T. (exclusive of Earnest Deposit, Educational Cess, Royalty, Clean Energy Cess, Value Added Tax, etc.) - see tables 2 and 3.

4.2 Effectiveness of e-marketing and Disposal: a Status Report 2005-2012

Three products viz, fly ash, raw lignite and scrap material have been introduced in the e-marketing and disposal system since 2005 till 2012. The current status of all the three items has been reported.

Fly ash: In the case of fly ash, e-auctions were held only in the last two years from 2010 to 2012. In total there were nine e-auctions of which only one auction was held during 2010-2011 and the remaining eight e-auctions were held during 2011-2012. The measure of central tendency average was five e-auctions per year.

Raw lignite: In case of raw lignite, e-auctions were held in the last three years from 2009 to 2012. In total, there were seventy e-auctions conducted, in which eleven e-auctions were held during the period 2009-2010, twenty three e-auctions were held during the period 2010-2011, and the remaining thirty six e-auctions were held during 2011-2012. The measure of central tendency as median was thirty five e-auctions per year during the last three years that were reported.

[6] 1 Lac =1420.64 Euro.

Scrap: In the case of scrap, e-auctions have been held since 2005-2006. A total of 249 e-auctions have been conducted in the last seven years. In the initial stage, thirty one e-auction were held during 2005-2006, in the second period also thirty one e-auctions were held during 2006-2007, in the third period (2007-2008) twenty nine e-auctions were held. In the following period (2008-2009) thirty five e-auctions were held. During 2009-2010 also thirty five e-auctions were held (in addition, eleven e-auctions for lignite were also held). Forty eight e-auctions were held during 2010-2011 (in addition, twenty three e-auctions for lignite and one e-auction for fly ash) and finally during the last period 2011-2012, fifty e-auctions (in addition, thirty six e-auctions for lignite and eight e-auctions for fly ash were held). In total, three hundred and twenty eight e-auctions were held in the proportion of 0.75, 0.21, 0.02 scrap, lignite, fly ash respectively (see table 4 and fig 2).

4.3 Advertisement for E-auction

The advertisement is being given for each e-auction for raw lignite in newspapers by NLC and in NLC/MSTC website. In respect of e-auction of scrap, ball clay and fly ash, the advertisement in the newspapers is given by M/S MSTC and NKC /MSTC website (see table).

4.4 Floor Price Determination

Scrap: The basic value will be determined based on the quality of the material, market conditioned. It varies from one e-auction to another. In case of raw lignite, fly ash, etc, the floor price that is adopted is based on the market condition.

The present floor price of raw lignite: Rs 2000/per MT, fly ash 655/MT (see Table 6)**.**

4.5 Advance Deposit for E-auction Participation [EMD]

Normally, no advance deposit is collected for the scraps e-auction. However, depending on the circumstances a pre – BID EMD clause is stipulated for certain items. In case of dry fly ash, raw lignite e-auctions the buyers have to remit the EMD for the required quantity at the rates stipulated in the e-auction document prior to the commencement of e-auction. The amount to be deposited is indicated in the respective e-auction document (see table 7).

4.6 Payment and Delivery of E-auction Process

The successful bidder shall remit the balance payment and furnish the photo ID issued by the MSTC and other documents indicated in the e-auction catalogue (see table 8).

5 Implications of the Study

This study focuses on transparent process of marketing and disposal in every public sector. The e-marketing system facilitates more number of competitive bidders that enhances healthy and business process. The open bid system online brings out competitive price by which the level of profit grows naturally. The improvement in the conceptual and application of the e-marketing is strengthened by the study.

6 Conclusion

E-marketing and disposal system is a modern technique that uses e-auction system for the purpose of making buyers and sellers in a competitive market process transparent and approach in public sector organizations. NLC Ltd is not an exception; it has acclaimed the status of the best performing public sector in Indian business context. The study describes various factors that are responsible for the success of the e-marketing system in this organization in three different formats for scrap material, coal/lignite and raw coal. It is true that the organization has raised its sales revenue and shown remarkable achievement. The study is aimed at adding value to the concept of e-marketing and disposal system using e-auction as a key tool. The study adds strength to the concept of e-marketing as well as to the theory of marketing.

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Annexure- I MAILED QUESTIONNAIRE WITH RESPONSES FROM NLC LIMITED

1. How many times did you offer e-auction tender during the period from 2004 to 2011? Please serve all the related aspects in relation to
   1. FLY ASH 2. RAW LIGNITE 3.SCRAPS

   Ans.: Fly ash (No. of e-auction):2010-11 -1, 2011-12 -8 Raw lignite: 2009-10 -11, 2010-11 -23, 2011-12 -36,

   Scrap: 2005-06 -31, 2006-07 -31, 2007-08 -29, 2008-09 -35, 2009-10 -35, 2010-11 -48, 2011-12 -50
2. Do you advertise for e-auction every year? If so, provide the details for the period from 2004 to 2011?
   Ans.: The advertisement is being given for each e-auction for raw lignite in newspapers by NLC and in NLC /MSTC website. In respect of e-auction of scrap, ball clay and fly ash, the advertisement in the news paper is given by M/S MSTC and NLC /MSTC website.
3. When do you advertise for the commencement of the e-auction?
   Ans.: One week before the date of e-auction
4. How many days do you allow to apply for e-auction in the website between the announcement date to auction date?
   Ans.: Registered buyer of M/s. MSTC can participate in the e-auction directly. New buyer has to register with M/s. MSTC prior to the e-auction.
5. How do you fix the rate per quantity for every item?
   Ans.: Based on the marketing condition and scrap quality.
6. Is any experience required for the participation in the e-auction? **Ans.:** Not required
7. How do you give the secret code to applicant? **Ans.:** NLC does not given the secret code to applicant.
8. How much money needs to be deposited as advance for the e-auction participation? **Ans.:** Normally, no advance deposit is collected for the scraps e-auction. However, depending on the circumstances a pre–BID EMD clause is stipulated for certain items. In case of dry fly ash, raw lignite e-auction the buyers have to remit the EMD for the required quantity at the rates stipulated in the e-auction document prior to the commencement of e-auction. The amount to be deposited is indicated in the respective e-auction document.
9. What are the documents to be enclosed by applicant for the e-auction? **Ans.:** No document need to be enclosed by the applicant for the e-auction.
10. How many times was e-auction done from 2004 to 2011? Please serve all the related aspects in relation to
    a. FLY ASH b. RAW LIGNITE c. SCRAPS

    Ans.: Fly ash (no. of e-auction): 2010-11 -1, 2011-12 -8 Raw lignite: 2009-10 -11, 2010-11 -23, 2011-12 -36,

    Scrap: 2005-06 -31, 2006-07 -31, 2007-08 -29, 2008-09 -35, 2009-10 -35, 2010-11 -48, 2011-12 -50
11. Please list out the basic value per ton of the above mentioned substances/ materials
    Ans.: Scrap: The basic value will be determined based on the quality of the material, market condition, etc. It varies from e-auction to e-auction. In case of raw lignite, fly ash etc, the floor price is adopted based on the market conditions. The present floor price of raw Lignite: Rs.2000/per MT, flashes 655/MT.
12. Please provide the list of those who had succeeded in the auction and what is the amount they have paid in relation to the basic rate that NLC has fixed? **Ans.:** The reply could not be provided in the absence of a request for any particular e-auction.
13. When will be the intimation about the successful bidding notified to the successful bidder?
    Ans.: As and when the e-auction closes, the m/s MSTC e-auction system generate.
14. After getting successful bidding what do you expect from those concerns?
    Ans.: The concerned successful buyer shall take auction as per the sale intimation letter in line with the e-auction terms and conditions.
15. How much is the bidder expected to pay as the EMD or caution deposit? **Ans.:** As per the indication in the e-auction catalog and according to the intimation letter send by MSTC.
16. When should the full amount be paid--before delivery or after delivery of the auctioned goods?
    Ans.: The full amount should be paid before taking the delivery as per the sale order and e-auction terms and conditions.
17. On what basis is the delivery right given to the bidder? **Ans.:** The delivery is effected as per the basis indicated in the respective e-auction documents.
18. Before the process of the delivery what should the auction bidder do?
    Ans.: The successful bidder shall remit the balance payment and furnish the photo ID issued by the MSTC and the other document indicated in the e-auction catalog.

19. When and how does an organization lose its right to enter e-auction? **Ans.:** If the organization fails to adhere to the e-auction terms and conditions stipulated by the M/s.MSTC it loses its right.
20. What detail is intimated to that concern? **Ans.:** NLC does not intimate anything to that concern as the e-auction is conducted by M/s.MSTC.

Annexure II Tables & Figure

Table 1 Key information required to fulfil the objective

Sl. No.	Objective	Information Required
1	Extent of transparent process	Is information provision biased/unbiased public/ specific
2	Factor influencing wider participation	Entrance for participation equality/inequality treatment among bidder
3	Possibility of improving bid price	What are different opportunities, what are supplementary inform additional information provided about number of bidder time to time, initial bid price quantity etc
4	Knowledge of win / lose bidders	Ensuring whether bidders are aware of the complete information about bid details and Feedback analysis
5	Time saving	Distance of bidder place from Neyveli Duration of participation in auction

Table 2 SALE OF BALI CLAY

YEAR	QTY. IN M.TS.	SALE REVENUE (RS.)
2009-10 (Conv. Method)	21249	31.87 Lakhs
2010-11 (From July'10) (E-Auction)	11650	111.27 Lakhs

Conventional Method: The price was at Rs.150/M.T / E-Auction Method: The current price is Rs.1000/M.T.

Table 3 SALE OF RAW LIGNITE (E-Auction)

YEAR	QTY. IN M.TS.	SALE REVENUE (RS.)
2009-10 (Sep To March-10)	1,43,990	22.13 Crores
2010-11	2,99,320	50.05 Crores

Table 4 Number of E-Auction Offers 2005-2012

Sl. No.	Period [in Years]	Number of e-auctions		
		Scrap	Raw Lignite	Fly ash
1	2005-2006	31	-	-
2	2006-2007	31	-	-
3	2007-2008	29	-	-
4	2008-2009	35	-	-

5	2009-2010	35	11	-
6	2010-2011	48	23	1
7	2011-2012	50	36	8
Total		249	70	9
Average		39	23	5

Table 5 Advertisement for E-auction

Sl No	**Product name**	**Advertisement 1**	**Advertisement2**
1	Raw lignite	By NLC	News paper and NLC MSTC website
2	Fly ash	By MSTC	News paper and MSTC and NLC website
3	Scrap	By MSTC	News paper and MSTC and NLC website

Table 6 Basic E-auction Value per Unit Floor Price on Market Condition

Sl No	**Product /Item**	**Basic rate in NLC**
1	Raw lignite	Rs 2000/per MT
2	Fly ash	Rs 655/MT
3	Scrap	Based on quality and market condition

Table 7 Advance Deposit for E-auction Participation

Sl No	Product/Item	EMD
1	Fly ash	Remit the rate as stipulated the e-auction document
2	Raw lignite	Remit the rate as stipulated the e-auction document
3	Scrap	No advance deposit

Table 8 Full Payment and Delivery of E-auction

SL NO	Product/Item	Payment details	Others
1	Fly ash	Remit the balance amount	Photo ID issued by MSTC
2	Raw lignite	Remit the balance amount	Photo ID issued by MSTC
3	Scrap	Remit the balance amount	Photo ID issued by MSTC

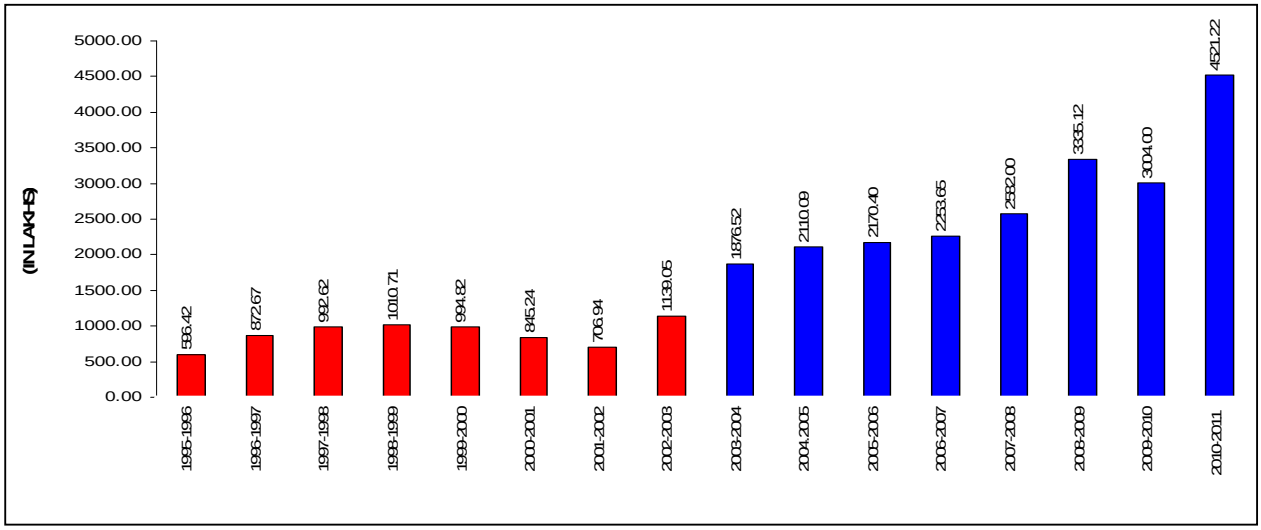

Figure 1 - E-AUCTION – SALE REVENUE OF SCRAP MATERIALS CONVENTIONAL PERIOD (1995-96 TO 2002-03) E-AUCTION PERIOD (2003-04 TO 2010-11)

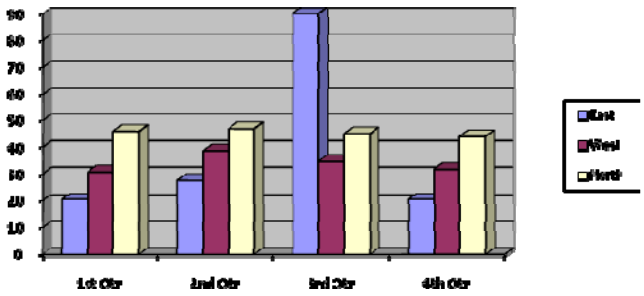

Figure 2 - Number of E-Auction Offers 2005-2012

Extinction Revisited: "Allee Effect" and Irreversibility in "Schooling" Fisheries

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Abstract - **Important results of Colin Clark's research in the 70s are used again in the discussion of the limits to the privatization of the fisheries. Those results highlighted the possibility of species extinction motivated by special forms of the natural growth function. This paper revisits the situation in which the growth function exhibits a non-feedback, or depensation, curve. The existence of non-shrinkage curves poses problems in determining the sustainable yield and has important implications for resource management. The so-called "Allee Effect" may explain the difficulties of recovery of certain stocks, even when there are a set of limitations to the fishing effort. Ultimately, it explains the extinction of some species: if we face a situation of non-critical feedback, an effect of irreversibility is introduced. These effects are considered in the schooling species fisheries case.**

Keywords - *Natural Growth Law, "Allee Effect", Irreversibility, "Schooling" Fisheries".*

1. Introduction

After almost four decades, important results of Colin Clark's (1973, 1974) research are used again in the discussion of the limits to the privatization of the fisheries as a means of introducing more efficiency in fisheries operations (Clark, Munro & Sumaila (2008, 2010)). Those results highlighted the possibility of species extinction motivated by special forms of the natural growth function of species.

This paper revisits the situation in which the growth function exhibits a non-feedback, or depensation, curve. The existence of non-shrinkage curves poses problems in determining the sustainable yield and has important implications for resource management.

The structure of the paper is the following:

In the first point we present the basic model of fisheries management, the so-called Gordon /Schaefer model. This bio-economic model introduces an equation that reflects the natural growth of the species and describes their biological dynamics.

The second point introduces different forms of this equation and investigates the impacts of non-feedback characteristics of growth functions on the management and conservation policy. In this context, the so-called "Allee Effect" may explain the difficulties of recovery of certain stocks, even when there are a set of limitations to the fishing effort.

In the third point the effects of irreversibility are considered and the possibility of species extinction is discussed. The schooling species fisheries case is used as an example of this kind of preoccupations.

2. The underlying Biological Dynamics of Gordon/Schaefer Model

To design an acceptable bio-economic model of fishing, we must introduce, in its foundation, a biological model of fishing resources growth. In the Gordon (1954) article, the underlying biological foundation is a variant of Schaefer (1957). The populations' dynamics can be easily described with a "Macro-biological Approach". A fish resource population or biomass will, if not subject to human capture, grow in terms of weight, both as a consequence of recruitment of new individuals and as the result of the growth of individual fish in the population. Natural mortality will act as a check on

growth. If we assume stable environmental conditions (especially, if we do not introduce men as predators), along the time, the biomass will approach a natural equilibrium level at which net growth is zero (Coelho, 1989; Coelho, 1999; Smith, 1968).

We define the Law of the Natural Growth as the specific form by each species or resource is regenerated. In fact, each specie regeneration capacity is affected by biological characteristics (birth rate, mortality rate, age structure, etc.) and environmental characteristics (nutrients abundance, temperature, habitat, existence and efficiency of the predators, etc). It was interesting to evaluate all of the factors but difficult. So, when introducing into the model the biological characteristics, we must consider restrictive hypothesis.

If we do not attempt to distinguish among the factors influencing net growth, the growth of the biomass can be viewed as a function of the biomass itself and the population dynamics can be modelled by a very simple differential equation:

$$F(x) = dx/dt$$

x denotes the biomass and F(x) represents the regeneration capacity associated with every level of the stock.

The relation between the rate of growth and the level of the stock is not monotonic. In the Schaefer model, we'll have a quadratic function:

$$F(x) = r\,x\,(1- x/K)$$

K denotes the carrying capacity and r, constant, denotes the intrinsic growth rate. When integrated, we are facing the popular Lotka/Volterra logistic equation of population dynamics (Neher, 1974; Wilen, 1985).

When we introduce men action of fishing, the first equation is modified:

$$dx/dt = F(x) – H(t)$$

H (t) denotes the capture rate.

The production function is given by:

$$H(t) = h\,E(t)\,x(t)$$

where E(t) denotes the fishing effort at time t (a kind of "capital-jelly" measure of the flow of labour and capital services devoted to fishing; this could be evaluated, for example, in terms of fishing hours), and h, constant, denotes a capture-ability coefficient measuring the different capture conditions between fishing grounds.

If the resources are being captured in a sustainable basis, then $dx/dt = 0$ and $H(t) = F(x)$. Hence, F(x) can be viewed as the sustainable yield associated with a given biomass level. Since H(t) is a function of E, as well as x, one can establish the sustainable yield/fishing effort relationship:

$$Y = \alpha E - \beta E^2,$$

where Y denotes sustainable physical yield, with $\alpha = h K$ and $\beta = h^2 K/r$.

With the biological model complete, we can introduce prices and costs. We assume that both the demand for captured resources and the supply of fishing effort are perfectly elastic. The cost function can be expressed as the simple equation:

$$C = c E$$

We assume that the total cost is linear with effort. The constant c denotes unit cost of effort.

Sustainable revenue is represented by pY, where p is the unit price of fishing. It has, also, a quadratic form.

We can now solve the model and analyse the behaviour of the "industry".

The main conclusions can be summarized as follows: If fishing was managed by a "sole owner", it would be stabilised at the point where sustainable resource rent - sustainable revenue less total cost - is maximised. In this situation, fisheries are managed in a socially optimal manner. If fishing effort expands beyond this point, overexploitation of the resources occurs.

But, as fishing activities take place in a regime of open access, there is no landlord to appropriate the resource rents generated by fishing. Thus, if fishing was at the point where resource rents are maximised, the "industry" would be enjoying super-normal returns and new fishermen would be attracted to enter the fishing ground. If fishing is unregulated and competitive, fishing effort will expand, leading to overexploitation of biomass. In this case, fisheries would not be in equilibrium until it had expanded to the point where total costs are equal to total revenues, that is, until resource rent had been fully dissipated. This "bionomic equilibrium" reflects the existence of

externalities in the capture process and it's a case of market failure (Filipe et al, 2007; Coelho, 2011).

Besides the relevance of the conclusions, we have to underline the role of the biological model when constructing such a bio-economic model of fisheries management. In fact, the potency of explanation of the basic model depends on the capacity of the growth equation that is introduced, to catch the fundamental characteristics of biological dynamics of the species considered. At the same time, if we do not want to introduce too much mathematical complexity in the model, we must take care of the efficacy/ feasibility of the model and of the biological information needs to estimate the bio-economic model.

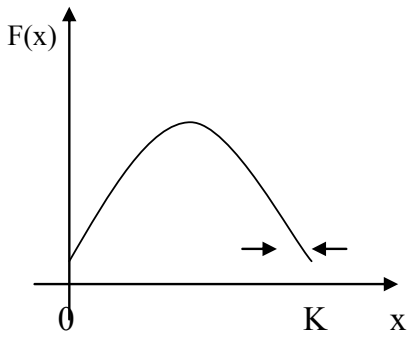
3. Compensation and Non-feedback Control in Biological Models

Also problematic is the possibility that F(x) does not have the usual form. Several alternative forms for the logistic model have been proposed.

The logistic model itself and, in general, models with a growth function such as the first figure - so that the proportional rate of growth

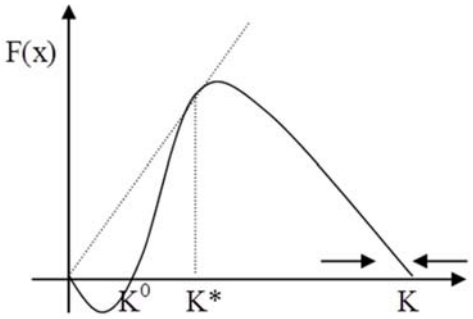
$$r(x) = \frac{F(x)}{x}$$

is decreasing with x - are called models of pure compensation.



On the other hand, if r (x) is an increasing function of x, for certain values of x, it is said that there is a process of non-feedback or "depensation". For example, there are curves that shows non-feedback for $0 < x < K^*$ and compensation for $x > K^*$. These types of curves are the so-called non-feedback curves.

Also, we can use the expression "curve of non-critical feedback" to refer non-feedback curves with the property $F(x) < 0$ for certain values of x, near $x = 0$, as in the second figure.



The existence of non-shrinkage curves poses problems in determining the sustainable yield, y, and has important implications for resource management. The first aspect can be seen as follows. Assuming that the stock is subject to a given capture with a constant effort, we have:

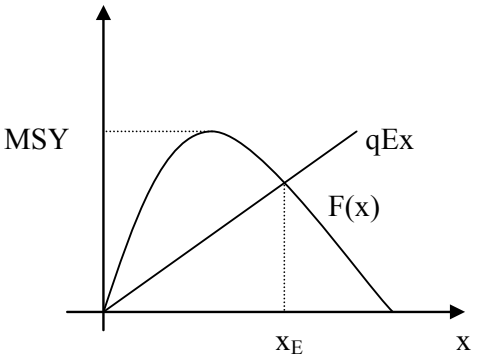
$$\frac{dx}{dt} = F(x) - qEx$$

Suppose that we want to build the Yield-Effort curve: $y = y(E)$.

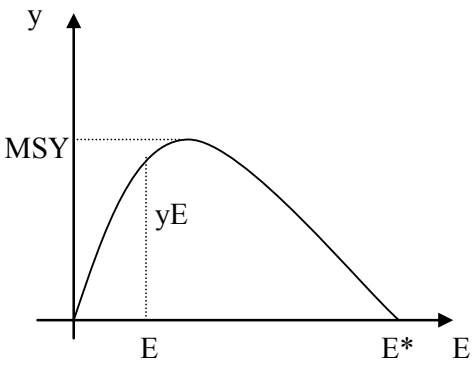
In the case of pure compensation, each level of space (E) produces a unique and stable solution for the population balance X_E and the corresponding yield Y_E is:

$$y_E = f(x_E).$$

Therefore, the curve Yield-Effort rises to a maximum (MSY) and then decreases slowly as the effort is being increased. The sustained yield is zero for values of $E \geq E^*$, where $q E^* = F'(0) = \max r(x) = r^*$. As in the logistic model, the resource stock is driven asymptotically to zero if the catch rate is maintained at a level higher than the intrinsic growth rate r^*.



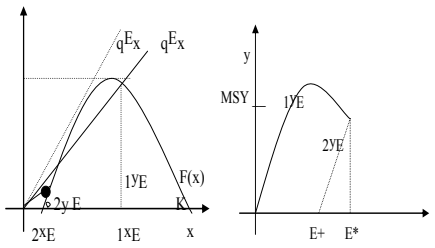
Natural Growth Curve



Yield-Effort Curve

In the absence of feedback effect we face the problem of the existence of multiple equilibrium solutions. For each level of effort E <E* = max r(x)/q there is a population of stable equilibrium 1xE and a yield equilibrium 1yE, equally stable. But, for values of E>E+=F'(0)/q, there is also a population of unstable equilibrium, 2xE.

If the initial level of the population x(0) is higher than 2xE, the equilibrium level is established at x = 1xE; however, if x(0)<2xE, equilibrium is established at x = 0, assuming that E is constant. Thus, there remains a critical effort E* such that y(E) = 0, but the yield curve-effort is different from pure compensation model, now forming a discontinuity at E = E*, where the yield curve reaches zero if E exceeds the critical level.



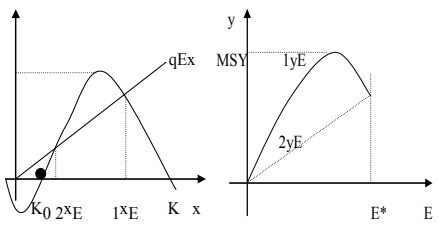
The implications for the management policy are very relevant:

First, the incremental approach of Schaefer model is not appropriate, since a slight increase of E can lead the population to collapse. It reminds us the "butterfly effect": a simple variation in E conducts the population to a possible disaster.

Furthermore, the model introduces a special effect. Suppose that the effort is approaching the level E> E* and x (t) approaches zero (while x is still positive). If E is reduced to a level below E*, this does not imply that the system returns to 1yE. In fact, one can demonstrate that if the reduction is not below 2xE, the population will continue to decline. That is, to return to 1yE may be necessary to reduce the effort until E+.

In short: to bring the population to acceptable levels, the reduction in fishing effort may be much higher than desirable. This "Allee Effect", as it is known in Anglo-Saxon literature (see, for example, Southey (1972) and Larkin, Raleigh & Wilimovscky (1964)), may explain the difficulties of recovery of certain stocks, even when there were a set of limitations to the fishing effort. Ultimately, it explains the extinction of some species.

Worse, if we face a situation of non-critical feedback. A new effect is introduced - that of irreversibility.



In this case, it can be seen that each level of effort E ≥ 0 gives rise to two equilibrium solutions

(1xE and 2xE) and that x = 0 is a stable equilibrium solution for any E. If effort goes beyond a supercritical level, the population may find itself reduced to a level lower than K0 (the minimum viable population). So, we find ourselves in a situation of irreversible extinction.

4. Non-critical Feedback and Species Extinction

In the world's fisheries there are some studied cases of this situation of non-feedback control. These studies also have important practical indications about resource management and conservation measures.

An example is the so-called "Schooling fisheries" case. These species, like sardine, tend to live in large schools. The existence of large schools provides a means of defense against large predators. The mathematical theory that studies the relationships between schools and predators, due to Brock and Riffenburgh (see Clark, 1974) indicates that the detection by predators is an inverse function of the size of the shoal. Since the amount of fish that a predator can consume has an average threshold, when exceeding this limit, the growth of the school implies a reduction of consumption by the predator. Also, other defensive aspects of the school, such as bullying or confusion of predators, are elements of more effective "schools".

However, this type of large schools behavior has allowed the development of highly efficient fishing techniques. With modern fish finding equipment by satellite, with modern nets of fibers, strong and easy to handle, fishing can remain profitable, even for small stocks (Bjorndal (1987), Neher (1990), Mangel and Clark (1983)). Of course, as these stocks are getting scarce they become even less protected.

Furthermore, the existence of these techniques prevents a stock effect on business costs, as opposed to the so-called "search fisheries." For "search" species, the fishing action implies search and detention. The existence of larger populations is essential for fishermen because it reduces the costs of detection (see Neher, 1974). But now, the high capacity of detection of new technology means that costs are no more sensitive to the size of stock, even for schooling fisheries (Bjorndal and Conrad, 1987).This situation is extremely dangerous because of the low biotic potential of some species. The reproductive capacity requires a minimum value below which extinction is inevitable. Since the efficiency of the school is reduced, the losses due to the effects of predation are relatively large at low stock levels. Clark (1974) states this turns into a situation of non-feedback in the stock-recruitment relationship. And that implies a discontinuity in the curves of yield-effort, so that an infinitesimal increase in stress, below a certain threshold, leads to an unstable state which can lead to extinction.

In the case of non-critical feedback, the path to extinction may be irreversible. According to Clark (1974), a necessary and sufficient condition for the existence of non-critical feedback is that the average fertility is too small to balance the high mortality of some low levels of population, for which the school becomes inefficient. So, the fishing communities can face a possible sudden collapse in the exploitation of small schooling species subject to strong capture. These breakdowns can directly result from overfishing or can be indirectly induced by environmental fluctuations operating on a population of excessive exploitation and decreased resistance.

Bjorndal, Conrad and Salvanes (1993), in a study on the capture of seals in the area of Newfoundland, concluded that, although the stock had not reached the danger of extinction, the existence of a feedback-like effect could be appropriate to describe the dynamic behavior of this specie. The same way, the poor biotic potential of species like whales, especially when subject to severe operating conditions, together with the existence of an intertemporal discount rate higher than the natural growth rate of the species, may be explanatory factors for the near extinction of this species and the need of establishing a "moratorium" on whaling by the International Whaling Commission. On this issue, see, for example, the studies of Conrad (1989) and Clark (1987).

5. Final Remarks

The widespread implementation of rights based management (RBM) schemes in fisheries management, as ITQs, increased the opportunity for private sector groups to influence fisheries management. This development has given rise to a debate over the extent to which should be encouraged this private influence.

In a provocative paper, Grafton, Kompass & Hilborn (2007) state, on the basis of empirical investigation, that the results of Clark (1973, 1974) are really no more than a theoretical curiosity with no

practical significance. But, other important investigations' results highlight that the conclusions of Clark cannot be safely dismissed. See, for example, the study of Dulvy, Sadovy & Reynolds (2003). The authors point that the possibility of extinction is relevant. In fact, the extinction occurred in about 100 marine fisheries (most of all, it is expected, in situations of positive minimum viable population levels – see Hutchings (2000)). That indicates that there is substantial scientific evidence that we can find several species with positive minimum viable population levels, and that there exist population levels below which the resources cannot replace their original levels of abundance even if we reduce the fishing effort.

According to Clark, Munro & Sumaila (2010) this should imply that there are limits to the privatization of fisheries: there are situations in which the communities should not put under private hands the defense of the common interest. In situations of "depensation" growth curves and of little growth rate of renewal, compared to the existing interest rate, the private management should lead ("efficiently-seeming") to species extinction.

We go further: in situations like this we should also not purely confide in public policy. The management of such situations imposes an important restriction to the managers and underlines the fundamental idea that, in these types of industries, there is more than simply Economics. In fact, Nature and her laws impose a necessary humility to political devisors. A principle of precaution in the definition of total authorized capture levels and in the formulation of other command and control, or economic, tools is simply a question of good sense and ethical posture.

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Globalization and Granger Causality in International Stock Markets

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Abstract – **This paper analyzes the process of stock market globalization on the basis of cointegration and Granger causality tests. Granger causality is based on regression modelling and typically captures current and past causal relationships in the data. The dataset used in our empirical analysis was drawn from DataStream and comprises the natural logarithm of relative stock market indexes since 1973 for the G7 countries. The main results point to the conclusion that significant causal effects occur in this context with well defined causal directions. There is also evidence that stock markets are closely related in the long-run over the 36 years analyzed and, in this sense, one may say that they are globalized. As expected, there is evidence that the US stock market dominates in general over the remaining markets.**

Keywords - *Cointegration, Globalization, Granger Causality, Stock Market.*

1. Introduction

Recent debates on economic globalization have triggered a substantial amount of research papers that try to determine its causes and explain the consequences of this phenomenon in terms of market performance and their ability to adjust globally to economic boosts and crisis. This has been particularly relevant in the case of financial markets and even more so in the case of stock markets. Indeed, the process of globalization of international stock markets has been deeply studied both by economists and other researchers interested in this subject such as, for instance, physicists and, invariably, they conclude that stock markets are highly "globalized" [Kasa (1992), Arshanapalli and Doukas (1993), Chung and Liu (1994), Masih and Masih (1997, 2002), Zhou and Sornette (2003), Tavares (2009)]. However, many of these studies lack a theoretical background that supports their view of what is globalization and how it can be measured, or they do not simply address the issue of the causality direction, which makes all the difference for policy purposes [Hamao et al. (1990), Drożdż et al. (2001)].

Globalization, in its literal sense, is the process of transformation of local or regional phenomena into global ones and can be described as a process by which the world population is gradually more integrated into one sole society. That is, globalization implies uniformity in terms of tastes, behaviors, prices, goods accessibility, and much more. It is a process of interaction among the economic and social agents (people, firms, etc) driven by international trade and investment and aided by information technology that reduced significantly the geographical distance barriers and communication difficulties between people living in different parts of the world.

One important aspect of economic globalization is market integration. In the sense of Stigler (1969) and Sutton (1991), a market is "the area within which the price of an asset tends to uniformity after allowing for different transportation costs, differences in quality, marketing, etc". On the other hand, market integration refers to proportionality of price movements over time for an asset or group of assets. The economic variable price is, therefore, a key element in the process of market globalization and provides a suitable framework for testing market integration by looking at the price relationship of assets over time. Strictly speaking we should look at proportionality of price movements over time for a given asset sold in geographically separated markets in order to show whether these markets are integrated or not. This is what we may call strong market integration but, in many cases, market integration only occurs in a weak or imperfect way. If this is so, one can expect nonlinearities and other types of price distortions to be present in the process of price transmission and a test of weak market integration can be performed on the basis of causality between prices, independently of whether they are proportional or not over time. If changes are proportional over time then the markets are said to be strongly integrated.

This definition of market integration can be mathematically expressed as a dynamic model where the long-run and the short-run effects can be clearly separated, known as the error correction mechanism.

This model is quite flexible and allows for different impacts of price and returns (or log price changes) movements across markets. For example, a change in the US market, usually considered as the dominant market, may be transmitted in quite different manners to the remaining markets, in which case it is difficult to conclude that markets tend to uniformity. This is not compatible with strong market integration but fits very well in the notion of weak market integration. Indeed, the process of market globalization is complex and the nonlinear transmission of price movements must be properly accommodated within the context of stock market globalization [Menezes et al. (2004, 2006)].

One advantage of the error correction model is that it allows for historical prices and returns to affect simultaneously the behavior of current stock market prices over time. Using historical prices and returns in this context is preferable to using just stock returns since the former retain both the long-run and the short-run information contained in the data, while the latter only capture the short-run information. This statement is valid under the assumption that prices are cointegrated, an issue that was extensively analyzed elsewhere [Engel and Granger (1987), Eun and Shim (1989)]. On this basis, one can construct statistical tests to verify whether the past (and present) information contained in prices and returns of, say, market A, help to explain the behavior of prices and returns of market B. This is what we mean by Granger causality and, under this hypothesis, one can say that knowing the behavior of prices in market A allows one to explain or even predict the behavior of prices in market B. A concise description of this method is presented in the next Section. Following, we present the data set used in our empirical analysis and the main results that were obtained. Finally, we present the main conclusions of the paper.

2. Methodological Issues

As noted above, one way to analyze the extent of market integration, and thus globalization, is by using Granger causality tests [Granger (1969)] which can be defined as follows: X_{2t} Granger causes X_{1t} if, *ceteris paribus*, the past values of $X2t$ help to improve the current forecast of $X1t$, that is:

$$MSE\left(\hat{X}_{1t} \mid I_{t-1}\right) < MSE\left(\hat{X}_{1t} \mid I_{t-1} \setminus IX_{2,t-1}\right), \quad (1)$$

where MSE is the mean squared error, I_{t-1} represents the set of all past and present information existing at moment $t-1$, $IX_{2,t-1}$ represents the set of all past and present information existing on X_2 at moment $t-1$, *i.e.*, $IX_{2,t-1} = \{X_{21}, X_{22}, \ldots, X_{2t-1}\}$, X_{1t} is the value of X_1 at the moment t ($X_{1t} \subset I_t$) and $\hat{X}_{1t}$ is a non-biased predictor of X_{1t}. On the other hand, X_{2t} instantaneously causes X_{1t} in the sense of Granger if, *ceteris paribus*, the past and present values of X_{2t} help to improve the prediction of the current value of X_{1t}, that is:

$$MSE\left(\hat{X}_{1t} \mid I_t \setminus X_{1t}\right) < MSE\left(\hat{X}_{1t} \mid I_t \setminus IX_{2,t}, X_{1t}\right) . \quad (2)$$

Given these definitions, how can we empirically implement these tests? To see this, consider the following ADL(p, q) price relationship:

$$X_{1t} = \theta + \sum_{k=1}^{p} \rho_k X_{1,t-k} + \sum_{j=0}^{q} \beta_j X_{2,t-j} + \nu_t \quad , \quad (3)$$

where X_{it} ($i = 1, 2$) denotes the relative prices (in natural logs) of asset i at time t, ρ_k captures the extent of autocorrelation in X_{1t}, β_j measures the relationship between prices (in levels and lags) and ν_t is a white noise perturbation. One can say that X_{2t} causes X_{1t} if the null hypothesis that all parameters β_j are simultaneously zero is rejected. The relationship can be bidirectional and, in this case, we say that there is a feedback relationship. If there is just one unidirectional causal relationship, then one of the markets can effectively influence the other market prices, but the reverse is not true. If the null hypothesis is not rejected in both cases, then there is no causal relationship between the underlying prices and one can say that they do not belong to the same market space. In practice, however, the Granger causality test performed in statistical software postulates as the null hypothesis that "X_{2t} does not Granger cause X_{1t}".

In multivariate cointegrated systems the Granger causality test can be performed on the basis of a VEC model of the type [Sargan (1964)]:

$$\Delta \mathbf{X}_t = \boldsymbol{\alpha}\boldsymbol{\beta}'\mathbf{X}_{t-1} + \sum_{k=1}^{p-1} \boldsymbol{\Gamma}_k \Delta \mathbf{X}_{t-k} + \boldsymbol{\mu} + \boldsymbol{\varepsilon}_t \quad , \quad (4)$$

where $\mathbf{X}_{t-1}$ is an i-dimensional vector of cointegrated lagged endogenous variables representing, for instance, natural logarithms of relative asset prices (*e.g.*, stock indexes) at time $t-1$. $\Delta\mathbf{X}_t$ and $\Delta\mathbf{X}_{t-k}$ denote returns at time t and $t-k$, respectively, where Δ is the

operator of first difference. $\mathbf{\Gamma}_k$ denotes p–1 i-order matrices of short-run information parameters where each of them is associated with an i-dimensional vector of lagged returns up to order p–1. $\boldsymbol{\alpha}\boldsymbol{\beta}'$ is an i-order matrix of long-run information parameters, where $\boldsymbol{\alpha}$ represents the adjustment speed to equilibrium and $\boldsymbol{\beta}$ contains the long-run or equilibrium coefficients. $\boldsymbol{\mu}$ is an i-dimensional vector of constants and $\boldsymbol{\varepsilon}_t$ denotes an i-dimensional vector of residuals where $\boldsymbol{\varepsilon}_t \sim \text{iid}(\mathbf{0}, \boldsymbol{\Omega})$. Note that the residuals $\boldsymbol{\varepsilon}_t$ are not serially correlated since the dynamic process linking the data is explicitly specified in the model, although they may be contemporaneously correlated.

The VEC model represented in (4) can be interpreted as a relationship between prices and returns in a given market. What it says is that the current returns are a linear function of previous returns and historical prices. Such historical prices form a long-run equilibrium relationship, where the involved variables co-move over time independently of the existence of stochastic trends in each of them, so that their difference is stable. The long-run residuals measure the distance of the system to equilibrium at each moment t, which may be due to the impossibility of the economic agents to adjust instantaneously to new information or to the short-run dynamics also present in the data. There is, therefore, a whole complex adjustment process involving short-run and long-run dynamics when the variables are cointegrated.

Simple manipulation of the VEC model leads to a reparameterized version where the vector μ is multiplied by the estimated long-run residuals and the matrices $\mathbf{A}_i$ (i = 1, …, m) contain the coefficients of the lagged returns for each variable separately. For a two cointegrated variable system and p lags[1], and noting that $\hat{u}_{t-1} = \hat{\boldsymbol{\beta}}'\mathbf{X}_{t-1}$, one has:

$$\Delta\mathbf{X}_t = \mathbf{A}_1\Delta\mathbf{X}_{1,t-j} + \mathbf{A}_2\Delta\mathbf{X}_{2,t-j} + \boldsymbol{\mu}\hat{u}_{t-1} + \boldsymbol{\varepsilon}_t \quad , \tag{5}$$

where $\Delta\mathbf{X}_t$ represents returns or log price changes at time t and $\Delta\mathbf{X}_{i,t-j}$ (i = 1, 2; j = 1, …, p–1) denotes lagged returns up to p–1 of the i^{th} variable. $\mathbf{A}_1$ and $\mathbf{A}_2$ are [2×(p–1)] matrices. $\boldsymbol{\mu}$ and $\boldsymbol{\varepsilon}_t$ are (2×1) vectors and $\hat{u}_{t-1}$ denotes the long-run residuals, where $u_t \sim$ I(0). A Granger causality test can be carried out on the basis of the null hypothesis: $\delta_{i1} = \ldots = \delta_{i,p-1} = \mu_i = 0$, where the δ_i coefficients correspond to the i^{th} row of $\mathbf{A}_2$. The test then compares the mean squared error under the null and under the alternative hypotheses.

[1] Notice, however, that the number of lags can be different for each variable.

3. Data ana Results

The dataset used in our empirical analysis consists of seven daily stock price series representing the G7 countries: US, Canada, Japan, UK, Germany, France and Italy. The data are the relative price indexes for these markets, where the base 100 was set at January, 1st 1973. The series were collected in the Datastream database and cover the period from January, 1st 1973 to January, 21st 2009, totalizing 9408 daily observations (five days per week). Figure 1 shows a graphic of the seven series in relative prices (panel a) and in the natural logarithms of relative prices (panel b).

It is remarkable how similar the time-path pattern looks for these seven stock market indexes with market boosts and crises apparently synchronized for all the countries (panel a). Data dispersion increases substantially along time, especially after the oil crisis of the early eighties and, further on, since the end of the 20th century. Price volatility over the period was substantially higher for Italy, France and the UK than for Canada, the US, Germany and Japan. In addition, all price histograms that are shown in Figure 1a exhibit a right-hand side long tail. The series in logs (panel b) lessen volatility in the data, as expected, and the log price histograms appear flattened. However, data dispersion does still increase over time. Some descriptive statistics of these series (in natural logarithms) are presented in Table 1.

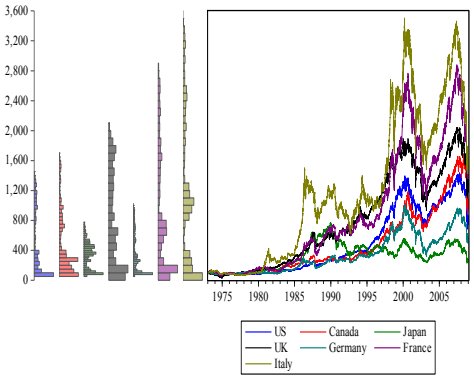
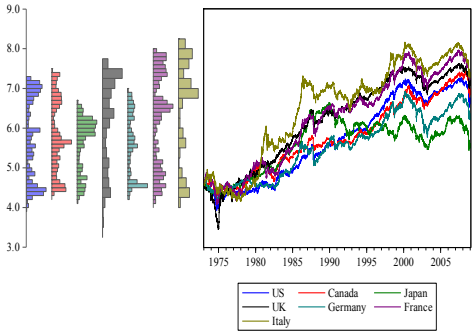


Figure 1a. Relative price indexes for the G7 countries



Source: Datastream. Base 100: January, 1st 1973. 9408 data points.

Figure 1b. Natural logarithms of relative price indexes for the G7 countries

Table 1. Descriptive statistics of the natural logarithms of relative prices

	US	Canada	Japan	UK	Germany	France	Italy
Mean	5.706510	5.779643	5.604483	6.179921	5.545114	6.226555	6.516560
Median	5.650874	5.662144	5.861683	6.434844	5.584004	6.474808	6.917948
Maximum	7.267135	7.433217	6.645377	7.621871	6.917379	7.964677	8.161164
Minimum	3.932218	4.297829	4.120337	3.446577	4.205439	4.070223	4.153556
Std. Deviation	1.035847	0.895167	0.668453	1.113543	0.789030	1.150704	1.238936
Skewness	0.025493	0.130726	-0.634781	-0.500333	0.009600	-0.228873	-0.592996
Kurtosis	1.508327	1.842078	2.038909	1.929123	1.653605	1.686334	1.977588
Jarque-Bera	873.2535	552.3834	993.9092	842.0589	710.7536	758.6182	961.1455
p-value	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	53686.84	54374.88	52726.97	58140.69	52168.43	58579.43	61307.80
Sum Sq. Dev.	10093.50	7538.058	4203.324	11664.46	5856.504	12455.99	14439.40
N	9408	9408	9408	9408	9408	9408	9408

Notice that all series are flatter than the Gaussian distribution and slightly skewed, therefore the J-B test statistic rejects the null hypothesis of normality for all of them. This is typical of stock market price series in the same manner as leptokurtosis and fat tails are typically observed in returns data. From this point onwards the analysis will only consider the natural logarithms data, that is, stock prices actually refer to the natural logarithms of the relative price indexes and stock returns or price changes denote the difference between log relative prices at two adjacent dates.

Before proceeding to the analysis of market integration one should look at the (none) stationary nature of the G7 series. Unit root and stationarity tests in levels and in first differences for all the series are shown in Table 2.

Table 2. Unit root and stationarity tests in levels and in first differences

Variable	ADF[a, c, d]	KPSS[b, c, d]
US[f]	-1.709328	0.960241 **
Canada[e]	-2.806501	0.468607 **
Japan[f]	-0.269712	2.549435 **
UK[g]	-0.736909	2.320246 **
Germany[e]	-1.722877	0.568883 **
France[e]	-1.050611	1.038102 **
Italy[g]	-0.500341	1.661498 **
ΔUS	-70.39091 **	0.244395
ΔCanada	-88.91458 **	0.075838
ΔJapan	-69.26301 **	0.126957
ΔUK	-45.20940 **	0.220531
ΔGermany	-92.36380 **	0.130575
ΔFrance	-89.32861 **	0.186063
ΔItaly	-44.66293 **	0.302849

Notes: [a] MacKinnon (1996) critical values: -3.43 (1%) and -2.86 (5%) for constant and -3.96 (1%) and -3.41 (5%) for constant and linear trend. [b] Kwiatkowski-Phillips-Schmidt-Shin (1992; table 1) critical values: 0.739 (1%) and 0.463 (5%) for constant and 0.216 (1%) and 0.146 (5%) for constant and linear trend. [c] exogenous terms in levels: constant and linear trend. [d] exogenous terms in 1st differences: constant (except for Japan in the KPSS test which is constant and linear trend). [e] 1 *lag* in levels for ADF. [f] 2 *lags* in levels for ADF. [g] 4 *lags* in levels for ADF. ** significant at 1%.

The ADF and KPSS tests are designed to capture weak stationarity with opposite null hypotheses. In the former case the null hypothesis of nonstationarity of the variables in levels is not rejected but it is rejected at 1% for the variables in first differences. In the latter case the null hypothesis of stationarity in levels is rejected at 1% but it is not rejected in first differences. The results are, therefore, consistent in both cases and lead to the conclusion that the price series under analysis are, in fact, integrated of first order. The number of lags selected in each test was set on the basis of the SBC information criterion [Schwarz (1978)]. One can thus conclude that the stock price series under analysis are nonstationary while returns are stationary. The next step refers to the cointegration tests in order to verify whether non-spurious causal relationships can be established among the variables being studied. The Johansen test statistics are presented in Table 3.

Table 3. Johansen cointegration tests

Rank	Eigenvalue	Trace Statistic[a]	Max-Eigenvalue Statistic[a]
$r = 0$	0.005329	153.0157 **	50.25020 *
$r \leq 1$	0.004587	102.7655	43.24244
$r \leq 2$	0.002368	59.52310	22.29762
$r \leq 3$	0.001934	37.22548	18.20505
$r \leq 4$	0.001430	19.02043	13.45522
$r \leq 5$	0.000539	5.565207	5.073572
$r \leq 6$	5.23E-05	0.491635	0.491635

Notes: [a] MacKinnon-Haug-Michelis (1999) *p*-values. Exogenous terms in CE: constant and quadratic deterministic trend. 2 *lags* in the endogenous variables. 9405 observations. ** significant at 1%. * significant at 5%.

The results indicate that there is one cointegrating vector since the null hypothesis that $r = 0$ is rejected at 1% in the trace test and at 5% in the maximum eigenvalue test but the null $r \leq 1$ is not rejected at standard levels. This means that the seven stock markets under analysis belong to the same market space and there is a long-run equilibrium relationship linking price data along with the dynamic short-run terms denoting market returns. Altogether, these results outline the starting point for analyzing market integration on the basis of Granger causality. The Granger causality *F*-statistics are presented in Tables 4 to 6.

Table 4. Granger Causality *F*-statistics in levels

Variable	US	Canada	Japan	UK	Germany	France	Italy
US	-	142.898 **	716.963 **	475.981 **	390.273 **	470.843 **	156.006 **
Canada	36.0065 **	-	361.477 **	113.420 **	73.5093 **	117.433 **	46.4521 **
Japan	14.3828 **	4.86702 **	-	27.3334 **	21.9847 **	24.1686 **	7.23094 **
UK	8.91317 **	3.99597 *	233.251 **	-	7.33226 **	6.02136 **	3.54475 *
Germany	6.03121 **	2.29723	284.715 **	1.13299	-	2.17821	0.32732
France	9.72877 **	1.51540	259.915 **	6.42979 **	1.54816	-	1.21910
Italy	1.93860	1.01208	107.911 **	0.61978	1.42051	7.52491 **	-

Notes: H_0: X_{it} does not Granger cause X_{jt} ($i \neq j$). 2 *lags*. 9406 observations in each series. ** significant at 1%. * significant at 5%.

Table 4 presents the Granger causality tests for the variables in levels, that is, stock prices. Recall that the test is interpreted as follows: X2t Granger causes X1t if, ceteris paribus, the past values of X2t help to improve the current forecast of X1t, where X2t represents the variables in the first column and X1t represents the variables in the first row. One can say, therefore, that for the significant causal relationships the historical prices of the former market affect the current price of the latter, forming a dynamical long-run relationship in the global economy. As we can see, about 74% of the coefficients are statistically significant, which means that there is substantial long-run causal effects among these markets, of which many of them are feedback relationships. However, we found no causal relationship in any direction for the pairs Germany-France and Germany- Italy.

Another important result is that, in the long-run, the US causes more than is caused by other markets. To see this, note that the F-statistics of the former (1st row) are substantially larger than the F-statistics of the latter (1st column). This is consistent with the idea that the US stock market, to a greater extent, 'exports' more than 'imports' boosts and crises, being therefore the engine of the global financial world. For example,

a crisis with origin in the US can spread in a broader way to other markets (as it seems in the current crisis) than a crisis with origin in Japan or even any European country. Canada shows an overall picture very similar to the US, that is, in general it causes more other markets than is caused by them, except in what refers to the US. Canada, however, appears to be caused only by the US, Japan and, to a lesser extent, the UK. Conversely, Japan is the most endogenous of the G7 markets. The European countries do not show an overall systematic pattern of causality, though the UK appears to emerge like an attractor in the EU context (but not with France) and follows the North-American markets. This is surprising insofar we would expect Germany to be the leading European stock market, given its role as the head of the European Union economy, albeit one should recognize the very important role of the London Stock Exchange in the global financial world.

Table 5 presents the Granger causality tests for the variables in first differences, that is, returns. The results show how much historical returns of one market affect the current returns of another market, making up therefore a dynamical short-run relationship in the system. Here, some 71% of the coefficients are statistically significant and we found no causal relationship in any direction only for the pair Germany-Italy (as in the long-run tests). Otherwise, the overall picture is the same as for the results in levels.

In the short-run, the North-American markets cause more other markets than are caused by them and the US leads the Canadian market. The opposite occurs for Japan as in the long-run. Again, the UK emerges as an attractor in the European Union context (except with France) but follows the North-American markets. It seems, therefore, that market causality among the G7 countries is present both in the long-run and in the short-run, affecting co-movement prices and returns.

Table 5. Granger Causality *F*-statistics in first differences

Variable	ΔUS	ΔCanada	ΔJapan	ΔUK	ΔGermany	ΔFrance	ΔItaly
ΔUS	-	138.970 **	708.196 **	491.025 **	387.364 **	476.872 **	154.376 **
ΔCanada	30.8130 **	-	369.375 **	123.680 **	74.2408 **	128.220 **	47.4845 **
ΔJapan	7.60523 **	3.61023 *	-	25.5639 **	17.2502 **	19.6704 **	5.39895 **
ΔUK	2.27861	3.71751 *	238.670 **	-	3.34280 *	0.07240	3.77099 *
ΔGermany	3.37056 *	2.36538	277.860 **	0.74040	-	3.50272 *	0.25046
ΔFrance	4.97310 **	0.80771	263.282 **	6.15885 **	0.91485	-	1.14968
ΔItaly	2.13516	2.54945	108.852 **	1.06984	2.05813	7.76945 **	-

Notes: H_0: X_{it} does not Granger cause X_{jt} ($i \neq j$). 2 *lags*. 9405 observations in each series. ** significant at 1%. * significant at 5%.

Finally, Table 6 presents the Granger causality results for the variables in first differences but where X2t now represents the first lag of the underlying variable. The results can be interpreted in terms of a delayed effect of returns of one market onto the current returns of another market. It should be noted the size of the F-statistics in this Table, where all the coefficients are significant at much less than 1%. The overall picture is, however, the same as before. Historical delayed returns worldwide have a significant impact on current returns for all the cases. In our context, historical delayed returns were only computed for one lag while one can believe that smoother but significant effects may also occur for two or more lags, though one lag computations will suffice for our purposes.

Table 6. Granger Causality *F*-statistics in first differences (lagged effects)

Variable	ΔUS	ΔCanada	ΔJapan	ΔUK	ΔGermany	ΔFrance	ΔItaly
ΔUS(t–1)	-	4403.8**	770.35**	1237.9**	1196.1**	1181.1**	420.91**
ΔCanada(t–1)	4198.8**	-	525.63**	961.60**	761.95**	851.67**	314.22**
ΔJapan(t–1)	63.808**	160.49**	-	327.92**	321.30**	307.39**	154.97**
ΔUK(t–1)	690.58**	830.07**	542.91**	-	1482.9**	2122.2**	755.22**
ΔGermany(t–1)	751.19**	678.05**	599.03**	1480.6**	-	2593.0**	1006.0**
ΔFrance(t–1)	652.79**	715.79**	555.44**	2131.1**	2589.7**	-	1048.5**
ΔItaly(t–1)	260.01**	267.33**	260.49**	754.62**	1001.9**	1054.0**	-

Notes: H_0: X_{it} does not Granger cause X_{jt} ($i \neq j$). 2 *lags*. 9404 observations in each series. ** significant at 1%.

Globally, the Granger causality results point to the existence of a single global stock market leaded by the US. The UK emerges as a regional leader within the European context. Japan, however, does not emerge as a leading market within the G7 countries but this is probably due to the long-lasting economic crisis that Japan has been facing. The great surprise (or perhaps not) is the dominant position of Canada relative to many other G7 countries. Canada may benefit from its proximity to the US where, surely, intense economic relationships, some similar economic policies and firm's relationships turn up North-America as a unified financial block. The results are, overall, compatible with the definition of weak market integration introduced in this paper although do not capture nonlinearities in the data. One can thus conclude that weak market integration occurs within the G7 over the period analyzed.

4. Conclusions

This paper analyzes stock market integration in the context of the global economy for the G7 countries. The theoretical background is rooted on a new concept of weak market integration which is defined as the causality that occurs in price transmission independently of whether this process is proportional or not over time. This allows for nonlinearities and other types of price distortions to be present in the overall process. Under proportionality of price transmission we say that strong market integration occurs. The empirical modelling of market integration based on price data is complicated by the nonstationary nature of these data sets. In order to acknowledge the nonstationarity problem, tests for unit roots and cointegration were performed prior to the empirical analysis of market integration based on Granger causality and mutual information tests. The unit root results are consistent with nonsationarity, and cointegration is present for the G7 stock markets over the 36-year period under analysis. It is therefore consistent to say that these markets belong to the same space, i.e., they actually form a single global stock market with one long-run or equilibrium relationship linking the data.

The cointegration results obtained assure that we are not facing spurious relationships between the seven markets under analysis. Thus, market integration can be tested using Granger causality. The results are consistent with the notion of pairwise weak market integration, since there are substantial causal effects, possibly linear and/or nonlinear, between pairs of variables. These effects occur both for prices and returns. They are also present for lagged returns relationships. Future work will look into the nature of the nonlinear relationships between stock markets, in particular with respect to the distinction between stochastic and deterministic effects and provide a robust basis to make prediction in the context of market integration.

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Corporate Social Responsibility: An International Study
The Case of CGD (Portugal), Vale (Brazil), TechnoLogica (Bulgaria) and IndianOil (India)

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Abstract – **There are many studies in the area of Corporate Social Responsibility but the presentation of several cases in one study reveals some particular aspects to be considered and to be had in account when CSR is studied. There are developments on this matter showing that progressively an increasing number of companies are concerned about their performance on this subject and about reaching their objectives involving CSR. Corporate Social Responsibility shall have self-regulating mechanisms through which responsibilities shall be monitored. Companies shall ensure that law is guaranteed as far as ethical standards and international norms shall be assured as well. According to the 2001 European Commission Green Paper, Social Responsibility conceptualization is associated with the idea of companies deciding, in a voluntary base, to contribute for a fair society and a cleaner environment. Corporate social responsibility deals with the organizations' actions intending to get a positive impact on several areas, such as environment, consumers, employees or communities, for instance. It demands a set of duties and obligations, to be induced on the relationship with the communities and the society in general in which the organization is integrated. In some countries, the corporate social responsibility is still a big challenge, since often the actions of social responsibility have not contributed effectively to develop the life situation of much people. This study emphasizes the general perspective of CSR in each one of these countries. CGD - Caixa Geral de Depósitos (Portugal), Vale (Brazil), TechnoLogica (Bulgaria) and IndianOil (India) are important companies concerned with the development of CSR activities; they have some very interesting results in this area.**

Keywords**:** *Social Responsibility, Sustainable Development, Environmental Sustainability.*

1. Introduction

Corporate Social Responsibility is nowadays important enough to make that organizations put very challenging objectives in this area. Many companies feel, in fact, a strong need of commitment with society and environmental concerns.

In Portugal, companies have a long tradition in social intervention which remounts to the century XV and the foundation of the Mercies. Recently environmental concerns have contributed to the important performance and developments in CSR area in some important Portuguese companies. The development of many companies' strategies move across the CSR objectives.

In Brazil, the basic needs of large segments of the population are still not being met. Issues related to survival, hunger, unemployment and social exclusion, among others, lead discussions about social responsibility of business to a lower level. In this sense, it is necessary an important debate on the corporate social action in Brazil.

In Bulgaria, companies are going through new realities and CSR is going as a new experience to implement a new attitude facing the new reality.

In India, there is yet a strong gap between Indian business needs and current practices. The Indian business begins to go into the international markets, what makes that becomes crucial that CSR philosophy develops to be

integrated in the business goals for long-term sustainability in economic, social and environmental areas.

The purpose of this study is to emphasize the perspective of CSR applied to four companies: one in Portugal, another one in Brazil, another in Bulgaria and the other one in India. Through the case studies of Caixa Geral de Depósitos, Vale, TechnoLogica and IndianOil it is intended to analyze the strengths and weaknesses of the development of measures of social responsibility in this area in each one of these countries.

2. Corporate Social Responsibility: A Commitment

According to the 2001 European Commission Green Paper, the conceptualization associated with the idea of social responsibility concerns the situation according to which companies decide on a voluntary basis, to contribute to a fairer society and a cleaner environment.

Based on this assumption, the company management cannot/should not be guided towards the only fulfilment of interests of the owners of the company, but also of other stakeholders' interests (employees, local communities, customers, suppliers, public authorities, competitors and society as a whole).

Corporate social responsibility is the continuing dedication to a responsible business, behaving in ethical premises and contributing to economic development, improving the life quality of workers, of their families and of local communities, aiming to have a positive contribution for the society as a whole.

The organization must be active and lead to the economic, technological and human development. To that extent, its performance requires full respect for human rights, investment in personal enhancement, environmental protection, combating corruption, compliance with social norms and respect for ethical values and principles of the society in which it operates.

Social responsibility requires a set of duties and obligations to be accomplished by individuals and firms in relation to the society and to the communities. Social responsibility deals with companies' actions aiming a positive impact in many areas as the environment, consumers, employees or communities, for example.

3. CGD: A Portuguese Banking

In 2009, the Caixa Geral de Depósitos (from now on "Caixa" or "CGD") joined the United Nations Environmental Programme for the Financial Sector (UNEP FI) and became the first Portuguese bank to join this program.

Since 1991, when it was created, the UNEP FI works the themes of sustainability in the financial sector with the aim of promoting good practices in the international financial institutions. This program reflects the recognition by the United Nations concerning the role of this sector in promoting sustainable development in that the processes of financial intermediation have repercussions in investment programs and, indirectly, in the allocation of natural resources.

Sustainable Development is aimed at rational utilization of natural resources while maintaining capacity for renewal and ecological stability and respect for inter-generational solidarity. According to the Brundtland Report (1987), sustainable development is one that meets present needs without compromising the ability of future generations to meet their needs.

The accent on the issue of environmental sustainability and eliminating poverty are key aspects of this new vision, which is raising the banner of growth with quality of life based on three pillars: economy, society and environment, combined with the issues of governance.

This adherence to the Program highlights Caixa concerns with the long term and confirmed its activity in supporting environmental sustainability. The basis is the conviction that the principles of Sustainable Development will form the basis of guidelines for future development. According to Mr. Faria de Oliveira, President of CGD, the times where structural changes are the ethical, environmental and social have been gaining weight. There are conditions to innovate and develop a better society and that membership of the UNEP-FI is a public commitment to sustainable development.

Note that this commitment of CGD with environmental sustainability and Corporate Social Responsibility in general seems to be, according to the statements of those responsible, the "genetic code" of the company / group.

Built in 1880, the Caixa Económica Portuguesa, as then called, revealed at once their social concerns being intended to receive the savings of the less wealthy and providing a "nest egg" in the long term. By 1885, with the reform, Caixa Nacional de Aposentações (National Fund for Retirement) was born. After, Caixa was going to be established as Caixa Geral de Depósitos e Instituições de Previdência. In the Estado Novo regime, Caixa became a key institution in the operations of agricultural credit and industrial and in 1969 assumed a central role in housing loans. All these aspects permit to understand the role that public authorities were successively assigning to the Caixa Group, the largest institution of public nature on the financial sector.

As you can read in a text of the Office of Historical Heritage (Gabinete do Património Histórico) of CGD – "From the History of the institution over 133 years, Caixa served various aspects of Portuguese society, having had in mind the moral principle of social intervention".

The great values that guide the work of Caixa and are the basis of its performance in terms of Social

Responsibility is appreciable in the Code of Conduct issued by the institution and designated in the Good Government report.

The commitment of Caixa is immediately identifiable, if we hold fast to its mission.

According to published texts, CGD's Mission is:

- Consolidating its position as a Group structuring the Portuguese financial system, distinguished by strong accountability and relevance of its contribution to economic development and to strengthen the competitiveness, innovation and internationalization of Portuguese companies;
- The stability and soundness of the financial system;
- As market leader, finding a balanced development between profitability, growth and financial strength, always within a prudent risk management.

In this context, the Group's strategic priorities defined for the three years 2008 -2010 included:

- The development of a human resources policy based on the pillars of Values and Culture of Enterprise, Knowledge, Communication and Performance;
- The supporting of the cultural and social development, promoting sustainability and being a reference to the Good Government in Portugal.

There is a set of clearly identifiable concerns about the wishes that pursue social responsibility.

These guidelines are then translated into 19 management priorities that include, among others:

- To boost the performance at the cultural level, and promote social sustainability;
- Proactive in developing best practice governance and ethical conduct;

The Code of Conduct establishes the rules and principles of professional conduct, being that the CGD staff on business principles of ethics, accuracy, truth, transparency, stability and security in relationships with customers.

Caixa has adopted the principles of Good Governance and public sector undertakings (Council of Ministers Resolution 49/2007) and undertook initiatives for compliance including preparation of an annual business plan by continuing to implement their mission and objectives of company as well as a report of compliance with these objectives and integrating sustainability analysis in the economic, social and environmental.

3.1 Caixa 2010, Zero Carbon Strategy

By the end of the twentieth century humanity faces the challenge of climate change and overuse of natural resources, issues that dominate the UN agenda. This has promoted a fundamental discussion about a new development model.

As we saw, according to the Brundtland Report this new model is identified with a development that meets present needs without compromising the ability of future generations to meet their own needs, ie, the Sustainable Development.

The scientific evidence of the phenomenon of climate change (refer to the reports of the IPCC-Intergovernmental Panel on Climate Change): disasters, suggest a range of impacts that are not only environmental but also economic and social. The impacts are being felt in politics, markets and quality of life, affecting employees and customers of Caixa, worldwide.

So, to combat this we must build an economy with lower emissions of GHG (greenhouse gases) per unit of wealth created. For the EU this may represent, in the spirit of post-Kyoto negotiations a 20% reduction in emissions in 2020, compared with 1990 levels, or even 30% if accompanied by other developed countries. According to the negotiation of the G8 summit of June 2007 the reduction is expected to reach 50% by 2050 (U.S. listed.)

It is clear that this new reality changes the logic of economic decision imposing new requirements for investment and risk management, while encouraging new markets (such as renewable energy) and adding new financial solutions. Caixa sees this and recognizes this as an opportunity.

In this line, promoted by Caixa since 2007, the program Caixa Zero Carbon is a strategic program that aims to help reduce the environmental impact of its activities while it induces good practices among its employees, customers and society in general.

These are ambitious objectives involving:

- More knowledge about the carbon footprint / emission levels of the activities of Caixa to allow the setting of reduction goals;
- More economic and energy efficiency, including through the adoption of measures to gain the use of renewable energy,
- Monitoring and evaluation of performance at this level;
- And new business development to strengthen the group's position in the domestic market - with new solutions to support and incentives to customers of cash to change their energy bill, support for demonstration projects in the fields of energy efficiency and promoting education and literacy carbon to employees and customers.

This action, through a course of action and dissemination, consistent and coherent, around climate change to help differentiate the profile of Social Responsibility, Caixa intends to improve the reputation of its brand. The Caixa Zero Carbon Program 2010 implements the strategy acting on five axes:

a. Information - Case reports on carbon reductions
b. Internal Action - Caixa reduces energy consumption and carbon emissions

c. Compensation - Caixa offsets carbon emissions inevitable
d. Market - Caixa promotes low carbon business
e. Communication - Communicate through Caixa Carbono Zero

3.2 The Projects

Central Solar Térmica (Thermal Solar Central)

One of the most visible projects to the reduction of CO2 emissions was the installation of solar panels on the roof of the headquarters building of CGD, transforming this building, located in Lisbon, in a huge Central Solar Thermal.

The installation of one hundred and fifty of solar collectors on the roof (1 600 m2) of the headquarters building at Avenida Joao XXI, allows the production of energy used to heat water for air conditioning systems and plumbing. In total, there is a saving of more than 1 million kWh of electricity per year (about 5% of global consumption).

The plant has a system for monitoring the energy produced, allowing to analyze the performance of the facility, and outlining a possible expansion of the use of solar energy to other buildings in Caixa.

The Thermal Solar Central CGD, along with other energy efficiency measures already implemented, results in electricity savings equivalent to annual consumption of about 2,000 people, thus preventing the annual emission of more than 1,700 tonnes of CO2.

This office building has a Certificate of Energy and the Ambient Air Quality, issued by ADENE-Energy Agency, with the highest A + rating.

The policy of energy saving is extensible to the network of agencies that is being gradually equipped with PV.

Dia a Dia Carbono Zero (Day to Day Zero Carbon)

Along with new technology and with the direct participation of employees, Caixa has been producing a kind of guide on best environmental practices to adopt in our daily lives, whether at work or at home, which is available (PDF) in the site of Caixa.

The mission of awareness extends to the general public through the production of the TV show “O Planeta Agradece” (The Planet Appreciates), an item on the radio and a “blogue”. This program is part of the Caixa Zero Carbon Program 2010, and aims to promote behaviours that help Caixa to reduce her own emissions. Simultaneously, it is to be replicated in a larger universe, to help the country meet its international commitments in this matter. Day by Day Zero Carbon is a program involving customers and employees around the world in combating climate change.

Floresta Caixa (Caixa Forest)

Of vital importance to the planet as CO2 sinks, the forests have, also, been addressed in the program.

The forests are a major renewable resource of Europe and the most important component of nature within EU. In Portugal (occupying nearly 40% of the country) forest constitutes an important area of activity that involves more than 150 thousand workers. Forests are also essential in promoting biodiversity, protection against soil erosion, correction of water regimes and air quality. It is therefore essential to promote effective forest management as a way to preserve and foster an important renewable resource, while contributing to meeting the emission limits set for Portugal under the Kyoto Protocol.

The program FLORESTA CAIXA represents a set of initiatives aimed to contribute to the construction of a new forest in Portugal. These are developed in partnership with some major environmental groups and linked to the stakeholders in the sector such as QUERCUS and ANEFA (National Association of Business - Agriculture, Forestry and the Environment).

The actions that the program will materialize: recovery of areas burned and the creation of sustainable forests with preservation of native species. It includes several projects for forestation and raising awareness of the importance of the forest.

Environmental Awareness

In the field of the FOREST ENVIRONMENTAL AWARENESS - CAIXA includes initiatives aimed to promote the adoption of appropriate environmental behaviour. In addition to the above set of actions we can cite the sponsorship of the Conference of Al Gore in our country and Portugal's edition of the book "An Inconvenient Truth."

In the "lounge" area of the headquarters of Caixa there are several brochures available on forests and on the theme of climate change. Shares of Christmas "for a better future" call attention in this court, to the importance of forest preservation… and for indigenous species to be preserved.

It also counts the support measures to forestation with children and young people from schools, participation of employees and their families.

Cartão Caixa Carbono Zero (Caixa Card Zero Carbon)

One of the recent innovations in this field gives the name of Caixa Card Zero Carbon (the card that embedded in nature, according to advertising copy CGD) and represents another step in implementing the strategy of CGD in combating Climate Change. It is a card truly innovative, unique of its kind in Portugal.

Integrated in the Program Caixa Zero Carbon 2010 (Market axis), this Caixa Card Zero Carbon intended to

be a means of encouraging a lifestyle of low carbon and allows its user to offset emissions that cannot avoid.

The Card provides special conditions in the purchase of goods and services with greater energy efficiency and better environmental performance, providing a solution that simultaneously reduces emissions, preserving the planet, and provides a significant financial savings for its user. Presents a set of features that make it attractive for the user, in particular, on favourable terms involving the return of annuities according to their original use and the amounts reached in the transactions, the flexibility of the conditions and terms of payment and in consideration of an interest rate of operations truly competitive.

Caixa Card Zero Carbon is a genuine product of low carbon, in which key elements were designed to minimize the effects of climate change. Firstly because it is a credit card made from recycled material, free of chlorine and that fosters communication by electronic means, thus thought to cause minimal effects on climate. By contributing to projects that absorb or prevent CO2, the card offers a portfolio of carbon credits to offset unavoidable emissions permits, making the day-to-day more "user-friendly" environment. In choosing this card, customers have access to special discounts on the purchase of goods and services more energy efficient, including a cash-back program that offers them carbon credits to offset emissions. The Card gives therefore CO2 credits, which means that the amount accumulated in the cash-back program is channelled to projects that absorb or prevent carbon dioxide. Emissions from the production and distribution of the card are quantified and compensated. To that extent, it can be said that the name Card Zero Carbon is justified-it is a card with no effect on climate.

Tapada Nacional de Mafra is the first project to benefit from funds provided by the Card Box Carbon Zero.This is an area of 50 hectares, which is strongly affected by the fires of 2003. Integrating project in forest area, the Card came enable the proper management of this area, with special attention to newly installed stands and processes of natural regeneration. It is intended to ensure sustainable forestry, fire protection and enhancement of biodiversity. The project ensured the monitoring of the action over 30 years. The project includes the development and implementation of a management plan that will allow carbon sequestration of a total of about 3000 tons. CO2 equivalent (CO2e).

The recent innovation in this area is called Cash Carbon Calculator. Installed at the site of the institution allows the user to calculate their carbon footprint quantifying the emissions associated with daily life from issues that relate to two key areas: housing (domestic consumption) and mobility (use of means of transport).

Support Scientific Research

Along with these actions that directly target the environmental, Caixa is integrating its activities in the promotion of scientific research as central to the evolution of knowledge and change attitudes and mentalities.

The role of education is central to sustainable development. Hence: Firstly, and according to the desideratum of increasing the financial literacy of potential users, Caixa has created mechanisms that are simple, practical and accessible, to encourage savings. This has created a financial education program, called Positive Balance, with access to the Net (www.saldopositivo.cgd.pt) to customers and non-customers. The contents are useful application in the daily management of the family budget, and include suggestions for energy saving approach of diagnostic tools to prevent financial indebtedness, financial products etc..

For young people there is a Program – Ciclo da Poupança (Cycle of Savings) which points to the need for savings and simple formulas to achieve them. It led in 2007 to a game with hundreds of agencies and students of 1st and 2nd cycles, on the celebrations of World Savings.

Most interesting, the Programa Nova Geração de Cientistas Polares (New Generation of Polar Scientists Programme) results of a collaboration with the Portuguese for the International Polar Year. It assigns scholarships to young scientists for studies to focus on relevant issues of Climate Change and its effects (Biology, Physics of the Atmosphere, etc.) on Antarctica Region. Simultaneously, Portuguese started a major campaign in Antarctica with the participation of Portuguese scientists held until 2009, Nov. The Committee for the polar year, consisting of researchers from several universities in Portugal and its action promotes the integration of young scientists in the work of teams who are developing this area of science, creating critical mass and promoting the image of the Portuguese Science World.

The lectures "Um Alerta Global para o Desenvolvimento Sustentável" ("A Global Warning for Sustainable Development"): in this field, there are alerts for sustainable development by supporting a series of conferences in Culturgest promoting discussion of relevant issues and with the participation of some of the most significant researchers (with themes such as Climate Change, Human Rights, Sustainable Development and the Information Society, Architecture responsible).

A way that promotes the development of skills in the area still refers to the Concurso de Design de Mobiliário com Materiais Reciclados (Furniture Design Competition with Recycled Materials) that challenged

the young people of Portuguese universities and polytechnics to display their talents, contributing to the development of proposals for Eco-Design and thereby furthering rows of recycling.

And others:

- Publications (the magazine “Azul”),

- Renewable energy credit programs, with special conditions for acquisition and installation of equipment;

- My Energy Program, in partnership with EDP - integrated solution of micro-generation solar thermal, photovoltaic and wind power for small and medium consumers.

Obviously that environmental sustainability should not be disconnected from the other two pillars of development: economic and social. We do not want to enlarge this communication, but we would like to stress the importance of Caixa’s solidarity actions, as well as actions to support culture and sport of its employees and the Community, or their efforts on the transparency of information.

4. Vale (a Brazilian Mining Company)

The company Vale is the second largest diversified mining company in the world in market value. World leader in the production and export of iron ore and pellets, and an important producer of nickel, copper concentrate, bauxite, alumina, potash, kaolin, manganese, ferroalloys and coal, the company has offices and operations in over 30 countries on five continents. Vale was the first Brazilian company to achieve the rating of investment grade and the first Brazilian company to trade its shares on Euronext (Paris).

The company has gained an enormous strength with the ore extraction in the Amazon, more specifically in the Carajas region, located in the southeastern state of Para Company, in its first year, produced 40 tons of iron ore, equivalent amount that is loaded per hour today. Vale has diverse activities within the mining sector.

The company operates in the segments below:

- Ferrous: iron ore and pellets, manganese and ferroalloys.
- Non-ferrous: kaolin, potash, copper and nickel.
- Logistics: Railroads, port terminals, coastal shipping and logistics solutions.
- Aluminum: Bauxite, alumina and aluminum.
- Energy: Eight hydroelectric dams, seven of which are already in operation.
- Coal: The Chart 1 shows the diversity of work, identifying what each product represents in the composition of gross revenue.

CVRD holds maximum production of nickel, bauxite, alumina, copper, thermal coal, cobalt, platinum group metals and precious metals. The company guarantees sales maxima of iron ore, nickel, copper, alumina, cobalt, precious metals, platinum group metals and thermal coal.

Privatized in May 6, 1997, the company had a net worth in 1997 of U.S. $ 350 million, with a market value around $ 10.5 billion by offering 11 thousand direct jobs. In less than a decade after massive investment, the company increased nearly 10 times its gross revenue, according to data presented in chart 2.

The privatization of Vale, which sale is even nowadays questioned, brought to the company an enormous investment sum. On August 11, 2006, CVRD made a public offer of $ 18 billion for Inco, Canada, which owned the largest reserves of nickel in the world. This business became an historic deal. It was the biggest investment made abroad by a Brazilian company. Vale has become one of the largest nickel producers in the world, with a production of 234,900 tons in 2006.

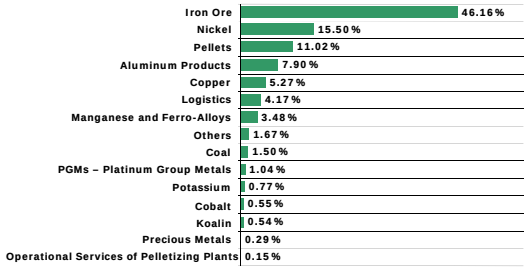

Chart 1. Composition of gross revenue (Source: Vale)

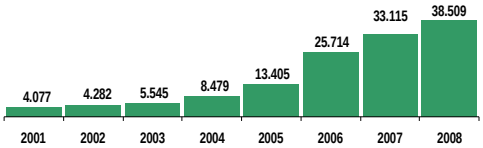

Chart 2. Gross Revenue in Millions (Source: Vale)

The transaction increased the market value of Vale and in December 2007 the company was valued in U.S. $ 151,711 billion, with a number of employees of 152,724 in 2007.

In 2008, the company was considered the mining company that most invests in its production processes, as shown in the chart 3:

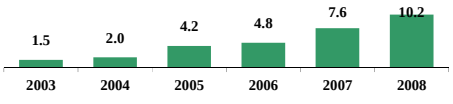

Chart 3. Investments of Vale in the World (Billions) (Source: Vale)

According to the data, Vale has invested more after its privatization in 1997 (and has increased its profitability).

4.1 Vale and the Environment

According to the company report, the essence of its work is the search for a balance between socio-economic development of territories and maintaining the quality of natural resources, biodiversity and life.

To do so, Vale has made continuous investments in the management of environmental impacts of operations and research of new technologies that improve the environmental control systems. The guidelines that guide its actions are explained in the policy of sustainable development of Vale, a document that guides the process from decision making to the actions performed on the day to day operations.

Vale considers the respect for the environment a key component of its sustainability strategy, seeking to balance environmental protection and economic development. To come to this end, the company has an Environmental Policy, in which commitments to environmental aspects are clearly explained.

The company's main points of its environmental policy are as follows:

- Maintain an environmental management system, aiming to ensure that activities comply with applicable laws and standards set by the company, in the absence of specific legislation, Vale will implement the best measures of environmental protection and minimizing risk.
- Educate and train employees to act in an environmentally responsible, ensuring the implementation of environmental policy.
- Develop research and incorporate new technology for continuous improvement activities, aimed at reducing environmental impacts and consumption of energy and matter.
- Maintain on-going dialogue with its employees and the community, aiming at improving environmental actions.
- Strive to their subsidiaries and affiliated companies to adopt practices consistent with this environmental policy.
- Request their products and services suppliers with proven environmental quality.

Vale policies, standards and environmental procedures are defined by the Department of Environment and Sustainable Development, which coordinates the Management System for Environmental Quality (SGQA) of the company, setting guidelines and targets, monitoring the development of environmental performance and providing tools for managing the environmental aspects related to the activities, products and services of Vale.

The Environmental Policy with the subsidiaries is still in process of discussion and alignment. In the context of the Management System of Environmental Quality are developed measures for monitoring, conservation, environmental protection and recovery which ensure the maintenance and recovery of ecosystems in which Vale operates.

The environmental management system is based on the guidelines ISO 14001 (International Organization for Standardization). Periodically, the operations are subject to external audits.

In recent years, important achievements were obtained in the rational use of water and energy, waste disposal and the awareness of people to environmental quality. Follows the environmental performance of the last three years. Vale is in fact aware that there are opportunities for improvement and is committed to the continuous improvement in building an environmentally friendly business model.

According to the report of the company, Vale has a great concern for environmental issues, and as a consequence there are significant investments in the environment. Its commitment is not limited to the environmental control systems that are required. The environmental aspect is an important component of the evaluation of new projects and decision-making investment for expansion of the company. Expenditures are monitored monthly and reported quarterly to the public opinion, and it counts with periodic financial audits.

The relationship with the various stakeholders is present in Vale environmental management. In each area where Vale acts, the company tries to be an agent of change, listening from outside and proposing alternatives and looks for integrating other social actors in the effort of finding solutions to environmental issues.

In 2008, Vale volume of resources invested in the environmental area was U.S. $ 678 million, almost 50% higher than that achieved in 2007. Most of the resources were allocated to three lines of expenditure:

- acquisition and implementation of environmental control equipment, aiming to improve performance in existing operations;
- maintaining environmental and geotechnical safety of dams and waste dumps;
- Reforestation and rehabilitation of degraded areas, which form the program Florestar Vale.

Environment Quality

The management system of environmental quality determines the development of effective monitoring, conservation, environmental protection and rehabilitation, aiming to ensure the maintenance and recovery of ecosystems in which Vale operates. The system is based on the guidelines of ISO 14001 (International Organization for Standardization) to which additional aspects were added making up the standard of environmental quality in Vale. Aiming to assess the management and guarantee the evolution of

performance, multiple transactions are submitted periodically to internal and external audits.

Policies, standards and environmental procedures of a general nature are defined corporately, and management is under responsibility of operations and business areas.

4.2 Social Aspects

The quest to build a positive social, economic and environmental legacy in regions where Vale operates is one of the principles that underlie the Sustainable Development Policy of Vale.

Activities, especially mining, are limited to the lifetime of the mineral deposit and therefore the presence in a particular place, in general, is finite.

Along the mineral cycle, there is a challenge to Vale: to make that actions are catalyst for regional economic development based on regional competences, which can ensure the perpetuity of social welfare in equilibrium with the environment. In that search, Vale performs management actions that enhance the positive effects of the presence of Vale, reducing the social risks of operations and at the same time, contributing to strengthening the foundations for local development in the long run.

Vale invests in integration, in cooperation with public and social agents, to encourage:

- The hiring of local employees and suppliers;
- Education for human development, for work and income generation;
- Planning the use of taxes generated by the operations of the company;
- The diversification of local economies;
- The strengthening of institutions;
- Environmental conservation and cultural heritage.

Thus, Vale tries to build social transparent networks, based on dialogue and permanent respect for the culture of each community. At the same time, tries to invest in management tools to foster the development of the territories. The intention is to build, considering society as a whole, the foundation for continuous improvement of quality of life.

4.3 Management of Local Development

Vale has several programs and tools, in different areas and regions of operation, to manage social and environmental impacts arising from the activities.

In the analysis of the feasibility of implementing projects, the methodology Front-End Loading (FEL) is adopted covering social, health, safety and environment, and economic and operational risks.

Furthermore, based on environmental, social and economic assessments, performed in the EIA/RIMA (Environmental Impact Assessment and Impact Report for the Environment), potential impacts of the presence of Vale are considered in the regions already in the phase of licensing and deployment projects.

These tools, together with the socioeconomic diagnoses made by Vale Foundation, conduct the Management Programs of Environmental and Socioeconomic Impacts, intending to find the mechanisms to avoid or minimize negative impacts and to maximize the positive impacts on the performance of Vale. These programs are implemented according to the needs of each project and consider the particularities of each region. Through these tools, it identifies the main impacts associated with the presence of mining. Among them stands out:

- Direct economic impacts
  - Positive: Generation of Employment, Vocational Training, Increased taxes, Hiring of local products and services, investments in infrastructure.
  - Negative: Environmental impacts such as dust and noise, interference with land use, risks of accidents.
- Indirect economic impacts
  - Positive: increase the wages, benefit income making, Leverage of other economic sectors, suppliers attraction, development of local suppliers, attraction of investments from various spheres of public and private sectors.
  - Negative: Pressure on infrastructure and public services, due to population increases; speculation in remote areas, due to the low housing supply and high demand; generation of economic leakage effects, due to the hiring of suppliers and employees of other regions, due to the lack of local businesses and experts.

4.4 Programs and Management Impact Practices

In order to leverage and maximize the positive outcomes of Vale in the territories, Vale works with structured programs considering the various relationships that Vale has set.

4.4.1 Qualification

Vale seeks to maximize the hiring of residents of the localities where it operates, especially in developing countries and remote areas.

Vale invests in professional training programs related to mining activities and other activities of the local economy. Through these programs, Vale aims to contribute to employment and income generation and diversification of the economy of the communities where it operates.

4.4.2 Relationship with Communities

At all stages of the company's ventures, from the start to the closing of operations, Vale counts with an Institutional relations and communications team. There are programs for establishing relationships with the communities that are based on a permanent and participatory dialogue between the community and Vale. Programs include visits to mining communities, meetings with leaders and participatory forums. In addition, it is intended to establish a direct and transparent dialogue with not only the community but also with the local government in order to build a harmonious relationship.

4.4.3 Relations with Traditional Communities

Vale gives special attention to the traditional communities in the localities where it operates. The basic guideline of the Interaction Program with Indigenous Communities is to ensure that the benefits generated by the project are enjoyed by the indigenous communities, respecting their cultural traditions in order to avoid, minimize or offset any adverse effects that the activity may stimulate.

4.4.4 Culture Appreciation

It is understood that anyone can contribute and participate in programs of recovery, revitalization and protection of cultural property. Projects are supported and agreements settled to the restoration of cultural and archaeological heritage of places where it operates. An example is the project of rescuing the language of the Kanak communities.

Besides these programs, implanted directly in the units, Vale Foundation works for the development of communities where Vale is present, helping to empower people and respecting local cultural identities through social programs structured.

4.5 Investment in Infrastructure

Over the past three years, the amount applied was approximately $ 169 million. There is a fall in the investment in infrastructures in 2008 due to the completion of current projects.

In the following years, southeastern Pará may have significant investments to remedy deficiencies in existing social infrastructure and prepare the region for a projected economic growth of 18% per year. To deal with these investments, the municipalities have counted with an ability of own investment which may have generated gross savings of $504 million between 2006 and 2010.

This is one of the main conclusions of the Integrated Socioeconomics Diagnostic of Southeastern Pará, a study made between 2006 and 2007, by Vale and Vale Foundation, under the auspices of Diagonal Urbana, a Brazilian consultant, specialized in integrated social management that counts with the participation of communities.

Although a significant structural deficit, the Southeast of Pará has great opportunities for sustainable development. After all, it is one of the richest regions of the world in natural resources and one of the major mineral provinces in the world. Since it has begun operations in the region, in the 80s, Vale has been supporting the development of the municipalities that are in its area of influence, while helping to preserve an area of 8 thousand km2 of native forest in Mosaico de Carajás.

Investments in infrastructure, urban sanitation, education and culture have contributed significantly to the development of the region. Even the company's growth over this period brought more opportunities for skills and employment for residents, more business for local suppliers and increase tax collection by government agencies, contributing to the local socioeconomic development.

Vale has currently 15 projects in the area and intended to make new investments, trying to reach the total value of U.S. $13 billion (from 2003 to 2010). To increase its presence and be more effective and socially responsible, Vale and its Foundation have decided that, first, it was necessary to know the region, understanding the present moment and projecting the future in the region.

Diagnostics marks only the beginning of the Plano de Gestão Integrada em Socioeconomia do Sudeste do Pará (an Integrated Management Plan for Socioeconomics of Southeast of Pará), which also includes the steps of preparing and implementing the Action Plan. The Plan, which is already being prepared in 2007, determines what should be done in the investments area and how each party should participate. The action already implemented is a stage of implementation of improvements, including efforts to seek financing. "This is a powerful tool that allows Vale to contribute to the sustainable development in regions where it operates", according Vale Foundation. The Plan includes six municipalities (Parauapebas, Canaã dos Carajás, Curionópolis, Marabá, Ourilândia do Norte and Tucumã), and influences the Eldorado dos Carajas.

4.6 Health and Safety Activities and Policies

In 2007, Vale has continued to carry out the strategy for health and safety through various activities, among which are:

- Policy Review Health and Safety - the new text of the policy specifies the commitments and the basics of managing Health and Safety, which embody the value of respect for life.
- Elaboration of Requirements for Systemic Health and Safety - the standard defines what must be done to ensure the proper development of the organizational processes of Vale. These

requirements stem from the Health and Safety Policy and its Principles. They are the ones that underlie the procedures, tools and performance indicators of health and safety management.

- Elaboration of Requirements for Critical Activities (RACs) - The requirements established for the execution of critical operational activities, with the purpose of preserving people's lives, ensuring the integrity and protect health in all areas of the company, so as in its subsidiaries and affiliates. The 10 activities of greater risk appetite for Vale are working at height, motor vehicles, mobile equipment, blocking and signalling, cargo handling, confined space, machine protection, slope stabilization, and detonated explosives and chemicals.
- Implementation of Information System Health and Safety - in order to improve the management and flow of information from Health and Safety, begins the deployment of a single information system for Vale in Brazil. The tool will support management decisions, according to the results of business areas.
- Membership in the Global Business Coalition on HIV / AIDS, Tuberculosis and Malaria - GBC (Global Business Coalition against HIV / AIDS, Tuberculosis and Malaria) - joins the group of more than 200 member companies of the GBC, an organization aimed at mobilizing resources for initiatives for combating and prevention of HIV / AIDS, tuberculosis and malaria.
- Event "Construction" - in June and July 2007, approximately 2.5 thousand leaders in Vale gathered in 19 cities of Brazil, to build together the foundations of a culture of prevention in health and safety.

The new Health and Security Policy of Vale, released in March 2008, establishes the following commitments:

- To control all risks associated with activities, processes, facilities, products and services.
- To act proactively in managing risks to health and safety of persons and facilities.
- To meet the legal requirements of health and safety and to take voluntarily.
- To continuously improve the performance in health and safety through the improvement of activities, processes, products and services, focusing on the use of innovative solutions and developing people competences.
- To encourage the development of performance in health and safety service providers.
- To maintain communication channels with the communities where operate and other stakeholders, so as to remain always alert to the influence of its operations in the health and well-being of people.

Since 2006, the performance goal of workplace safety (accidents with remote and internal corporate standards) is tied to variable pay of employees. In 2007, the process changed so that in contemplating the health data. The set of actions already implemented and the beginning of the process of cultural transformation have already shown some results.

Between 2005 and 2007, various measures to improve management of health and safety are implemented, for example, setting targets covering issues of health and safety for all departments and the intensification of awareness campaigns.

Starting in 2007, a process of improvement of registration procedures and data collection on health and safety began. The standards of classification of accidents were implanted according to the rules Occupational Safety & Health Administration (OSHA), the Agency for Safety and Health at Work in the United States, and several initiatives for training and for employees awareness were held in order to standardize the recording of information.

With the implementation of this process, in 2007 some improvements were got.

Regarding the rate of accidents with lost time, a significant reduction was got over the period 2005 to 2007. This means that the accidents of greater severity were reduced. The perspective is that in the coming years, accident rates may continue to reduce, both because of the improvements implemented as because of the stability in the form of gathering and recording data. In this sense, the participation of Vale began in a working group of ICMM (SCHEBenchmarking) in order to align indicators of health and safety and occupational hygiene.

With regard to risk prevention and health guarantee, Vale maintains a rigorous system for identifying health risks in all its units. The goal is to use this information to the creation of specific programs that can be deployed, promoting an attitude of prevention by employees, relatives and the communities in which Vale operates. By the end of 2007, risks for the following diseases were identified:

- Occupational: musculoskeletal diseases, back pain, risk of hearing loss and pneumoconiosis.
- Endemic: intestinal parasites and diseases carried by animals, dengue, malaria, chagas diseases, yellow fever, hepatitis A and B, HIV / AIDS, leishmaniasis, and worms. Among the programs maintained by the company are: campaign to prevent sexually transmitted diseases - STD / AIDS, World Day to Combat AIDS, workshops on alcohol and smoking, and prevention campaigns against cancer and diabetes; support group for diabetics, hypertensives and people with cardiovascular risks; program of gym work, education program affective-sexual (Vale Youth - developed by Vale Foundation),

aimed at young people from nearby communities in order to guide the sexual life and preventing the occurrence of sexually transmitted diseases; campaigns of vaccination against influenza, and inspections to prevent and treat dengue and yellow fever. Besides these initiatives, Vale offers health plans to its employees and third parties as described in the job session and People Development.

Such efforts have earned public recognition. The Healthy Living Program, of Albras, won in 2005, the Social Value Award (jury of experts and jury) in the category "Quality of Working Environment" and, in 2007, Lennart Levi Award in the category "Poster Enterprises", VII Congress of Stress of ISMA (International Stress Management Association). Vale invested U.S. $ 25.2 million by the mid 2009.

According to the testimony of some local politicians, royalties would be a form of compensation to alleviate the problems acquired with the implementation of Vale projects in EPC. The royalties would also help to solve problems such as sanitation, health, etc., that are considered by municipalities as socially critical areas, which solutions would not be viable only with the transfers from state and from Union resources.

5. TechnoLogica

TechnoLogica is one of the biggest Bulgarian software companies. TechnoLogica's business is to help companies and organizations to implement and to take advantage of new information technologies in their developments and projects. According to the last two CBN Bulgaria ICT Ranks™ TechnoLogica is the largest Bulgarian-owned software company. TechnoLogica has been active on the Bulgarian market since 1990. Today, the company has offices in Sofia, Plovdiv, Varna and Skopje (Macedonia) and is a member of various business associations and chambers.

The company Mission is to meet and exceed clients' expectations by significantly improving their activity through the implementation of leading information technologies.

In order to stay competitive as the provider of technology transfer services, TechnoLogica follows a target-oriented policy of innovation by anticipatory implementation, adaptation and further development of new information technologies and building of technological software tools. TechnoLogica is an intellectual capital company, which actively participates in the development of the knowledge-based economy. Among the most recent acknowledgements of TechnoLogica's achievement in this area are the 2008 first prizes in the „Investor in Knowledge" category awarded by the Bulgarian Business Leaders Forum and in the „Knowledge Management" category in the annual HR awards of the Bulgarian Human Resources Management and Development Association. Business ethics makes an integral part of TechnoLogica's corporate culture, because if the Company wants to be sought after as a valuable technological partner in the projects of its partners, its name must stand for a guarantee of high technological level and exceptional business ethics. The business of TechnoLogica as a technological partner requires that the Company be easily accepted by the other players in the field of information technologies. The Business Ethics Certificate was awarded to TechnoLogica personally by Prince Charles in the year of 2003.

TechnoLogica does business that is socially responsible. The management of the Company recognizes social benefit as a touchstone of every action TechnoLogica undertakes. As a company that is dedicated to innovation, TechnoLogica considers social issues as providing challenges and opportunities.

5.1 Young People and Education Benefit Projects

TechnoLogica traditionally supports and consistently accomplishes the idea for close cooperation between business and the academic circles. The management realizes the necessity for the business to contribute to the quality education and professional fulfillment of the young people in Bulgaria as well as the benefits of such cooperation for TechnoLogica's strategy realization. TechnoLogica has long years of experience in cooperating with the academic circles. Yet in 1993 the first summer internship of students from the American University took place thanks to the initiative of TechnoLogica. The company has made donations to almost all universities of Bulgaria and aims at being a catalyst for a stable cooperation between business and education. TechnoLogica participates actively in the Business Master Classes organized by the Bulgarian Business Leaders Forum (BBLF) with lecturers in the Information Technologies and Human Resources modules.

The latest program of the company for the benefit of young people and education is being developed at the Faculty of Mathematics and Informatics (FMI) of the Sofia University "Kliment Ohridski". The program consists of several projects related not only to the students but also to their professors. At the TechnoLogica Education Centre for Professionals we regularly organize workshops for students from the Master's Programs at the FMI. It is already a tradition that certified practicing professors train the faculty professors and system administrators in the newest technologies free of charge. This is done in order to facilitate the process of implementing new technologies and also to provide resources for it. Following this trend a specialized free of

charge training in Microsoft starts from academic year 2006/2007. This training is a part of the approved academic curriculum and is lead by certified professionals from TechnoLogica. TechnoLogica regularly accepts trainees from the faculty who get the opportunity to continue working at the company on full time employment agreements after the completion of their internship programs. In 2006 TechnoLogica announced a contest for "The Lecturer in a Subject in the Information Systems Field Best Aappraised by the Students" with a prize fund amounting to 5 000 leva.

As a company specialized mainly in information systems development, by means of this annual award TechnoLogica expresses its gratitude and respect to the professors who have contributed to teaching the students useful knowledge that could later on be used in their practical work. Through direct voting on the FMI web site the students chose the three lecturers with the greatest contribution to their professional growth as IT specialists. A challenge to the young software specialists is also the contest called "Wings for Your Ideas" which aims at looking for new and original ideas for software products, instrumental tools and technologies. The company will invest in the best ideas and will facilitate their actual implementation in all aspects and all the projects that have participated in the contest shall be published on a special web site and popularized among the companies in the IT sector. The authors of the ideas preserve their copyright over those ideas and all additional conditions for their implementation will be organized in the form of a contract. TechnoLogica was the first to respond to the charity campaign for an elevator for students with disabilities in the FMI building and donated 10% of the needed 100 000 leva. By doing so TechnoLogica hoped to give a good example of charity activities in the IT sector and also expected that the kids with disabilities will receive an equal start for education and professional fulfillment, just like their healthy peers. At the end of 2006 the gathered amount comprised 50% of the sum necessary for building the elevator.

The "Engineering Education – Solid and Working" program started at the end of 2003 as a model for bringing business and education closer and it develops successfully and gives good results for the students as well as for the production enterprises. Even then the initiators of the program forecasted the strong demand for engineers which already is a proven fact. The program started with the donation of a software with a trade price amounting to 2.5 million dollars – an act of support by the American corporation, software producer, SolidWorks. It encompasses six universities and numerous Bulgarian industrial enterprises, the donation thus being only a part of the initiative. The goals of the program are improving the quality of the engineering education, increasing the interest towards it and stimulating the joint practical developments of the universities and the enterprises. Thus, simultaneously will increase the competitiveness of the Bulgarian companies and the opportunity for successful professional fulfillment of such specialist will arise. DiTra, the CAD/CAM center of TechnoLogica and official representative of Solid Works for Bulgaria and Macedonia, made an installation of the donated software, trained the lecturers and supplied studying materials. In April 2006 was published the new SolidWorks textbook – "SolidWorks – User's Book. Functionality, Examples, Guidelines". It is sold on preferential prices to students. The industrial enterprises actively participate in the initiative by means of offering guest lecturers, workplaces and practical help. Within the bounds of the initiative are carried out university days, seminars, job fairs, master classes as well as the student contest for working with SolidWorks. The student contest takes place in two categories - for best project done with SolidWorks as well as for speed, skillfulness and ability to work with the software. The contest finals take place at the annual meeting of the friends of SolidWorks where young engineers can demonstrate their abilities in front of potential employers. The winners receive the annual TechnoLogica scholarship. Almost all finalists from the contest find good jobs at prestigious Bulgarian companies. That was the main objective of TechnoLogica and the American software producer SolidWorks – to fill in the gap in the education of engineers and to establish a lasting connection and engagement between employers and students. In the year 2006 another producer of software joined the program – Delcam, who offered licenses of the CAM system FeatureCam to the technical universities in Sofia, Varna, Rouse and Gabrovo. DiTra in its turn taught the professors how to work with the software. DiTra, as an official representative of SolidWorks for Bulgaria and Macedonia, annually maintains the working capacity of the installed software and right now the universities work with the latest actual version.

As a result of the work and desire of all the participants in the program, the students at three different faculties of the Technical University in Sofia, as well as the Technical Universities in Varna, Rouse and Gabrovo and the University of Food Technologies in Plovdiv study and work with SolidWorks and SolidCAM, just like their colleagues at the Massachusetts Institute of Technology. In the year 2006 DiTra opened a Laboratory for Assistance of Innovative Processes in Industry which has at its disposal the latest software tools. It is equipped with a high class machine for rapid prototyping of Stratasys and a 3D scanner. Apart from the advantage to the Bulgarian companies, the functioning of that laboratory is also related to the next big step in the "Engineering Education – Solid and Working" program and more

precisely, its turning into a model for other similar laboratories at the Technical Universities in Bulgaria. Still in 2007 the University of Rousse "Angel Kanchev" became the first academic institution with a similar laboratory. Thus, the first step to the goal was made – for the Bulgarian Technical Universities to be promoters of the latest technologies and centers for their pilot application in the industry, as well as for the scientific potential of universities to meet the necessities and projects of the industrial enterprises. That is a meeting which could bring many benefits to both parties.

5.2 Carting for Employees

The main resource in the software branch is the human capital. A spirit of innovation is one of the important criteria in the selection of personnel at TechnoLogica. The firm has created an atmosphere of creativity and it is a given that everyone working here is willing to be a professional and an innovator, and that these qualities must be stimulated. One very important quality that TechnoLogica is proud of is free communication. The management is not only open to innovative and daring ideas by everyone about anything, but it is also proactive in the process of conceiving of and formulating the ideas of its employees. At TechnoLogica, 15% of each employee's working time is dedicated to research and training. Most often it is used for collecting information about new technologies, and for analysis of their potential and applicability. Given the speed at which the field of information technologies has been developing, these require special attention and sufficient resources for up-to-date introductory training. Appreciating the importance of high-quality training, in 1995 TechnoLogica created the first certified training centre for IT professionals in Bulgaria. Professionals there are educated on the basis of specifically designed training programs and backed up by the financial support of the world's software leaders, who certified all the tutors teaching in the programs. The facilitated access to teaching materials on new technologies provides an opportunity for constant and consistent learning on the part of the trainees. Internal training courses have also been developed on issues regarding the latest technologies and the technological tools owned by the company. These courses are modified for clients and also as an element of the technological transfer offered to them by TechnoLogica. What is of utmost importance to TechnoLogica is to work for the formation and development of professionals on an international level. TechnoLogica helps its young employees develop as valuable professionals through arranging for the sponsorship of their certification courses by the leading IT corporations. All employees receive financial support when they marry or have a child. It is a common practice that interest–free loans are provided to employees for the purchase of real estate property.

5.3 Community Benefit Projects

In 2007 on the occasion of the 50th anniversary of the National Polytechnic Museum TechnoLogica financed entirely the building of a new web site representing the activity and development of the museum and its branches. Following its strategy for supporting the Bulgarian cultural institutions, TechnoLogica also supported the National Polytechnic Museum in staging the "The Bulgarian Trace in Science" exhibition, prepared by the museum. So that the less popular facts from the Bulgarian scientific development, contained in the exhibition, could reach wider audience, TechnoLogica shall donate copies from "The Bulgarian Trace in Science" to different governmental and academic institutions.

Through the financial aid granted by the company the new and revised edition of the book of Prof. Isaak Passi "Motives of Human Behavior" appeared on the book market at the end of 2006.

Still in 1993, TechnoLogica, absolutely free of charge, for the first time in Eastern Europe used multimedia kiosks for new quality service for the visitors of a public forum, namely the Technological Fair in Plovdiv. The kiosks were equipped with touch-sensitive screens, and provided information about the exhibiting firms, the location of their stands, the exhibition town and the sightseeing places in Plovdiv responding to visitor-entered criteria. TechnoLogica provided for free a similar kiosk to the National Historical Museum, so that children can search by themselves for the information they are interested in and get used to working with a computer. TechnoLogica also created the first compact disc presenting Bulgaria's historical and cultural heritage.

The multimedia presentation of the Bulgarian Army, provided by TechnoLogica at the celebration for NATO's headquarters in Mons, Belgium 30th anniversary called for a new look at Bulgaria. The CD, enhanced with a presentation of the Atlantic movement in Bulgaria, was the official present of the Bulgarian delegation for NATO's 50th anniversary in Washington DC. The project received high acclaim from the Pact's Management.

TechnoLogica stimulates and promotes new modern methods of presenting Bulgaria and Bulgarian institutions to the world. The firm has created pro bono a number of websites for the Atlantic Club in Bulgaria, the Ministry of Internal Affairs, the first website of the Bulgarian Business Leaders Forum, to list but a few.

By donating software (HeRMeS) needed for building a database and releasing an Internet portal for potential employers, as well as for the supply and demand of

human resources among the retired military, TechnoLogica referred to the problem of military retirees' social adaptation. The project aims to establish connections with HR managers, services assisting former military in their adaptation, and with training organizations. A project with a similar objective featured the launching of a new interactive forum in the web-site of the Employment Agency, which contains profiles of job seekers, registered in all employment bureaus in the country. The company developed that forum at a symbolic price with the sole aim to demonstrate the capacities of technologies and their use for the public.

On the eve of year 2000, the Company decided to donate the sources it had spared for equipping a gym for its employees to the "Dara" Christian National Mercy Association in Stara Zagora for supporting parentless children.

Throughout 2006 the employees of TechnoLogica gathered clothes, toys and necessities and donated them to the children from the Medico-Social Care Centre in the town of Pernik. Apart from that all employees offered certain sums from their salaries and to every lev given by an employee the company added three more. The money was used for the purchase of new kitchen furniture for the Care Centre. During the Christmas and New Year holidays the team of TechnoLogica once again made a donation to the kids from the Care Center which was again multiplied by three. In 2007 the gathered amount will be used for the renovation of the sanitary premises at the Center. One of the kids prepared a Christmas card which TechnoLogica sent to all its clients and partners donating part of its circulation also to the needs of the Care Center.

Another charitable project in which TechnoLogica got involved was initiated by BAIT (The Bulgarian Association for Information Technologies) and the "Charity Doer" Foundation. The project is called "In the web" and the aim is to equip with computers and Internet connection the greatest possible number of centers for bringing up and educating parentless children. TechnoLogica participated in the campaign with a donation of color display monitors. At present around 350 kids have access to modern information technologies and make use of the vast amount of information offered in the Internet. Thanks to this stimulus more kids were motivated to make more efforts and act responsibly towards their duties.

TechnoLogica actively participates in the work of six non-governmental organizations (BBLF being one of them) and invests significant resources in them - approximately 1.3% of its annual turnover and two man/months per year for supporting their activities.

6. IndianOil

Indian Oil Corporation Limited (IOCL) or IndianOil is the largest commercial enterprise in India and the 125th highest ranked Fortune Global 500 Company in the country. For over five decades, IndianOil has been the leader in the petroleum business in the country with presence in downstream petroleum refining and marketing and upstream exploration and production. A visionary plan to diversify into petrochemicals, Gas marketing and globalization has enabled the company to grow as a diversified, transnational energy major company. Today, IndianOil has a presence in Sri Lanka, Mauritius and the Middle East. Its subsidiary IndianOil Mauritius is one of the major players in the petroleum business in Mauritius. In Sri Lanka, its subsidiary Lanka IOC has established itself as a benchmark for fuel retailing besides expansion into other related areas. At IndianOil, corporate social responsibility (CSR) has been the cornerstone of success right from inception in the year 1964. The Corporation's objectives in this key performance area are enshrined in its Mission statement: "…To help to enrich the quality of life of the community and to preserve ecological balance and heritage through a strong environment conscience".

IndianOil has defined a set of core values for themselves – Care, Innovation, Passion and Trust – to guide the corporate in all they do. IOCL is able to claim all countrymen as their customers. That's why, they coined the phrase, "IndianOil – India Inspired", in their corporate campaigns. Public corporations like IndianOil are essentially organs of society deploying significant public resources. Therefore, they are aware of the need to work beyond financial considerations and put in that little extra to ensure that they are perceived not just as corporate behemoths that exist for profits, but as wholesome entities created for the good of the society and for improving the quality of life of the communities they serve as a constructive partner in the communities in which it operates, IndianOil has been taking concrete action to realize its social responsibility objectives, thereby building value for its shareholders and customers.

The Corporation respects human rights, values its employees, and invests in innovative technologies and solutions for sustainable energy flow and economic growth. In the past five decades, IndianOil has supported innumerable social and community initiatives in India. The company has performed by touching the lives of millions of people positively by supporting environmental and health-care projects and social, cultural and educational programmes. Besides focusing primarily on the welfare of economically and socially deprived sections of society, IndianOil also aims to develop techno-economically viable and environment-friendly products & services for the benefit of millions of

its consumers, while at the same time intends to ensure the highest standards of safety and environment.

IOCL has had a task to prepare a 360 degree Media Campaign leverage IndianOil's CSR activities and to meet its marketing central goal. The problem perceived by IOCL as a large government owned company is that it takes a number of initiatives as part of its social responsibility program. However, it is not communicated to public at large. But, at a time when the new economy is in the forefront, IndianOil needs to project this aspect of the corporation for projecting a positive brand image and the same image can be leveraged to attain corporation's marketing objectives. The main objective of the company's CSR advertising campaign is to focus both on the core strength of the corporation as well as to create an emotional connection with public to enhance the image of the corporation and to leverage it to meet its marketing goals. Target consumers of the campaign are both male and female, general public, all India socio-economic classes. The advertising happens to be firstly in English language and further translated in various other official languages of India. In addition to print media, the campaign is inclusive of 360° branding proposal hoarding/ banner/ poster/ TV/ radio/ any other.

Indian Oil Corporation Limited (IOCL) is one of the top most leading Maharathna corporate companies spending the highest share of profit toward corporate social responsibility.

The most successful CSR advertising campaigns of IndianOil are 'Empowering 40000 women, planting 1 million trees and having 16.572 billion investments on research and development for green fuel projects' and yet 'The smiles we multiply in the deprived society'.

7. Some Final Notes

This study intended to present some successful cases in which some companies in different countries and regions in the world are concerned with Social Responsibility. Each one of these companies integrate a CRS perspective in their business core as a strategy for creating an image and promoting the company in the communities and society as a whole, considering sustainable practices but also seeing this way as an approach to keep ahead in the long term.

After the individual presentations, it is important to refer these notes about a global concern. It is relevant in these four cases to show the particular settings, adjusted to the specificities of each one of the countries in which they are inserted, convergent and divergently.

All the companies are concerned about the way to show the society the ideas they have about the way they are related with the society itself and the communities and environment.

It is important to highlight that corporate social responsibility must not be confounded with philanthropy. The responsible positioning of all the companies must have some results in terms of their performances. And consequently, there is yet lot of research needed in terms of constructing economic indicators to reveal the impacts of the corporate social responsibility actions on the profits and other economic results of firms' activity.

This study reveals the importance of developing a research on the themes of business ethics in companies and the respective impact on organizational structure in companies and their relationship with stakeholders, both internal and external to the company.

Finally, this study is mostly an empirical based research. However, it also reveals that there are also theoretical issues related to corporate social responsibility that must be considered in the agenda of the researchers and scientists interested on these fields of investigation. For instance, there is a very innovative idea that must not be let out of consideration. Supposing the existence of some companies that create positive externalities to the society as it is the case of cultural organizations. In this case the economic theory prescribes that society must subsidize these institutions in what can be seen as an application of a negative Pigouvian tax. In this situation, what can be the corporate social responsibility? What kind of actions shall have these companies in relation to society? And how can social responsibility be defined in this opposite sense? Should society support indeed these companies in terms of social responsibility, in this sense?

It is too early to gauge the results of this strategy. The impact of the conduct of social responsibility, especially in this aspect of environmental sustainability can only be realized in a longer period. In any case, and a perspective that brings us closer to an ex-ante, it is possible to draw attention additionally to the following notes.

Companies with management strategy which believe in ethical and solidarity with their colleagues and with the Community share these processes as an important "capital".

Social responsibility is certainly not just philanthropy, but shall/should also include this activity. Increasingly, social responsibility, in general, and promoting environmental sustainability, in particular, carries out an operation more effective if integrated into the global perspective of business and relationship with their environs.

Before ending this study, it would be interesting to make a reference to the establishment of a whole strategy around climate change and policies considering the communities welfare that allows to avoid dispersion and to avoid to stray image of a policy or meaningless policy without clear objectives. Such a situation reinforces the brand image with a seal of pertinence and internal coherence that enables a more effective performance.

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