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Moral has no seasons:
Using CSR as a key element for achieving competitive advantage.

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Abstract:

Firms' new challenges in the 21st century involve innovation and society's request for a more responsible business model. Based on bounded rationality conditions and the important role of externalities, it is analyzed through a case study whether corporate social responsibility strategies are essential for companies to achieve sustainable competitive advantages.

Key words:

Sustainable Development; Sustainable Management; Corporate Social Responsibility; Open Innovation models.

1. Introduction

Efforts towards generating sustainable growth and steady benefits have owned its accurate planning to the competitive advantage owned by the company. In several studies, it has been demonstrated that Corporate Social Responsibility (CSR) can improve a firm's performance by enhancing the prestige and perception from consumers' perspective (competitive advantage). However, it has also been denoted that solid inter-agents relationships are enhanced when they have consolidated CSR actions between them.

New models for conducting business emerge, and together with them new difficulties. Known as "open innovation" (OI) models, the aforementioned collaborations between organizations have also gained a purely international character. This study aims to analyze those new interactions and relationships between firms, which of them succeed and the role corporate social responsibility plays in such a context. Taking into account the complex level of the existing interrelationship between agents and countries where they operate, it becomes difficult to accurately depict the company's culture, its values, and beliefs; as shown in Figure 1.

Based on prior research and studies conducted up to date, companies are re-shaping their mission as economic agents, as well as their relationship with the social context in which they operate. Firms cooperate, work with and constantly interact with other enterprises, in many occasions beyond national borders. There is then a research gap as what are the implications of corporate social responsibility in nowadays' firms achievement of competitive advantages, future growth, performance and sustainable development.

The proposed research aims to analyze, from the structural perspective, whether companies using Open Innovation Models can effectively achieve competitive advantages by incorporating corporate social responsibility strategies, activities and initiatives. Partnership among agents can be through divesting, licensing, creating new companies with joint-venture, have simple supplier-client relationships, etc. All of these derive from research and development efforts, after which new intermediate products and processes that are patented, sold and incorporated to diverse production lines (whether in the same or different sector).

By conducting a study case on a highly profitable firm that operates in such international contexts, the influence that Corporate Social Responsibility (CSR) policies and actions have on such firm's economic growth and achievement of competitive advantage can be evidenced. The analysis will be conducted on a corporate level, considering that enterprises should now be viewed and studied as a whole, which includes all the diverse branches, franchises and other stores under the company's brand name, consolidated trademarks and collaborating agents.

This study case can contribute to understand the importance of social context in Business Strategic Planning for those firms in Open Innovation Models, considering that specialization has become the key to obtain and maintain a competitive advantage. Future similar study cases can support the evidence presented on this analysis.

2. Literature Review And Propositions

2.1. Macro-economic models and externalities

The herein proposed research involves a significant level of importance regarding both, academia and practice. With reference to academia, beginning with Ruggie (1982), who points out in International regimes, transactions and change, that neither liberalism, capitalism, communism nor earlier economic models have contributed to build macro-economic basis under which sustainable growth is ensured. The author devotes a specific section to enlarge his views on stress, contradiction and future.

From Ruggie's (1982) perspective, the future for macro-economic models, i.e. embedded liberalism, shall be shaped by company's actions and strategies rather than national or transnational organizations policies and decisions. There is a great degree of influence from each domestic market characteristics, including political frame, laws, regulations, etc. However, it is equally important the influential effect of firm's investment and the developmental possibilities it opens. Thus, in the near future, the actions that corporations undertake will not only answer to a social responsibility towards its shareholders, but also to the generation of sustainable economic growth on a macro-economic level.

2.2. Externalities

Coase (1960) mentions in his Nobel-prize winning paper that detrimental consequences of human actions are acceptable only to a certain extent. Although the definition of negative effects may only seem to make reference to harming another person (either physically or mentally) and endangering the environment (by polluting, cutting trees, disrupting animal specie's natural habitats, etc.); it must be reminded that these are not the only ways in which social welfare can be damaged.

Levitt was a pioneer debating about the social responsibility that a business has and in 1958 (published by the Harvard Business Review), "The dangers of social responsibility" stated that "*government's job is not business, and business' job is not government*". This view explains companies should devote its resources to making profits not to social causes, which is, according to their view, what governments should take responsibility for.

This view is now known as the *agency theory perspective*, and explains that corporate social responsibility is a misuse of a company's resources and those that are destined to social activities would be more efficiently used if they were allocated to value-added internal projects or returned to shareholders. Friedman agrees with this and explains it in detail in his 1970 New York Times article "The social responsibility of business is to increase its profits".

However scholars' views changed years later, such as Freeman (1984), who – basing his analysis in Barnard (1938) – explained that supporting corporate social responsibility will contribute to the firm's market position, contradicting previous beliefs. This theory is known as *stakeholder theory*, where it is a long-term beneficial effect for firms to do CSR activities related to their stakeholder's interests and necessities. If these actions are not present, groups related to the company may *withdraw* their support, thus staking the future of the firm.

Donaldson and Preston (1995) expanded this theory, enhancing the importance of the ethical and moral dimensions and made a case for business to engage in CSR actions.

2.3. Assuming consequences

Although these theories are relatively new, it is observed that they are related to Jonas (1973), who depicts humans are the only animals that can choose consciously and deliberately the actions that they perform and thus they should be consistent in assuming the consequences of thee. This implies that if, for instance, someone damages the environment in order to produce a certain good, then that person is responsible for the detrimental effects and should compensate for it.

Furthermore, Waldman, Siegel and Javidan (2005) deemed useful to apply *strategic leadership theory* to Corporate Social Responsibility. In their research, the authors determine a set of transformational leadership's aspect and analyze if there is a correlation with manager's trend to launch CSR-related activities. They conclude that certain aspects are positively correlated with a company's tendency to engage in social activities; while also determining that managers will be making strategic use of these CSR activities.

Up to which degree companies engage in CSR activities strategically has also been examined through the *Resource-based view of the firm (RBV) theory*. In this analysis, Wernerfelt (1984) and Barney (1991) begin by stating heterogeneous resources (both, tangible and intangible) that conform firms can be moved from one company to another. Because of this, Barney (1991), basing on Penrose (1959) and her early research on the subject, concludes that resources and capabilities have an intrinsic value due to the fact that they are rare, inimitable and cannot be substituted easily.

It should be noted that additional to the study and literature regarding corporate social responsibility, Nelson (1984) mentions the "bounded rationality" fact that affects human decision-making process. The "engineering of choice" is not based on people holding all the information available to make their choices. Only based on limited knowledge and biased personal characteristics that one option is selected over a set of possible choices. This creates a source of a sustainable competitive advantage, where applying corporate social responsibility in this theory, Hart (1995) focused on environmental aspects. He explains that, for certain companies, engaging in CSR-environmentally related activities, can build up a resource/capability. As a consequence, the company may have a sustained competitive advantage that allows them to continue its economic activities for a long-term period.

Russo and Fouts (1997) empirically tested this theory by making use of year-benefits and firm-level data on environmental profitability. They found that both variables were positively correlated, meaning that companies with higher environmental performance also presented higher financial results. Mc Williams and Siegel (2001) also focused on the RBV theory by outlining a model in which there were two companies who produced the exact same products, yet one of them had added a "social" feature to its output while the other had not.

The aforementioned social characteristic is assumed to be highly valued by some customers or by a determined stakeholder, thus being of high importance for a manager's strategic

planning. The decision making process depends on several factors, including each individual's self-awareness (Hill, 2010) and CSR cost-benefit analysis. Such study determines the level of demand for CSR activities or attributes and the degree of that demand's importance (Bahndarkar and Álvarez-Rivero, 2007); and therefore, the level of resources destined to these activities.

2.4. Open Innovation Models

With regards to practical evidence, Chesbrough (2003; 2006) popularized the concept of Open Innovation and a structured theory began to gain shape. The combination of products, processes, organizational forms and commercialization methods resulting in innovations that have as many as responsible as companies have contributed to that novelty. Therefore, the interconnections and links between these are of high research importance, to comprehend the decision-making process.

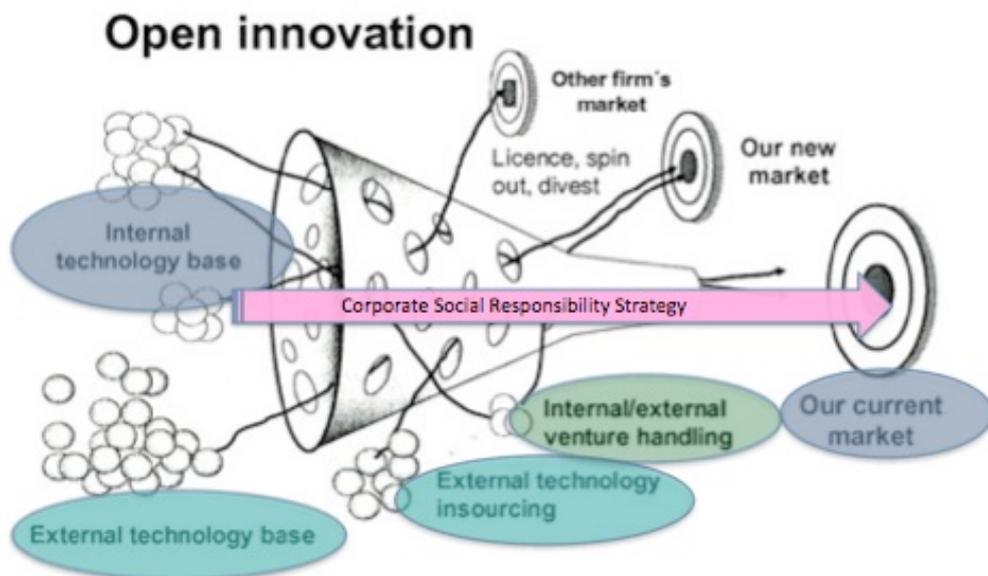


Figure 1: Corporate Social Responsibility in Open Innovation Models

Source: Own elaboration based on Chesbrough (2006)

Focusing on an integrative theory between corporate social responsibility and Open Innovation, academia has only recently addressed the topic and, so far, there is an absence of company-shared CSR initiatives and Open Innovation Models literature. There is lack of studies in this field of business because accurate CSR management has only recently proved to be a crucial factor for a firm's success (Hart 1995; McWilliams, Van fleet and Cory 2002). Nonetheless, there is a need to research more in depth the reasons behind these findings, as well as the means to reinforce the connections between CSR management and operating in Open Innovation models.

Additionally, it would be also extremely relevant to confirm that successful companies align their corporate social responsibility activities with those of its collaborators, maximizing the beneficial effects of those actions. If confirmed, this would set the basis for a new

business model that would result in an overall benefit for world-wide society. As a consequence, it would be reasonable to assume that sustainable competitive advantages are truly established when there exists a unified set of rules and regulations for corporate social responsibility policy; and these are shared with other agents. It has been proved by several studies that there is a high degree of correlation between maximization of benefits and financial performance and the effects of a given company in its social context, such as environmental damage or recovery.

2.5. Corporate Strategy: Social Responsibility

The understanding of Corporate Social Responsibility as an integral part of the business structure and core line of strategic planning is a binding fact for the Strategic Business Planning theory. This topic has been researched aligning CSR with the Agency Theory (Freeman 1970); with the Stakeholder Theory (Donaldson and Preston 1995; Jones 1995); also Institutional Theory (Jennings and Zandbergen 1995); as well as the Resource-Based View of the Firm (Hart 1995); the Theory of the Firm (Baron 2001; McWilliams and Siegel 1997; Mc Williams and Siegel 2000; Mc Williams and Siegel 2001); and last but not least Strategic Leadership Theory (Waldman, Siegel and Javidan 2005).

United Nations introduced the Global Compact institution, which has become the world's largest corporate citizenship initiative. They make a statement for including a CSR program into the *corporation's strategic outlines* (i.e. applying it to the whole company, its franchises, etc.), so that it is considered a real and committed core value. In order to cover social risks, they must be brought up to the same level of relevance as other firm's risks, such as technical, economic and political.

Farao and Viltard (2011) analyze Corporate Social Responsibility in corporations based in developing countries, both local firms and multinationals with subsidiaries in such areas. The authors' study hypothesis is based on the premise that sustainable social responsibility is a competitive advantage any firm should strive to achieve. They mention as key factors strategic leadership and operation management; which should be aligned with CSR initiatives. Farao and Viltard's (2011) analysis results in general socio-economic and political context of developing countries not favoring short-term sustainable social responsibility strategies.

Notwithstanding the external circumstances, the authors point out ten cases of firms operating in Argentina, and one case of an American private university (Olivet Nazarene University) in which corporate social responsibility is a priority in strategic planning and has successful results. Furthermore, they consider a new leadership model ought to be conceived, as well as "understanding that operational efficiency isn't enough".

Farao and Viltard (2011) base their analysis in Hart and Milstein (2003), who study the firm's value creation process and determine as indispensable to:

- Focus actions in the lines of reducing environmental damage (which result from rapid industrialization);
- Operating for the civil society with greater transparency;
- Creating radical innovations based in new technology that allows for reduction of environmental footprint and social damage;
- Fulfilling basic needs of world's lowest social class to enable creation of wealth and fair income-distribution.

Farao and Viltard (2011) comment in their final remarks that it is essential to develop standards that will help firms select their suppliers and other collaborators. Additionally, increasing the number of relationships with agents and the degree of technological transference can contribute to more efficient production processes. Fostering a corporate culture based on sustainability, producing eco-friendly goods and identifying as such for consumers immediate recognition, and allowing for re-use or re-cycling of such products, are also factors identified as possible contributors to creating consistent competitive advantages.

Connecting the Sustainability analysis with the Business Strategic approach, greater understanding on the role of CSR in Open Innovation models can be derived. OI calls for transnational CSR, which implies one firm determining its own set of laws and regulations (in the form of codes of conduct or other document) and applying it to subsidiaries, suppliers, clients or any other collaborators. This matter that has not yet been fully addressed, and there high level of practical and theoretical relevance in confirming the premise that states successful companies engaging in CSR activities with other companies, derives in creating competitive advantages and thus creating shared value.

This study is guided in the light of those companies that apply open innovation as their corporate business model, and aims to answer the following question:

What are the effects of corporate social responsibility strategy in companies operating in Open Innovation frameworks?

It is because of this that the present analysis will focus on the following propositions:

P1: Companies that use Open Innovation models and are successful in their fields tend to apply Corporate Social Responsibility policies.

P2: Combination of Open Innovation and Corporate Social Responsibility can help enterprises reinforce their competitive advantage.

3. Methodology

3.1. Data and methodology

Taking into account the novelty of the field studied, it must be noted that the spectrum of data available for such purpose is indeed limited. In order to gather data for the present analysis, it was first studied the theoretical framework. Basing this study on Hall and Halmers (2011), key sources of information were determined to be:

- Global Compact (GC)
- World Council for Business and Sustainable Development (WCBSD)

Eco-Patent Commons: initiative launched by IBM, Nokia, Pitney Bowes and Sony along with the World Business Council for Sustainable Development organization.

The Commons' main objective is to provide information for others to make use of these patents to protect the environment as well as enabling collaboration for new innovations. The aim was to create a common data base, available for public use, where companies could voluntarily disclose a particular innovation (known as *eco-patent*) that would improve the ecosystem and ensure sustainable business development, such as reducing CO2 emissions.

From the 6-firms that met the abovementioned criteria, i.e. being GC members, as well as participating in the WBCSD Eco-Patent Commons, and for the sake of the present analysis, Bosch was selected among those, for an in-depth study. The fundamentals for such choice were mainly based on the number of Eco-Patents pledged to the Commons (with 24 patents in total it was the largest, being followed by Hewlett Packard with only 3 patents pledged). In addition to this, Bosch provides a larger degree of in-depth information (Company factsheets, Innovation investments and other data's disclosure, Annual and CSR reports, etc.) compared to other firms in the Commons who are also members of GC.

Because of this, Bosch's History and evolution will be analyzed, the firm's corporate values and intrinsic corporate culture, as well as the markets in which operates and the products/processes in each of them. A study of its financial performance, together with the evolution of its Research and Development efforts will also be conducted. Furthermore, the results of such investigations will be revised by evaluating resulting innovations in all its products and processes lines, registered and not registered as patents.

With the help of MatheoPatent software, details of the company's forward and backward citations will be studied for those exclusive rights donated to the EcoPC. By analyzing Backward and Forward Citations, complex set of interconnections are evidenced and explored. One Patent (namely A-previous patent) cites certain other registers for the development of a new product, process or procedure (i.e. register B pledged to EcoPC). Yet this networking continues, the resulting novelty B can be used in subsequent innovations as a citing patent (e.g. innovation C).

It is intended to analyze what are the relationships between these eco-patents and those new registers use the eco-innovation as their base technology; and if there exists any virtuous cycle where EcoPC patents are cited for eco-i which are subsequently also pledged to the EcoPC. Based on this approach, being Bosch chosen for this study; single patents pledged by this firm to the EcoPC as well as other registers were studied. The diffusion of this knowledge can explain if there exists a contribution to other enterprises' research and development in the lines of eco-innovation and helps achieve their CSR goals and objectives, etc.

Bosch will also be analyzed from the Business' strategic perspective, their CSR policies and the effects that Eco-Patents (and by inference their CSR-related policies) have in its competitive advantage. A "collaboration map" will be established, showing the connections between firms that help them achieve their innovations. Many of the corporation's innovations would have not been possible without research agreements with Universities, other academia-related organizations, national governments, joint ventures with firms, and other collaborative relationships.

With this complete analysis of Bosch Corporation, it will be understood if this organization fulfills the vital elements for value creation process mentioned in Hart and Milstein (2003) mentioned in section 2. With this integral study case, complemented by evaluating the

degree of success Bosch has in the markets it operates in, the hypothesis can be either accepted or refuted and the study query answered for Robert Bosch GmbH.

4. Bosch Overview

4.1 History summary

Bosch, formally Robert Bosch GmbH is a multinational corporation that owes its foundation to the “Workshop for Precision Mechanics and Electrical Engineering”, first established in 1886 by Robert Bosch in his homeland in Germany: Stuttgart. After starting as an electrical-specialized firm, Bosch is nowadays one of the world’s most diversified companies as it comprises within its business areas from highly technical-specialized machinery to the most common consumer goods.

Stockholders

Robert Bosch is a privately owned corporation, whose stakeholders can be divided in three main groups. Approximately 7% of the company’s stakeholders are the Bosch Family, i.e. descendants from the man who created the firm, Robert Bosch. The largest proportion of the enterprise’s stocks (more than 90%) are in the hands of the Robert Bosch Stiftung, which has been managing for more than 40 years the philanthropic bequest of the firm’s founder.

This foundation’s purpose is directly and exclusively charitable, making use of funds received from the distributed dividends of Robert Bosch GmbH Corporation and not engaging in *any* corporate activity. The stocks held by the foundation do not hold any voting rights (which is a way of separating entrepreneurial from philanthropic activities) and those rights were transferred to a trust, the Robert Bosch Industrietreuhand KG, as shown in graph 2, holding 0.01% stakes and 93% voting rights.

Most of the profits are reinvested in the corporation, in order to support research, development and innovation to build the company’s future and sustainable growth. Albeit this fact, nearly the total of profits distributed to stockholders are devoted to altruistic causes thanks to the Robert Bosch Stiftung (such as humanitarian or environmental projects).

The Robert Bosch Stiftung provides Research and Development contributions to society, by founding a hospital (Robert-Bosch-Krankenhaus), promoting investigation through the creation of an Institute for Clinical Pharmacology (Dr. Margarete-Fischer-Bosch Institut für Klinische Pharmakologie) and the Institute for the History of Medicine (Institut für Geschichte der Medizin der Robert Bosch Stiftung) where they keep track progress on medicine and healthcare.

All of them conform to the Robert Bosch Stiftung; but there are other associate foundations that contribute to similar causes: Hans-Walz-Stiftung, the Otto und Edith Mühlischlegel Stiftung, the DVA-Stiftung, and the Rochus und Beatrice Mummert-Stiftung.

Besides these initiatives and collaborations, Robert Bosch Stiftung organizes program areas in order to support a wide range of independent (not related to the foundation) project ideas and initiatives. 2010 project grants awarded by the foundation resulted in a 63.2 million

Euros investment. Robert Bosch, believed People are the basis of Innovation, reason why the program areas revolve around human capital. These sections are: Health and Science; International Relations; International Relations II; Education and Society; and Society and Culture.

4.2 - Corporate values: Social Responsibility

Robert Bosch GmbH has a solid and long-term commitment to its shareholders, worldwide community and devotes its research and development facilities to innovate in the lines of sustainable development. Its culture and corporate values confirm this, which is shown in the work environment provided for employees, the focus on eco-friendly products, as well as by constantly working for a better environment and improving people's lifestyle.

The slogan "Innovation for life" applies to any aspect of the corporation, shown in the creation of new goods based on consumer's needs, making those products fit for customer's lifestyle, and preserving the society and the environmental context in which it operates. Beginning with the several programs conducted by the Robert Bosch Stiftung and the different agreements with Universities, Institutions, NGOs, Governments, Transnational Organizations (such as the European Union), etc.

It is important to denote that Bosch's CSR is shown in the initiatives, projects and researches it supports directly or indirectly, as well as in the Code of Conduct, being one of the 20 German companies to sign it in 2010. Also, the multinational has a Basic Social Principles agreement applicable to all its employees in over 320 locations, in over 60 countries; and its collaborators.

In pursuing the achievement and keeping track of progress, the company offers information regarding the different actions it undertakes. This serves as internal as well as external data that allows employees and other shareholders to confirm the firm's real commitment to the GC (herein mentioned in section 2) principles and evidence the advances made on each of the four areas (Human Rights, Labor, Environment and Anti-corruption). The following table shows Actions undertaken in 2007-2008 period.

5. Bosch Factsheet and figures

5.1 - Financials

With a market value around 220 Billion¹ € the company is the world's largest supplier of automobile components and it engages in business relationships with nearly every automobile company in the world. Additionally, Bosch has a large network of alliances, joint-ventures, and other agreements with technical institutes, universities, governments, translational organizations (such as the European Union), local initiatives, etc.

Throughout the first decade of the 21st century, the firm experienced a steady growth with increasing sales revenues, while keeping R&D investment at a constant rate of approximately 70% of the retail income figures. In recent years, Bosch raised the percentage destined to research and development being in 2010 equal to 77%. As evidenced in Table 6, the firm's sales revenues decreased from 2007 to 2008, and from 2008 to 2009; while the

¹ Average market data calculations (Yahoo!finance, August 12th 2011)

firm presented net loss of 1,214 million Euros in year end 2009. Notwithstanding this fact, Bosch continued to invest in R&D, following its strategy and the firm experienced a major recovery between 2009 and 2010, increasing sales by approximately 23% year-on-year. Additionally, profit also rose to a net value of 2,489 million Euros, a significant increase compared to the two previous fiscal years.

With regards to human capital, the firm has consistently increased expenditure in personnel, in spite of 2009's sales downturn and net loss at year-end. Therefore, the firm is consistent with its commitment towards its employees, investing in training programs to increase the qualifications of employees, its R&D capacities. This derived in an overall raise of innovations created during that period (which will be enlarged further on in this section), thus resulting in higher sales, and substantial increase in 2010's net profit.

5.2 - Business Sectors

Automotive Industry

The Bosch Group invented the first practical magneto, an early ignition electrical source that provided the spark to ignite the fuel in most of the earliest internal combustion engines. The company's logo depicts the armature from a magneto, given that thanks to this innovation the firm gained importance and is now one of the leaders in the industry.

Among other key auto-features that turned the group into a leader in this industry are: Anti-lock Braking System (ABS), Traction Control Systems (TCS), Electronic Stability Program (ESP), body electronics (i.e. central locking doors, windows and seats, among others), oxygen sensors, injectors and fuel pumps.

Car stereo systems and in-car navigation systems are also high contributors to the company's overall revenues, being Bosch the leading enterprise in manufacturing these incorporated technologies. In mid 2008, it formed an equally stock-owned company with Samsung SDI, under the name of SB LiMotive, with a 28.000m² lithium-ion battery cell-manufacturing plant; which is started hybrid vehicles production in 2011 and is scheduled to begin with electric vehicles in 2012, increasing the number of employees and expanding already large Bosch Corp. staff.

Industrial Technology

As it was mentioned before, Bosch Rexroth-Robert Bosch's subsidiary is a supplier of industrial technology that supports the corporation's two main markets: mobile hydraulics and factory automation (driving, controlling and moving machinery). However these technologies have also helped to diversify and develop a new market: packaging. Robert Bosch is one of the world's largest supplier of packaging technology, offering an integral service by planning, designing, manufacturing and installing packaging lines for food, confectionery, pharmaceutical and other similar product manufacturers (some examples are Novartis; North China Pharmaceutical Company-NCPC; Boeringer Ingelheim-BI; Unilever, Nestlé, Norwood).

Consumer goods and power tools

Through Bosch, Skil, Dremel, RotoZip, Freud, Vermont American and many more brands, Robert Bosch Corporation is the largest manufacturer of portable power-tools world wide.

These tools are intended for industry use, building trade and do-it-yourselfers (DIY-ers); being the product range from drill bits and saw blades to gardening appliances. Within the BSH Bosch and Siemens Hausgeräte GmbH joint-venture, provision of thermotechnology (e.g. heating units) and security systems, thus making Bosch's target consumers from consumer goods areas to construction building. With specific regards to thermotechnology, Bosch is the largest European manufacturer thanks to its 100% owned subsidiary, BBT Thermotechnik GmbH.

5.3 Products

Robert Bosch's core corporate values are seen in the firm's initiatives, aiming at achieving future social and environmental improvements. Therefore, pursuing to create a fair sustainable growing company, the firm cherishes cultural diversity, fairness, openness and trust, high degree of responsibility, initiative and determination; which leads to a high degree of reliability, credibility and legality observed in the corporation.

Leading technology and related services provision, the international character of these sectors and the constant support on research and investment has guided this firm to expand on a world wide scale and be one of the leaders in its sector. This was achieved by taking advantage of the trans-national level of influence. Exploiting such opportunity, the firm diversifies, takes advantage of economies of scale and makes efficient use of efforts in building strong and meaningful development. The basis for this growth was mainly by focusing on automotive, industrial technologies and consumer goods, creating products with high innovation, efficiency and effectiveness degree.

Based on Mr. Robert Bosch's philanthropy; the company follows its creators wishes promoting social actions in every context in which they operate. Additionally, the firm devotes special efforts in eco-innovations and promotes research in this field. Acting according to principles shared with many other firms on an international scale, helps the company achieve international recognition as a pioneer in CSR initiatives. Innovations such as improving the internal-combustion engines in automobiles, develop components and systems for future electric vehicles, are some of the many examples in the field of eco-research that have showed excellent results.

Every year, multiple initiatives start their developmental process stage after extensive research; of which one of the most important is the electrical powertrain. This new development amounted approximately 400M€, and is an investment that will only see returns in a long term. Other key R&D project areas, showing Bosch's true commitment to eco-friendly innovations, are batteries used in commercialized hybrid cars as well as those in development stage for future fully electrically powered automobiles.

Considering future cars will be 100% electrically powered, it is essential to denote that these new automobiles will be based on an expensive technology – thus having a higher market price than homonymous fuel-led cars. Because of this, Bosch believes several innovations are necessary for a harmonic transition between 100% fuel and 100% electrical. Moreover, such an evolutionary shift will also contribute to lower CO2 emissions.

In 2010 hybrid solutions were in their final stage and launched to the market after years of being the center of the company's R&D. Through a joint-venture with Samsung SDI, Bosch

recently started the production of battery cells, while working extensively in eco-friendly initiatives in the automobile industry. Some are further reducing the fuel consumption and emission of internal-combustion engines, especially in those engines equipped with direct injection systems and turbo-charging.

Apart from evident major improvements in the firm's most important sectors (automotive); Bosch also brings eco-innovation to Consumer Goods and Building Technology. The corporation created the EcoPlusHome, which managed to build an emission-free, affordable and comfortable home. Collaborating with partners in Canada, they included photovoltaic panels, solar thermal technologies, electric backup element and many other features that allowed for a yearly energy generation of 15,000kwh out of which 14,000kwh were consumed by the family living in the test house.

Today, EcoPlusHome has won the Scotiabank's EcoLiving 2011 Innovation Award and 12 homes with equal characteristics are under construction in British Columbia, Saskatchewan and New Brunswick. Transition from regular housing to the *eco-home* implicates creating first hybrid devices, alongside gas appliances, which are being developed to integrate solar thermal systems or electric heat pumps. For DIY-ers and professional markets, new power gardening tools have been launched with particularly high performance lithium-ion batteries. These are eco-friendly and at the same time cordless – thus being user-friendly and offering high degree of mobility.

Production process and procedures

Robert Bosch GmbH innovates in products that are eco-friendly and help contribute to their overall CSR strategy, while they are designed for day-to-day life use. Furthermore, the firm invests on reducing environmental damage during their production processes and procedures on different matters:

- Energy and water consumption
- CO2 emissions from heat use
- Electricity and district heat
- Use of chlorinated hydrocarbons
- Volatile organic compounds
- Quantity of waste and wastewater
- Recycling
- Environmental investments and costs.

Overall energy use includes electricity, natural gas, heating oil, district heat, coal, coke and other energy sources. As it is well known, several of these sources damage the environment, reason why Bosch created plants to generate its own energy from renewable sources, reducing by 0.5% the firm's energy consumption in the last years. As regards the corporation's water consumption, in recent years the total amount has been lowered by approximately 3% and the share of Bosch's water use is below the share of fresh water from public supply. This is partly due to innovative recycling systems, which contributed to efficiently use this resource.

With reference to CO2 emissions, natural gas is the firm's main source (70%) , followed by district heat (11%); heating oil (11%) and coke/coal (8%). Levels of these emissions have increased due to an increase in the overall corporation's production. After this was

evidenced, Bosch started devoting part of its R&D efforts to innovate in production processes so as to reduce these emissions while increasing output-making.

Chlorinated hydrocarbons (CHCs) are organic compounds with a wide variety of structural and divergent chemical properties that lead to broad range of applications (vinyl chloride, chloromethanes, pesticides, insulators, among others). It has been proved to have a significant degree of toxicity for animals, plants and humans, reason why since 2005 Bosch has been working on innovations to replace these compounds with non-harmful ones. By 2008, CHCs were only used in the firm's locations in Changzhou (China) and Nonatola (Italy), currently discontinuing the use at these locations as well.

Moreover, other elements proved to be harmful: Volatile Organic Compounds (VOCs). These are emitted during the cleaning and coating of metal parts, and were commonly used by Bosch until their detrimental effects were discovered. Nowadays, the firm works in order to reduce the evaporation of the substances or achieve effective encapsulation. This is achieved by switching coating methods to water-based solutions or powder coating as well as using water for cleaning (instead of solvents). Recent results showed there had been approximately a 7% reduction year-on-year.

The quantity of waste (disposal and demolition), as well as wastewater (including sanitary facilities, treated and untreated processes), has been reduced in the past decade. Water-saving measures, as well as innovations revolving water treatment have helped to achieve a lower level of environmental damages. Additionally, recycling has played an important role in all the aforementioned eco-friendly actions. Used automobile components were remanufactured, and in the case they could not be re-shaped, its materials were divided and re-used separately.

5.4 - Bosch's Patents and Eco-Patents

Robert Bosch GmbH is one of the key reference companies in the automotive and house goods products sectors. Since its foundation in 1886 it has increased its market share and expanded worldwide thanks to constant innovation; engaging in motivating and promoting it in every context where it operates.

Research and development; and the innovative outputs that this generates, is one of the most important pillars of the corporation's global strategy. It has associates working in R&D, being 26,000 researchers in the automotive technology sector only, with increasing numbers in developing countries, particularly Asia (newly opened centers in China, Japan and Singapore's Research and Technology Center Asia Pacific) and the BRICs².

Furthermore, another quantitative element that evidences Bosch's evolution in R&D, is the firm's innovations registers. When analyzing the evolution of the corporation's patents in the 21st century (as off 1999), it is first noted that the firm has registered novelties in more than 25 countries: Austria, Australia, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, Great Britain, Italy, Japan, Netherlands, Portugal, Sweden, United States,

² BRICS: Brazil, Russia, China and India.

Republic of Korea, Greece, Poland, Slovenia, Brazil, China, India, Russian Federation, Turkey and Taiwan.

Along the years, Bosch has increased its R&D locations and the nations in which these were to be found, being in recent times a raised awareness in the potential that emerging markets and developing countries provide. The mean of registers per country has been calculated, yet given that the majority of the firm's novelties are patented in the country where the R&D has been conducted *and* in Germany (where the matrix operates); including the German variable introduced a bias in reflecting the average number of patents per country that were awarded each year.

During the 20th century, and overall in this first decade of the 21st, rapid climate change, greater social inequalities, natural disasters, increasing awareness over environment damages that industrialized societies bring about; are many of the factors that have called for Eco-innovations. Along with the qualitative and quantitative data previously mentioned as far as Bosch Eco-Innovation and Eco-Friendly initiatives concerns, they also promote these lines of research and development in other companies, through the Eco-Patent Commons.

Based on the recent data that derives from the Eco-Patent Commons, Bosch has pledged 24 patents, which are intended to promote further Eco-Innovations aligned with CSR practical initiative. In order to analyze the effect that these registers have in generating further environmentally friendly outputs, forward citations derived from these 24 patents were analyzed. From the total number of Bosch's Eco-Patents, they were first allocated in two categories: those registered only in Germany (Company's Matrix country) and those that were registered in other regions or nations.

The resulting first group had 7 patents, which were all registered in Germany, as well as in another country or region, namely United States, Japan, France, Great Britain, and Brazil. It can be evidenced that excepting the last nation, all the other registers have been in developed states. In the second group, where registers had only been in Germany, there were 17 different innovations.

With the Matheo-Patent software, forward citations were tracked for both categories. Out of the 24 items, only four had forward citations. The total forward citations for the two registers that were only filed in Germany was 4 patents, three corresponded to the first one in the table above and only one to the second Eco-Patent. From these total four patents citing those included in the EcoPC; 75% were registered in Germany and else were: European Patent, International Patent Application, and US Patent Office. Only one of them was solely registered in Germany.

Analyzing the technological sectors, the vast majority belongs to the Automotive while the remaining are in the electric industry. Furthermore, in all cases the citing patents belong to the same sector as the Eco-patent. This implicates that there has not been a transmission of knowledge from the initial sector to a different one. This may be due to the fact that this eco-friendly technology requires high-tech and is great specialization, thus limiting the number of sectors where it could be applicable. However, it shall be noted that the original invention, as well as the subsequent three registers that derive from it, are of recent creation.

From these cases analyzed, most of the patents following the Eco-Patent are independent from Bosch; i.e. are neither subsidiaries or owned by Robert Bosch GmbH. Those firms occupying the 60% independent from Bosch are: Webasto AG, Continental Automotive GmbH and Volkswagen AG & Skoda Auto AS; Ford; Toyota; Brunswick; Sanshin Kogyo; Denso Int. America Inc.; Unisa Jecs Corp. which are all located either in Europe, U.S.A. and Japan, all developed countries. The other 40% are innovations that have been registered by Bosch or one of its subsidiaries or owned-companies.

In studying forward citations, most of the patents were not aimed at protecting the environment or minimizing climate change effects. Nevertheless, considering that most of the original registers, as well as innovations derived from them, have been registered over 10 years ago; it is reasonable that the outcomes were not eco-friendly as there was not yet a risen awareness of this. Nowadays, social and environmental matters have become a must in pursuing sustainable development and competitive advantage achieving.

Operating in Open Innovation context, allows for greater collaboration and information sharing between companies. In an environment where contributing to global sustainable development is a key factor for success, by orienting R&D to eco-i, firms are creating elements that provide them with unique competitive advantages against competitors. This allows building new product lines contributing, among many other factors, to environment and social protection, increase company's earnings, credibility, brand image and credibility.

As a result of the economic crisis that took place around 2008, Bosch boosted its efforts in research and development, believing that the answer to an economic downturn would be innovation. According to the results the firm has had in that year, the two subsequent year-end reports and the first half of 2011, it proved right. Cross-functional transfers, international assignments, agreements with organizations and all other forms in which research and development can be carried out kept Bosch on track towards sustainable development.

5.5 - Operation and Research Locations: Bosch owned and subsidiaries

Although the company was first created in Stuttgart, its headquarters is located in Gerlingen and the Bosch Group includes more than 320 subsidiary companies. Automotive industry is its core business, being 60% of its revenues originated by auto-component supplies. The remaining 40% corresponds to industrial machinery production, consumer goods and hand tools.

Bosch owns 100% of several subsidiaries, located all around the world: Argentina, Australia, Austria, Belgium, Brazil, China, Czech Republic, Denmark, France, Finland, Hungary, India, Japan, Italy, Malaysia, Netherlands, Portugal, South Africa, South Korea, Spain, Sweeden, Tunisia, Turkey, United Kingdom, United States of America, and many other; employing over 281,717 people in more than 50 countries. Bosch Group is also the major stockholder of key industrial companies:

- Bosch-Siemens Hausgeräte- European appliance maker
- Blaupunkt unit – Vehicle audio equipment
- Bosch Rexroth – Hydraulic, electric and pneumatic machinery (applications of this technology range from automotive to mining)
- Telex Communications and Purolator Filters (joint venture holder with Mann+Hummel)

Bosch devotes a great share of its earnings after interest and tax to Research and Development activities (R & D). Always thinking ahead and promoting innovation, the company has many self-owned facilities destined exclusively for them, as shown on figure 5. Apart from these Research Locations, Bosch has a large network of alliances and commercial agreements with the Academia and Business World, as well as Governmental, Non-governmental and Transnational Organizations, to jointly develop innovations in line with achieving sustainable growth objectives.

External Collaborators

Innovation is today's key to achieving competitive advantage, an increasing market share, a leader position in each sector and sustainable development. As it was herein stated, Bosch operates in several different sectors as well as in many locations all around the globe; implicating highly complex interrelationships that the firm establishes with other companies. Along the years, the level of collaboration increased exponentially either by divesting, licensing, creating new companies with joint-ventures or having simple supplier-client relationships.

Sharing principles and values becomes an important factor when establishing, shaping and enduring these relationships in Open Innovation markets. Bosch's R&D efforts will only be accurate if they ensure that their associates have their same core values. Hence, this corporation strives to ensure that its culture and beliefs are shared with every firm that it collaborates with. In doing so, it ensures their standards are shared and customers truly receive an output with Bosch's corporate beliefs.

This is one of the main reasons why this firm has internal standards and norms, as for instance the Purchasing and Logistics Guidelines. Agents who wish to collaborate with Bosch can learn what the company's minimums required to others wishing to engage in transactions with the firm. Taking into account the increasing degree of market globalization and the wide range of sectors, industries and locations where Bosch operates; the core elements of the guidelines commanding the firm's business are based on fulfilling standards of quality, cost and supply targets (resulting in the QKL acronym for its German initials).

Any agent (firm, institution, NGO, etc.) that wishes to engage in transactions, research or business relationships with Robert Bosch GmbH must abide, commit and have its own regulations in alignment with these principles. By asking for this commitment, Bosch ensures that its cultural values are cherished, as well as its actions being supported, respected and not overruled (at least by its *own* collaborators). This particular approach is based on UN basic principles of the Global Compact, i.e. respecting human rights, having optimum working conditions, strong action to fight corruption, protecting and minimizing environmental damage; and most importantly, inspiring and involving employees to commit and work along these lines.

The company has understood that motivated and efficient staff is the most valuable asset that the firm can effectively apply CSR policies. Training (and lifelong learning) becomes the key instrument for achievement. This belief is a "must" for Bosch, as well as for any subsidiary or participated company, with consequent strategic implication for its collaborators (either if they are firms, academic or other institutions, government organizations, etc.).

Therefore, some of Bosch's initiatives are high quality seminars, where technical, work management and business issues are covered. Therefore, thinking in practical terms, all topics are taken from and aimed for the world of practice. These courses are offered not only to its own staff, but also for its suppliers', collaborator's (etc.) employees, and it is also open for potential future partners, where colleagues can interact with each other, exchange ideas and understanding identities, thus understanding and enabling better formal (as well as informal) relationships in the future.

Associates from Asia, Latin America (and the Caribbean) and Eastern Europe who had contracts for over 24 months increased to over 400 in recent years. This allows employees and collaborators to gain practical experience; locals are chosen and trained to gain know-how, which will remain in those geographical areas. Such actions have as a result a bilateral flow of knowledge and innovation possibilities. Instead of bringing German already trained and qualified personnel; the firm provides the necessary elements for training and development. In this way, employees hold the key tools and essential knowledge in order to boost local research and development, which can in the future produce outputs that are valuable to the whole Robert Bosch Corporation.

As the herein analyzed company is a large multinational enterprise (MNE), the set of collaborations it has established comprises not only other companies but also academic institutes (as universities, research centers, etc.); non governmental organization (NGOs); non profit foundations; governmental organizations; supranational organizations (such as the WBCSD); even the European Union. Bosch's diverse alliances are as follows:

a) P2P Collaborations with Universities for new developments: Bosch has signed a significant amount of agreements for research in diverse technical-electronic fields with Universities such as the Massachusetts Institute of Technology (MIT); Stanford University; University of Michigan; University of Barcelona (UB- Spain); University of New York Tirana (located in Tirana, Albania); and many other Academic-related centres.

Besides collaborating with Universities, when creating innovations, there are some cases in which Bosch agrees to co-patent. Therefore, the efforts in R&D do not only rest in the hands of the firm but also the academic institution can make use of this new creation. There are other cases where the output of the investigation is an individual creation non-related with any previous agreement. However, due to the potential applications/uses of it, Bosch chooses to purchase the register or idea to continue in the innovative path towards responsible sustainable benefits.

b) Supporting Scientific Research (Bosch InterCampus Program): The firm launched a program that supports and provides financial aid to top finance research institutions in four countries: Germany, collaborating with RWTHAACHEN, KIT, and Universität Stuttgart; USA-Bosch Energy Research Network (BERN), by association with Caltech (University of California-Berkeley), MIT, Stanford University, and the University of Michigan; China, supporting the Tongji University, the Shanghai Jiao Tong University and the Fundan University; and India- in the internationally recognized Indian Institute of Science (IISc)- by setting up the Robert Bosch IISc Centre for Research in Cyber Physical Systems.

c) B2B collaborations for new developments: Whether in the automotive sector, with companies such as Ford, Volkswagen, or Tata Motors; or in the energy industry by

associating with Infineon or The Linde Group, the German multinational searches peer firms with aligned strategic intentions to exploit its R&D's maximum.

Bosch also participates in *invent*, which is an independent association through which German-based firms working in the automotive sector collaborate to create intelligent and user-friendly traffic technology. This initiative comprises companies such as AUDI AG, BMW Group, DaimlerChrysler AG, IBM Deutschland GmbH, Siemens AG, Volkswagen AG and many more.

d) R&D Agreements with governments: Bosch has reached several agreements with diverse government agents, as well as with the European Union's Framework Programme⁴. For instance, at the moment the firm is currently working in the 7th Framework Programme initiative denominated FP7 Europractice. Together with other enterprises and institutions, they work in developing advanced electronic technologies aiming at the improvement of the competitiveness of the European industry.

Security technology is also being developed in the lines of sustainable growth and reducing environmental footprint. Automatic fire detectors using intelligent algorithms to distinguish smoke particles from other particles (such as dust) help diminish the number of times they receive misinterpreted signals. This contributes to lower wasting energy and water on "false-alarm" fires. Another example of a recently launched eco-innovation in the field of household appliances is the self-dosing washing machine. This product incorporates a specific technology that detects the level of charge and uses detergent and water according to the weight of clothes introduced. This leads to a reduction in these inputs' consumption, therefore protecting the environment.

6. Discussion

It was depicted in section 2 that the socio-economic framework in which firms operate has been changing. Nowadays, companies' mission is achieving competitive advantage by means of value creation. Hart & Milstein (2003) identify four key elements strategic planning shall have in order to successfully grow towards that ultimate goal's completion. In this section, it will be argued which of those fundamentals Bosch Corporation fulfills.

1- *Focus actions in the lines of reducing environmental damage (which result from rapid industrialization);* the firm invests in reducing environmental damage during their production processes and procedures on different matters: Energy and water consumption, CO2 emissions from heat use, Electricity and district heat, Use of chlorinated hydrocarbons, Volatile organic compounds, Quantity of waste and wastewater, Recycling, Environmental investments and costs. Up to date, Bosch has significantly reduced the environmental detrimental effect produced by its facilities.

2- *Operating for the civil society with greater transparency;* Bosch has its own Code of Conduct, biannual CSR Reports as well as updates on such matters included in Annual Statements and customers. Furthermore, the company holds a set of standards and norms, as for instance the Purchasing and Logistics Guidelines (quality, cost and supply targets); which must also be abided by agents who wish to collaborate with the firm.

3- *Creating radical innovations based in new technology that allows for reduction of environmental footprint and social damage;* the firm devotes special efforts in socio-ecological minimization of detrimental effects, and promotes research in this field. Innovations such as improving the internal-combustion engines in automobiles, develop components and systems for future electric vehicles, are some of the many examples in the field of eco-research that have showed excellent results. Moreover, the firm also prioritizes recycling final products and components, such as auto-parts, which are either remanufactured or its materials are divided and reused separately.

4- *Fulfilling basic needs of world's lowest social class to enable creation of wealth and fair income-distribution;* more than 90% of Robert Bosch GmbH's stocks are in the hands the Robert Bosch Stiftung (charitable foundation). Funds received through dividend distribution are destined partly to health and humanitarian aid (total of 5.8 million Euros investment in 2010), contributing to covering basic needs of the world's poorest population. Additionally, the foundation devotes funds to science and research; international relations; education and society; culture; research at institutes and medical investigation; investments in the Robert Bosch Hospital. With these initiatives, people with lower resources can access higher education, better healthcare and possibilities to learn from other cultures, etc.; thus contributing to the creation of wealth and fair-income distribution.

7. Conclusions

Through out the study conducted, several findings came to light, complementing the knowledge gathered in academia and practice with regards to companies operating in Open Innovation contexts and those firms that implement CSR strategies, policies and have these kind of initiatives as a core element when planning for the firm's future.

With regards to the first hypothesis of this analysis, Companies that use Open Innovation models and are successful in their fields tend to apply Corporate Social Responsibility Policies, practical contributions conclude that this statement is true for the study case conducted. Being one of the leaders in the automotive industry, as well as key corporations in the consumer goods and industry appliance production, Bosch takes into account social and environmental risks when performing their strategic future planning.

Such risks are nowadays one of the main elements that need to be considered, which can even determine or modify economic perspectives. Theoretical contributions then would state the corporation's mission, long-term objectives and short-term targets should be aligned with elements identified as essential to value creation. Among these we outline: acting to reduce environmental damage; operating for the civil society with greater transparency; creating radical innovations to reduce environmental footprint and social damage; contribute to poverty alleviation and fair income-distribution.

As far as the second hypothesis to be tested through this study case, Combination of Open Innovation and Corporate Social Responsibility can help enterprises reinforce their competitive advantage, it has also proved a true statement. Through operating in OI contexts, Bosch's large set of connections with other economic agents allows for alliances and associations aiming at accurately solving technical, political, social challenges, socio-

demographic modifications, economic downturns or depressions. By providing innovative responses to current risks and foreseeing potential challenges, Bosch maintains and enhances its competitive advantage.

In spite of sustained growth, during the 21st century financial crisis, firm's sales decreased in 2007-2008 period with total net loss for the corporation. As a response to this situation, Bosch boosted its efforts in research and development, believing that the answer to an economic downturn would be innovation. Notwithstanding this, the firm experienced a major recovery between 2009 and 2010, increasing sales by approximately 23% year-on-year. This proves the effects of CSR actions incorporated to the firm's overall strategic planning, when studying corporations operating in Open Innovation frameworks, such as Bosch, can contribute to generate economic profit.

As far as this investigation's results, link between leading open innovation-operating firms and enterprises implementing CSR policies (and including thee in their strategic planning) has been found to be a virtuous cause-effect relationship circle. Robert Bosch GmbH is an example of such companies operating in OI contexts and being successful in its fields (particularly in the automotive sector), a cumulative and positive process involving a strong tradition in innovation.

8. Limitations

The lack of data available for studying behavior of companies operating in Open Innovation models and applying a structural Corporate Social Responsibility Strategy, is one of the most important limitations. Based on the novelty of the subject upon which this analysis is stated, it is logical that there is no broad set of information available for developing extensive quantitative and qualitative studies. The ideal data set could be generated yet the time constrictions that the current analysis has does not allow for it.

Provided the novelty of the topic studied and the existing available data, the contrast of this study's hypothesis is a first step towards understanding effects of CSR strategies in OI firms. Future studies on the matter can enlarge, compare and contrast the results that the present paper will reveal for a singular case.

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