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Motivating factors and critical actions in hospital environmental management programs.

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Master Thesis presented to the Business Management Post Graduation Program, COPPEAD School of Business, Federal University of Rio de Janeiro, being part of the requirement to attain the Master in Business Management Title.

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Jan Tonio Schreiber Krüger

MOTIVATING FACTORS AND CRITICAL ACTIONS IN HOSPITAL ENVIRONMENTAL MANAGEMENT PROGRAMS.

Master Thesis presented to the Business Management Post Graduation Program, COPPEAD School of Business, Federal University of Rio de Janeiro, being part of the requirement to attain the Master in Business Management Title.

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“To explain all nature is too difficult a task for any one man or even for any one age. Tis much better to do a little with certainty & leave the rest for others that come after than to explain all things by conjecture without making sure of any thing.”

Sir Isaac Newton

ABSTRACT:

KRÜGER, Jan Tonio Schreiber. Motivating factors and critical actions in hospital environmental management programs. Rio de Janeiro, 2014. Thesis (Master in Management) – COPPEAD Business School, Federal University of Rio de Janeiro, Rio de Janeiro, 2014.

Environmental responsibility has been a widespread research theme. Its application in the health care sector however has been incipient. Given the fact that health care services tend to increase due to greater life expectancy and due to the fact that environmental externalities produced by human activity are having negative effect on human health, a deeper understanding of this relationship is appropriate. To contribute to this effort this thesis aims at investigating what are the main motivations driving hospital managers to adopt environmental responsibility programs and which actions that they have been implementing. A multiple case study was conducted involving four medically certified hospitals in Rio de Janeiro and São Paulo, selected out of different ownership types. Public, a private and private HMO owned hospitals were selected for interviews and secondary data analysis. The research has shown that the main motivational factors (competitive, ethical and regulatory) drive sustainability efforts of these hospitals and that the competitive and regulatory motivators have the potential to establishing a baseline of environmental performance which vary across ownership type (public or private). Further on the research has also indicated that the comprehensiveness of environmental actions does relate to the motivators that drive companies to adopt those actions. Two conceptual models are presented to illustrate these findings and offer bases for further research.

Keywords: Healthcare, Sustainability, Environment, Brazil, Motivations, Actions.

RESUMO:

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Responsabilidade ambiental tem sido um tema de pesquisa em voga. A sua aplicação no setor de saúde e de hospitais, entretanto, tem sido incipiente. Dado o fato de que os serviços de saúde tendem a aumentar devido à maior expectativa de vida e devido ao fato de que as externalidades ambientais produzidos pela atividade humana estão tendo efeito negativo sobre a saúde humana, uma compreensão mais profunda dessa relação é apropriada. Para contribuir para este esforço esta dissertação tem como objetivo investigar quais são as principais motivações que levam gestores hospitalares a adotar programas de responsabilidade ambiental e quais as ações que têm sido executadas. Um estudo de caso múltiplo foi realizado no Rio de Janeiro e São Paulo envolvendo quatro hospitais certificados, selecionados de acordo com diferentes características. Foram selecionados dois hospitais públicos e dois privados (um pertencente a uma seguradora de saúde nacional). Entrevistas e análise de dados secundários foram executadas. A pesquisa mostrou que os principais fatores motivacionais (competitivos, éticos e regulatórios) levam aos esforços de sustentabilidade nestes hospitais e que os motivadores competitivos e regulatórios têm o potencial para o estabelecimento de um desempenho ambiental mínimo, que varia de acordo com o tipo de hospital (público ou privado). A pesquisa também indicou que ações mais avançadas de sustentabilidade ambiental estão atreladas aos motivadores que levam estas organizações a adotar tais medidas. Dois modelos conceituais são apresentados para ilustrar estes resultados e oferecer base para futuras pesquisas.

Palavras Chave: Hospitais, Saúde, Sustentabilidade, Ambiental, Motivadores, Ações, Brasil.

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1. Introduction

sus·tain·able: adjective
: able to be used without being completely used up or destroyed
: involving methods that do not completely use up or destroy natural resources
: able to last or continue for a long time " (MERRIAM-WEBSTER, 2014)

Environmental sustainability has shown to be of growing interest among academia, governments, organizations and society as a whole. It has become common sense that direct and indirect human interferences are having profound impacts on the balance of ecosystems around the world, thus triggering full scale global climate change. These changes in turn have shown profound effect on economies, politics and even on the human being as an individual.

According to environmental reports these changes pose a real threat to developing countries when it comes to providing basic human amenities to their population, such as food provisions and safety from natural hazards (Rio+20, 2012). Climate is becoming ever more extreme, leading to accelerated desertification in some places while others suffer from excess or complete lack of precipitation. It has been suggested that these changes are caused by a direct or indirect human activity. Sustainable development aims at tackling the challenge of how to provide social and economic advancement without negative outcome to the environment.

The most common definition of sustainable development has been coined at the World Commission on Environment and Development convention in 1987: "Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (BRUNDTLAND, 1987). Although the resources required to fulfill current and future needs could, in theory, be substituted for others, Ekins (2011) argues that the interaction between the countless ecological systems is not totally comprehended. Therefore it is not possible to determine if a given resource, exhausted by one generation, could be substituted in the future by another one since this availability is undermined by several uncertainties. Following this line of thought the author argues that economic development should be concerned with the preservation of current ecological functions[1].

On a more individual level, a parallel can be drawn between sustainability and medicine as a practice. The field of medicine focuses on the health of the body and the mind. For over a

[1] Ekins refers to De Groot's (1992) ecosystem functions of regulation, habitat, production and information which in conjunction provide the ecosystem's goods and services necessary for humans wellbeing and social-economic development.

century of social and economic improvements, medical treatment and improved pharmaceuticals have increased human life expectancy by several decades[2]. In fact, a common mission statement of hospitals and health care organizations is to preserve life and treat diseases. Thus, there seems to be a logical and ethical duty in medicine to avoid externalities that might work against its ultimate goal. Notoriously the Hippocratic Oath, sworn by physicians and health care professionals, states that these professionals should abstain from doing harm to their patients.

Unlike a hospital's mission that states it should sustain life, the equipment and installations used to do so end up having a negative effect on human health given its environmental externalities (ULHØI; ULHØI, 2009). Although a strong cause-effect relationship is not possible to be determined, since operations in hospitals are subject to a lot of other externalities, the authors argue that the medical sector has the ethical obligation to follow a "do no harm" philosophy.

Even though there is an alignment between the field of medicine and environmental sustainability, adherence to environmental sustainability practices are incipient, and academic research is even scarcer. Therefore, this thesis aims to strengthen the theoretical foundation to bring these two research fields closer together.

1.1. Objective

The objective of this thesis is to advance the academic research regarding environmental management in the health care sector. Specifically, it has the objective of investigating what motivates hospital managers to seek and adopt environmental responsibility programs. Additionally, it seeks to identify what are the critical actions that these managers have regarding environmental sustainability programs.

Thus the general research questions are:

- Why do hospital managers adopt environmental responsibility programs?
- What are the critical actions for these managers take regarding environmental sustainability?

[2] According to World Bank data the average life expectancy at birth has risen from 52.5 years in 1960 to 70.8 years in 2012.

1.2. Relevance

The relevance of this study relies on three pillars. Firstly, we have come across incipient academic research concerning environmental sustainability in hospitals. Secondly, there is a growing need for health care treatment and, as a consequence, there are a number of services to be provided by this sector. Lastly, one can easily witness the ongoing dramatic impacts of human activity on natural environment.

The scarcity and incipiency of this research field is pointed out and criticized by Ulhøi and Ulhøi (2009). As mentioned in the introduction, given a hospitals mission of sustaining patients' lives, there should be strong movements towards not harming people through negative environmental externalities.

Additionally, there is a growing demand for health care services. Besides the vegetative growth of the Brazilian population, life expectancy is still on the rise. Both these facts add to more people seeking medical services for a longer period of time. Besides the foresight of a growing demand and service activity in this sector, the share of the population opting for private health care insurances rose from 18,1% to 24,7% from 2003 to 2012, accounting for over 47 million inhabitants. Public health care is remarkably deficient in Brazil. Private insurers on the other hand are obliged to maintain specific service levels due to regulations. Therefore, it can be assumed that this movement towards private health care means more services being provided. In monetary terms, the private health care sector already accounts for 80 billion Brazilian Reais (35 billion USD as of August 2014) of spending, 31 of which (13.5 billion USD) concerning hospitalizations alone.

Finally, the consequences of human activity over the natural environment are becoming ever more apparent, and so is the negative impact on human health. United Nations Conference on Sustainable Development 2012, commonly referred to as Rio+20, pointed out the deterioration and disequilibrium on ecological systems provoked by human activity (UN, 2012). This environmental degradation in turn has been linked to human health in academic studies (EZZATI et al., 2004; SALVI, 2007) and recent report from the Intergovernmental Panel on Climate Change (IPCC, 2014), which has estimated over 7 million deaths per year have direct influence from air pollutants.

According to the national healthcare agency (*Agência Nacional de Saúde*) there were 5.203 general and 1.092 specialized hospitals in Brazil in 2012, alongside more than 100 thousand clinics and ambulatories. Each one of these units has a potential to produce

significant environmental externalities, which will contribute to increased environmental degradation and climate change.

Hospitals are particularly a potential source of great environmental externalities due to their operational nature. Since hospitals are commonly running on a 24/7 regime and still have to account for a high variability in treatment demand, both in volume and in specificity, it is expected to have a great amount of underutilized capacity. Use of resources such as electricity, heating and water are, therefore, expected to be high. Additionally, hospitals consume, store and handle a variety of special substances, ranging from medications as simple as aspirin to radioactive isotopes used in cancer treatment and specific exams. These, as well as contaminated materials, have to undergo special procedures to be removed and disposed and will consume a greater amount of natural and financial resources and manual labor (KAPLAN et al., 2012).

These three facts, which are the incipiency of the research field, the growing demand for health care services and the worsening of environmental degradation, justify the effort to write this research thesis.

1.3. Research delimitation

Academic research regarding environmental sustainability in the medical and hospital operations has shown to be scarce according to the literature review undertaken for this thesis. The subject is broad. Besides, it involves several stakeholders and perspectives. With the aim of contributing to the development of this research field, this thesis focuses on one specific perspective of the broader subject: the perspective of hospital managers will be the focus point of this research.

The attributes which are expected to be found during the research have been drawn from a literature review about models of classification of environmental sustainability programs. These attributes relate to key motivating factors found in several distinct sectors and geographical regions of former research.

To define the population of which cases would be selected, it was decided to qualify hospitals according to a medical accreditation. The Joint Commission International accreditation for hospitals was chosen because of its international reputation for quality and treatment assurance. Interviews with experts on the subject, as well as the interviews of the

case study , assured that this criterion would provide comparability between cases. The use of an international accreditation also provides opportunity to replicate the current research across national boundaries in future research if so desired.

Since the objective of this thesis is to find out what motivates managers to adopt environmental responsibility programs, little focus has been placed on environmental performance per se. Hospitals' environmental footprint can vary substantially according to type and intensity of treatment. Besides that, no previous academic research has proven to take into account specific environmental performance measures that could be helpful for this research thesis. However, this was not considered to be a problem.

1.4. Organization of this thesis

This thesis is structured into seven chapters. The first one contains the introduction to the research field that will be the matter of this work, the objectives, the relevance and the delimitation.

Chapter 2 presents the literature review that was undertaken to elaborate this thesis. It is subdivided into three items. First, the issue of environmental sustainability is brought up and reviewed briefly. After that, several distinct environmental management classification models and papers about sustainability in the health care sector are presented. The second item touches on the motivating factors that have driven organizations to adopt environmental responsibility initiatives in distinct sectors and geographic regions. Finally, the last item presents the conceptual framework devised to carry out the field research of this thesis.

The third chapter presents the methodology of the thesis to reach its proposed objectives. The motives behind the selection of qualitative research using multiple case studies, the selection criterion of the cases, the analysis methods and its limitations make up this chapter. The fourth chapter presents a brief overview of the cases followed by the fifth chapter, which presents the insights gained from the field interviews as well as the secondary data. The sixth chapter presents the case analysis in the light of the proposed framework.

Finally, the last chapter offers the conclusions of the current research as well as suggestions for future research that could possibly strengthen the academic knowledge regarding environmental sustainability in the health care sector, specifically in the operation of hospital facilities.

2. Literature Review

The main objective of this thesis is to investigate what motivates hospital managers to adopt environmental responsibility programs and what are the critical actions concerning environmental sustainability in their operations. To achieve these objectives it is necessary to have a broad understanding of environmental sustainability, stakeholder theory (especially in regards to environmental management) and which dimensions existing environmental classification schemas have used to classify organizations in different sectors in regard to their environmental strategies. These models offer insight to motivating factors and attributes of environmental management programs in other sectors.

Literature review has been carried out using Thomson-Reuters "Web of Science", Google Academics, Emerald Insight and EBSCO. Search terms used where "Environmental Sustainability Model", "Environmental Sustainability Strategy", "Environmental Management Stakeholder" added with the term "Hospital" and "Health Care". Articles where screened by their title and abstract. Relevant citations from those articles were also reviewed if considerate relevant. On top of those, selected articles from the operations and strategy lectures of the COPPEAD Master program served as base for the elaboration of this thesis.

The first part of the literature review will present a broad overview of environmental responsibility in the light of management research, followed by a brief presentation of the subject related to hospitals. The second part will relate stakeholder theory to environmental management. The third part will present five environmental strategy classification models which all contain dimensions and criteria which tie back to stakeholders, particularly the management body of an organization. Finally, the last part summarizes the presented models with stakeholder approach to provide the framework used in the field research of this thesis.

2.1. Environmental Sustainability

The definition of sustainability most commonly in use comes from the 1987 report "Our Common Future", drafted by the Commission on Sustainable Development from the World Commission on Environment and Development (WCED). "Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (BRUNDTLAND, 1987).

Environmental Sustainability follows this line of thought. Ekins (2011) argues that environmental sustainability is the capacity that the biosphere has to continue to provide the

necessary resources for human health and welfare. The author relies on research from the ecology field, specifically from De Groot (1992), and argues that the environment provides essential functions that both affect the biosphere and human activity and health. Human activity generally affects the biosphere in a negative way, and by debilitating environmental functions this will have negative effect on human activity and health. Although the model seems pretty comprehensive Ekins (2011) argues that ecological systems are highly complex and their interaction is not fully comprehended. Thus, that there is not enough knowledge that can guarantee that a profound change in the biosphere, product of human activity, will not come at the price of extremely debilitated environmental functions needed to maintain human health and welfare. Given this fact the author argues that the maintenance of current natural environments, and its functions, should be paramount.

The theory of the firm traditionally defines the objective of the organizations in terms of maximizing return on investment of its stockholders (FRIEDMAN, 1970). It does also consider private organizations to be the primary generators of growth and wealth which reflects on societies welfare. On the other hand Shrivastava (1995) argues that organizations are not just wealth creators. According to the author, organizations have been conceptualized as systems of production, while ignoring the downside and not realizing that they are also systems of destruction, by using natural resources and producing negative externalities, like sewer and waste. This alternate conceptualization of the organization is hardly encompassed by current standards of evaluation and performance. Shrivastava argues that historically the objectives have been defined in terms of growth, return on investment, sales and profit, all of which hardly encompass the risks of environmental degradation so far. Organizational performance has also been majorly about economic figures and productivity, ignoring aspects of environmental performance. Like Shrivastava, many other authors argue that environmental performance and objectives should be internalized by the organizations in order to achieve actual environmental sustainability (FLECK, 2011; PORTER; KRAMER, 2006; PORTER; REINHARDT, 2007).

According to Porter & Kramer (2006) the field of social and environmental responsibility has made significant advancement over the last decades. However, the authors point out that these advancements have been largely pushed upon the organizations by external sources of pressure, like tighter regulation by governments and unexpected public reactions. Additionally they criticize the way that social and environmental concerns have been dealt with in most of organizations. According to the authors most organizations view the effort

towards social and environmental responsibility as a defense mechanism instead of developing an approach that makes more sense with the organizations strategy as a whole. Social responsibility programs can be a factor of differentiation for an organizations in markets where the price and quality barriers have been pushed to their limits. Porter and Reinhardt (2007) go further and argue that organizations have got to think of their greenhouse gasses emissions as a cost, since there is strong evidence that this will become a reality in the near future. They argue that implementation of best practices is the minimum a company should aspire to if they intend to stay competitive in the future.

Shrivastava (1995) points out that governments and international forums organized by governments have been the main stakeholders discussing the environmental issues (for instance the United Nations climate conferences in Rio de Janeiro held in 1992 and 2012) although in fact private organizations actually are the main externality producers. It is also in the realm of private, profit seeking, organizations that the financial, technical and institutional competences to implement environmental solutions exists (SCHMIDHEINY, 1992; WELFORD; GOULDSON, 1993).

Furthermore, it is these organizations that can extract a real advantage from the adoption of environmental responsible practices. Besides cost advantages drawn from environmental efficiency, a company can also secure new markets ("Green Customers"), capture first entrant advantages in a more advanced industry, add value to the brand and establish a beneficial relationship with external stakeholders (SHRIVASTAVA, 1995). Acording to this author two mechanisms used to achieve these goals are the adoption of Total Quality Environmental Management (TQEM) programs which stem from the Toyota philosophy of Total Quality Management (but focused on environmental issues) and competitive strategies which seek to environmental positioning as a source of advantages over the competition.

Porter & Kramer (2006) and Porter & Reinhardt (2007) arguments have similarities to Shrivastava (1995), showing that there is a clear understanding in the academics field that changes are required in the business environment. These messages, however, have not made it over to the management practice of private organizations as it seems.

Regarding environmental responsibility in hospitals there are several particularities which are of interest to this thesis and will be briefly discussed in the next paragraphs. First is that the issue has not been explored in depth by academic research. Second is the fact that environmental sustainability and health care have a strong connection which is ever more

prominent. Lastly, that the nature of the services provided by hospitals has particularities that have to be considerate when environmental responsibility comes to be discussed.

First of all, although the issue has been gaining in momentum in the management of health care facilities, especially in regards to cost savings (KAPLAN et al., 2012), the relationship between the climate change and the impact that environmental degradation is having on human health, and the production of negative externalities by equipment's that are originally intended to cure and treat human beings is not explored in depth (ULHØI; ULHØI, 2009). According to these authors, it is of utter importance that the study of health care and sustainability be connected given the fact that environmental degradation is having relevant impact over health quality, and thus over health care treatment.

The second issue connects health and environmental degradation. The impact of Greenhouse gases emissions has been gaining scientific credibility and public recognition by the academic and business community (IPCC, 2001, 2007). Several studies have linked environmental degradation to human health (MCMICHAEL; WOODRUFF; HALES, 2006; PATZ et al., 2005; WORLD HEALTH ORGANIZATION, 2002). For instance a study has shown negative impact of air pollution on the development process of newborn children, with an increased neonatal mortality rate and increased risk of chronic diseases which could require lifelong assistance and thus lifelong use of financial and material resources for treatment (SALVI, 2007). Estimates from the beginning of the last decade link a possible 150 thousand deaths per year to climate change (EZZATI et al., 2004). Data from the 5th Assessment Report (AR5) of the Intergovernmental Panel on Climate Change, IPCC, indicate that over 7 million deaths per year might be linked to air pollution alone (IPCC, 2014).

The health care sector commonly defines its mission as treating and preventing diseases and illnesses that afflict the human being. Thus, there is a clear contradiction if the processes and operation of this very industry does produce negative environmental externalities which in itself have a negative impact on human health (ULHØI; ULHØI, 2009).

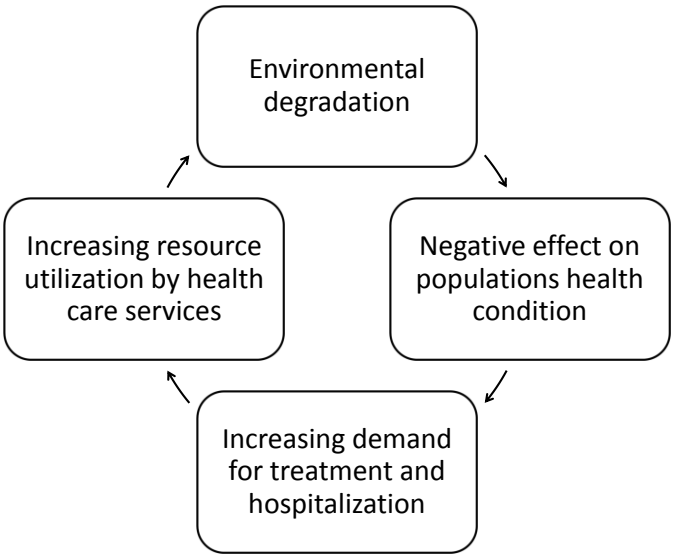

Figure 2.1: Vicious impact cycle of hospital operations. Adapted from (ULHØI; ULHØI, 2009)

Lastly we point to the particularities of health care equipment's like hospitals. Data from the US Energy Information Administration indicate that hospitals are an intense user of electricity. According to studies from 2003 large hospitals account for approximately 1% of all commercial building and 2% of square meters in the United States. They do however represent 4,3% of the energy use under the same criteria. More recent study has shown that this percentage has risen to 5,5% (U.S. ENERGY INFORMATION ADMINISTRATION, 2012). Another study carried out in 2007 estimates that the greenhouse gas emission from the healthcare sector accounts for 7% of total US emissions (CHUNG; MELTZER; TEAM, 2009).

The intense use of energy is justified by the fact that hospitals operate 24 hours a day and have to account for a high variability in terms of treatment type and amounts. Ulhøi and Ulhøi (2009) argue that due to this fact hospitals need infrastructure and resources which can accommodate this variability. According to the authors the philosophy of saving lives at any cost has pushed other issues out of hospital management focus, with the collateral effect of high costs and high environmental externalities.

Solid waste also is particular in hospitals. Given the fact that these are often considerate as infectious they have to undergo special disposal and treatment processes which add cost and resource use. Given this fact the solid waste produced by hospitals represents an environmental, as well as a health care risk (KAPLAN et al., 2012). In Brazil the solid waste produced by hospitals is subjected to special regulation given these risks. The national agency responsible for this regulation (ANVISA) does provide specific manuals with processes and procedures which have to be followed (RDC ANVISA N° 306/04 and CONAMA N° 358/05).

The agency has estimated that 3000 tons of solid waste are produced by hospitals each day in 2006, 20% of which requires special treatments like incineration, chemical and biological treatment, mechanical disintegration and deep burial. According to the law hospitals are co-responsible for the final destination of special waste even if a service contractor takes over this function.

2.2. Stakeholders and Drivers

According to Freeman (1984) a stakeholder is defined as any party or person that can influence an organizations decision or be affected by it. This definition recognizes that the activities of an organization impact parties that are internal to it as well as others which are external. In any form, external or internal, a negative externality produced by the organization will become a motive for the stakeholder in question to exert some kind of pressure in order to change or mitigate it. On the other hand, a possible positive future outcome of a given action will bring stakeholders to pressure for the actual realization of this potential.

Several authors argue that it is a necessity of organizations to manage stakeholder interests in order to maintain social legitimacy of its existence. That is, approval in the eyes of society(FLECK, 2011; SARKIS; GONZALEZ-TORRE; ADENSO-DIAZ, 2010). Sarkis, Gonzeles-Torre and Adenso-Diaz (2010) point to the fact that organizational learning capacity is a key capacity that companies have to develop in order to address stakeholder demands. Roome and Wijen (2005) reinforce this proposition, especially when there is a conflict of interest between several distinct stakeholders.

Ulhøi and Ulhøi (2009) point to the fact that environmental sustainability issues touch a variety of stakeholders, which not uncommonly have conflicting interests. To address each parties concerns can become an important driver in the development os environmental sustainability programs within organizations.

Abreu (2011) argues that the adoption of a specific environmental strategy by an organization is a function of pressures exerted by society over a enconomic sector as a whole, and thus by societies behaviour towards environmental sustainability. Hoffman (2001) on the other hand argues that it is a combination of internal and external elements that shape the environmental strategy of an organization.

Levy and Rothenberg (2002) explore different institutional mechanisms which can lead to heterogeneity between companies in a same sector when exposed to the same external pressures regarding the environment. According to the authors the pressures are absorbed in distinct ways according to the culture and history of the organizations. Additionally they argue that managers often need to prioritize demands from a variety of stakeholders, and that the order in which these will be addressed is particular to each organization. Lastly they point to the fact that the increasing transnational nature of organizations exposes them to a set of pressures which can be unique to each company (given their locations) but that can spill over to the whole organization, even to those regions where local external stakeholder pressure is low or absent. Delmas and Toffel (2004) corroborate this argument, claiming that organizational structure, strategic positioning and institutional performance will mediate how external pressure will be absorbed and interpreted.

Environmental sustainability literature point out that the main motivators driving organizations to develop their actions in this area include the necessity to comply to regulation, to achieve competitive advantage, to attend to stakeholder demands, to be ethical, to react to critical facts, amongst others (BANSAL; ROTH, 2000; DIMAGGIO; POWELL, 1983; JIANG; BANSAL, 2003; WINN, 1995). Paulraj (2009) asserts that there are three main dimensions regarding the adoption of environmental sustainability programs: Regulation, Competition and Ethics.

The regulatory and legislative dimension is arguably the most obvious of these three. Acording to Delmas and Toffel (2004) regulatory bodies can exert coercive power that will bring organizations to adopt environmental practices. For example, demand environmental certification to take part in governmental projects. A more radical way would be to revoke licenses to companies operations if certain environmental standards are not met.

The regulator, in most cases the state, can also assume the position of facilitating the adoption of environmental sustainable practice by providing the necessary support to drive organizations in this direction. This can be accomplished by financial incentives, for instance tax cuts for companies that adopt environmental standards, or by incentivizing research and development of new technologies that increase environmental performance (BANSAL, 2005; DELMAS; TOFFEL, 2004; DIMAGGIO; POWELL, 1983).

The environmental classification models used in this thesis, which will be presented further on in this chapter and serve as the basis for the case study, address regulation as a form

of external environmental pressure and as a exogenous risk factor which could compromise the organizational legitimacy to operate (ABREU, 2009; VASTAG; KEREKES; RONDINELLI, 1996).

Even though regulation enforced by law and agencies has been increasingly restrictive and harsh on organizations, there is supporting evidence that these restrictions can lead to increased innovation by the affected companies which have to cope with the new requirements. Mitchell and Singh (1996) argue that a new solid waste regulation in Germany had positive effect over recycling. According to the new law, approved in 1991, the companies that sold products, would need to collect and recycle at least 72% of all glass and metal containers, as well as 64% of paper, cardboard and plastic packaging until 1995. One evidence that this restrictive regulation had a positive effect on innovation and environmental performance is the fact that already by 1992 companies had reduced the amount of material used in packaging of their products by 25% (WINN; ANGELL, 2000).

A second motivational dimension points out that competition is an important driver in the adoption of environmental practices. According to Paulraj (2009) companies that are motivated by the competitive factor believe that environmental sustainability programs will enhance their competitive positioning, be it by a cost reduction, be it by a differentiated offer to their customers for which those are willing to pay a premium. Both of which should contribute to long term financial sustainability of the firms.

Henriques and Sadorsky (1996) have carried out a research amongst major Canadian companies to assert that the second strongest source of pressure to adopt environmental sustainable practice comes from the consumers. The first one is regulation. To address clients pressure thus becomes an important task of companies that seek to maintain their customer base.

The adoption of environmental sustainability programs can also contribute for corporate reputation and add brand value (HART, 1995). Thus it becomes an additional source of competitive advantage for companies in mature markets (SHARMA; PABLO; VREDENBURG, 1999). Gabzdylova, Raffensperger and Castka (2009) study point to the motivating factors in the New Zeeland's vine production economy. The research point to the fact that five out of a dozen of motives are directly related to competitive factors, two of those amongst the top four concerns of producers. The most important competitive motive cited by

producers refers to the quality of the end product, which is significantly dependent on how producers manage their waste streams and how pesticides are used during plantation.

Lastly, the third dimension proposed by Paulraj refers to ethical issues. Gabzdylova, Raffensperger and Castka (2009) research has corroborate the existence of ethics as a motivational factor in the adoption of environmental sustainable practices. The top two declared motivators in the New Zeeland's vine industry were "Environmental Values" and "Personal satisfaction with profession". Companies that are motivated by ethical factors take responsibility for the environment, independent of competitive and legislative factors, because they believe that this is the right thing to do (BANSAL; ROTH, 2000).

The roots of the ethical motivation lie in the sense of belonging of an organization, and the people that manage this organization, to a social and natural environment that surrounds it (PAULRAJ, 2009). Buchholz (1991) adds to this view by posing that the sense of philanthropy in organizations can outweigh profit seeking strategies and make companies act in favor on environmental sustainability even if there is no guaranteed economic benefit in sight. Bansal and Roth (2000) corroborate this idea, asserting that organizations seek idealization over rationalization.

2.3. Environmental Classification Models

The following section will present five distinct models which describe and classify environmental responsibility strategies of organizations. While there are several additional models (for an comprehensive list until 2000 please refer to Kolk and Mauser (2002)) these five models where chosen due to the fact that they present different approaches which span the last two decades and can all be clearly linked to the three main motivational factors presented by Paulraj (2009). The chosen models also complement each other and thus have become the basis for the research framework at the end of this chapter, as well as the interview guide used in the field.

2.3.1. Hunt and Auster (1990)

Hunt and Auster (1990) present a continuum model which categorizes organizations environmental programs along five stages. According to the authors it is becoming more important to consider environmental risks in order to maintain long term competitiveness.

Notorious examples of environmental disasters are recalled, like the Exxon Valdez[3] oil spill in Alaska and the toxic gas leak of Bhopal[4], India. Those have led to sanctions and fines by the regulators, substantial financial and legal liabilities and loss of reputation in the eyes of the consumers.

The five stages, ranging from "beginner" to "proactivist" are listed in the figure 2.2. The three most salient criteria which differentiate one from another are the degree to which the program reduced environmental risk, the commitment of the organization and the design of the environmental program.

Organizations that fall into the "beginners" category ignore the issue of environmental management completely or delegate the issue to an existent position without much attention to it. There is no effort whatsoever to develop a formal policy regarding environmental management and no regard to negative externalities caused by the company's operations. According to the authors small organizations as well as those that have no clear and direct impact over the environment (financial sector for instance) are commonly found under this category.

The next stage is "Fire Fighter". These organizations have some resources and manpower allocated to environmental management, but these managers have no power, capacity and autonomy to exercise their functions in a satisfactory manner. Due to this fact, environmental managers in these organizations have to select and prioritize which environmental concerns can and will be addressed according to how pressing the issue is becoming. According to Hunt and Auster (1990) this situation has roots in the inability of top management to comprehend that environmental responsibility programs can be a source of efficiency gains to the company.

[3] The Exxon Valdez was an oil spill from a US tanker under the same name which poured over 260.000 barrels of crude oil (according to official estimates) on the remote region of Prince William Sound, Alaska, on March 24, 1989. Total fines have reached over 750 million US Dollars for actual damages and punitive damages and the legal procedures have stretched until 2009.

[4] The Bophal disaster, as it is commonly referred to, was a gas leak at Union Carbide's pesticide production plant in Bophal, India, that occurred at the night of 2nd to 3rd of December of 1984. Death toll are estimated between 3000 and 16000 in the following two weeks related to the accident. Union Carbide settled the legal action paying 470 million US Dollars in 1989.

Table 1 **Developmental Stages of Corporate Environmental Management Programs**

Criteria	Stage One "Beginner"	Stage Two "Fire Fighter"	Stage Three "Concerned Citizen"	Stage Four "Pragmatist"	Stage Five "Proactivist"
Degree to which Program Reduces Environmental Risk	No protection	Minimal protection	Moderate protection	Comprehensive protection	Maximum protection
Commitment of Organization					
–General Mindset of Corporate Managers	Environmental management is unnecessary	Environmental issues should be addressed only as necessary	Environmental management is a worthwhile function	Environmental management is an important business function	Environmental management is a priority item
–Resource Commitment	Minimal resource commitment	Budgets for problems as they occur	Consistent, yet minimal budget	Generally sufficient funding	Open-ended funding
–Support and Involvement of Top Management	No involvement	Piecemeal involvement	Commitment in theory	Aware and moderately involved	Actively involved
Program Design					
–Performance Objectives	None	Resolve problems as they occur	Satisfy corporate responsibility	Minimize negative environmental impacts	Actively manage environmental matters
–Integration with Company	Not integrated	Involved with other departments on piecemeal basis	Minimal interaction with other departments	Moderate integration with other departments	Actively involved with other departments
–Reporting to Top Management	No reporting	Exceptions reporting only	Generates voluminous reports that are rarely read	Consistent and targeted reporting	Personal meetings with managers and board of directors
–Reporting Structures	None	Exceptions reporting only	Internal reporting only	Mostly internal with some external reporting	Formalized internal and external reporting mechanisms
–Involvement with:					
•Legal Counsel	None	Moderate	Moderate	High	Daily
•Public Relations	None	None	Moderate	High	Daily
•Manufacturing/ Production	None	None	None	Moderate	Daily
•Product Design	None	None	None	Minimal	Daily

Figure 2.2: Stages of environmental conduct (Hunt & Auster;1990)

The third stage is named "Concerned Citizen" and encompasses organizations that have a genuine concern for environmental issues, however the implementation of effective and broad environmental programs has not been fully realized. The authors point out that no relevance in the organizational structure and the predominance of environmental specialists that don't speak the "organizational language" are commonly the root cause why the formal intention does not lead to practical implementation. In essence there might even be technical knowledge present but the organization lacks managerial knowledge to tap into these expertise.

Second to last come the "pragmatist" organizations. These, according to the authors, have the ability of forecasting environmental problems which stem from their own operations or

from changes in the regulation that might come to be enforced. The environmental department or the employees responsible in the functional areas for this issue, have enough resources and power to influence the decision making process of the company. Potential risks are evaluated and periodic reports point to the current state of affairs regarding environmental issues. Additionally there is formal training and processes of how to address environmental issues before they come into existence.

The last stage is named "Proactivist". These are the organizations that are pioneers on the environmental management frontier and take de development of management systems above and beyond regulation and consumer demands to develop new standards of performance and innovation. In these organizations environmental training touches all employees, from the factory floor to the board, and environmental issues are taken in consideration in the strategic decision making process.

According to Hunt and Auster (1990) there is a natural progression from one stage to the next over this continuum. For this progression to happen managers of these organizations should comply to seven key elements and be aware of six steps during implementation phase, presented in the table 2.1 and 2.2. Lastly the authors point out that the specificities of each company and sector should be taken in consideration when an environmental management program is being designed and implemented by an organization.

Key factor	Description
Top level Management commitment	Top level management involvement is essential to enable environmental concerns to penetrate the whole corporation.
Corporate policies that integrate environmental issues	A broad and formal organizational policy should be the basis for cultural and structural transformation.
Effective interfaces between corporate and business unit staff	Broad and effective implementation of environmental policies requires efficient communication interfaces between strategic and operational levels.
High degree of employee awareness and training	High degree of training in all levels of the organization is crucial for effective implementation of environmental policies.
Strong auditing program	Regular internal and external audits guarantee that environmental goals are setup and pursued.
Strong legal base	Regulation and legislation directly affect environmental programs. New processes and procedures should comply and anticipate environmental regulations.
Establish ownership of environmental problems	Defining ownership of environmental issues avoids "passing the bucket" problems.

Table 2.1: Key implementation factors (Hunt & Auster; 1990)

Implementation	Description
Assess the full range of environmental risks	A clear definition of environmental risks should be the starting point of an environmental management program.
Calculate the cost of poor environmental management, then sell the need for good practices	Assign costs to non-implementation of environmental management programs helps management to identify its importance.
Find a good manager	Diversity and complexity of the issues requires managers that can effectively connect to a diverse set of departments and manage trade-offs.
Organize for visibility, accessibility and effectiveness	Environmental initiative should be communicated to all employees.
Manage and use information flow	Data and information's about environmental performance should lead to the production of reports which make it to the strategic level to be considerate in decision making process.
Re-evaluate and reform existing programs	Environmental management programs should be periodically evaluated, keeping regulatory and technological changes in mind.

Table 2.2: Key implementation steps (Hunt & Auster; 1990)

2.3.2. Hass (1996)

Hass (1996) starts from a review of seven distinct classification models of environmental strategy which have been published between 1990 and 1993 with the intend of carrying out a field research with eight Norwegian companies: four in the food processing sector and another four in the printing sector. After her research the author develops her own model due to inadequacy of the existent models.

According to the author there are two main types of classification models of environmental strategies. Stage models, which classify a given strategy in a continuum scale, and categorical models in which a strategy is places into a category according to its characteristics. In the later model organizations can move from any given classification to another while the continuum model poise that an organization evolves according to a predetermined path.

The five continuum models which are presented by the author (HUNT; AUSTER, 1990; KOECHLIN; MÜLLER, 1992; NEWMAN; BREEDEN, 1992; NEWMAN, 1993; ROOME, 1992) differ from each other by what criteria is used to classify the environmental strategies. Hass points out that a common shortfall of most models is the fact that the evaluation criteria are not well defined.

The other two models reviewed by Hass are categorical models. Steger (1993) presents a two by two matrix which leads to four distinct strategies based on environmental risks in one dimension, and opportunities which might be explored by the company in the other dimension. The model proposed by Schot (1992) uses three criteria (General attitude to regulation, top management support and approach towards environmental problems) to define

five environmental management strategies. The author cites Bailey (1994) to point to the fact that any classification model should form groups which are mutually exhaustive and exclusive. That is, the model can classify any case that it pretends to and there must be no ambiguity whether a case belongs to one or another classification.

Hass (1996) selects the Hunt and Auster (1990) model for her research due to the fact that the criteria used by these authors have sufficient detail as to what to measure and how these classify the companies according to their answers. However the result of the field research carried out by Hass is frustrated by the fact that only six out of the twelve criteria could be adequately used in the markets Hass selected. The author concludes that the Hunt and Auster (1990) model is not transparent enough and thus the development of a new classification model is in need.

Using the collected data, both from a survey using the six possible criteria from Hunt and Auster (1990) and interviews with the organizations managers, Hass utilizes cluster analysis technique to group the companies into several different clusters. After this step the author analyzes each company to search for common aspects that they share, and which aspects are distinct from companies that have fallen into a different cluster. Comparing the data from the clusterization analysis with the interviews Hass defines two dimensions for her own model. The first one refers to the existence of a structured and developed environmental management system in the organization. The second one evaluates if this system has actually lead to successful implementation of environmental practices.

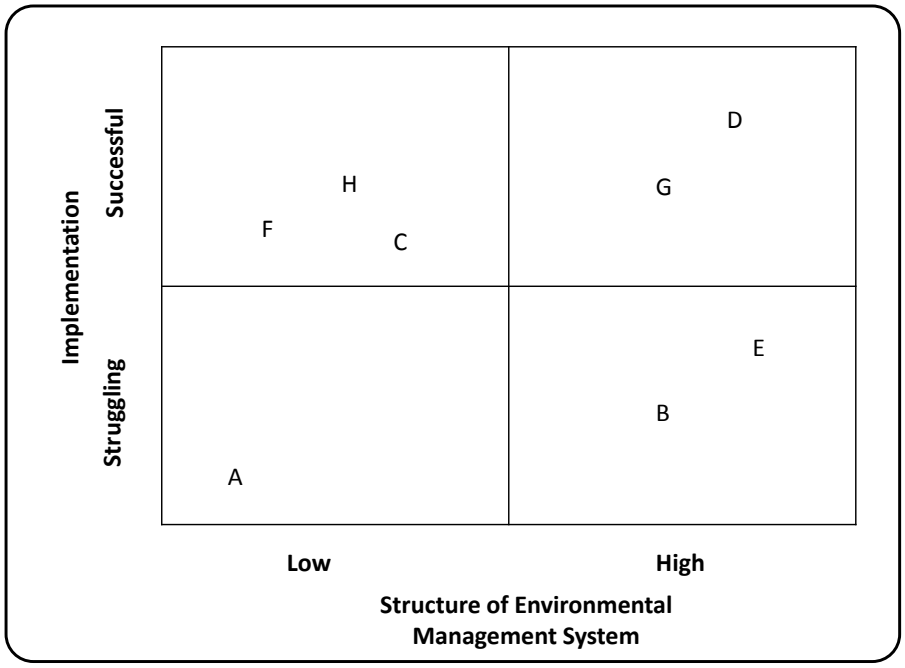

Figure 2.3: Environmental management typology (HASS; 1996)

Hass argues that companies that have a developed and well-structured environmental management system have clear and formal politics on how to address issues when they come to take place, as well as having top level management support. Companies that fall into this categories can have successful implementation when they are future oriented, anticipating internal and external demands for environmental actions. On the other hand even companies with structured management systems can be struggling to implement environmental actions if there is not enough monitoring of demands that are present or that may become in the future.

In the group of organizations that have environmental management systems that are not well developed Hass posits that there is low emphasis in formalizing the organizations positions towards the issue, which can be attributed to an social and political environment that is permissive as a whole or if the particular industry is not perceived as having a high environmental impact. In this case the dimension of implementation divides companies that at least comply with the relaxed demands that are presented to them from the ones that don't even achieve this minimum level of environmental responsibility.

In her conclusion Hass (1996) asserts that any classification model is only as good as the quality of criteria that it has used to evaluate the study subjects, and thus she does recognize that her own model is somewhat of limited in this sense. The author does also critique prescriptive models, arguing that in most cases these serve only as an heuristic model for the managerial workforce, without practical implementation possibility to measure what is actually going on within the organization. This became clear when the author tried to apply the Hund and Auster (1990) model. Finally the author draws attention to the fact that there is still no strong link between the environmental strategy of an organization and the organizational strategy and structure as a whole, and that further studies have to be undertaken to build up this link.

2.3.3. Vastag, Kerekes and Rondinelli (1996)

Vastag, Kerekes and Rondinelli (1996) propose an environmental strategy model based on two dimensions (endogenous risk and exogenous risk). According to the authors the tendency of ever more strict regulation regarding environmental conducts which can even make managers accountable for negative externalities and have severe impact over brand equity, has risen the pressure on organizations to implement comprehensive environmental management programs. To corroborate this positioning the authors point to the creation of environmental

standards, namely the ISO14.001 from the International Organization of Standardization, and the fact that it's adoption is gaining momentum in several industries.

However, Vastag, Kerekes and Rondinelli (1996) argue that the implementation of standardized actions is not ideal since every organization and sector has particularities that should be taken under consideration during the design and implementation of an environmental management program. The proposed classification model is based on mapping the internal and external risks to which the organization is exposed. After this mapping process the authors have compared the environmental actions taken by organizations and compared it to risk profile which they have determined for each one.

The authors define environmental risk as the probability that exists of a negative externality produced by the operation of that business. This risk depends both on the operations and processes that the company undertakes as well as the location and external conditions where the company does reside. Endogenous risk refers to the former one, that is, risks which derive from internal factors. Exogenous risk is determined by factors external to the organization, like it's physical location.

To test the proposed model 400 questionnaires were sent to companies of several industrial sectors in Hungary. Out of the 169 responses 141 could be used in the evaluation process. The authors have then determined the endogenous and exogenous risk profile of each one, based on the type of industrial activity of the company and the physical location of each plant, and defined four distinct categories. These categories are displayed in a 2x2 matrix shown in the figure 2.4.

The first group was named "Reactive". This group encompasses companies that face small exogenous and endogenous environmental risks. This environmental strategy applies to companies that have limited environmental footprint and consequently there is little to no regard to this issue in the decision making processes of the organization, be it at strategic or operational level.

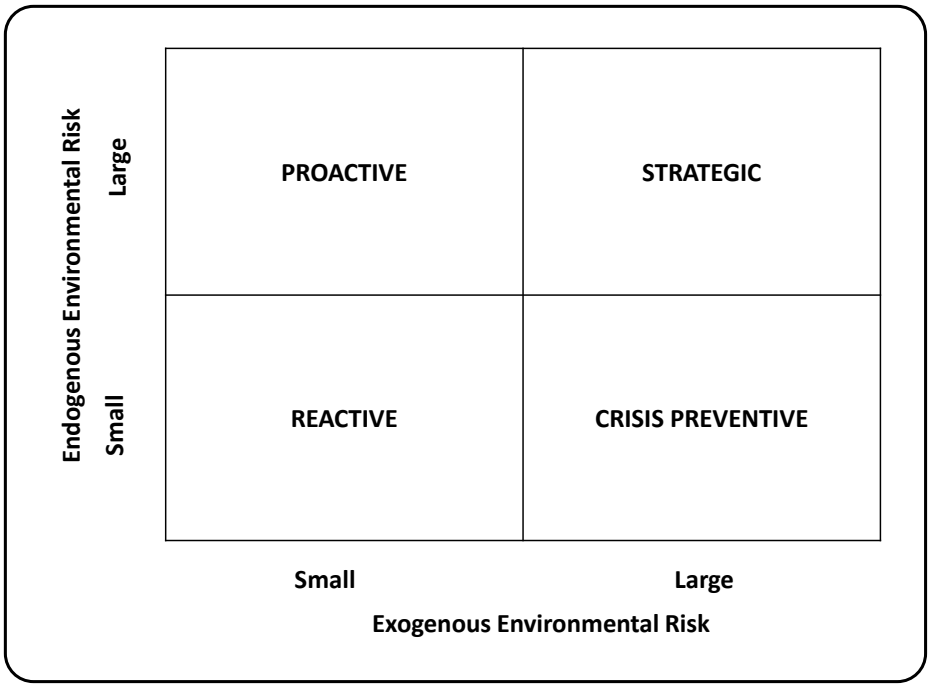

Figure 2.4: Classification of environmental management approaches (VASTAG; KEREKES; RONDINELLI, 1996)

The second group consists of organizations which have a high potential of pollution and environmental impact due to the nature of its processes. However, due to investments in infrastructure or given a very remote location of the plant the risks and impacts of pollution are small. These organizations show a greater concern over environmental issues on the operational level, with decentralized staff that is concerned with particular plants, and that try to anticipate changes in regulation and public opinion that might affect the plant's operations.

The third group has high endogenous and exogenous environmental risks. These are named as "Strategic" since the environmental issue is an important part of keeping the business running without external pressures that might grind production to a halt. The authors cite chemical industries that operate in a heavily populated area. In this scenario environmental issues are dealt with at the high levels of the organization and there is great care to communicate the environmental strategy and avoid legal exposure.

The last group encompasses organizations that don't have a direct relevant impact over the environment, be it by the fact that they are less dependent of natural resources or by the fact that these impacts are indirect. However, the little externalities that are produced might affect a large number of people given the plants location. These fall into the category "Crisis Preventive". These companies generally focus their efforts in educational programs that aim at maintaining a low risk perception by the general public and investments in technology that avoids any increase in the level of pollution.

The authors did a non-parametric test using the 141 responses obtained, utilizing a CART algorithm (Classification and Regression Trees) to test if the responses were in line with the predictive classification they have done using the endogenous and exogenous risk profile of each organization.

The predictive accuracy of 47,5% is considered satisfactory by the authors given the complexity and the inherent difficulties of the classification process. Based on this result Vastag, Kerekes and Rondinelli (1996) come to the conclusion that there is a well-defined relationship between the endogenous and exogenous risk profile of organizations and their environmental strategy.

2.3.4. Winn and Angel (2000)

Winn and Angel (2000) also rely on a 2x2 matrix to study the environmental management practices in organizations. The authors base their research of the literature of corporate social performance, organizational strategy and previous models of environmental strategy to determine which are the most important and relevant dimensions in the adoption of a corporate environmental strategy.

In the first phase of the study Winn and Angel develop a questionnaire with 24 items, based on environmental management categories from Arnfalk and Thidell (1992), and send it out to 535 member companies of the *Duales System Deutschland GMBH* (DSD). The DSD is a no-profit consortium which has been established by German industries given the new solid waste regulation approved in 1991 which required companies to collect and recycle the majority of packaging material from their own products. A total of 135 complete questionnaires were used to determine the two dimensions for the model developed by Winn and Angel (2000).

Similarly to Hass (1996), Winn and Angel (2000) establish dimensions dealing with the implementation of the environmental management program and the formal commitment of corporate policies. Both models point to the existence of situations where there is an imbalance between the formal politics and the actual implementation of the pretended actions. To find out more the authors seek out four companies, each of which has fallen into a distinct category of their 2x2 matrix and operate in the same economic sector, for an in depth case analysis.

The four categories have been named “Deliberate Reactive”, “Unrealized”, “Emergent Active” and “Deliberate Proactive”. The figure 2.5 summarizes these positions which are further detailed in the next paragraphs.

Approach to Implementing Corporate Greening

Policy Commitment to Environmental Issues	passive/reactive	active/proactive
low	**‘Deliberate Reactive’ Greening (Cell 1)** *unsystematic, reactive, reluctant* Top management shows no commitment and the environment is not seen as the company’s responsibility; The environment does not appear in functional decision making, nor in operations specifically; The company is not prevention oriented and shows little planning or monitoring for prevention; The firm is an environmental follower	**‘Emergent Active’ Greening (Cell 3)** *CEM, despite top management, accidental capability* The firm manages suppliers and R&D for the environment and takes responsibility for environment; Prevention is part of the organization’s capability set and it is innovative, but: The environment is not systematically considered in all functional decisions and top management shows no commitment to environment
high	**‘Unrealized’ Greening (Cell 2)** *top management professes importance: yes – priority: no* *lack of CEM systems* The environment is considered in all functional decisions and top management appears highly committed, but: Neither suppliers, nor product R&D are managed for the environment, and the organization is not seen to have a responsibility for its environment; Planning, monitoring, and prevention is low; The firm is an environmental follower	**‘Deliberate Proactive’ Greening (Cell 4)** *integrated policy and systems of CEM* The environment is considered in all functional decisions; Inputs and suppliers are managed and products are designed for the environment; Top management is highly committed, and the organization takes responsibility for its environment; Organizational prevention capability is high; The firm is an environmental innovator

Figure 2.5: Model of corporate greening (Winn & Angel; 2000)

The first category is described as “Deliberate Reactive”. Organizations that fall under this category have week formal commitment to environmental responsibility and commonly react to the issue only when pressed by some external party or to a critical fact which cannot be avoided. These organizations don’t see the environment as something that has to be taken in consideration during decision making processes, be it on strategy, be it on operational level. There are no monitoring mechanisms at all or environmental reports. Additionally

environmental misconduct only leads to corrective action from the organization if there is significant pressure from an external stakeholder. The case study points to companies that are heavily under cost pressures and management is focused primarily on financial figures. Environmental responsibility actions are only implemented if there are clear and foreseeable economic benefits as well as simple implementation process.

The second category, "Unrealized", encompasses organizations that have a stated commitment from top level management to environmental responsibility, however this does not translate into actions and the common sense in the company is that these issues are not important. Operational level does not take environmental responsibility into consideration in planning and decision making and there are no formal reports. These companies are usually accused of committing "greenwashing" (OLIVER, 1991), the use of environmental intentions for promotion while there is little to no practical increase in environmental performance. The case study showed that these companies have active communication strategy that praises environmental responsibility while plant level operations all but ignore it. The authors argue that this is a result of low level of importance given to the issue in the management of the company that is unable to align multiple objectives in order to achieve environmental, social and economic targets.

The third group, "Emergent Active", describes organizations that proactively implement environmental responsibility actions but that don't have formal companywide politics that explain their existence. That is, there is no formal consideration of the environmental issues in the decision making process, be it on strategic or operational level. The environmentally responsible actions appear as a side effect of "business as usual" in these companies. This pattern is similar to the emergent strategies described by Mitzberg and Waters (1985) on organizational level. The case study showed that there is a great effort of middle management towards the actions that boost environmental performance. This is however not because greater environmental performance is achieved, but rather environmental performance is a side effect of production efficiency, namely in using less raw materials. Both consumers and top level management had little concern for environmental issues in this case.

The last group, "Deliberate Proactive", describes organizations that have a a stong formal commitment to environmental issues as well as an active and successful implementation of these intentions. This group contains companies that are pioneers on the environmental responsibility issue. Both strategic and operational levels take environmental responsibility in consideration during decision making and there are formal and periodical reports and audits in

all functional areas of the company. In the case study a strong commitment from employees has been found in all organizational levels, which enabled consistent and proactive implementation of the desired environmental management actions. The case study also showed that the organization used total quality management under ISO9000 norm as a guideline to audit its own environmental practices, going beyond any regulatory necessity.

Winn and Angell (2000) consider that the types “Unrealized” and “Emergent Active” represent a disequilibrium that deserves special attention. Acording to the authors It is necessary to investigate how these companies can advance to a deliberately proactive position by either implementing actions or integrating the responsibility philosophy into the organizational culture and values.

In the case of companies that do have a public commitment to environmental issues, but were this does not lead to actual implementation the authors posit three possible scenarios. First, the fact that the commitment can be recent and there has been no time for implementation yet. Second the lack of resources to implement the actions. And lastly, that the issue is explored as a political statement using corporate communication with no real intention of implementing any responsibility actions in the day to day operations of the company (Greenwashing).

In the case of organizations that don’t have a formal political commitment to environmental responsibility, even though they do act responsibly, the authors also present three possibilities. First that middle management is not able to communicate the advantage that environmental responsibility is having on other performance indicators (specifically financial indicators), and thus lack the competence of spreading these actions to other departments. Second, that a given improvement has only been a response to a particular external pressure. Lastly that the implementation of these environmental responsibility actions is driven by the particular interest and personal values of a middle manager while top management has little regard for it.

The authors come to the conclusion that the issue of environmental responsibility is inherently complex due to the large number of internal and external stakeholders that are involved in the matter. However, that in an economy that is punctuated by fast and radical changes it becomes crucial for organizations to comprehend the relationship between formal commitment and actual implementation of any actions. In particular those regarding

environmental responsability since it has become clear that it will be a subject that will become more important in the future of organizations.

2.3.5. Abreu (2009)

Abreu (2009) develops a model of environmental classification with the intent that it could be used in both developing and developed economies and that is applicable to a wide range of sectors. The proposed model categorizes organizations according to the environmental pressures they are exposed to and the institutional conduct of these organizations.

According to the author the environmental pressures have roots in risk of environmental damage, regulation and the actual enforcement of this regulation and several stakeholders demands. Companies that operate in economic sectors with high regulation and enforcement, with and active body of stakeholders that remain vigilant to environmental issues and exercising activities that have high externalities are classified as having high environmental pressure. On the other hand, companies that operate in a sector with low regulation, with no vigilant stakeholders and producing limited externalities from their operations are classified as having low environmental pressure.

The environmental conduct on the other hand is classified between developed and not developed in the model. In the first case there is a formal environmental management system that has been implemented by the organization. In this case the top level management takes on responsibility and is engaged in infusing environmental responsibility philosophy into the corporate values and culture. In addition to this the environmental concern goes beyond corporate boundaries and involves suppliers and clients. Companies that don't have a developed environmental management system are characterized by the lack of formal positions in the organization to deal with environmental responsibility issues. This in turn leads to lacking resources, commitment and capacities to implement environmental responsibility actions. Possible actions that do reduce environmental impacts are implemented only if they are required to meet a specific regulation or if there are clear cost advantages in doing so.

The figure 2.6 shows Abreu's conceptual model.

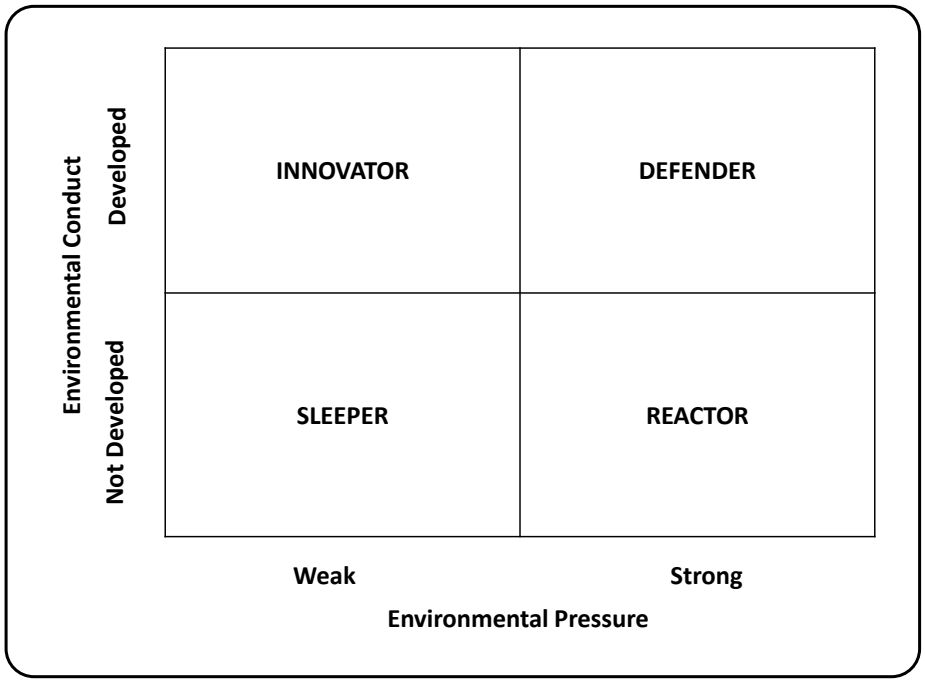

Figure 2.6: Environmental Strategy Matrix (ABREU; 2009)

Organizations that operate in a sector that has low environmental pressure and that do not have a developed environmental management system are classified as "Sleepers". Since there are no external pressures to adopt environmental responsibility actions the issue does not make it into the corporate strategy decisions. Any resources that are allocated to the issue are a result of minimum compliance to enforced regulation.

Companies that do operate in the same sector, with low environmental pressures, but have a developed environmental management system are classified as "Innovators". Abreu (2009) argues that these are usually market leaders and enjoy competitive advantages from this position, being able to develop new product and service offers given their ability to invest. Their strategy is proactive, going beyond regulation compliance. They also seek out certifications as means to further protect their competitive advantage. Finally, they seek to enhance the organizational ability as a whole to deal with environmental issues as opposed to have localized operational strategies to deal with it.

Organizations that are in a sector with high environmental pressure and that do not have a developed environmental management program are classified as "reactive". These companies seek to comply with regulation only so much as it does not bring their operations to a halt. Externalities that affect stakeholders are usually ignored and mitigation actions are only implemented if there is considerably legal or financial exposure in not doing so.

Lastly, companies that are in sectors with high environmental pressure and have developed environmental management programs are classified as “defenders”. These companies are aware of the negative externalities that their operations cause and try to mitigate them in order to avoid impact to their corporate reputation. Environmental responsibility programs are viewed as a form of improving return on investment and profitability since they improve corporate reputation and lead to more efficient processes.

In a more recent article Abreu (2011) argues that once a company has determined under which environmental strategy category it falls under the process of deciding what actions to take next becomes more comprehensive. Knowing where the company is and where it does want to get makes planning of environmental actions more reliable. The author does also reason that her model complements corporate strategy models since it does take in consideration both internal and external factors. By doing so it recognizes the limits a given organization has in moving from one strategy to another.

2.4. Summary of environmental classification models

This subchapters objective is to summarize the models which have been presented so far, evidence their commonalities and point out how they contribute to a strong literature review regarding the issue at hand. How each model connects to the others and to the three main drivers for environmental practice adoption from Paulraj (2009) will be discusses in the next paragraphs. This summarization has also been the basis for the interview guide used during the field study of this thesis.

The models of environmental management strategy classification, which were presented in this chapter, show very clearly that there is no consensus on which criteria and dimensions are most adequate to measure and classify an organizations approach to the issue of environmental responsibility. To that we can add that there are numerous other models, a comprehensive list of which can be found in the article by Kolk and Mauser (2002). Additionally this is an evidence for the complexity which is inherent to the issue of environmental responsibility as described by Ulhøi and Ulhøi (2009). Nontheless, the selected models have commonalities and paralels which, when taken together and suplemented with the notion of three main drivers of environmental responsibility from Paulraj (2009), offer a strong basis for the exploratory research carried out in this thesis. The table 2.3 summarizes the five classification models which have been presented in the literature review.

The figure 2.7 exemplify how the different models connect with one another. Two main axes are drawn from Abreu's (2009) model: Environmental pressures, which can be both internal and external, and environmental conduct which represents organization's internal processes and procedures. Vastag, Kerekes and Rondinelli's (1996) exougenous risk and Hunt and Auster's (1990) degree of risk reduction criteria have commonalities with Abreu's Environmental pressure dimension. Additionally Vastag, Kerekes and Rondinelli's (1996) endogenous risk provide a bridge between Abreu's dimensions.

In addition to Vastag, Kerekes and Rondinelli's (1996) endogenous risk and Abreu's (2009) environmental conduct, it is possible to align other three main dimensions in the internal axis of this visual model. The structure of the environmental system (HASS, 1996; HUNT; AUSTER, 1990), the declared commitment of the organization (HUNT; AUSTER, 1990; WINN; ANGELL, 2000) and the practical implementation of the environmental programs (HASS, 1996; WINN; ANGELL, 2000).

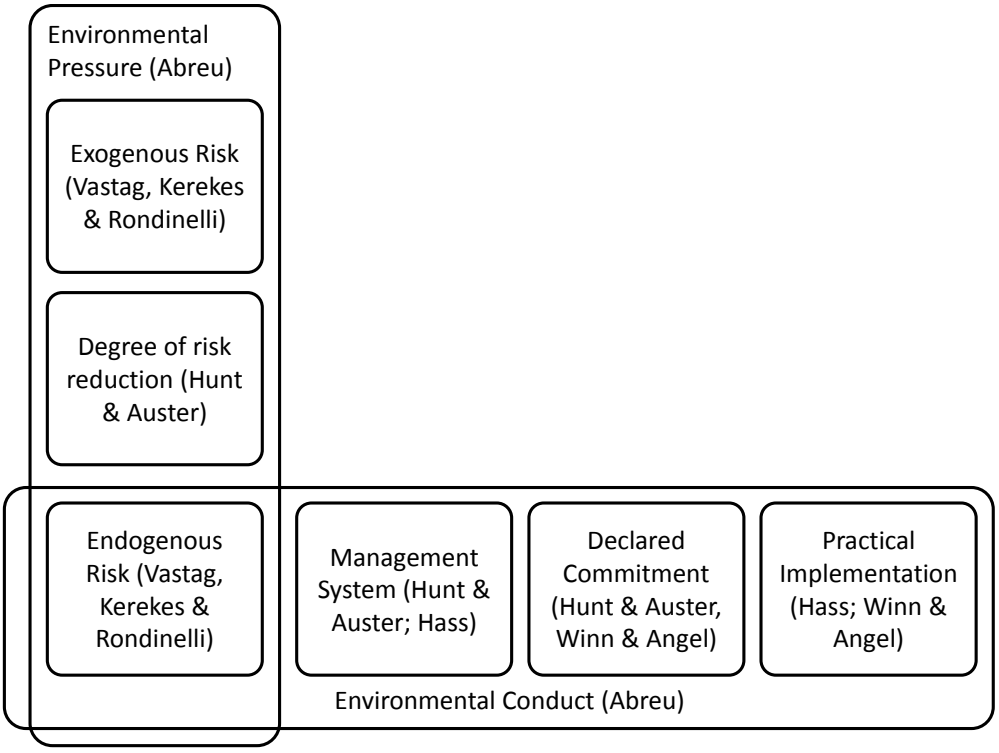

Figure 2.7: Visual map of models and criteria

Table 2.3: Summary of models reviewed

Author	Model	Type	Study	Criteria	Detail of criteria
Hunt and Auster (1990)	Prescriptive	Five Stages continuum	-	Degree of environmental risk reduction	To what degree does the program reduce environamntal risk in the organization
				Commitment of Organization	How does management of the organization deal with the issue of environmental responsability and what resources are allocated to it
				Program Design	Environmental performance goals, integration across the company, top level management reports
Hass (1996)	Descriptive	2x2 matrix	Norway, food processing and printing companies	Structure of Environmental Management System	Formal and structured environmental management program
				Implementation	Actual and successful implementation of the formal environmental policies
Vastag, Kerekes and Rondinelli (1996)	Predictive / Descriptive	2x2 matrix	Hungary, several sectors	Endogenous risk	Risks that are a direct result of operation and internal processes of the organization
				Exogenous risk	Risks that are determined by external issues like location, demographics, infrastructure, education and populations atitutes towards environmental issues
Winn and Angel (2000)	Descriptive	2x2 matrix	Alemanha,1st study in several sectors, 2nd study in food processing sector	Active or passive implementation	How does the organization deal with environmental issues
				Commitment of organizational policies	Formal commitment and organizational policies towards environmental responsibility
Abreu 2009	Descriptive	2x2 matrix	Brazil, O&G, textile and beverages industries	Environmental pressure	Internal and external stakeholder pressure an organization experiences in a determined sector
				Environmental conduct	Roles and processes an organization has to deal with environmental issues

Each model has been reviewed to identify the key questions and dimensions that were evaluated by it. These have been listed for each and grouped into three main categories of drivers according to Paulraj (2009), and further divided into motivators and concrete actions. Out of the five models and Paulraj's (2009) article 65 key questions or statements have been identified and linked to one or more of the three main drivers (regulatory, competitive or ethical). It should be noted that the amount of questions and statements in each category does not represent the relative importance, but rather the amount of questions that have been identified from the articles. Those vary in scope and depth both within and across each author's model.

Author	Regulatory		Competitive		Ethical		Total (no repetition)
	Motivator	Action	Motivator	Action	Motivator	Action	
Hunt and Auster (1990)	-	2	-	-	-	5	6
Hass (1996)	-	1	-	-	-	1	2
Vastag, Kerekes and Rondinelli (1996)	1	4	2	8	3	7	22
Winn and Angel (2000)	2	-	-	1	1	8	12
Abreu (2009)	1	8	1	4	-	7	17
Paulraj (2009)	2	-	2	-	2	-	6
Total:	6	15	5	13	6	28	

Table 2.4: Key statements and questions identified in literature review

Besides the fact that some statements and questions from the models can be linked to more than one main motivator, as per Paulraj's (2009), some are very similar to each other. Thus, all statements were grouped together by meaning and condensed into statements that represent the original meaning. The resulting framework is a comprehensive collection of the reviewed literature for this thesis and has been the basis for the interview guide used during the field research.

Table 2.5 shows as an example how the five statements and questions classified as competitive motivators have been summarized into two statements. This process has been carried out for all 65 entries that have been identified. Replication of the process shown in table 2.5 for all entries can be found in the appendix A.

Competitive Motivation	Author	Competitive Motivat	Author
Pollution prevention pays	Vastag, Kerekes and Rondinelli (1996)	Environmental responsibility programs have positive effect on the economic and competitive performance, ensuring short and long term benefits.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009)
In the long term, our spending on environmental R&D will give us an competitive andvantage	Vastag, Kerekes and Rondinelli (1996)		
We believe that our ecological responsiveness will lead to long-term profitability	Paulraj (2009)		
We believe that our environmental activities will differentiate us from our competitors	Paulraj (2009)	Environmental programs are key factor to aquire new customers.	(PAULRAJ, 2009), (ABREU, 2009)
Have clients requested environmental accreditation, either under ISO14001 or another norm?	Abreu (2009)		

Table 2.5: Summarization process of framework

The resulting framework has two statements for each of the three main motivational dimensions (Competitive, Ethical and Regulation) and three, six and five statements, respectively, regarding concrete actions of the organizations and is displayed in tables 2.6, 2.7 and 2.8.

Competitive Motivator	Authors	Henceforth:
Environmental responsibility programs have positive effect on the economic and competitive performance, ensuring short and long term benefits.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009)	**DC1**
Environmental programs are key factor to aquire new customers.	(PAULRAJ, 2009), (ABREU, 2011, 2009)	**DC2**
Competitive Related Actions	**Authors**	**Henceforth:**
Environmental responsability programs seek to improve the image of the organization to internal and external stakeholders?	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)	**AC1**
Solid waste management aims at improving the competitive position of the organization through lower expenses.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)	**AC2**
The organization seeks to improve its processes in order to achieve greater environmental and economic efficiency.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009), (WINN; ANGELL, 2000)	**AC3**

Table 2.6: Conceptual framework: competitive motivators and actions

Ethical Motivator	Authors	Henceforth:
Environmental sustainability is a challenge for all and we have to do our part because it's the right thing to be done.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009), (WINN; ANGELL, 2000)	**DE1**
Personal believes of top management is a key factor in the adoption of environmental responsability.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009)	**DE2**
Ethical Related Actions	**Authors**	**Henceforth:**
The highest level of management of the organization is actively involved in environmental responsability programs.	(HASS, 1996), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL,	**AE1**
Corporate strategy encompasses environmental responsability issues consistently.	(HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)	**AE2**
Allocation of resources, financial and otherwise, are consistent and cover the needs of environmental management.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990)	**AE3**
There is concern about the environmental efficiency of suppliers and service providers who serve the organization.	(ABREU, 2011, 2009), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)	**AE4**
The organization monitors and audits the disposal process of their wastes as well as other environmentla impacts?	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996)	**AE5**
There is comprehensive training that reaches all employees of the organization?	(ABREU, 2011, 2009), (VASTAG; KEREKES; RONDINELLI, 1996)	**AE6**

Table 2.7: Conceptual framework: ethical motivators and actions

Regulatory Motivator	Authors	Henceforth:
We are interested in being prepared for future environmental regulation to avoid problems when they come into practice.	(WINN; ANGELL, 2000)	**DR1**
The environmental program aims at fulfilling environmental regulation and avoid sanctions.	(ABREU, 2011, 2009), (PAULRAJ, 2009), (VASTAG; KEREKES; RONDINELLI, 1996)	**DR2**
Regulation Related Actions	**Authors**	**Henceforth:**
Incident prevention aims to avoid fines and penalties.	(VASTAG; KEREKES; RONDINELLI, 1996)	**AR1**
Waste disposal aims to meet the minimim needs established by the legislator or regulator.	(VASTAG; KEREKES; RONDINELLI, 1996)	**AR2**
Environmental management system to satisfy the requests of regulators.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996)	**AR3**
The reports developed by the organization are aimed at satisfying regulatory agency or lawmaker.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (HASS, 1996)	**AR4**
Training offered to employees aims to meet the standards and laws of regulatory agency or lawmaker.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)	**AR5**

Table 2.8: Conceptual framework: regulatory motivators and actions

3. Methodology

The following section will present the selected methodology used in this research as well as the research questions, case selection, case analysis methods and limitations of the present research.

3.1. Research Type

According to Yin (2005) the research methodology should be selected according to the answer to three main questions. The first one is what kind of questions the research addresses; the following one is about the amount of control that the researcher has over the events he is going to investigate; and finally, the last one is whether the events are contemporary or not. Figure 3.1 shows the most common research methodologies according to Yin (2001), and the set of answers to the three proposed questions mentioned above.

Strategy	Form of research question	Requiers control over behaivioral events?	Focuses on contemporary events?
Experiment	how, why	Yes	Yes
Survey	who, what, where, how many, how much	No	Yes
Archival Analysis	who, what, where, how many, how much	No	Yes/No
History	how, why	No	No
Case Study	how, why	No	Yes

Figure 3.1: Relevant situations for different research strategies (YIN; 2005)

Despite the fact that there are several initiatives in the field of environmental management in hospital operations, there is a limited amount of academic research addressing the issue, thus subsidizing some research seeking to answer questions of "how" and "why" these managerial movements are occurring. Eisenhardt (1989) contributes to this view, arguing that in early stages of a research topic a case study approach is most appropriate. Lastly, due to the fact that the organizations being investigated are real life businesses dealing with human life, an experiment has been eliminated as an option of research. In the light of these answers to Yin's (2005) guiding questions the present research constitutes an exploratory case study.

It was decided to do a multiple case study instead of selecting one particular in-depth case study. This decision was made due to time and access constraints. The fact that the field

research would have to be accomplished in few months (July 2013 and February to April 2014) and because of previous experiences in hospital management research, a full disclosure and commitment of one local hospital to this research was unlikely.

Unlike quantitative research that focuses on statistical sampling to achieve a representative group of subjects in the study, the case study methodology does follow a theoretical sampling that aims at enriching the study as a whole (EISENHARDT, 1989; YIN, 2005). Yin (2005) continues to argue that in a multiple case study, the selection should be made in order to achieve a literal replication, in which each additional case does lead to similar outcomes, or theoretical replication, in which case the researcher expects different outcomes due to predictable reasons. The latter method was chosen and selection of the cases is detailed in the section 3.3 below.

Moreover, it aims to provide robust and generalizing attributes to the results of the research (YIN, 2005). Semi-structured interviews have been carried out with 2-5 management employees from each case. As secondary data the researchers observation during the interview visits were considerate as well as documentation provided by the organizations or published on their websites, such as press releases, annual reports and general information about the organization. The use of multiple data sources does provide additional credibility and reduces bias (YIN, 2005; EISENHARDT, 1989).

3.2. Research Questions

The objective of this study is to identify what motivates hospital managers to seek and implement environmental management programs in their operations (Motivating factors) and which are the most important factors to be taken into consideration by the management team during this process. Both of these were identified in the literature review presented in chapter two and summarized in the research framework. Thus, we have two general questions which this study seeks to answer:

- - Why do hospital managers adopt environmental sustainability programs?
- - What are the critical actions for these managers take regarding environmental sustainability?

3.3. Case Selection

Because hospital operations vary a lot according to the type, intensity and quality of medical treatment, it was determined that only hospitals which provided high quality services would be taken into consideration for this research. To fulfill this purpose the Joint Commission International (henceforth JCI) hospital accreditation was selected as a qualifying factor. Interviews conducted before the current case studies with two managers working for one of the biggest health maintenance organizations (HMO) of the country showed that such a criterion would level the cases in terms of quality of medical services provided by the organizations. As far as type of is concerned, it was chosen not to be critical in the light of the proposed research questions since the main focus is on motivational factors, and not on measurable environmental impact, which can vary in types and intensity of treatment. It was further determined that the hospitals should be located in Rio de Janeiro or São Paulo due to travel and access limitations.

JCI accreditation is provided exclusively by the *Consórcio Brasileiro de Acreditação* in Brazil and can be specific to limited medical services (labs, transport, clinic, home care) or as a wholesome accreditation for the hospital unit. The latter one was selected for this case since the aim was to investigate a hospital as a unit of analysis. A total of 16 hospitals proved to meet this criterion. Five of those located in Rio de Janeiro and eleven in São Paulo as shown in Table 3.1 The first year of accreditation and the organizational nature (private vs. public run) are also listed. JCI accreditation has to be renewed every three years.

Finally, one case in Rio de Janeiro was discarded as a possible case because of its very particular nature. The HEMORIO – SES/RJ is a blood bank, and as such its main services hover around the collection, treatment and distribution of blood and not patients. The two medical experts interviewed prior to the case studies also agreed that it does not compare with traditional, patient centered operations.

Hospital	City	Ownership	Year of first JCI Certification
HEMORIO - SES/RJ	Rio de Janeiro	Público	2001
HOSPITAL ALEMÃO OSWALDO CRUZ	São Paulo	Private	2009
HOSPITAL COPA D´OR	Rio de Janeiro	Private	2007
HOSPITAL DO CÂNCER II	Rio de Janeiro	Público	2008
HOSPITAL DO CORAÇÃO - HCOR	São Paulo	Private	2006
HOSPITAL ISRAELITA ALBERT EINSTEIN	São Paulo	Private	1999
HOSPITAL NOVE DE JULHO	São Paulo	Private	2012
HOSPITAL PAULISTANO	São Paulo	Private	2010
HOSPITAL SANTA PAULA S/A	São Paulo	Private	2012
HOSPITAL SÃO VICENTE DE PAULO	Rio de Janeiro	Private	2008
HOSPITAL SÍRIO LIBANÊS	São Paulo	Private	2007
HOSPITAL TOTAL COR	São Paulo	Private	2010
SOCIEDADE HOSPITAL SAMARITANO	São Paulo	Private	2004
UNIDADE HOSPITAL SÃO JOSÉ	São Paulo	Private	2010
INTO	Rio de Janeiro	Público	2006
ALVORADA	São Paulo	Private	2013

Table 3.1: Hospitals with JCI certification in Rio de Janeiro and São Paulo

In the light on Yin's theoretical replication (YIN; 2005), this study aimed at investigating hospitals with different set of characteristics in order to provide robustness and external validity to the research. According to Delmas and Toffel (2004) firm characteristics moderate the adoption of environmental practices on the operational level and how stakeholder pressures are perceived. While the authors have cited multinational versus national firms, as well as leading firms and those that have historically a poor environmental performance, this study will depart slightly from that perspective in order to adapt to the Brazilian Hospital Sector. It was proposed that there could be significant differences among government run hospitals, HMO owned hospitals and private hospitals, since stakeholder pressures would potentially be absorbed in distinct ways by those organizations. Hoffman (2001) contributes to this hypothesis arguing that the cultural framework of an organization mediates how stakeholder pressures are perceived. It was determined that at least one case in each category should be investigated. Selected cases are described in more detail in chapter 4 of this thesis.

Hospital employees were contacted using personal networks or phone numbers and email addresses listed on the contact pages of the organizations. The employees dealing with environmental management were targeted as the primary desired interviewees. In all cases this was possible. A summary of the participating hospitals is displayed on table 3.2.

Hospital	Ownership	Location	Type	M²	Beds	Employees	JCI Accr. Yr.
A	Private Non-Profit	São Paulo	General	135000	650	6080	1999
B	Private For-Profit HMO	São Paulo	Cardiology	8100	93	440	2010
C	Public Federal	Rio de Janeiro	Orthopedics	70000	321	4700	2006
D	Public Federal	Rio de Janeiro	Oncology	6200	87	490	2008

Table 3.2: Selected hospitals for the case study

3.4. Data Collection

Data collection was carried out in two ways. Secondary data, in the form of annual reports, environmental reports and institution information were collected between July 2013 and May 2014. This information provides a general overview of the hospitals only and is not intended to provide an in-depth analysis of environmental performance or actions since this research focuses on what motivates managers to seek those programs.

Prior to field research, two interviews were conducted with managers of a leading HMO provider to gain knowledge on the characteristics of the sectors, validate some assumptions and check if the interview guide was appropriate. Minor changes were carried out in the interview protocol after these initial conversations.

Semi-structured interviews were conducted in July 2013 and between March 2014 and May 2014. Interviewees have been encouraged in the beginning of the interviews to freely talk about their background, professional history and personal take on the meaning of environmental responsibility and sustainability. The interview guide served only as a reference during the process to make sure all desired themes were explored during the encounter. These interviews were conducted and recorded for future transcription and analysis. All interviews were held with managers or coordinators at the time of the appointment and are listed below according to their job position, years of experience at the current organization and nature of the hospital.

Interviewee	Hospital	Years at the Company	Position
A1	A	4	Director
A2	A	6	Manager
B1	B	5	Manager
B2	B	3	Technician (susbtituting for manager)
B3	B	7	Manager
B4	B	6	Director
B5	B	2	Coordinator (corporate level)
C1	C	7	Manager
C2	C	9	Coordinator
C3	C	8	Manager
D1	D	10	Coordinator
D2	D	10	Director
D3	D	27	Director

Table 3.3: Interviewees

3.5. Data treatment and analysis

Secondary data were mainly used for a brief description of the organizations and the hospital. This provides the reader with the necessary organizational context of each case.

The recorded interviews were transcribed by the author and read at least twice to identify possible passages which meet the research framework presented at the end of section two. Each section that presented relevant information to the research theme or which could be clearly linked to a proposition presented in the framework was marked and copied to a table. This table identifies the author of the remark, which organization he belongs to, which page of the transcription the remark is on and which proposition of the framework it is linked to.

This analysis enabled the author to filter the necessary evidence out of the interviews, therefore providing the base for the analysis carried out further on. It also enabled the author to present the findings in a concise and summarized way for the reader of this study in the form of tables and graphs. A total of 335 sections[5] were extracted from the transcriptions into the analysis tables. Since some of those could be linked to more than one concept of the research framework, a total of 385 entries made up the analysis tables. Following this step, the entries were sorted by driver or action dimensions of the framework and by author.

[5] Citations from these interviews were used to illustrate the cases in Chapter 5. These citations have been translated by me with minimum alterations to maintain original meaning and cohesion. Appendix B. contains the original citations and their translations.

3.6. Methods limitations

Like all research methods, the case study methodologies have limitations. The first limitation is the possible bias from the researcher during the gathering and analysis processes of the research. The difficulty in distinguishing between variables and events during the research process contributes to this fact. Furthermore, the interviewees also introduce their share of bias to the research given the fact that their answers are based on personal beliefs and perceptions which by definition are subjective.

A second limitation of case studies is that they offer little basis for scientific generalization. Since the objective of this thesis is not to provide an overarching theory, but rather to provide a very specific and incipient view into what motivates managers of accredited hospitals in Brazil to implement environmental practices, there is no aspiration to provide results that can be generalized. Thus, the results of this thesis can only be generalized theoretically.

4. Case Description

A total of four hospitals took part in the research. Two private hospitals in São Paulo (one being a beneficiary charter organization and the other one being a unit owner by a national Health Maintenance Organization), and two public hospitals in Rio de Janeiro. This chapter will present a brief description of each hospital to provide context for the analysis chapter, which follows. Since the focus is on the motivation and critical actions of the managers regarding environmental responsibility programs less focus has been given on actual environmental performance and more on the general mindset of management workforce and general culture surrounding the issue at these facilities. Due to lacking standardization and public available data the information provided for each case description vary.

4.1. Hospital A

Hospital A is a private general hospital in São Paulo, Brazilians largest and richest city. The hospital is set up as a beneficiary non-profit organization (which should not lead the reader to believe it's exclusively a charity hospital) and has strong ties to a specific ethnic group. It is generally considered amongst the most sophisticated hospitals in Brazil, offering a wide range of medical services.

As a beneficiary charter the hospital has considerable tax cuts, it is however obligated to provide equal worth of services free of charge for the general public or for a public entity. In the case of Hospital A it does so by managing several public health care units and processing considerable amounts of exams for the public healthcare system.

The charter was founded in 1955 and financed itself initially by voluntary donations, originated from people in this ethnic group. While donations are still present today the largest amount of yearly budget comes from contracts with Health Maintenance Organizations, private treatment and the hospitals own insurance policies. According to annual reports the hospital has a conservative financial policy, relying mostly on revenues to finance expansions and growth.

The hospital is comprised of six buildings in different units across São Paulo city. The headquarter, and first building, has been housing the institution since 1971 after twelve years of building time and houses over the half of employees, beds and chirurgical units. In total the hospital has over 221 thousand square meters of constructed area, holding 652 hospitalization beds and 35 chirurgical rooms. A total of more than 198 thousand patient-days have been

logged in 2013 (patients in hospital at midnight of each day summed together over the year) representing an occupancy rate of 85%. A total of more than 45 thousand chirurgical procedures have been carried out and the medium patient stay has been 4,25 days in 2013. Between employees and third party staff that are directly involved with the daily operation of the hospitals units there are over 11 thousand collaborators.

The hospital has been accredited by the Joint Commission International for over ten years and has more than a handful other accreditations in the medical field along ISO14.001 environmental management certification for more than 10 years. Three of its buildings also have LEED (Leadership in Energy and Environmental Design) certification for environmental sustainable constructions, a certification given by the U.S. Green Building Council. One of these has LEED Gold seal, which is the second highest available.

The hospital also integrates is U.N. Global Compact principles (UN, 2014) into its operations, which proposes 10 mandates that companies should follow in the adoption of best practices, including social and environmental issues. Additionally the hospital adheres to the "Green House Gases Protocol" and discloses its environmental impacts according to GRI methods.

The hospital measures water and energy consumption as a total and relative to the amount of service offered during the timeframe of the measurement. Both have shown increase from 2012 to 2013. Water use has risen by 3,4% while energy use has gone up by 4,5%. Solid waste disposal has also been increasing, 4,7% from 2012 to 2013, but there has been reduction of infectious and none recyclable residues while recyclable residue have had an immense increase of almost 80%. Chemical and radioactive residues have also risen considerably, the first one due to a change in legislation, which changed classification criteria for the waste types and the later one due to increased services using this type of material.

As part of the solid waste management efforts the hospital has an active recycling policy, which includes not only common materials like plastic, paper and cardboard, but also specific byproducts like electronic waste (from obsolete equipment with electronic components), medication packaging and organic waste. Electronic waste is collected, disassembled and specific component sent to recycling, reconditioning or reuse by a co-op NGO. Specific medical suppliers have been engaged to reduce or eliminate waste from their product packaging and leftovers, either by utilizing cartridges, which can be sent back to the supplier

or packages that could be recycled efficiently. As for organic waste the hospital has three bio-digesters that process food leftovers to compost.

Greenhouse gases emissions, following the GHG Protocol have also been rising both as a total and as amount per service. Equivalent CO2 tons (the measure used by GHG Protocol) has risen 11,2% from 2012 to 2013, while the amount per service unit has risen 11,7%.

While these indexes are on the rise the Hospital has a Strategic Sustainability plan which aims at reducing to zero the amount of greenhouse gases emissions of the services it does provide. Two main projects to achieve this goal are a pneumatic waste disposal system and plasma based waste incineration equipment. The former uses tubes laid out over the whole building to receive waste packages and transport it to the disposal sector without the need of carts and human effort. Not only does it aim at reducing the resources needed to haul waste of the floors, but also does guarantee added security for patient and medical staff since waste can be removed quicker. The later system, the plasma incinerator, does use extreme high temperature to burn solid waste and by doing so eliminating the risk of infectious solid waste disposal, all the energy and resources that would have to be used to dispose the infectious waste and as a byproduct produces heat and energy which can be used by the hospital for its operations.

The hospital does also seek to reduce paper on administrative level, moving medical record charts to a paperless electronic system that can be accessed by the medical staff using electronic devices such as tablets and smartphones. This initiative has started in the smaller units of the hospital and is expected to grow rapidly to the whole hospital over the next years.

Environmental responsibility also makes its presence in the governance structure of the hospital. There are specific roles that deal with the subject under the Quality, Security and Environmental department. In addition to that the hospital has two boards, one responsible for the execution of the strategic plan and another for controlling the actual execution. The deliberative council elects both boards. Both these boards, which are considerate the highest management position, have staff committees that deal and advise the members on social and environmental responsibility issues.

4.2. Hospital B

Hospital B is a private hospital in São Paulo focused on cardiology and related diseases and emergencies. The hospital is part of one of the biggest private national health maintenance organization and was inaugurated in 2006 in a building specially constructed to host it. Alongside Hospital B the organization directly owns another 26 hospitals in the country, many of which in the same city, and has agreements with other 2100 hospital units countrywide to offer medical services to its clients.

The organizations roots date back to 1972 when its founder took over control of a small bankrupt clinic in Rio de Janeiro. After some years and acquisition the organization changed its name and business concept to offer health care insurances and has been expanding ever since to become the country's biggest HMO. In 2012 the organization started a merger process with an US based leading HMO organization.

Hospital B holds 93 hospitalization beds 19 of which being for intensive treatment spread over a total constructed area of 8.100 square meters. Over the year of 2012 it has performed over 14 thousand ambulatory treatments and had over 6.700 admissions. Its total workforce is comprised of approximately 440 workers, not including external doctors that perform specific procedures and surgeries in its installations.

Hospital B has been the second unit from the group to receive ISO14.001 environmental certification and is also one that holds the JCI certifications since 2010. The hospitals 2012 sustainability report follows GRI A standards and reports limited data on an aggregate level (12 units based in São Paulo region) regarding solid waste production as well as companywide aggregate data on energy and water consumption. A year-to-year comparison is not present in this report justified by the incipiency of the measurements.

Overall resources measured by the hospitals operations include natural gas (for heating), water and electricity. Between 2012 and 2013, the resource utilization across these three categories has fallen by 5% in each one. While there is no per service indicator like in Hospital A there are general occupation data available which for 2012 to 2013 indicate a 3,9% decrease which might be responsible for some part of the savings in resources. Other initiatives have been the installation of sensors to activate lights only when there are people present in common areas, the substitution of light bulbs for LED energy saving models and the shutdown of some elevators during the night shifts when there is usually no need to keep all available elevators turned on.

Several environmental practices to handle solid waste are stated in the annual companywide sustainability report and implemented in Hospital B. A "Green IT" program aims at reducing the need of paper based workflow, moving information to a centralized system, which can be accessed over any device reducing the need of printing services as paper utilization. IT waste is also periodically collected in Hospital B to be sent to a specific co-op that handles removal, reprocessing or recycling of those materials. In this case not only the hospitals own obsolete equipment is collected, but also coworkers are also encouraged to bring personal IT waste to the hospital. Finally, the hospital does have separate collection bins for the most common recyclable materials that are then sent or collected by appropriate service providers.

On corporate level there has been structured and implemented a sustainability committee in 2011. This committee reports to the board and is responsible to guide the Sustainability Department according to the company's strategy. In mid-2012 this committee has approved companywide guidelines regarding sustainability. The sustainability report states that one of the priorities is to develop a green hospital model, to come into place with a new hospital unit in Rio de Janeiro scheduled to be completed by 2014. This model should then serve as a reference point for other units of the organization.

Regarding hospital B, despite its relative new building, there are already construction efforts underway to move the hospital to a new location adjacent to the current building. This new building will be greater in size and is supposed to include modern environmental responsibility features. For instance, Green Buildings LEED certification, better use of natural light and better facilities to handle solid waste produced by the operations of the hospital.

4.3. Hospital C

Hospital C is a public hospital under federal administration. The hospital reports directly to the ministry of health care. It is a specialized orthopedics hospital which does serve not only as the main treatment facility of that nature in the state of Rio de Janeiro, but also as a reference point in public health care norms and procedures for the public national health care system as a whole. As every public hospital in Brazil it is part as of the national healthcare system "*Sistema Único de Saúde*" and as such all medical treatment is free of charge. Financial resources are provided directly by the ministry of health care and being a public

institution the hospital does need to comply with specific regulation regarding management, such as contracting and purchasing policies.

The hospital was founded in 1973 under a different name after acquiring a deactivated private hospital. In 1991 the hospital was passed over to the state of Rio de Janeiro but returned to the federal level after only a couple of years due to employee's efforts after struggling with lacking resources. By 1993 it had returned to federal management and in the following year acquired its current name.

The hospital moved to a new facility in 2011 more than doubling its capacity. The new facilities take just over 70 thousand square meters. In 2012 (the most current report available) the hospital had a total of 321 hospitalization bed, 48 of which are for intense treatment. It does also have 21 chirurgical rooms and 60 consulting rooms. The hospital has performed 6.784 chirurgical procedures in 2012, one third of which being of high complexity. In the same year over 169 thousand medical consultations took place.

The hospital has around 4700 collaborators in its day-to-day routine. Half of this workforce is comprised of federal employees who enjoy tenure. The other half is comprised of outsourced services provider's employees who do include cleaning, security, maintenance and general management tasks.

The hospital has been accredited with the Joint Commission International certificate in 2006 and recertified in 2009 and 2012. The new building has also been praised by national architectural organizations.

The new building did also bring transformation regarding environmental management of the hospital. Rainwater collection system has been installed and a water treatment facility is available on site to recycle gray water (wastewater which does not contain significant amount of human waste, for instance runoff from hand basins) to be used for irrigation, cooling of air conditioning equipment and cleaning of general outside areas. To save on water usage the new building also use water reducing valves for hand basins and two stages water flushing systems for toilets.

Regarding energy use the new building has solar panels on the rooftop of the building that serve as a complementary system for water heating. General need for artificial light has also been reduced due to greater window area, thus utilizing more natural light and common areas have sensors to automatically turn lights on and off. High efficiency central air conditioning

system has reduced energy per square meter usage for cooling the building. The air conditioning and lightning systems of the building are controlled by a preprogramed system that turns the air conditioning and lights off in areas that are not used during specific times of the day. The hospital management also has as an objective substituting all halogen lights for LED lights in the future.

From 2011 to 2012 water usage has increased 64% to 105 million m3 and energy use has increased 15% to 14 million kilowatts. The hospital does not have a per service unit measurement which can relate the amount of resources to actual service offerings. There is no carbon footprint report.

Environmental responsibility issues are dealt with by the Residue Management Sector, under the infrastructure division, which in turn is under the executive department, responsible for the day-to-day operations of the hospital. There is no formal sector or designation for the environmental responsibility management and there are no members of the board, or formal staff committees that report to the board, dealing with environmental responsibility. The Residue management team accumulates the functions regarding environmental sustainability and there is not a specific person dedicated to the issue in this department.

Annual reports have limited amount of information regarding environmental responsibility and environmental impacts. Public available data is limited to requirements from federal audit agency that does not encompass significant amount of data in that regard. Namely there are only total amounts of paper, water and energy used by the institution.

4.4. Hospital D

Hospital D is a public hospital under the federal administration. The hospital reports directly to the ministry of health care. It is a specialized oncology hospital which does serve not only as the main treatment facility of that nature in the state of Rio de Janeiro but also as a reference point for national public health care norms and procedures for the public health care system as a whole. As every public hospital in Brazil it is part as of the national healthcare system "*Sistema Único de Saúde*" and as such all medical treatment is free of charge. Financial resources are provided directly by the ministry of health care and being a public institution the hospital does need to comply with specific regulation regarding management, such as contracting and purchasing policies.

The hospital history dates back to the 1930s to the first governmental efforts in research and treatment of specific diseases. The hospital itself would only become an autonomous institution with its own hospital in 1957. This building is still today headquartering the institution, housing management and the biggest part of its treatment facilities. Over the years the institution has grown and currently has four treatment facilities. Two existing hospitals were incorporated in 1992 while the last one was constructed and taken into operation in 1998.

In total the hospital has 413 hospitalization beds in its four buildings (208, 87, 55 and 63 respectively), which serve different purposes according to specialty. Each facility has a focus on specific diseases or patient stages.

The hospitals workforce comprises approximately 4400 employees, 3200 of which are federal servants that enjoy tenure. The rest is comprised of outsourced labor force providing both services such as cleaning and security, as well as hospital specific tasks such as nurses and researchers. This second type of workers were until recent years a majority in the hospital, subcontracted to a private institution which would in its own not be obligated to federal contracting laws. This practice has been condemned by federal auditing institution and taken before court forcing the hospitals management to conduct a public tender process to substitute is outsourced workforce for public servants. This particularity means that since 2010 the hospital had a huge turnover in its workforce since public tender processes in Brazil have to be as little arbitrary as possible.

The hospital has received Joint Commission International certification for all its four units between 2008 and 2010. However, only unit 2 has been recertified in 2012 while the other three units have not been recertified.

The future plans for the hospital are to consolidate all current units into one singular complex, which is adjacent to the current headquarters. Landsite has been recently secured and demolition of previous constructions is underway. Planed conclusion is 2017 and the new construction plans to integrate advanced environmental responsability features like greater use of natural light, water reuse system and green rooftops.

Current environmental responsibility actions are limited to residue management in the hospitals, incipient use of paper free medical charts and legislative responsibility mandates in procurement process. These efforts have been undertaken mainly to comply with regulatory norms regarding handling of the residues and to comply with patient safety and security

chapters from the JCI certification process. There are no formal positions in the whole organization that deal with environmental responsibility issues. All units have specific employees responsible for residue management, but use service providers contracted by the organization as a whole for waste removal and treatment. Purchasing and other administrative tasks are also done on an organizational level.

While the organization has several tasks that are carried out on an organizational level the focus during the research was concentrated on the Unit 2 of the current hospital given the fact that it was the only one that still retained JCI certification. This hospital comprises 87 hospitalization beds, six high complexity hospitalization spots and a chirurgical center over 6.200 square meters in seven floors and approximately 500 employees including outsourced service providers.

As with Hospital C, annual reports have limited amount of information regarding environmental responsibility and environmental impacts. Public available data is limited to requirements from federal audit agency, which does not encompass significant amount of data in that area.

From 2011 to 2012 water usage has decreased 33% to 93 thousand m3 and energy use has decreased 10% to 21 million kilowatts. The hospital does not have a per service unit measurement which can relate the amount of resources to actual service offerings. There is no carbon footprint report. While consumption of these two indicators is significantly down there is no formal considerations as to the reason for such phenomenon in the official reports other than gradual replacement of light bulbs for energy saving models, incremental improvements in electrical appliances and the water pressure reduction valves.

5. Interview Analysis

In the following sections the findings from the interviews will be presented based on the interviews[6] and secondary data collection. It was decided to group the evidence by driver and actions (Competitive, Ethical and Regulatory) rather than by hospital. For each analysis point (a motivator or an action as stated in the framework) the cases will be presented in alphabetical order (A to D) unless similarities between the cases argue to present the cases in a different order.

A last subchapter will contain those items that were not foreseen by the research framework but that have been considerate as relevant for the theme given the input received during the interview process.

5.1. Competitive Drivers and Actions

Paulraj (2009) argues that the competitive motivator for organizations to adopt environmental management practices basically manifests itself in the search of cost reductions or differentiation for which a premium can be charged to the customer. These two alternatives are encompassed in this thesis framework by the driver DC1 (Environmental responsibility programs have positive effect on economic and competitive performance, ensuring short and long term benefits) and DC2 (Environmental Management programs are key factor to acquire new customers).

DC1 driver was present in some form in all hospitals. It was however not attributed directly as an advantage over competition, but rather as basic cost saving necessity given the ever-rising cost of energy, water and other resources. Alternatively as an obligation due to the fact that public financial resources are employed in the case of public hospitals. It has to be noted that in most cases the interviewees left the clear impression that environmental benefits are rather a side effect of good business practice and not the driver for the adoption of any specific environmental practice that has led to reduced costs. In all hospitals was the cost issue related strongly to waste management.

The DC2 driver was largely absent and even dismissed in several interviews as relevant for the current standpoint of the market. Only once was the environmental management

[6] All interviews were carried out in Portuguese. The inserts from the interviews in this thesis have been translated by the author with minimal adaptions, to maintain their original meaning. All translations have been presented to a peer to check for accuracy. Original excerpts and their translations are present in appendix B.

efforts, such as ISO14.001, mentioned as a feature that was seen as relevant to clients. But it has to be noted that this reference only came from the interviewee from the corporate level of Hospital B's organization in correlation to Health Care Plans sold by the HMO to other corporate clients and not for end users. On the operational level the idea of environmental practices as a feature that would be valued and paid for by the customer was dismissed in several occasions by interviewees from both private hospitals. According to A2: "Nobody pays. The paying source (HMO's, Banks, Insurance Companies) doesn't care if I am sustainable[7] or not. They won't pay more because I am sustainable". B1, from the second private hospital corroborate this view: "I think this issue is not very present. They are always very concerned with the cost. Of course when you worry about cost it might touch on this subject a bit. But as a matter of sustainability, I still think it is undervalued by the paying parties."

As for the public hospitals, since public health care system is totally free of charge in Brazil and the hospitals budget is not defined by the amount and type of services that are provided, this issue was completely absent.

Three main actions related to the competitive motivations were derived from the literature. First (AC1) that environmental responsibility programs seek to improve the image of the organization to internal and external stakeholders. Second (AC2) that solid waste management aims at improving the competitive position of the organization through lower expenses; and lastly (AC3) that the organization seeks to improve its processes in order to achieve greater environmental and economic efficiency.

Evidence for AC1 was found predominantly in both private hospitals although they varied in form and intensity. While both have ISO14.001 certification Hospital A provides greater amount of publicly available information through its website and annual sustainability report which follows GRI Level A+ guidelines[8], meaning that as external certifier has reviewed the report for validity. The 2013 report is the fourth following GRI guidelines. According to A1: "We are one of the few hospitals that disclose these indicators (environmental indicators), a

[7] Interviewees have used the concepts of environmental sustainability and environmental responsibility to refer to actions regarding environmental management programs and actions. While the translation has maintained the literal translation interviewees were referring to environmental responsibility.

[8] GRI (Global Reporting Initiative) is a non-profit organization which publishes guidelines for standardized reporting of corporate social, economic and environmental initiatives. The GRI guidelines have become widely used across boarders and market sectors. www.globalreporting.org/

series of internal indicators which I see that most other don't even know about, or if they do they are not willing to disclose."

Hospital B has less publicly available data both in its annual report and website (it has to be noted that Hospital B is considerably smaller and part of a larger corporation). On corporate level there is an annual sustainability report according to GRI Level A, without an external certification. This report has aggregate data from the whole corporation and while several initiatives stated in the report are present in Hospital B's operation there is no specific information to the hospitals environmental efforts and impacts. The 2012 sustainability report is the second one following GRI guidelines. According to B1:

> Today it's still viewed a little bit as marketing. People talking about sustainability because they see it's a trending topic. But anyway, it is a differentiation from others. The ones that talk about sustainability they want to be different. But I think beyond the marketing there is the preoccupation of the organization with the environment (B1).

As for both public hospitals there is little to no effort in utilizing environmental responsibility programs to address stakeholders' needs. Both hospitals disclose only environmental indicators required by a federal auditing agency and have no independent sustainability report or external auditing program in that regard. The information required for these reports is also minimal and far from GRI equivalent. Hospital C has limited information on its web page about the environmental management infrastructure of its new building while Hospital D praises the features that it's new headquarter (under construction) will have.

Evidence for AC2 was found amongst all Hospitals. Since hospitals produce a great amount of residues, part of which needs special treatment procedures due to infectious potential, it is a source of financial costs, which the organizations attend to. Depending on regional location a hospital has either to contract a private company to handle its residues or pay a fee for the public cleaning company to do so. Both private hospitals, in São Paulo, have to contract the public cleaning company for the removal and treatment of infectious residue, which charges by a three tier model (i.e. low, medium and large residue producer). For general waste a private company has to be contracted. In the case of the public hospitals in Rio de Janeiro both the infectious and general waste are collected by private companies. Nonetheless approaches vary across hospitals.

Hospital A's efforts to reduce residue management cost are both short term and long term. Short-term efforts include the constant training regarding disposal of residues as well as communication strategies to raise awareness over residue production in the first place. For

instance, from 2008 to 2013 it managed to reduce waste from not eaten food served by the cafeterias of the hospital from 18% to 7,5% (7,5% is equivalent to 8,5 tons of organic waste per month in 2013). In addition to that the hospital is installing a third biodigester, equipment that can transform this organic waste in composting material. In addition to that there have been efforts to increase the amount of residues that are recycled, and thus not disposed as infectious or general waste. IT and electrical waste is channeled to organizations that reuse those materials. Paper, cardboard, plastic and other recyclable material have made up just over one thousand tons saved from going to landfills. While the hospital makes little income from these materials (just over 34 thousand Brazilian Reais in 2013, equivalent to 15 thousand US Dollars), which is actually donated to a social cause, it saves the hospital costs in the form of general waste that does cease to exist and thus does not need to be hauled to landfills.

Hospital A also has initiatives from which it expects future economies regarding residues. A couple of large autoclave is being installed to sterilize infectious residues. By doing this the hospital expects to be prepared for future regulation changes and when those come into place have financial economies. According to A2: "Today it doesn't pay for itself, but when the municipality changes the rule[9], when the fee applies to volume, for weight, then I will save money." Another waste related investment that has been brought up by the same person is a pneumatic transport system of waste bags in the hospitals building. According to him this automated system can reduce the necessary man-hours of waste collectors by 60%, and since wages are increasing this system could in the future save the hospital considerable financial resources.

Hospital B has some efforts similar to the former case. The hospital does have recyclable collection bins for general waste as well as partnerships with recycling organizations for IT equipment. Training is provided on a regular basis and targets all employees that work in the hospital. Additionally all new employees receive instructions regarding waste disposal when admitted. Special attention is given to the ISO14.001 criteria, which the hospital has to fulfill to maintain its accreditation. While one interviewee has brought up the possibility of acquiring an autoclave to sterilize the infectious waste produced by the hospital, such equipment's were not installed until the time of this research. According to him it was under consideration and a major factor would be the return over investment factor of such an acquisition. No major change or transformation has been cited by the interviewees, which can

[9] Since in São Paulo there is a three tier model it can actually be beneficial, from the financial point of view only, for hospitals to dispose some general waste in the infectious waste if that will not incur in a tier change and not be sanctioned by the municipality infectious waste collection service.

be attributed to the fact that on corporate level there is a residue management handling plan since 2003 (prior to the hospitals existence) that is enforced in the groups hospitals in São Paulo.

Hospital C's efforts to reduce solid waste gained momentum with its relocation to a new facility in 2011. According to the interviewees the solid waste streams, both infectious and general waste, were planed from scratch up considering all the people and processes that they did influence. According to C3: "We started plotting the flow of materials, not just residues but also food, clothing, and everything else that has to do with hospitality. How many trash cans per floor. In the beginning it was hard, but with time we figured it out."

C1 complements the above statements: "We achieved reductions in residue, we had 40% infectious residue. Today we have around 11-12%, so we managed to reduce this infectious waste, thus the environmental impact. So you reduce cost, because infectious residue needs to be treated, you minimize cost." One main cause cited for this was the new processes and procedures for discarding medical waste. During the move to the new building it was decided not to have trash bins in every infirmary and consulting room. Instead, each sector has a centralized waste collection closet to which employees have to bring the waste in small bags. This extra work normally carried out by the nursing staff made the inadequate discard of general waste in infectious waste bins plummet.

Hospital D is indisputably the least advanced case regarding waste management. The solid waste management plan seeks to fulfill basic regulatory and JCI compliance terms. While in the past the unit that was the focus of this study had a recycling program for paper and cardboard such an effort did stop when the persons behind it left their positions. Subsequent efforts to restart the program where frustrated by bureaucracy and lacking resources. Existing efforts focus on training for correct disposal, but there is little to no concern regarding cost advantages gained from such practices.

Evidence for AC3 was found in all hospitals but varied in scope and approach. Both private hospitals showed a greater care for cost issues. All hospitals engage in basic actions to reduce energy and water consumption. Regarding energy consumption the use of sensors to automatically activate lights only when people are present in an ambient, and all hospital managers cited the use of LED lights. Regarding water consumption pressure reduction valves and two stage flushing systems were also common across hospitals. In all these cases the

financial benefit was cited as a clear driver which suggests that the environmental benefit is rather a welcome side effect of an action that was undertaken due to other reasons.

Hospital A has taken the issue further by exploring greater efficiency from its current facilities. To achieve this, the organization relies on LEAN and Six Sigma philosophies applied to their processes and procedures. Additionally the Hospital does benchmark itself against other companies in other sectors, in order to learn best practices and learn which one can be applied to the health care sector. "So we have been doing benchmark as a whole, and the environmental issue has been present a lot given the nature of companies we have visited[10]. They have this issue present a lot on their agenda." A1 continues:

> So, for instance, an action that does not seem to have anything to do with sustainability. When I have a faster turnaround of patients in the rooms it is like enhancing performance, like having a bigger hospital. So we are getting to the point where we realize that we don't need another building like we thought we did in a couple of years. Because in enhancing performance and not building another facility, I am making an interesting contribution to the environmental issue (A1).

In Hospital B, B4 suggest a strong connection of the actual medical practice, the hospitals financial burden and the environmental impact.

> So if I can do the same job with less resources, this is efficiency, and we have to seek it. Doing a job well done with abundant resource is easy. I want to know if you can do the same when you have labor shortages, scarcity of resources. We do always discuss this, for instance in relation to costs. If I'm going to have surgery, and instead of opening up 20 packages of surgical thread, I can open 10. Or if I can open only the exact amount that is needed? This is more intelligent and it is saving resources (B4).

The same manager makes another interesting connection regarding the use of blood products. According to him, even though nobody thinks about blood and blood derivate as a resource that has to been dealt with parsimony, it is a scarce item that does have significant environmental and financial impacts due to the whole collection, treatment, transportation and storage processes. Additionally it does always carry some degree of risk for the receiver patient. According to the interviewee, since they started considering blood and blood related products as a resource that has to be saved, the percentage of surgeries using those products has diminished from 60% to 35% without affecting the quality of treatment and medical outcomes.

In hospitals C and D the cost issue was addressed several times in regards to energy, water and paper consumption. Interviewees have cited the exchange of common light bulbs for

[10] The interviewees cited companies from the Oil&Gas and Mining industry as well as international forums and fairs related to environmental sustainability and medical equipment's and products.

energy saving LED models in hospitals as well as the installation and use of mode efficient air conditioning systems. Regarding water management in hospital C a grey water re-usage system was cited as well as water pressure reduction valves in the bathrooms, a feature that was also cited in hospital D.

5.2. Ethical Drivers and Actions

Ethical drivers to adopt environmental sustainability programs can be ordered under two distinct categories according to Paulraj (2009). First, as a general sense of belonging of the organization to the environment, recognizing that environmental sustainability is a challenge that each organization has to recognize and face with concrete actions. Second, that it stems from the personal beliefs of managers in key positions in the organization.

The first Ethical Driver, (DE1) "Environmental sustainability is a challenge for all and we have to do our part because it's the right thing to be done" has only been found consistently in Hospital A. Both interviewees from Hospital A have pointed to the fact that having been build and maintained by a specific ethnic group has infused the organization with social and cultural values from that group, and that these serve as a baseline for the corporate social and environmental responsibility. Additionally it was mentioned that the fact that the organization has systematically acquired knowledge about its environmental impacts over several years has given managers the actual scope of environmental impacts. According to A1:

> I think that when you discover that your hospital, that is there to cure, that it also harms, and that is what happens, and I am not talking about Hospital A. Every hospital does this; it is just that we measured it and found out that we do. So certainly this causes some harm to the environment, it has its quota of responsibility. And then the question is, how do I minimize this impact, how do I mitigate or if possible how do I eliminate this impact (A1).

In hospitals B, C and D it was mentioned by some managers that there are some people that hold personal beliefs that support this approach, but that this is yet to become a consistent culture across the whole organization.

The second Ethical Driver (DE2) "Personal believes of top management is a key factor in the adoption of environmental sustainability" has been identified in all hospitals as a key factor. However, in Hospitals A and B it was found to be one of the drivers for the actual adoption of environmental sustainability programs while in Hospitals C and D the lack of strong beliefs from top management regarding the issue has been cited as a barrier for more comprehensive adoption of such initiatives.

B1 acknowledges that there is still a long development journey ahead, but that the organizations leadership backs up the issue: "Certainly leadership here is involved in this work. And we have got the idea through quite reasonably to everyone in the organization. I think it will never be enough, for sure, but we are on the right track." A1 points to the importance of having the highest executive of the organization behind the issues of environmental management:

> I think that it's very hard for things to happen "bottom up". It is possible of course, but at some point it has to be "top down", it has to be on the CEO's and the President's agenda to get traction. And it is, it certainly is. Our CEO has long experience in the Oil & Gas sector; he does personally have strong cultures of security, environment and such issues. So I think he assigns great importance to these issues (A1).

Hospitals C and D show a different scenario. In these cases it was mentioned that the efforts to put forward environmental management initiatives are mostly due to the efforts of specific middle management personnel or a department which has developed such actions as a side project.

Interviews from Hospital C show a developing scenario in which the absence of top level support has been cited several times, but at the same time some incipient actions to consolidate environmental practices have also been pointed out. According to C3 "this initiatives will not come from them (top management), it has to come from us, from everyone, or from a group that is interested in developing this issues better." C2 adds to this arguing that top-level management has yet to consistently back up the environmental initiatives taken forward by her department. On the other hand C1 points out that specific actions point to a consolidation of environmental efforts across departments (more on that on AE2 further down)

Six actions related to the ethical motivators were derived from the literature. Consistent evidence for AE1 "The highest level of management of the organization is actively involved in environmental responsibility programs" was found in Hospital A and B. In hospital A the issue has received consistent attention from the top executive as already cited in previous paragraphs. A2 corroborates this view: "so you see, on the highest governance level, on the board level you have a committee that advises on environmental sustainability."

In hospital B the both B1 and B4 have praised the importance that higher management gives to the issue of environmental responsibility. A key factor has been the systematic collection and review of actual environmental data. B4 addresses this point in detail:

> Some of these indicators are reviewed on a monthly basis on a general performance meeting we hold. So for instance, energy and water consumption, amount of residue production, all these indicators are reviewed monthly and are also taken in consideration in certification meetings for the ISO and JCI, which have chapters that address these issues (B4).

Hospitals C and D showed yet again low or almost absent support from top-level management. In hospital C there has been limited support, the residue management team has taken on the responsibility of developing the environmental sustainability initiatives but there has been no top-down mandate to do so, or extra resource allocation to accommodate the extra tasks. In Hospital D, recent crisis regarding a huge workforce shortage and exchange has been cited for the lack of importance given to this particular area, even though the issue was considerate to be important personally by one of the directors.

Regarding action AE2 (Corporate strategy encompasses environmental responsibility issues consistently) both the interviews and the corporate communication material (annual reports and websites) where looked at.

Hospital A, as before mentioned, publicizes extend data relative to its environmental responsibility efforts and impacts. The hospitals yearly report follows GRI guidelines (A+ standard as per GRI levels) and displays in a comprehensive way the amounts of resources utilized by its operations. While the stated Mission, Vision and Values of the hospital do not state environmental sustainability or responsibility interviewee A1 has stated that such an addition is unnecessary since the current statements addressing commitment to social responsibility and the ethnic preacher of pursuing good actions already fit the environmental responsibility matter.

A2 has outlined how the hospital has developed a comprehensive environmental strategy over the past years. Although the hospital has ISO14001 over a decade it was argued that simply having an environmental certification is not enough. “We have the ISO14001 since 2003, but more as a bureaucracy thing, reporting environmental impacts for instance. But not as an umbrella environmental management system.” According to the interviewee an effort was made to establish what the state of the art environmental practices were on the health care sector by visiting fairs, searching for existent cases and comparing practices with other industries. With the assistance of an outside consulting firm an extensive master plan for the environmental management was devised.

> So given all that, we did a master plan for sustainability. For which I took everything that exists linking sustainability to hospitals and health care services. And that lead to 30 themes and over 104 guidelines to guide us. We can’t do everything at once, so we chose some priority areas for us to work on. This master

> plan was developed in 2011 and it continues being monitored and continues in force. It is broken up in pieces, so it has issues related to inputs, waste, greenhouse gases, green surgical center, healthy eating (A2).

Hospital B has limited attention given to the environmental issue on its yearly report. This document focuses predominantly on medical issues. There are mentions to the ISO14001 certification but without data relative to actual environmental impacts or actions in that direction. Stated Mission and Vision of the hospital are focused on medical issues while the hospital values mentions social responsibility and good governance practices. On corporate level Mission and Vision focus on health care and operational excellence, while the values are maintained the same. On corporate level a yearly report, following GRI A standard (self-reported with no external verifier), addresses the environmental responsibility issue on the corporate level focusing specially on the ongoing initiatives regarding environmental management. Resource utilization and environmental best practices are stated as being part of the reports surveyed issues while hard data on actual environmental impact is limited to aggregate amounts of solid waste generated by all São Paulo based own hospitals as well as aggregated water and energy data for the whole company. There is however no year-to-year comparison justified by the incipiency of those measurement efforts.

Nonetheless there is firm belief in the interviewees' opinion that there is support both on operational level as well as corporate level regarding environmental responsibility issues. Periodical meetings of employees that deal with the environmental responsibility issue on operational basis across all the corporations Hospitals in São Paulo as well as similar activities from maintenance personnel has been cited as an important action to boost the issue. A yearly "Environmental Forum" has also been institutionalized to increase awareness and spread best practices across the corporation. According to B1:

> So, this sustainability part I see as something that comes more from corporate level. From the high level management that has governance over all units. They define which hospitals will be accredited under ISO14001. So it started in another unit, then we were the second one and then they will look as to who is next to get certified (B1).

Hospital C has very limited attention given to environmental responsibility issues on its yearly reports. Mission, Vision and Strategic Objectives contain no mention of social or environmental responsibility. Likewise do the 20 strategic objectives for the 2010-2014 period. Environmental reporting is limited to federal auditing agency requirements. Water, energy and paper usage are listed for the last three years and some initiatives that have positive environmental impact are listed on the report.

Although not yet in existent, C1 has mentioned the request from top-level management to form a cross specialty commission to devise a sustainable logistics plan in the future. The same interviewee has however stated that there are obstacles, for instance the lacking training and courses offered to employees to enhance knowledge regarding these issues. C3 has argued that the issue is still concentrated at specific departments and people, and that this is a problem that has to be faced.

> It ends up being a project from housekeeping or from the residue management team, and it can't be like that. Sure many people have these concerns, but it has to be something more generalized in the institution. It has to be institutionalized; it can't be something that only a department does (C3).

Hospital D follows the same directives to elaborate its yearly report for federal auditing agency as does Hospital C. Likewise the information's contained regarding environmental management are limited. Mission, Vision and Strategic Objectives do also not contain any reference to environmental management. The issue is mentioned however in the prospects of a new building which is under construction and is supposed to host all future operations. Conceptual ideas are presented and praised as to enhance environmental performance in the future.

Two interviewees have stated the recent workforce crisis and exchange as a huge problem to implement any action that is not related to medical functions, although some employees have a personal concern over the environment. D3 has mentioned that a commission regarding external benchmarking and best practice search, not limited to the environmental issue, has failed due to medical problems of some participants that no other people could substitute. D1 has put it this way:

> We face many crises in here. So today this is not our focus (environmental sustainability). It's not our focus but it is a concern. A concern from coordination, from director that work with me on accreditation and that know that this has to exist. They know this and it is something that is held by them and that at some point in time has to be worked on. But today it is not our focus (D1).

AE3 action is related to "Allocation of resources, financial and otherwise, are consistent and cover the needs of environmental management." Here again we see a clear disparity between public and private hospitals regarding both financial resources as well as workforce to take on the tasks related to environmental responsibility management.

Hospital A's managers have argued that on the one side there is consistent allocation of resources to environmental management, with dedicated employees assigned to the matter and investments in infrastructure of substantial financial relevance. According to A1 the

environmental dimension is becoming a common issue when new projects are being presented in board meetings and that past projects that had environmental benefits have been approved even though from financial viewpoint there were superior options available. A2 has corroborated this with the already mentioned autoclave equipment's, which have no immediate return over investment given the current regulation.

Hospital B's interviewees have acknowledged that there is adequate allocation of financial and workforce resources even if there is no dedicated function on the operational level. However, according to B4 there will always be room for improvements and more investments regarding environmental responsibility, and that currently their focus is on spreading the general culture and awareness across the whole workforce of the hospital. He also added in his statements that in general the Brazilian society still lacks a broad environmental consciousness and that this reflects on each organizations actions.

> So, we gave the issue considerable importance, but I think that it might never get all the importance that it deserves. I think we need to reinforce the issue constantly. In our case we have focused on how we can make the environmental sustainability become a part of our culture, of the whole hospital (B4).

In Hospital C the consensus between the interviewees was that the allocation of workforce was the biggest obstacle for more comprehensive environmental management programs. The financial issue has not been brought forward in the interviews as a major issue. According to C2 the lacking workforce creates a burden to the employees, which can't manage all tasks with the care that each one deserves.

> When you can take care of your responsibilities chances are you are going to a good job. When you have to take care of somebody else's tasks, chances are that you are not going to do a good job on that job, neither on your own. So today you have a mixture of residue management, cleaning and sustainability. But with the man count that we have today in our department we can't handle all three issues (C2).

Hospital D has shown evidence of lacking resources in what concerns both financial and man count. As mentioned before the workforce crisis that the hospital has gone through hindered environmental responsibility programs from being established or continued over time since they have been very dependent on specific employees. All interviewees have stated that there is lacking human resources for comprehensive training and that some employees have been overburdened with the task of participating in up to five committees, holding high responsibility in each one.

In addition to that the allocation of financial resources is scarce and complicated. D4 argues that there is a general need of investments to make the environmental responsibility

issue go beyond residue management, and that such funding is currently unavailable. D1 adds that funding environmental programs is difficult given the absence of detailed guidelines or regulations to force implementation of such measures.

> There are no financial resources to take these things forward. And we don't have the necessary funds to do it ourselves. For instance if I want to change the hydraulic systems in the building to collect rainwater. This will have some costs, to adapt the infra structures, how will we pay for it? We have to make a public bidding. And based on what? Does this follow any guideline from the ministry, from the health care agency? When we want to make a public bidding we have to state what law or regulation this is attending to. So if there is no one telling us that we need to do something to be in compliance to a specific law, it does not happen (D1).

AE4 action "There is concern about the environmental efficiency of suppliers and service providers who serve the organization" has been brought up in hospitals A, B and C. All three have in common the concern over services regarding hospital infectious waste and the companies that process these materials. This however seems to be rather an effect of regulation since hospitals are co-responsible for their waste up until final destination. All three hospitals have also cited the concern over less harmful cleaning products used by service provides which take on cleaning and maintenance tasks in the hospitals.

Packaging materials of deliveries to the hospitals, be it of equipment's, medication or other materials have also been cited on interviews of these hospitals with greater emphasis by both private hospitals, which have engaged suppliers to work with less, reusable or recyclable packages when possible. Hospital B has stated not only environmental concern but also lacking physical capacity to store huge amounts of residue.

As for the purchasing processes, all hospitals have shown some concern but yet again there have been great differences between private and public hospitals. Both private hospitals have shown concern in the buying processes given their ISO14001 certification, which directs organizations holding its certificate to attend to the issue. Both public hospitals on the other hand have stated that they follow norms and regulations that apply to federal institutions regarding environmental requirements during public bidding purchases. It has also been stated by interviewees from these hospitals that such requirements are quite primitive and that there is no autonomy to enforce more stringent clauses at the hospital level since suppliers could contest those in court.

AE5 (The organization monitors and audits the disposal process of their wastes as well as other environmental impacts?) is related to the recording and measurements that the organization performs in regard to its environmental impact. During the interviews little

information in this regard was present. Interviewees from hospital A have stated that their hospital has been one of the very few that has done a profound inspection of environmental impacts. A good part of which is accessible in the annual sustainability report. In hospital B B4 has stated that in the search of excellence it makes sense to collect all possible outcome data, medical and otherwise, that are available.

> So today we try to measure all medical outcomes to patients to establish if I am treating him in the best possible way. What are the results of our surgeries, for instance in terms of mortality and complications. All this aiming at operational excellence. And it makes a lot of sense to collect to have this same mentality to other outcomes other than clinical. So, how am I dealing with the environmental sustainability issue in the hospital since hospitals do produce environmental impacts. So I think that environmental sustainability is something that is part of the operational excellence that we are aiming at for the hospital (B4).

As for both public hospitals the monitoring of environmental impacts is still incipient, with total amount of energy, water and paper being monitored. Additionally the volume of residues, organic and general waste is monitored.

The last action (AE6) related to the ethical motivator regards if "there is comprehensive training that reaches all employees of the organization?" All interviewees have stated that one of the central challenges related to environmental management is enhance awareness of both employees and general society, as well as to transform environmental responsibility from a trending "nice to have" topic to an actual practice that becomes a daily routine in the hospitals operations.

A1, from hospital A, has detailed how the issue is addressed in their case. The topic is considered as a strategic topic and as such it is always integrated in training sessions when there is a connection between the subject matter of a specific training and the environmental area. Additionally there are specific sessions dedicated to the issue.

> Our latest conversations have been in the direction that it does need to reach every employee in the hospital. So we are building our teaching grid so that all employees, even the outsourced ones, receive training. That is, that even the valet employees get the necessary training, because it does influence our delivery. So today we have this teaching program and these strategic topics have to reach every single employee (A1).

In the second private hospital periodical training stations are set up to engage employees in training sessions regarding environmental responsibility. B1, B2 and B4 have all made connections between the training efforts and the ISO14001 and JCI certification processes. In fact the training stations have been referred to as "certification stations". Additionally to that new employees receive training from the employees that handle the environmental issues on operational level at the hospital.

In hospital C the residue management team, which has taken on most environmental responsibility efforts, has recently managed to be included in the training process of resident practitioners, and as such provide basic safety and sustainability training for this part of the workforce. Additionally an in locum training effort has been cited in the interviews, in which employees from the department visit and train employees from other departments while these are on the job. C2 has however sustained that there is yet to be implemented a structured environmental training which can reach all employees and that there is also lacking external training possibilities for the employees which specifically handle environmental issues and provide training for the rest of the workforce.

D1 has presented a similar structure in hospital D. New employees receive basic training on admittance and specifically nursing staff receives further on the job training at a later stage. However it was also noted that the training has historically been dependent on the personal efforts of key employees and that these efforts have not been an institutionalized.

In all cases it was noted that some categories are more resistant to change of habits and work processes. Specifically the medical staff was cited as a group of workers that are less available for training sessions and resist more to change of habits.

5.3. Regulatory Drivers and Actions

Two motivators related to regulation have been identified in the literature review. One has a future oriented perspective, stating that organizations seek to adopt environmental practices in preparation to regulation that will come into existence or that are believed to be enforced in the future. The second one is a reactive motivator. That is, organizations seek to implement environmental practices to comply with current regulation only.

From all four cases only Hospital A's interviewees have shown a consistent future oriented positioning, which is the focus of DR1 (We are interested in being prepared for future environmental regulation to avoid problems when they come into practice). This future orientation is also present in the yearly annual report, which addresses long term development. As already cited on page 68 by A2, the organization is improving their residue management capabilities further than required by current regulation. According to him the hospital seeks to be totally independent regarding the processing of infectious waste, and by doing so being protected of future changes in regulation, which could increase the cost of contracting external service suppliers that provide such services. To accomplish this, the

hospital does look for state of the art technologies on the market and even engages in research efforts to develop new technologies.

> And in the end what I really want is equipment, which can process all residues and transform them into nothing, into plasma. You would end up with compressed tablets of residue. That's my dream. Complete treatment of gases, energy self-sufficient and even with some little cogeneration. We are working on this, because we don't want to depend on others (A2).

A further action that can be accounted as an incipient step into preparing for upcoming tighter regulation is the adoption of self-regulation mechanisms and collective efforts to develop and share environmental practices, even though interviewees have not specifically stated these as a conscious preparation process for regulatory changes. As self-regulation mechanisms the accreditation processes have stood out, be it JCI on a medical level or ISO14.001 on the environmental management level. The interviews have suggested that having some sort of external controller over the internal processes, which exceed the necessary regulation, is a stronger motivator to engage in these practices than having only internal commitment. In the case of hospital B the yearly report from corporate level has shown some limited orientation to long term development, and a yearly 2020 workshop organized by corporate level seeks to propagate and develop the long term orientation of it employees.

The second driver related to motivation, DR2, argues "the environmental program or actions aim at fulfilling environmental regulation and avoid sanctions". In all hospitals have interviewees stated the importance of complying with regulation, especially in regards to infectious residue management. Importance of this compliance however has been noted to be more present in the interviews from those hospitals that have less developed environmental programs and practices, especially hospital D. In hospital C the issue was brought up in reference to residue and purchasing while in hospital B, besides residue, the maintenance manager has argued that half of their actions related to environmental issues has directly to do with compliance (not stating the reason for the other half). In hospital A regulation has been brought up very little, mainly as an obstacle for more comprehensive and advanced environmental practices.

In hospital D regulation has been stated as being the main driver of actions that have been taken by the management or as a counterpart of actions that have not been taken because there is no regulation mandating those actions. D1 has argued that current regulation is dubious and unclear in several aspects, not just from the environmental standpoint. And that if something is not clearly mandated trough a formal obligation it is most likely not going to be put in

practice. D2 has corroborated this referring to the public bidding process used for purchasing, which follows federal regulation and has little to no room for customization.

Five actions have been identified from the literature review directly related to the regulatory motivator. The first one, related to actions put in place by the organizations to handle incident prevention has been found in all hospitals only related to infectious waste management since the current regulation clearly states the co-liability of hospitals over the residue up until final disposal. There was no mention of other environmental incidents, which the hospitals do prepare for, voluntarily or by regulatory mandate.

AR2 does address the waste disposal issues in more depth (waste disposal aims to meet the minimum needs established by the legislator or regulator). In hospital A the issue was not addressed as being relevant since there was a clear stated effort of having practices, which exceed legal requirements. In hospital B, B3 has stated that there exists a dilemma regarding what type of residue should be considered infectious or not, in the case presented by the interviewee all waste regardless of type that has been produced inside one of the patients' rooms should be labeled as infectious. As per B3 the hospitals policy has been to safeguard against any legal liability by interpreting the existing regulation in its strictest sense, meaning that all residue of the patients' rooms are treated as infectious.

In both public hospitals (C & D) the residue management practices where several times tied to the regulation regarding the issue. As C2's statement illustrates, "we do have a residue shelter, which is a legal obligation, it's no merit of our organization or something we innovated in, it's an obligation." In hospital D the waste disposal processes were also described as strictly following only the legal requirements imposed by the regulatory agency.

AR3 regards if there exist "environmental management system to satisfy the requests of regulators." In all cases were regulation cited as having somewhat limited influence on specific tasks and actions which the hospitals had to take, as already exemplified in the previous action point regarding solid waste disposal. Other regulations and norms, which have been cited and do touch all hospitals practices, are the elimination of certain materials and chemicals used in new equipment's, like mercury and CFC gas.

Both private hospitals had ISO14.001 environmental certification. In hospital A there was a clear separation stated by A2 between having this certification and in fact having an overarching environmental strategy and management system. While in hospital B the certification and protocols of ISO14.001 where referred to as the basis for their environmental

management. However, in neither case was the existence of environmental management programs related to a legal requirement.

Likewise in the public hospitals, C showing incipient signs of institutionalizing environmental practice into a formal environmental management program and D having only isolated environmental practices, have not mentioned any legal requirement mandating existence of formal environmental management programs. While it was stated in both cases that current regulation does require environmental criteria to be part of purchasing processes it has also been declared that there has not been comprehensive training to translate this regulation into systematic actions that benefit environmental purchasing (Hospital B) and that the regulations are still not specific and strict enough to account for any meaningful change.

As for AR4 (The reports developed by the organization are aimed at satisfying regulatory agency or lawmaker) there was a similar situation. While hospitals A and B developed sustainability reports bases on GRI standards by voluntary means both public hospitals developed limited reports for the federal agency overseeing both institutions (given the fact that they were federal hospitals). In no case was it mentioned that environmental reports were being developed to satisfy legal requirements.

The last action identified in the reviewed models relates to the training of employees. AR5: “Training offered to employees aims to meet the standards and laws of regulatory agency or lawmaker.” There was no indication in any case of environmental training as being part of any legal obligation for the organizations.

5.4. Other findings from the interviews

Some statements that have been brought up during the interviews could not be linked specifically to one of the proposed motivating factor or action of the framework but nevertheless offer insights relevant to the research of environmental responsibility in hospitals. These will be presented in this subchapter.

One point, which was addressed during the interviews, is if there was a direct linkage between environmental sustainability and health care. In all hospitals at least one interviewee stated that this was in case the fact while some interviewees stated that there was no connection at all. In the former group all were from the medical or nursing staff while the latter was comprised of management staff with business or engineering degree. These were

presented in two forms. First in the form of environmental practices benefiting the actual patient of a hospital, for instance in that natural light provided a more comforting ambience for patients and that this is believed to have positive effect over any type of treatment. A more elaborate connection was presented in hospitals A, B and C, referring to the environmental impact of a hospital and how those can lead to deterioration of humans health conditions, thus becoming a vicious cycle as proposed by Ulhøi and Ulhøi (2009). A2 has referred to the Hippocratic Oath to illustrate this fact.

> A basic principle of Hippocrates, first cause no harm. How can you cause no harm if you do need natural resources to treat people and to maintain hospital open 24/7. You need power, you need water, you need gas, and you need medical supplies, which are chemicals. So you have all these inputs and on the other end you have outputs in the form of residues, emissions, sewage, like any other production process. This was never cared about. Once you have these outputs you harm the environment, which closes a vicious cycle that is against the Hippocratic principle of not doing harm (A2).

Another point that the interviews have shown is that non mandatory certifications, like the ISO14.001 on environmental level and the JCI on the medical level can act as a mechanism of self-regulation of the organization which can lead to more consistent actions than only a proclaimed internal policy without an external verifier. This was made clear in statements collected in hospital B, C and D referring to the effort put into the correct solid waste management. Interviewees have stated that due to JCI certification a great attention was given to these issues, due to the fact that it is one of the certification chapters which the auditors require inspections on. Similar attitude was found in hospital B in relation to the ISO14.001. B4 has addressed the issue in the following way: “If I have a certification that means that I have established processes to make things happen more automatically, and I have an external audit to know if the things that I say are actually happening.”

Lacking benchmark opportunities and environmental performance measurements tailored for the health care industry was also cited as a barrier by the interviewees. B4 has cited medical databases as a comparison, arguing that for the medical issues of his specialty there is a vast and structured database available to compare medical outcomes on a worldwide basis while for the environmental performance no such feature is yet available.

> Regarding environmental sustainability we don’t have this kind of comparison outside of our group. What we do is to compare ourselves with the other hospitals from the corporation. How much water, electricity we are consuming and how much residue we are producing. We do this with the other hospitals in São Paulo. Twelve in total, in the group. We have very similar metrics for all these hospitals and we compare one to another (B4).

A2 does offer some insight into the same matter when he says that almost no medical organization has full comprehension of how much environmental impact they do produce. Hospital A has in its efforts developed a service index bases on "equivalent passages", which tries to represent the service amount provided in the field of medical diagnostics, emergency room and admitted patients. Crossing this service index with resource utilization, like energy, water and equivalent CO^2 the hospital has managed to establish an environmental performance index. This measurement is however internal and there has not been any indication of other institutions which utilize the same, or similar, method hindering environmental benchmark possibilities.

General attitude of society towards environmental responsibility has also been cited as one main influence over environmental practices of organizations, not limited to any specific economic sector. Several interviewees have cited the fact that environmental responsibility is only now becoming a relevant factor in people's lives and that throughout our society the issue is vastly neglected and given low priority. A2 exemplifies this arguing that a private hospitals group has picked up environmental responsibility as a strategic focus point only after several attempts and personal effort to push the issue forward, and even so it has been listed as one of the lowest priority of this focus group. The incipiency of the issue in the health care sector has also been pointed out by A2: "this environmental sustainability issue, this has been around for only about two decades in the world; it is very new in relation to what hospitals do."

5.5. Summary of findings from interviews

The following subsection will present a small summary of findings from the field interviews carried out for this thesis. These findings were also summarized in table 5.1 that show the consistent presence of each motivator or action in each of the hospitals that took part in the interview. While in some cases there were isolated mentions which do support one of the propositions the summary table only account for the cases where the issue was addressed by more than one interviewee and statements were consistent across the interview itself and corroborate by other interviewees. Further, table 5.2 does present the additional findings which were not part of the initial proposed framework. Two of those findings can be attributed to the hospital in the same way as propositions from the proposed framework, and another two are general statements about the sector as a whole.

Only one driver and one action were consistently found across all cases. The driver in this case is that environmental efforts lead to economic benefits and the action is correspondent to this driver, i.e. taking up practices which are both economically and environmentally beneficial.

Also on the competitive dimension the notion that environmental programs leads to acquisition of customers was not relevant to any of the managers of hospital units. Improving the hospitals image through environmental action was found only in private hospitals while economic benefits from waste management was found in both private hospitals and in hospital C.

On the ethical dimension all propositions found consistent backing up in hospital A. Hospital B stayed behind only in consistent addressing of the driver which acknowledges that environmental sustainability is a moral duty and in comprehensive monitoring and auditing of environmental impacts. Public hospitals lacked a consistent approach on this dimension, only Hospital C showing solid concern regarding environmental practices of service suppliers. Regardless of this fact interviewees from all hospitals have cited that environmental concern is still a lacking characteristic of the Brazilian general culture and that this has influence over organizations actions.

The regulatory dimension has shown the most lacking support from the interviews. Hospital A showed a more future oriented concern about regulation while the public hospitals showed a concern to fulfill current regulation. The existence of environmental incident prevention, environmental management programs, reports and training has shown no relation to regulatory mandates in any case. While waste disposal practices were consistently related to regulation in all hospitals except A.

		Hospital			
Framework Proposition: competitive related	Code	A	B	C	D
Environmental responsibility programs have positive effect on the economic and competitive performance, ensuring short and long term benefits.	DC1	x	x	x	x
Environmental programs are key factor to aquire new customers.	DC2				
Environmental responsability programs seek to improve the image of the organization to internal and external stakeholders?	AC1	x	x		
Solid waste management aims at improving the competitive position of the organization through lower expenses.	AC2	x	x	x	
The organization seeks to improve its processes in order to achieve greater environmental and economic efficiency.	AC3	x	x	x	x
Framework Proposition: ethical related	Code	A	B	C	D
Environmental sustainability is a challenge for all and we have to do our part because it's the right thing to be done.	DE1	x			
Personal believes of top management is a key factor in the adoption of environmental responsability.	DE2	x	x		
The highest level of management of the organization is actively involved in environmental responsability programs.	AE1	x	x		
Corporate strategy encompasses environmental responsability issues consistently.	AE2	x	x		
Allocation of resources, financial and otherwise, are consistent and cover the needs of environmental management.	AE3	x	x		
There is concern about the environmental efficiency of suppliers and service providers who serve the organization.	AE4	x	x	x	
The organization monitors and audits the disposal process of their wastes as well as other environmentla impacts?	AE5	x	x		
There is comprehensive training that reaches all employees of the organization?	AE6	x	x		
Framework Proposition: regulatory related	Code	A	B	C	D
We are interested in being prepared for future environmental regulation to avoid problems when they come into practice.	DR1	x			
The environmental program aims at fulfilling environmental regulation and avoid sanctions.	DR2			x	x
Incident prevention aims to avoid fines and penalties.	AR1				
Waste disposal aims to meet the minimim needs established by the legislator or regulator.	AR2		x	x	x
Environmental management system to satisfy the requests of regulators.	AR3				
The reports developed by the organization are aimed at satisfying regulatory agency or lawmaker.	AR4				
Training offered to employees aims to meet the standards and laws of regulatory agency or lawmaker.	AR5				

Table 5.1: Summary of findings according to research framework

Other findings related to environmental responsibility and health care have been the notion of a clear link between negative externalities and human health condition. This was supported by interviewees from hospitals A, B and C. Such a proposition is clearly linked to the ethical dimension. Another point which came up is the use of self-regulatory mechanisms for environmental matters, which will be proposed as the adoption of external audits and

certification regarding the issue. In this case it was found that hospital A and B do use such mechanisms. While this is not technically a pure regulatory driver or action in mimics those and it was determined to extend that category with this item.

		Hospital			
Additional Proposition	Type	A	B	C	D
Connection between environmental externalities and human health care condition.	Ethical	x	x	x	
Use of self-regulative environmental mechanisms in the form of external certification and audits.	Self Regulatory	x	x		

Table 5.2: Additional propositions after interviews

Finally two general concepts were consistently brought forward by interviewees in all hospitals:

- Society in general is still lacking consistent environmental concern and particularly in the health care sector the issue does not receive attention.
- Although some hospitals do measure some environmental impacts there is yet to be established a consistent benchmarking protocol and habit of this matter in the health care industry.

6. Discussion

The cases, which have been part of this research effort, have shown great disparities amongst each other that nevertheless offer insight into the existence and development of environmental management programs and actions in health care. The objective of this thesis is to investigate what motivates managers to implement environmental responsibility programs and actions, as well as pointing out what the main related actions addressing these motivations are. To accomplish this different environmental strategy classification models and literature about motivators have been used to devise a framework which served both to establish an interview guide and the analysis framework against which those interviews were compared to. The interview analysis already ties the interview results to that framework. In the following paragraphs a brief discussion will be undertaken moving back from the framework to the underlying literature from which it has emerged. First the drivers will be addressed and further on the managers related actions.

Evidence supporting the three driver categories presented by Paulraj (2009) have been found during the research, however how the existence of those underlying drivers lead to actions regarding environmental management and action seem to vary.

The competitive driver was present in the form of concerns regarding cost saving measures, derived in the research framework from Paulraj (2009) and Vastag, Kerkeres and Rondinelli's (1996). This was true for all institutions regardless of their ownership nature. While this research effort had no quantitative approach to measure relative importance within and across cases, a clear impression gained from the interviews is that given the economic sustainability issue of private institutions, which depend on revenue to sustain their operations, the cost saving driver was more pressing in those cases. The second competitive driver, based on contributions from Paulraj (2009) and Abreu (2009), which addresses the acquisition of new clients based on differentiation from competition using environmental initiatives has found no reliable evidence in the research process.

The first ethical drivers was based upon Paulraj (2009),Vastag, Kerkeres and Rondinelli's (1996) and Winn & Angell (2000) regarding the moral duty of an organizations to the sustainability challenge. Strong evidence for this driver was found only in the private non-profit hospital, which has a strong connection to an ethnic group. The evidence suggests that organizations take on values and conducts of their stakeholder groups, in particular those that have most influence over its governance. The fact that this hospital has a strong stakeholder group, which holds common values within itself, suggests the possibility of transferring those

values to the organization. For the other institutions there has not been evidence of a similar compact and homogeneous stakeholder group which could infuse the organization with such values. An overarching stakeholder group can be society as a whole in this case, but in the opinion of all interviewees the general concern for environmental matters is still very low. The second ethical driver has been based on Paulraj (2009) and Vastag, Kerkeres and Rondinelli's (1996) regarding top management support for the environmental initiatives. In this case the interviews suggest that there is an autonomy and bureaucracy problem affecting the public institutions. In all cases there did exist managers with genuine concern and believes backing up environmental management as an important task which the hospital should care about. However, the interviews conducted in the public hospitals point to the fact that those personal believes are hindered by the governance structure and culture of these organizations. That is, personal believes face great difficulty of becoming institutionalized as an organizational culture in the public institutions.

Regulation as a driver for the adoption of environmental practices has been proposed in a future oriented and present oriented fashion. The notion of adopting environmental practices as a preemptive action against future regulation has been proposed by Winn & Angell (2000). Only in the interviews from hospital A has a consisted future oriented approach to regulation shown to exist. The annual sustainability report also has a future oriented emphasis. Hospitals B corporate level also has some future oriented actions, however in this case the interviews on operational level have not shown strong evidence that future regulations are a driver for any action taken by those managers.

The second regulatory driver has been derived from Paulraj (2009), Vastag, Kerkeres and Rondinelli's (1996) and Abreu's (2009) and addressed current regulation as a driver. The interviews from both private hospitals have shown regulation to be the main driver for the actions that they consider to be linked to environmental responsibility. The same governance characteristics of lacking autonomy and great bureaucracy which seems to hinder ethical drivers to be translated into actions in this case seems to have an ambiguous roll of driving and not driving adoption of environmental practices. That is, if a regulation clearly mandates the adoption of an environmental practice, it becomes a strong driver. On the other hand, if regulation does not mandate specific actions or has ambiguous interpretation which present uncertainty it become very unlikely that any action will take place.

Besides the motivational drivers the literature review has also provided series of propositions and questions, which were summarized into action statements against which the

interviews and secondary data were compared to. This, as well as statements about the environmental actions that the hospitals performed have been the basis to answer the second research question of this thesis.

From the research framework we have several statements linked to the competitive, ethical and regulation driver. While the answer to those represents the consistent existent of such actions in the hospitals, given the views of the interviewees and the secondary data analysis, the lack of the action does not necessarily means lacking concern. A rather interesting point which became clear during the research effort is the existence of disequilibrium between what is happening and intend of some managers of those institutions. Those points will be addressed in the following paragraphs.

The first two actions related to the competitive motivators were based on statements from Vastag, Kerkeres and Rondinelli's (1996) and Abreu's (2009). The first one, concerning improving positive perception of stakeholders was found consistently in both private hospitals. The main targets of these efforts according to the interviewees were the own staff, followed by patients. A subtle characteristic, which has to be kept in mind, is that patients in most cases don't perceive themselves as the paying party of the services, which they consume in these hospitals since the vast majority does consume these services through a private health insurance plan. That said, the interviews suggest that the effort of enhancing positive image is rather a marketing intend which does not have a clear and direct payback for the hospitals. In hospital C, while this point could not be considerate as consistently existent, the interviewees have cited the fact that the hospital seeks to be a reference and dissemination point for its staff and patients, however that such initiative are still incipient.

The second action related to competitive motivator addresses economic benefits, which can stem from improved solid waste management. This was corroborated in most cases, only the hospital which had the least developed environmental practices did not show strong believes from managers that more advanced solid waste management practices can save money. It has to be noted however that in all cases was the issue dealt with rather from the medical security and financial point of view than from the environmental point of view. That is, the interviews suggest that in this case environmental benefits are a welcome side effect and not a primary intent.

The last action relates to operational improvements, which seek environmental and economic benefits. This statement was based on Vastag, Kerkeres and Rondinelli's (1996),

Winn & Angell (2000) and Abreu (2009). It has been found in all hospitals. In all cases the economic factor has shown to be paramount, the environmental benefits again being a welcome side effect. Improvements with no clear economic benefit were only referenced in the interviews from hospital A.

Actions related to the ethical drivers have shown the greatest disparity between private and public hospitals. But in these cases the interviews have also shown the disequilibrium between the managers concerns and the actions undertaken in the institutions. This has been particularly the case in hospital C.

The first and second action related to ethical drivers can be taken together in this analysis. Top-level management involvement with the environmental issues (HASS, 1996, HUNT; AUSTER, 1990, VASTAG; KEREKES; RONDINELLI, 1996, WINN; ANGELL, 2000) and if formal corporate strategy encompasses environmental issues (HASS, 1996, VASTAG; KEREKES; RONDINELLI, 1996, WINN; ANGELL, 2000). This was only found to be the case in the private hospitals. Governance and power structure of the public institutions as well as other pressing issues, for instance the work force crisis in Hospital D, have been cited as impediments in these cases. The interviews in these cases also suggest that our society as a whole does not pressure for environmental accountability in the public health care sector given the fact that the public health care system still can't provide medical services to meet demand and general environmental responsibility awareness is considerate low. This low relative importance also accounts for the lacking formal commitment of those institutions to the matter. In the case of hospital C however some incipient actions suggest that there might be a changing scenario. Interviewees have cited that grass-root initiatives from the residue management team have lead higher management to determine the establishment of a working team to institutionalize more sustainable logistics processes for the hospital.

The allocation of financial and other resources to the environmental issue has been the third action point of the research framework (HUNT; AUSTER, 1990, ABREU, 2009). Again here in both private hospitals the interviewees have showed to be contented with the amounts of resources. In the case of hospital A, which has shown the most investments in the notion was even that it would not be appropriate to invest more before having a more consolidated environmental culture amongst staff. Hospitals under public management on the other hand have shown to be lacking consistent allocation of resources to the environmental management issue. Governance and power structure, as well as the high demand for treatment have been suggested as the reasons for the lacking resources committed to the issue.

The fourth action statement dealt with environmental concern of hospital towards their suppliers and service providers (ABREU, 2011, 2009, VASTAG; KEREKES; RONDINELLI, 1996, WINN; ANGELL, 2000). Again we have seen a consistent approach from the private hospitals, partially driven by the fact that both have ISO14.001 certification and it does suggest austere contracting and procurement policies. Hospital C also showed to have initiatives concerning procurement, basically given a combination between regulation which mandates environmental attributes in procurement processes and the personal efforts of the residue management team which has become the focal point for the issues concerning environmental responsibility even without having a formal attribution or resources to do so.

The monitoring of environmental impacts has been the second to last action point suggested by the framework (ABREU, 2009, HUNT; AUSTER, 1990, VASTAG; KEREKES; RONDINELLI, 1996). Again at this point, the private hospitals exceled in relation to public ones. One fact that became apparent during the research process is that both private hospitals have more advances information systems that provide the ability of storing and recalling of environmental information's. The public institutions on the other hand seemed to resort to less advanced information technology, which meant that collection of data and information workflow was less advanced. Hospital C again has shown incipient actions to increase the data amount available to enhance its environmental performance. The interviews have suggested that in this case the personal commitment of part of the residue management team was again what enabled such advancements.

The last point is related to comprehensive training regarding environmental management to all employees (ABREU, 2011, 2009, VASTAG; KEREKES; RONDINELLI, 1996). As with all previous points the private hospitals shown a more structured and resource available approach to this mater. In this case however in both public hospitals interviewees have shown great concerns and exemplified those with actions that have been taken in the past or incipient actions taken for the future. In all cases have the managers stated that general populations approach to environmental responsibility is deficient, and as such employees need to receive comprehensive training and education to assimilate and internalize environmental management concepts. It was also several times noticed that environmental management is not part of the curriculum of the most common workforce of a hospital. That is, medical and nursing staffs do not receive environmental responsibility notions during their academic training even though they might be dealing with highly impacting materials. Even though comprehensive training for all employees could not be stated as being present in the public

institutions the interviewees have stated that there are incipient movements to establish a more comprehensive environmental training (Hospital C) or employees responsible for training that have been doing a personal crusade to disseminate the issue (Hospital D). In both cases it can be stated that there is genuine concern but lacking resources to take on the task of comprehensive environmental training for all employees.

Finally, out of the five actions relating environmental sustainability to regulation only one has shown consistent evidence in the interviews. Environmental incident prevention to comply with regulation (VASTAG; KEREKES; RONDINELLI, 1996), environmental management system (ABREU, 2009, HUNT; AUSTER, 1990, VASTAG; KEREKES; RONDINELLI, 1996), environmental reporting (ABREU, 2009, HUNT; AUSTER, 1990, HASS, 1996) and minimum environmental training to comply with regulation (VASTAG; KEREKES; RONDINELLI, 1996, ABREU, 2009) have not been supported by the interviews of this research.

The only action connecting environmental practices to regulation have been specific to waste disposal (VASTAG; KEREKES; RONDINELLI, 1996), in this case including sewage. The management of solid waste according to regulation has been presented as an environmental initiative in hospitals B, C and D. As a matter of fact it has been cited as the most important environmental activity in both public hospitals.

7. Conclusions and recommendations for future research

This chapter will present the conclusions generated from the research effort undertaken during the elaboration of this master thesis as well as presenting some future research proposals, which have emerged during this period and could not be answered in the scope of this effort.

7.1. Conclusions

The effort undertaken had as objective investigating what motivates hospital managers to adopt environmental management programs and what actions were being taken by these managers to address the environmental issues.

The literature review was based on environmental strategy models, stakeholder theory related to environmental sustainability and the scarce academic literature about environmental responsibility in the health care sector. These articles served as a basis for a research framework and a semi-structured guide for interviews that took place in hospitals based in Rio de Janeiro and São Paulo, Brazil. A multiple case study methodology was chosen given the incipiency of academic research of environmental responsibility in the health care sector and the type of questions which were proposed. A total of four cases have been analyzed to provide theoretical generalization which provides basis for future research. While on the outset of the research it was hypothesized that there could be significant differences between public, private autonomous and private HMO owned hospitals the field research has shown that both private hospitals have only subtle differences and as such the main differences appear when public and private hospitals are compared.

The three main motivating dimensions proposed by Paulraj (2009) have shown to be present in the adoption of environmental responsibility practices in hospitals. The interviews and analysis carried out for this research point to the fact that the ownership type and governance structure of those organizations determine which motivating dimensions will have greater influence over manager's decision making process. We will address the motivational factors first and further on the critical actions of hospital managers.

While in all hospitals there has been the presence of practices that have positive effect on both environmental and financial performance, evidenced from the interviews has shown that in most cases the environmental benefit is a welcome "side effect" of financial sound practices. The environmental practices aren't a competitive differentiation factor for hospitals.

While the denomination used throughout this thesis has been Paulraj's (2009) "competitive motivator" the findings suggest that a more appropriate definition is that there is a financial motivator driving adoption of environmental practices while there is not a competitive motivator doing so. That is, saving financial resources can be a motivator for hospital managers to adopt environmental practices while acquiring new customers or being able to charge a premium given environmental initiatives is not a motivator for hospital managers.

Ethical motivators on the other hand have been found to drive adoption of environmental practices in the private institutions while the public ones lack behind in these criteria. The reason being that private institutions have the necessary autonomy and resources required to implement environmental practices as desired by the stakeholder composition that has the most influence in its governance. A more compact and homogeneous stakeholder group in the private institutions does also benefit the adoption of values from these groups by the organizations. In the public institutions, while the interviews have shown genuine concern of at least some part of the management body of those organizations, the potential that those personal believes have to drive adoption of companywide practices and culture is hindered by lacking resources, autonomy and over-bureaucratic governance structure.

Regulation as a motivator for the adoption of environmental practices on the other hand has shown to be of great importance for the public sector hospitals. Given the governance and power structure of those institutions the top down mandates in the form of regulations and norms have shown to be the primary motivator for consistent adoption of environmental practices. At the same time, regulation being also somewhat primitive regarding environmental responsibility practices leads to low prioritization and effectiveness of such measures.

While the private cases that have been part of this research have shown to be less motivated by regulation than by other factors (Financial and Ethical) it has to be noted that both hospitals can be considered as high quality institutions, which is not the case for a lot of private hospitals in the country. It is rather likely those private hospitals which do not have equal resource availability as the cases that were investigated, will likely be more affected by regulation and financial motivators than by ethical motivators as has been the case for the chosen institutions.

Keeping those conclusions in mind an initial visual representation that hopefully will lead to further research efforts and can serve as a heuristic model for both practitioners and

academics is proposed in figure 7.1. An underlying initial problem which has already been addressed in the previous chapter is the fact that there are no consistent and widespread environmental performance data on hospitals, as well as no standardized measure which could be identified during this thesis to define environmental performance for hospitals. The model does however encompass the findings from the interviews. The width of the motivating boxes could vary over time. That is, the regulatory motivator could extend (or contract) given regulatory changes, which in turn will affect the environmental performance baseline an organization has to comply to in order to continue in existence (given that oversight is efficient, which is an issue that will not be discussed in this research). Thus regulatory motivator is heavily dependent on the state. The competitive motivator on the other side is more exposed to market factors like resource prices (which on their own can be depended on regulation), workforce availability and wage negotiations and demand for medical services (which are on the rise).

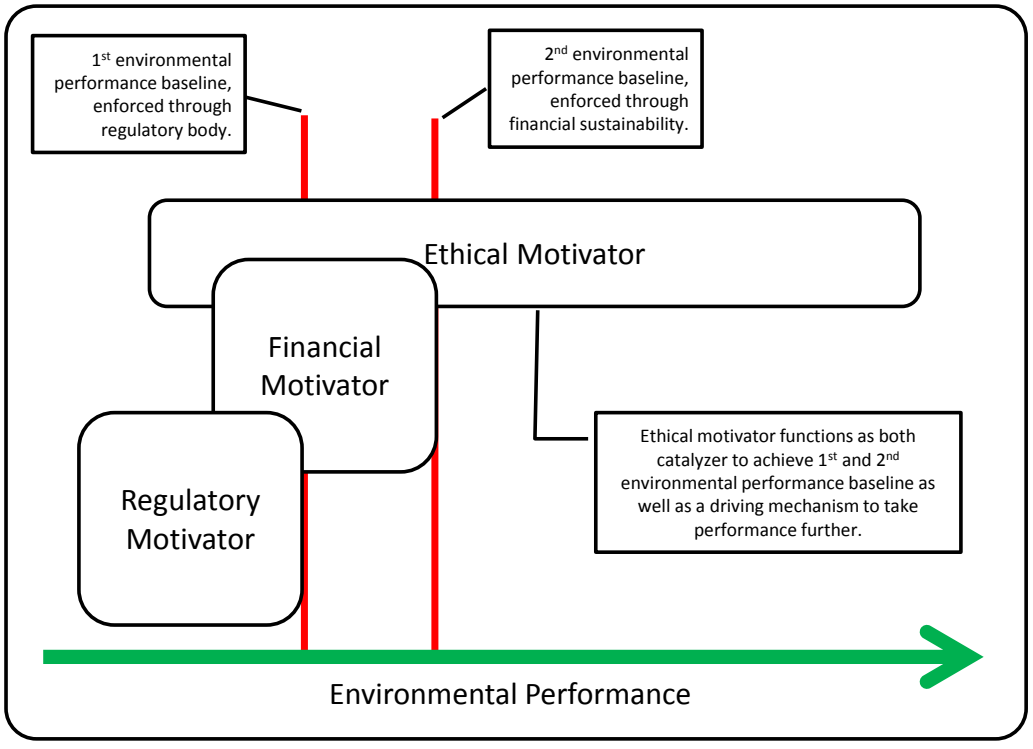

Figure 7.1: Conceptual Motivator/Performance Model

Lastly, while the ethical motivator could in theory also set an environmental performance baseline this would require that an organization cannot survive because it does not fulfill minimum ethical standards which would lead to failure in its operations. For instance, if the whole society does not approve of a given ethical posture and thus the organization does face a legitimacy vacuum and/or lack of customers. Given the notion that environmental concern of society as a whole is still considerate to be low and the fact that if such conditions would

arise they would most likely be encompassed by regulatory measures, an ethical environmental performance baseline does not seem to be reasonable.

A final note to this conceptual model is that private and public hospital might differ in the importance that the second performance baseline has. While it is reasonable to assume that public hospital managers should also have great care for the financial issues surrounding their operations it is a fact that they do, as a unit, function on a deficit logic. Private institutions on the other hand do need to generate revenues that cover expenses on the long run, with the threat to its existence if not able to.

Regarding the actual implementation of environmental practices the conclusion that can be drawn from this research is that there is a natural hierarchy of environmental priorities in hospital management, starting from the outputs and visible direct externalities of such institutions. That is, the first priority has to do with the correct waste handling, followed by waste reduction and then resource utilization efficiency. More elaborated strategies, for instance involving suppliers to develop more sustainable logistics and consumables and active lobbying for more comprehensive regulation on the issue, are of higher nature in this hierarchy. Figure 7.2 illustrated the conceptual model of actions.

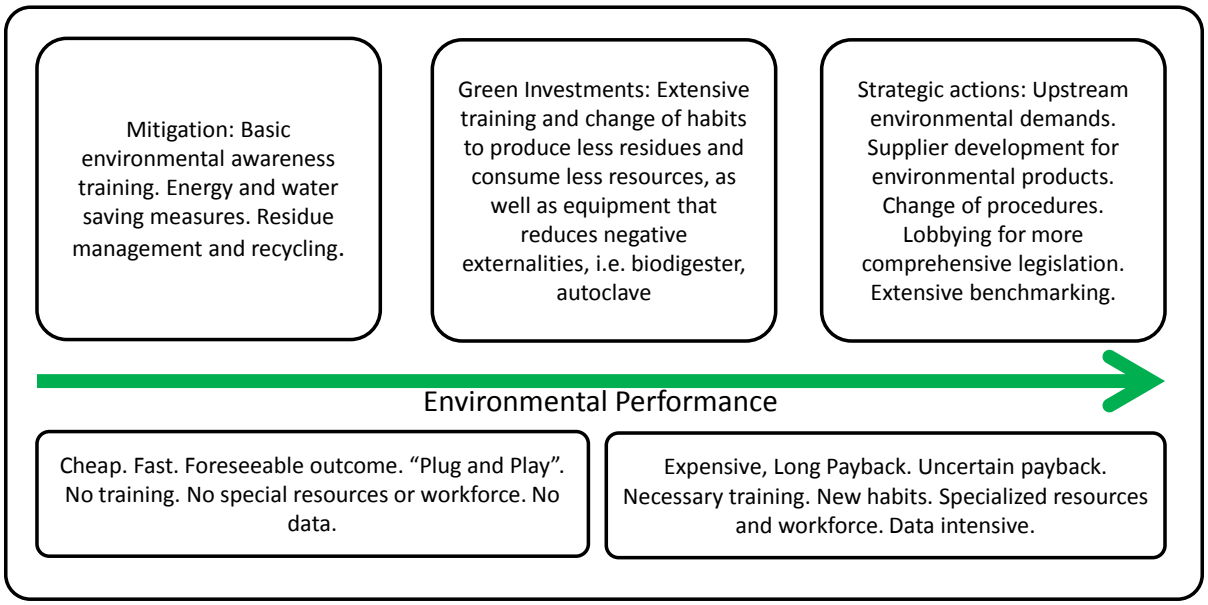

Figure 7.2: Conceptualization of environmental actions

While there is certainly no predetermined path that has to be followed as to which actions should be taken and in what order the interviews have shown a consistent patterns across hospitals in the implementations steps of environmental practices. Specifically, environmental concerns start at the residue management, energy and water consumption. Basic energy and water saving methods (like LED bulbs and two stage flushing) can be copied from other

sectors experiences without requiring extensive or specialized knowledge. Basic recycling policies are also easy and fast to implement. As for infectious waste reduction there are techniques which require some training effort but that have proven efficacy and can be implemented without too much financial resources (like Hospital C's residue flow rearrangement).

A further stage of actions would involve greater financial and resource investments, based on extensive training and advanced equipment's that might change significant processes and procedures which have to be carried out by the hospitals workforce. This might even require contracting specialized workforce. The financial payback for such efforts will be longer than basic mitigating actions.

A third stage proposed are actions that deeply modify services which are being provided (managing patient's health instead of treating patient's diseases), and the relationship of hospitals with their suppliers and regulators. These advanced actions seek to avoid negative externalities moving the focus upstream in the value stream. Lobbing for regulation that incentivizes environmental innovation and practices, and engaging suppliers in the effort to produce less harmful and impacting medical supplies. A common characteristic of such actions is the change of habits, more complexity dealing with external parties and the intensive use of data for benchmarking.

The conceptual model proposed here does recognize that there is a natural tendency of hospital managers to pluck the "low hanging" environmental actions. That is, to engage in environmental actions that are easy to implement without complications and innovation needs. This is a comprehensible movement in a sector which has historically all but ignored the issue so far, especially in the market which was analyzed (Brazil). However, the fact that even those organizations that are commonly believed to be the pioneers and leaders regarding environmental management are showing increasing environmental impacts indicates that there is a general need for more strategic environmental actions in this sector if externalities are to be kept at current or lower levels in the future. As mentioned, the strategic actions might involve a more complex set of actors in the value chain of the whole sector and be blocked, or subsidized, by some of these actors. For instance, it has been noted during the interviews that in the USA Group Purchasing Organizations (GPO's) are the main buying channel of medical supplies by hospitals and that these organizations have the negotiation and financial power to demand medical suppliers to change and adopt their product to fulfill environmental demands. Such practices are not common in the Brazilian market, buying power is thus fragmented and

hospitals have little to no leverage against suppliers to demand more environmentally responsible products.

Both conceptual models relate to environmental performance (which this research does not define nor did it intended to). However, assuming that future regulatory and market changes will drive the environmental performance baseline forward, and it is quite safe to say that it will over time, environmental actions implemented in hospitals will likewise need to move from the mitigating to the strategic pole of the proposed conceptual model to keep up with future requirements.

As a final conclusion of this thesis it can be stated that environmental management in hospitals is still very incipient and that regulation on the matter is both very relaxed in terms of environmental performance and too strict to allow for environmental innovation in this sector. The lack of broad academic research in this specific sector requires further efforts to advance these conceptual models into the quantifiable research and management tools that can assist managers to implement sustainability actions in their hospitals.

7.2. Future research proposals

In the outset of this research the proposed objectives have been set much broader than what could be accomplished given the limited access, resources and incipiency of environmental management practices in hospital environments, especially in the Brazilian health care sector. This became clear as the research moved from the literature review to the analysis of the secondary data and the successive interviews. Nevertheless some insight has been gained which spur new questions that deserve future research efforts to be addressed.

First there is no standardized environmental performance measure tailored to the specific services provided by hospitals. This in itself is a great challenge given the fact that there is a wide array of services provided utilizing distinct inputs and having equally distinct outputs in what concerns type and amount of materials. The issue is further complicated due to the fact that a given medical issue can be handled with different treatment types. And on top of that due to the fact that current measurements, when existent, generally don't have the necessary details to establish a direct treatment/environmental impact ratio. An incipient but isolated effort in this direction has been seen in Hospital A that does have an environmental impact per equivalent patient passages. A more detailed investigation on such environmental

performance measures and its capacity to serve as a benchmarking figure can offer further knowledge into the matter.

Moving back to the hospital managers the question arises of how to devise an incentivizing structure, which can combine both environmental performance measures as well as traditional medical performance measures. Certainly this is a very delicate situation since patient's security and environmental impact might well be opposing interests in many cases. The sheer existence of such performance measures can also be questioned.

On a strategic level an implementation model and/or a classification model of environmental management practice tailored for the health care sector can be an important managerial tool to drive increased adoption of such practices. The specificities of hospital operations and the growing size of this economic sector does call for managerial tools that can assist in developing and implementing environmental practices which enhance not only environmental performance but also help to keep health care costs under control. This can be of utter importance especially in countries with high resource depletion and environmental contamination as well as in those where financial resources are limited.

The models that have been depicted in the literature review of this thesis and the results about motivations and critical actions of hospital managers offer a good starting point to such an investigation. For instance, it became clear that during the research that in general the exogenous risk proposed by Vastag, Kerkeres and Rondinelli (1996) and the environmental pressure dimension of Abreu's (2009) model are low given the fact that general attitude of Brazilian society towards environmental sustainability is still very relaxed. A comparison with health care institutions in other geographies, where environmental consciousness is high, might result in interesting insights.

Second to last, on a more practical level a detailed case study evidencing the historical development of the environmental practices in a leading hospital from the environmental viewpoint can offer heuristic model for other hospital managers, which seek to develop or enhance their environmental responsibility practices.

And finally, a more comprehensive survey of environmental practices encompassing a broader array of institutions can present a better understanding of how the sector as a whole deals with the environmental responsibility issues.

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9. Appendix

9.1. Appendix A: summarization of models statements and questions.

Competitive Motivation	Author	Competitive Motivation	Author
Pollution prevention pays	Vastag, Kerekes and Rondinelli (1996)	Environmental responsibility programs have positive effect on the economic and competitive performance, ensuring short and long term benefits.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009)
In the long term, our spending on environmental R&D will give us an competitive andvantage	Vastag, Kerekes and Rondinelli (1996)		
We believe that our ecological responsiveness will lead to long-term profitability	Paulraj (2009)		
We believe that our environmental activities will differentiate us from our competitors	Paulraj (2009)	Environmental programs are key factor to aquire new customers.	(PAULRAJ, 2009), (ABREU, 2009)
Have clients requested environmental accreditation, either under ISO14001 or another norm?	Abreu (2009)		

Ethical Motivation	Author	Ethical Motivation	Author
We engage in environmentally friendly activities because it is the right thing to do	Paulraj (2009)	Environmental sustainability is a challenge for all and we have to do our part because it's the right thing to be done.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009), (WINN; ANGELL, 2000)
The environmental challenge is one of the central issues of the 21st century	Vastag, Kerekes and Rondinelli (1996)		
To minimize the chance of future environmental tragedies, we should pursue a partnership of government, industry and academia	Vastag, Kerekes and Rondinelli (1996)		
It is the responsibility of this company to improve the natural environment in which we operate	Winn & Angel (2000)		
Hierarchical level of environmental manager?	Vastag, Kerekes and Rondinelli (1996)	Personal believes of top management is a key factor in the adoption of environmental sustainability.	(VASTAG; KEREKES; RONDINELLI, 1996), (PAULRAJ, 2009)
Our environmental initiatives are driven be self-interest rather then a sense of obligation	Paulraj (2009)		

Regulative Motivation	Author	Regulative Motivation	Author
It is necessary for this company to sistematically gather information about environmental issues in order to antecipate future legislative requirements.	Winn & Angel (2000)	We are interested in being prepared for future environmental regulation to avoid problems when they come into practice.	(WINN; ANGELL, 2000)
We are very intrested in preparing for future environmental legislative requierments that may affect our organization	Winn & Angel (2000)		
Complying with regulation	Vastag, Kerekes and Rondinelli (1996)	The environmental program aims at fulfilling environmental regulation and avoid sanctions.	(ABREU, 2011, 2009), (PAULRAJ, 2009), (VASTAG; KEREKES; RONDINELLI, 1996)
Has the organization been fines or penalized due to environmental issues?	Abreu (2009)		
Environmental regulation is the primary driver for all our environmental activities.	Paulraj (2009)		
Our environmental activities are directed towards complying with institutional norms and/or regulation.	Paulraj (2009)		

Competitive Actions	Author	Competitive Actions	Author
Enhancing positive Image	Vastag, Kerekes and Rondinelli (1996)	Environmental sustainability programs seek to improve the image of the organization to internal and external stakeholders?	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)
Public communication program	Vastag, Kerekes and Rondinelli (1996)		
Environmental marketing program	Vastag, Kerekes and Rondinelli (1996)		
Does the organization have communication channels to receive environmental demandas from internal and external stakeholders?	Abreu (2009)		
Improve waste management	Vastag, Kerekes and Rondinelli (1996)	Solid waste management aims at improving the competitive position of the organization through the use of less material and lower expenses.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)
Recycling	Vastag, Kerekes and Rondinelli (1996)		
Disposal	Vastag, Kerekes and Rondinelli (1996)		
Does the organization have environmental indicators (Waste water quality, solid waste generation, noise, energy use, green house gases emission, etc)	Abreu (2009)		
Does de organization have operational controls to measure environmental impact?	Abreu (2009)		
Does the organization have R&D to develop services and product that have less environmental impact?	Abreu (2009)	The organization seeks to improve its processes in order to achieve greater environmental and economic efficiency.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009), (WINN; ANGELL, 2000)
We consider ourselves to be on the forefront with environmentally friendly products and processes	Winn & Angel (2000)		
Improve manufacturing technology	Vastag, Kerekes and Rondinelli (1996)		
Production (resource utilization)	Vastag, Kerekes and Rondinelli (1996)		

Ethical Actions	Author	Ethical Actions	Author
Support and involvement of top management	Hunt & Auster (1990)	The highest level of management of the organization is actively involved in environmental sustainability programs.	(HASS, 1996), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)
Is there top level management engagement with environmental [illegible]	Hass (1996)		
Board members with specific responsibility	Vastag, Kerekes and Rondinelli (1996)		
Top management can address arising problems immediately, since this company sistematically monitors its environmental impacts.	Winn & Angel (2000)		
Environmental activities are given the highest priority be the top management of this firm	Winn & Angel (2000)		
The top management of this firm is dedicated to the concept of sustainable development (i.e. economic development which does not adversely impact the natural environment.	Winn & Angel (2000)		
Are there reports of environmental performance for top level	Hunt & Auster (1990)		
General mindset of corporate managers	Hunt & Auster (1990)	Corporate strategy encompasses sustainability issues consistently.	(HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)
Environmental protection is part of the company written philosophy	Vastag, Kerekes and Rondinelli (1996)		
Environmental issues are always considered during new product development	Winn & Angel (2000)		
Our strategic planning process take our environmental activities and impact into account in decision about future investment.	Winn & Angel (2000)		
Integrating environment into corporate strategy	Vastag, Kerekes and Rondinelli (1996)		
Resource commitment to environmental issues	Hunt & Auster (1990)	Allocation of resources, financial and otherwise, are consistent and cover the needs of environmental management.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990)
How much resources are alocated to manage environmental issues?	Abreu (2009)		
Are there specific roles in the organization to deal with environmental management?	Abreu (2009)		
Environmental issues are seen as among the most important criteria when making major decisions about raw materials, auppliers, transportation, inventory, production processes, etc.	Winn & Angel (2000)	There is concern about the environmental efficiency of suppliers and service providers who serve the organization.	(ABREU, 2011, 2009), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)
Sourcing of raw materials	Vastag, Kerekes and Rondinelli (1996)		
Environmental performance evaluation of suppliers	Vastag, Kerekes and Rondinelli (1996)		
It is our responsibility to make environmental demands on our subcontractor/supplier and their products	Winn & Angel (2000)	Are there environmental criteria for supplier selection?	(ABREU, 2011, 2009), (VASTAG; KEREKES; RONDINELLI, 1996), (WINN; ANGELL, 2000)
Waste minimization is a primary goal driving decision making within all functional areas of this company	Winn & Angel (2000)		
Does the organization have environmental requierments for purchasing and sourcing?	Abreu (2009)		
Recycling	Vastag, Kerekes and Rondinelli (1996)	The organization seeks to monitor and audit the disposal process of their wastes?	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996)
Does the organization have environmental indicators (Waste water quality, solid waste generation, noise, energy use, green house gases emission, etc)	Abreu (2009)		
Does de organization have operational controls to measure environmental impact?	Abreu (2009)		
Is there performance objectives regarding environmental management	Hunt & Auster (1990)		
Familiarity of employees with company objectives in environmental protection	Vastag, Kerekes and Rondinelli (1996)	There is comprehensive training that reaches all employees of the organization?	(ABREU, 2011, 2009), (VASTAG; KEREKES; RONDINELLI, 1996)
Does the organization have complete knowledge of environmental legislation it has to comply?	Abreu (2009)		
Is there specific training regarding environmental management?	Abreu (2009)		

Regulative Actions	Author	Regulative Actions	Author
Preventing Incidents	Vastag, Kerekes and Rondinelli (1996)	Incident prevention aims to avoid fines and penalties.	(VASTAG; KEREKES; RONDINELLI, 1996)
Disposal	Vastag, Kerekes and Rondinelli (1996)	Waste disposal aims to meet the minimim needs established by the legislator or regulator.	(VASTAG; KEREKES; RONDINELLI, 1996)
Does the organization have an environmental management program (ISO14001, Own System, Being Implemented)?	Abreu (2009)	Environmental management system to satisfy the requests of regulators.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (VASTAG; KEREKES; RONDINELLI, 1996)
Have the environmental aspects been indentified?	Abreu (2009)		
Does the organization have environmental audits?	Abreu (2009)		
Hiring external experts in environmental affaris	Vastag, Kerekes and Rondinelli (1996)		
Nature of the reports	Hunt & Auster (1990)		
Is there a formal environmental policy for the organization?	Abreu (2009)	The reports developed by the organization are aimed at satisfying regulatory agency or lawmaker.	(ABREU, 2011, 2009), (HUNT; AUSTER, 1990), (HASS, 1996)
Does the company have clear policies regarding environmental issues?	Hass (1996)		
Does de organization have measuring and monitoring systems?	Abreu (2009)		
Does the organization produce and publish environmental reports	Abreu (2009)		
Is there performance objectives regarding environmental management	Hunt & Auster (1990)		
Familiarity of employees with company objectives in environmental protection	Vastag, Kerekes and Rondinelli (1996)	Training offered to employees aims to meet the standards and laws of regulatory agency or lawmaker.	(VASTAG; KEREKES; RONDINELLI, 1996), (ABREU, 2011, 2009)
Does the organization have complete knowledge of environmental legislation it has to comply?	Abreu (2009)		
Is there specific training regarding environmental management?	Abreu (2009)		

9.2. Appendix B: Translation from selected interview parts.

Interviewee	Portuguese	English
B1	Acredito que sim. Acho que todo o segmento que tem esse preocupação é um diferencial. Hoje é um pouco visto como marketing né, pessoa que fala sustentabilidade vê que tá famosinho então o pessoal, ah nos nos preocupamos' mas enfim, tem um diferencial. O próprio marketing já trás isso né. O pessoal que fala sustentabilidade ele quer ser diferente. Ele quer falar que tá. Mas acho que muito mais além do marketing tem a questão da preocupação do negocio com o meio ambiente.	Today it's still viewed a little bit as marketing. People talking about sustainability because they see it's a trending topic. But anyway, it is a differentiation from others. The ones that talk about sustainability they want to be different. But I think beyond the marketing there is the preoccupation of the organization with the environment.
B1	Então, isso da parte de sustentabilidade eu enxergo que está mais pro corporativo. Mais para a alta direção, que te um governo de todos esses hospitais. Ele define. Então uma ISO14001, ele define qual hospital que ele vai querer começar. Então começou no Vitoria, na sequencia já veio aqui para o Total Cor, e ai eles estão avaliando quais vão ser os próximos hospitais a ter essa certificação, então isso né, vem da alta direção, ate a questão de compras por ser corporativo eles vão definir	So, this sustainability part I see as something that comes more from corporate level. From the high level management that has governance over all units. They define which hospitals will be accredited under ISO14001. So it started in another unit, then we where the second one and then they will look as to who is next to get certified.

B4	Então hoje a gente procura medir todos os desfechos relacionados ao tratamento dos pacientes. Então será que eu estou tratando o paciente da melhor forma? Como que é o resultado da minha cirurgia, por exemplo, em termos de mortalidade, em termos de morbidade, de complicações. Então tudo isso assim buscando excelência operacional, e faz muito sentido eu ter não só essa preocupação com desfechos clínicos mas com outros desfechos também. Então, como que eu estou tratando da questão de sustentabilidade dentro do hospital. Já que um hospital também causa danos ao meio ambiente, então eu acho que isso é a excelência operacional que a gente está buscando para o, pro hospital. Sustentabilidade está dentro desse capitulo.	So today we try to measure all medical outcomes to patients to establish if I am treating him in the best possible way. What are the results of our surgeries, for instance in terms of mortality and complications. All this aiming at operational excellence. And it makes a lot of sense to collect to have this same mentality to other outcomes other than clinical. So, how am I dealing with the environmental sustainability issue in the hospital since hospitals do produce environmental impacts. So I think that environmental sustainability is something that is part of the operational excellence that we are aiming at for the hospital.
B4	Assim, a gente deu bastante importância, talvez nunca vai ser, acho a meu ver, a gente nunca da importância que ela merece. Acho que a gente precisa sempre estar reforçando isso. Mas a gente, a importância foi dada no seguinte sentido. O que que a gente pode fazer para isso se tornar uma cultura, do hospital inteiro de sustentabilidade.	So, we gave the issue considerable importance, but I think that it might never get all the importance that it deserves. I think we need to reinforce the issue constantly. In our case we have focused on how we can make the environmental sustainability become a part of our culture, of the whole hospital.
B4	Ai a gente foi atrás de uma certificação. Então essa certificação que a gente fez, recentemente, a ISO, vai um pouco nessa direção. Se eu tenho um processo de certificação eu tenho processos estabelecidos para fazer com que isso aconteça de forma amis automática e tenho inclusive uma auditoria externa para saber se as coisas que eu digo, que eu faço, eu estou fazendo mesmo.	If I have a certification that means that I have established processes to make things happen more automatically, and I have an external audit to know if the things that I say are actually happening.
B4	Eu acho que não basta só a gente orientar, conscientizar, se toda vez você tem um monitoramento desses indicadores. E alguns indicadores desses até são vistos mensalmente num, numa reunião de indicadores que a gente tem. Então, consumo de energia, consumo de água, quantidade de lixo, enfim, tudo isso faz parte de um grupo de indicadores que a gente discute mensalmente e que também são levados em reuniões de certificação, de ISO, ou mesmo certificação JCI que tem um capitulo, o que que vocês fazem com isso tudo.	Some of these indicators are reviewed on a monthly basis on a general performance meeting we hold. So for instance, energy and water consumption, amount of residue production, all these indicators are reviewed monthly and are also taken in consideration in certification meetings for the ISO and JCI, which have chapters that address these issues.
B4	Então se eu consigo fazer o mesmo trabalho com menos recurso, isso é eficiência e a gente tem que buscar isso. Fazer um trabalho bem feito com recurso abundante é fácil, quero saber quando você tem escassez de trabalho, escassez de recursos e você consegue fazer o mesmo trabalho. Isso a gente aborda sempre, por exemplo. em relação a custos. Se eu vou fazer uma cirurgia, uma determinada cirurgia, que eu posso usar ao invés de 20 fios, ao invés de 20 pacotes de fio cirúrgico, eu posso abrir 10. Ou vou abrindo a medida que eu necessito, isso é muito mais inteligente e isso é poupar recurso.	So if I can do the same job with less resource, this is efficiency, and we have to seek it. Doing a job well done with abundant resource is easy. I want to know if you can do the same when you have labor shortages, scarcity of resources. We do always discuss this, for instance in relation to costs. If I'm going to have surgery, and instead of opening up 20 packages of surgical thread, I can open 10. Or if I can open only the exact amount that is needed? This is more intelligent and it is saving resources.
B4	Ainda acho que é bem pouco presente esse assunto. São sempre muito preocupados em, com o custo. É claro que quando se preocupa com custo acaba tocando um pouco nesse assunto, mas talvez mais como um assunto de sustentabilidade ainda acho que isso é pouco valorizado pelas fontes pagadoras. De uma forma geral.	I think this this issue is not very present. They are always very concerned with the cost. Of course when you worry about cost it might touch on this subject a bit. But perhaps more as a matter of sustainability I still think it is undervalued by the paying parties.
B4	Certamente toda liderança daqui está bem envolvida nesse trabalho. E a gente tem conseguido passar de forma bastante razoável essa ideia para todo mundo. Sempre vai faltar, com certeza, mas a gente vai bem.	Certainly leadership here is involved in this work. And we have got the idea through quite reasonably to everyone in the organization. I think it will never be enough, for sure, but we are on the right track.

B4	Em termos de sustentabilidade a gente não tem ainda fora do nosso grupo esse tipo de comparação. O que a gente faz é comparar dentro do grupo. Então, as nossas metas de consumo de água, de energia elétrica, de lixo. Tudo isso é comparado entre nos, entre nosso grupo de hospitais aqui em SP. Nos somos 12 hospitais do mesmo grupo, então a gente tem sempre métricas muito parecidas para os hospitais. E a gente se compara entre nos.	Regarding environmental sustainability we don't have this kind of comparison outside of our group. What we do is to compare ourselves with the other hospitals from the corporation. How much water, electricity we are consuming and how much residue we are producing. We do this with the other hospitals in São Paulo. Twelve, in total, in the group. We have very similar metrics for all these hospitals and we compare one to another.
A1	Com certeza né. Eu acho que se você descobre que o seu hospital, que cura né, ele também afeta , ele também, e é o que acontece, ou seja... é de novo é interessante que as vezes as pessoas, a gente fala, "a o Einstein faz isso", não é o Einstein, todos os hospitais fazem, é que o Einstein mediu e descobriu que faz. Então, com certeza, isso causa um mal de alguma forma, está prejudicando o meio ambiente, ta prejudicando, ta criando a sua cota de prejuízo. E ai a questão é como é que eu minimizo ela, como que eu mitigo isso, como que eu elimino isso se possível né. Então acho que sim, fato.	I think that when you discover that your hospital, that is there to cure, that it also harms, and that is what happens, and I am not talking about Hospital A. Every hospital does this, it is just that we measured it and found out that we do. So certainly this causes some harm to the environment, it has it's quota of responsibility. And then the question is, how do I minimize this impact, how do I mitigate or if possible how do I eliminate this impact.
A1	Então por exemplo, uma ação que parece que não tem nada a ver com o meio ambiente, mas quando eu consigo girar as pessoas mais curto, de prazo mais curto dentro dos quartos, é como se eu aumentasse a performance, aumentasse o tamanho do hospital. Então esta quase se descobrindo, olha, eu não preciso fazer outro prédio como eu imaginava daqui a um, dois anos, porque eu aumentando essa performance eu to, e ao não construir outro prédio ai sim talvez a gente esteja fazendo uma contribuição interessante.	So, for instance and action that does not seem to have anything to do with sustainability. When I have a faster turnaround of patients in the rooms it is like enhancing performance, like having a bigger hospital. So we are getting to the point were we realize that we don't need another building like we thought we did in a couple of years. Because in enhancing performance, and not building another facility I am making an interesting contribution.
A1	Não, ele, a nossa discussão ultimamente é que ela tem que atingir todos os funcionários, então a gente está desenhando essas grades, que elas atendam a todos os funcionários, inclusive terceiros também que hoje em dia a gente se preocupa ate a treinar terceiros. Ou seja, manobristas, que não são funcionários Einstein porque a gente sabe que eles também influenciam no nosso delivery né. Então a gente hoje tem todo o programa, e como falei, esses assuntos estratégicos vão ter que permear tudo.	Our latest conversations have been in the direction that it does need to reach every employee in the hospital. So we are building our teaching grid so that all employees, even the outsourced ones, receive training. That is, that even the valet employees get the necessary training, because it does influence our delivery. So today we have this teaching program and these strategic topic have to reach every single employee.
A1	Isso, exatamente, você tem nas áreas, não é o meu caso, mas você tem outras que sim. Você tem um Balance score card da sua área, ne, e nesse BSC vão ter questões financeiras, vão ter questões de atendimento do paciente ou no meu caso do aluno, e uma serie de questões, e algumas áreas ela vai ter uma meta lá realmente de resíduo. E é acompanhado, eu participo de algumas reuniões de diretoria, em que a gente acompanha a evolução de emissão de gases, de lixo, tudo mais	You have Balance Score Cards for every department, and on this BSC you have financial issues, patient care issues, in my case student issues, a series of indicators. And for some departments you have a residue indicator. And there is attention given to this. I participate in some board meetings, and they follow up on green house gases emissions, residue production and all these indicators.
A1	Sim, é comunicado, se você buscar na internet você vai encontrar o nosso , como se fala, o nosso anuário, não sei se você já pegou do Einstein, saiu agora a pouco, eu acho que lá você vai encontrar também bastante sobre isso, então, e o Einstein é um dos poucos que publica esses indicadores, publica uma serie de indicadores nossos internos, que muitas, eu vejo que ou não sabem ou descobrem e falam eu não vou nem contar isso para ninguém	We are one of the few hospitals that discloses these indicators, a series of internal indicators which I see that most other don't even know about, or if they do they are not willing to disclose.

A1	Eu acho que assim, de uma certa maneira é muito difícil, eu acho as coisas acontecerem “bottom up”, ne, ou seja, é possível é, mas ela é “top down” de um certo momento, de uma certa forma, ou seja, ela tem que estar na agenda do CEO e do Presidente . Tem que estar. E esta. Nesse caso com certeza esta. O nosso CEO, eu é o Henrique, é um cara assim que vem , tem um passado muito grande assim de Shell, ou seja tem uma, ele pessoalmente uma cultura grande de segurança, de meio ambiente, de questões assim, Então ele trás, eu acho, assim de maneira muito forte a importância desses itens.	I think that its very hard for things to happen "bottom up". It is possible of course, but at some point it has to be "top down", it has to be on the CEO's and the President's agenda to get traction. And it is, it certainly is. Our CEO has long experience in the Oil & Gas sector, he does personally have a strong cultures of security, environment and such issues. So I think he assigns great importance to these issues.
A1	Então a gente tem feito esse benchmark como um todo e a questão do meio ambiente tem aparecido muito. Ate pela natureza das empresas que a gente escolheu visitar. Que tem esse assunto na pauta de uma forma bem presente.	So we have been doing benchmark as a whole, and the environmental issue has be present a lot given the nature of companies we have visited. They have this issue present lot on their agenda.
A2	Por um principio básico de Hipócrates, ne, primeiro você não causa dano. Como você não causa dano, se um hospital veio para tratar as pessoas e de repente você utiliza recursos da natureza, insumos, para manter um hospital 7 dias da semana, 24 horas funcionando. Você precisa de energia, você precisa de gás, você precisa de insumos de medicamentos e materiais que são produtos químicos, então você recebe essa gama de coisas e joga isso para fora através de resíduos, através de emissões, e através de foco no efluente, como qualquer tipo de processo. Isso nunca foi visto, porque a medida que você volta para o ambiente você adoece o ambiente, e volta, cria um ciclo vicioso contrario a máxima do Hipócrates que é primeiro não causar dano. Como que eu posso não causar dano se eu estou causando dano?	A basic principle of Hippocrates, first cause no harm. How can you cause no harm if you do need natural resources to treat people and to maintain hospital open 24/7. You need power, you need water, you need gas, and you need medical supplies which are chemicals. So you have all these inputs and on the other end you have outputs in the form of residues, emissions, sewage, like any other production process. This was never cared about. Once you have these outputs you harm the environment, which closes a vicious cycle which is against the Hippocratic principle of not doing harm.
A2	Então a gente foi evoluindo, 2008, apesar de termos uma isso 14000 desde 2003, por causa de uma decisão a JCI. Tem os FMS’s que são os itens de Facility Management Safety, que são 9 itens ligados a segurança do paciente, mas de infra estrutura. Combate a Incêndio, plano de emergência, questão de resíduos, questão de segurança ocupacional, a questão de energia que não pode faltar energia para os equipamentos médicos, são pré-requisitos. Questão de produtos químicos. Resolveu-se na época certificar a questão ambiental pela 14000, então a 14001 ela existe aqui desde 2003 mas também aspectos burocráticos. Aspectos de impactos e tal, mas sem uma visão de guarda-chuva de um sistema de gestão se sustentabilidade.	We have the ISO14001 since 2003, but more as a bureaucracy thing, reporting environmental impacts for instance. But not as a umbrella environmental management system.
A2	Então diante de tudo isso a gente fez um plano diretor de sustentabilidade. No qual eu peguei tudo que existe ligado a sustentabilidade em hospitais, em serviços de saúde, e fiz lá 30 temas e mais de 104 diretrizes e é isso que norteia. Não da para fazer tudo junto então a gente escolheu as áreas prioritárias para a gente trabalhar. Esse plano diretor ele foi desenvolvido em 2011 e ele continua sendo monitorado e continua em vigor. Ele é dividido, então ele tem questões de insumos, tem questões tem resíduos, tem questões de gases de efeito estufa, tem questões de centro cirúrgico verde, tem questões de alimentação saudável.	So given all that, we did a master plan for sustainability. For which I took everything that exists linking sustainability to hospitals and health care services. And that lead to 30 themes and over 104 guidelines to guide us. We can't do everything at once, so we chose some priority areas for us to work on. This master plan was developed in 2011 and it continues being monitored and continues in force. It is broken up in pieces, so it has issues related to inputs, waste, greenhouse gases, green surgical center, healthy eating.

A2	E ai você fala assim, vou ganhar dinheiro né, eu vou usar todos os meus resíduos como infectantes. Porque se minha taxa é pequena eu vou deixar de pagar uma empresa privada para retirar o resíduo orgânico, para retirar o lixo comum. Como eles tem limite de capacidade não posso fazer isso, mas a primeira ideia que me dá é: eu vou ganhar dinheiro. Porque a taxa é fixa.	And then you say, I am going to save money, I will dispose all my waste as infectious waste. Because if my tax for the infectious waste is small I can save on the contract with a company to pick up my general waste. I can't do that because I know they have a limit to, but that's the first idea that comes to mind. I am going to save money. Because its a flat fee.
A2	Isso no mundo vai acabar, isso é mundial. Isso não tem como mais fazer isso. Você vai gerar, você vai pagar aquilo que você gera. Então nos compramos duas autoclaves enormes, que a gente está em fase final de instalação e um triturador, o meu resíduo infectante eu vou garantir que ele saia do hospital inerte. Totalmente desinfetado. Vou triturar e vou jogar no aterro comum por exemplo. Hoje não to. Hoje não se paga, mas na hora que a prefeitura mudar, a taxa para volume, para peso, eu vou ganhar.	This will end, worldwide, there is no way this will continue the way it is (charging per tier for residue). You will pay for what you produce. So we have bought two large autoclave, which are in final phase of installation and a crusher. So I will guarantee that my residue leaves the hospital inert. Totally disinfected. We will crush it and then I can send it to a normal landfill. Today it doesn't pay for itself, but when the municipality changes the rule, when the fee applies to volume, for weight, then I will save money.
A2	. E no final das contas o que eu estou querendo realmente é ter um equipamento, a gente está buscando junto com ITA, um que pegue todos nossos resíduos e transforme em nada, plasma né. Você usa o conceito do plasma e você teria placas. Esse e o meu sonho, tratamento de gases completo, ele auto alimenta e ainda tem uma cogeração pequena. Eu to trabalhando nisso, porque eu não quero depender de terceiros	And in the end what I really want is an equipment, which can process all residue and transform them into nothing, into plasma. You would end up with compressed tablets of residue. That's my dream. Complete treatment of gases, energy self-sufficient and even with some little cogeneration. We are working on this, because we don't want to depend on others.
A2	Não, não, ninguém paga. Fonte pagadora não tem nenhum tipo de interesse se eu sou sustentável, me pagar mais porque eu sou sustentável, não. Isso é fraco. Governo não tem nenhuma meta institucional brasileira para redução de gases de efeito estufa, não tem. É voluntário mesmo. Você faz porque quer. Não tem pressão.	Nobody pays. The paying source (HMO's, Banks, Insurance Companies) don't care if I am sustainable or not. They won't pay more because I am sustainable.
C3	Porque fica sendo as vezes um projeto, não pode ser assim, né, não pode ser somente a hotelaria e a gerencia de resíduos. Claro, muitas pessoas tem essa consciência, mas tem que se trabalhar mais a consciência geral da instituição para ser uma coisa institucional né, não pode ser da gerencia de resíduos ou da hotelaria, ou do almoxarifado que devolve processo porque. Não pode ser uma coisa assim, ou de forma geral, tinha que ser uma consciência coletiva que ai assim, na hora que for pegar o copinho lá a pessoa vai lembrar que não. E a gente precisa eu acho trabalhar melhor nessas companhas ai, massificar isso para ver se instituí uma consciência coletiva.	It ends up being a project from housekeeping or from the residue management team, and it cant be like that. Sure many people have this concerns, but it has to be something more generalized in the institution. It has to be institutionalized, it can't be something that only a department does.
C2	. A gente divulga isso né, para, digamos assim para o trabalhador de modo geral. Nos temos um abrigo, que é uma exigência legal também, não é nenhum mérito, ah que maravilha nos inovamos, é uma obrigação tá. Mas nos temos um abrigo bem separado, com resido comum, resido infectante, resíduo químico, e reciclado que foi a grande conquista nossa. Então nos temos um espaço lá no nosso abrigo que a gente faz uma coleta de todos os nossos reciclados.	We do have a residue shelter, which is a legal obligation, it's no merit of our organization or something we innovated in, it's an obligation.
C2	Acho, acho. Nos da gerencia de resíduos, a gente acaba mesclando um pouco lá, um pouco cá, ai sabe o que acontece? A gente acaba não fazendo nada bem feito. Quando a gente consegue dar conta, quando a gente da conta daquilo que é nosso tem uma chance enorme de ser bem feito. Quando a gente tenta dar conta do que é do outro a chance é enorme de nem dar conta do seu nem dar conta do outro. Então hoje existe uma mistura aqui no	When you can take care of your responsibilities chances are you are going to a good job. When you have to take care of somebody else's tasks, chances are that you are not going to do a good job on that job, neither on your own. So today you have a mixture of residua management, cleaning and sustainability. But with the man count that we have today in our department we can't handle all three issues.

	hospital com: gerencia de resíduo, limpeza e sustentabilidade.	
C1	O resíduo nos conseguimos diminuir, nos tínhamos em torno de 40% de resíduo biológico. Hoje nos temos uma realidade de 11 a 12%, então nos estamos conseguindo reduzir esse resíduo biológico, então esse impacto ambiental. Então você diminui custo, que o biológico precisa ser tratado, então você minimiza o custo. E o local também que o rio não tem muitos locais para a gente, para estamos segregando esse material biológico, então você consegue juntar o útil ao agradável, diminuir custos e ao mesmo tempo ajuda o meio ambiente.	We are achieving reductions in residue, we had 40% infectious residue. Today we have around 11-12%, so we managed to reduce this infectious waste, thus this environmental impact. So you reduce cost, because infectious residue needs to be treated, you minimize cost.
D1	Não encontra abertura a nível financeiro para tocar isso. Não tem abertura financeira e não tem recursos próprios para fazer isso. Por exemplo, se hoje eu quero aqui que renove toda a parte de hidrosanitários. Eu consigo captar água da lavação das mãos para que vá para a lavação dos pátios. Tá, mas o custo que isso vai me gerar na adaptação de infra estrutura, tá, vai me custar tanto, de que forma que nos vamos pagar? Vamos abrir uma licitação? Ampara no que, isso está atendendo a que norma, está atendendo a alguma RDC? ANVISA? Então eles pedem para a gente justificar qual é a lei que aquilo está atendendo. Então assim se não tiver assim realmente um órgão dizendo que a gente tem que fazer para atender alguma lei não acontece.	There are no financial resources to take these things forward. And we don't have the necessary funds to do it ourselves. For instance if I want to change the hydraulic systems in the building to collect rainwater. This will have some costs, to adapt the infra structures, how will we pay for it? We have to make a public bidding. And based on what? Does this follow any guideline from the ministry, from the health care agency? When we want to make a public bidding we have to state what law or regulation this is attending to. So if there is no one telling us that we need to do something to be in compliance to a specific law, it does not happen.
D1	Hoje, assim, a gente passa por varias crises dentro da instituição. Hoje isso Não é o foco. Não é o foco, mas é uma preocupação. É uma preocupação que vem lá da coordenação, que vem dos diretores que trabalham comigo em acreditação que sabem que isso tem que existir, eles sabem disso, sabem que é uma coisa que tá lá guardadinha mas que alguma hora vai ter que trabalhar isso. Só que hoje isso não é o foco.	We face many crisis in here. So today this is not our focus (environmental sustainability). It's not our focus but it is a concern. A concern from coordination, from director which work with me on accreditation and that know that this has to exist. They know this and it is something that is held by them and that at some point in time has to be worked on. But today it is not our focus.
D1	Não sei se ficaria claro, elas não dificultam mas também não viabilizam as coisas mais claro para que as coisas aconteçam. Né, fica aquele meio que, ah, tá escrito mas não me obriga então vamos continuar como está. E é meu entendimento que é sessa forma. Se ficar na penumbra não acontece. Se ficar aquele, tá escrito mas não me obriga, então não vou fazer.	The regulations don't hinder but do also not facilitate the adoption of environmental efforts. It ends up being something that is written somewhere but it is not an obligation. And in my view if it is like this it does not happen.
C3	a gente começou a pegar planta, desenhar fluxo né, fluxo não só de resíduo, mas de resíduo, nutrição, rouparia, tudo que era hotelaria começou a juntar um por um, lata de lixo. Não seis e ele chegou a entrar nisso, quantas latas de lixo por ambiente. Que antes era aquela coisas pequenininha, então no inicio foi bem difícil, mas com o tempo a gente foi se ambientando	We started plotting the flow of materials, not just residues but also food, clothing, and everything else that has to do with hospitality. How many trash cans per floor. In the beginning it was hard, but with time we figured it out.