

Technological change in manufacturing process in a developing country: a case study or a social drama ?

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Abstract: Through an abundant descriptive social-historical study of a deep technological change in a manufacturing plant which transforms raw wood into wood plates and a lot of other related products, this paper will focus in the social, cultural and human aspects that was strongly impacted in the local community where the company is inserted.

This study is about the second largest brazilian company in its business, located at 100 kilometers of the biggest brazilian metropolis in a little community of approximately 100.000 inhabitants, where the company is the biggest employer of a local work force little qualified. This company is owned by a famous and influent brazilian politician.

The technology of the former industrial process was highly air and water pollutant. This situation has resulted in a lot of severe fines imposed by an environmental government agency (CETESB). The implementation of the process of technological change made possible that the company achieved two aims: the environment became relatively unmolested while the plant got a big increase in the efficiency of the industrial process.

Meanwhile, this change has affected dramatically some social and human already historical problems of the local community: a growing unemployment rate of a little qualified workforce; social and psychological abandonment of these persons by the local authorities, and a demanding reconstruction of the company-community relationship.

This study tries to show how it is complex, variable and uncertain to society the implementation of only technological solution without treatment of the human and social issues in a difficult economic moment that the country is passing over.

Keywords: Technological change; Social impacts; Environmental impacts;

Introduction

Ethical problems exist in every kind of work. But, as the individuals move up in the hierarchical level of any organization, the rules of conduct - convenient made for others to guide the actions of the people, are becoming faint. The individual should learn, in any way, to treat with these conscious questions that he has to resolve by himself.

The importance of the ethical/moral world become evident by the fact that there is no social life without the presence of rules and norms of conduct. The moral is a set of norms, precepts and values that regulates the individual behavior in the society. In this conception, is spoken of norms and behaviors, therefore there are two distinct plans: the normative and the factual.

In between the norms created to orient the human conduct, objectifying a greater social cohesion, it should be distinguished the norms or principles of moral from those juridical norms, established by the law:

- the moral coercion is internal and comes from the consciousness. In the world of the law the coercion is external and is provenience from the state;
- the moral precedes the law, once that societies always had the necessity of establishing norms, much earlier than the formation of the state;
- the law is characterized by the exteriority or, the individual may not agree with the norms but he can comply with them. Meanwhile, the moral norms are complied by intimate conviction of the individuals. It is in this sense which is spoken about the interiority of the moral life.

The Ethic and the Business World

Every business exists in some place and in some time (and its era). It can appear insignificant but if there are rights that are originated from something that happened in the past, the fact that existed past agreements, promises and settlements (implicits or explicits) is a very important occurrence. Such things create responsibilities.

The fact that the businesses are in some place and that they are not any ethereal and abstract entity means that they affect their surroundings, as in terms of the environment as in its economical or esthetical insertion. The businesses in the past were dependent of lands, soils and cities while a place to exist and dependent too of the workers while provider of work force. The people in those places modified their lives to accommodate the businesses, and they started to depend of these businesses as the means of their subsistence. A mutual dependence relation based in space and in time began to develop.

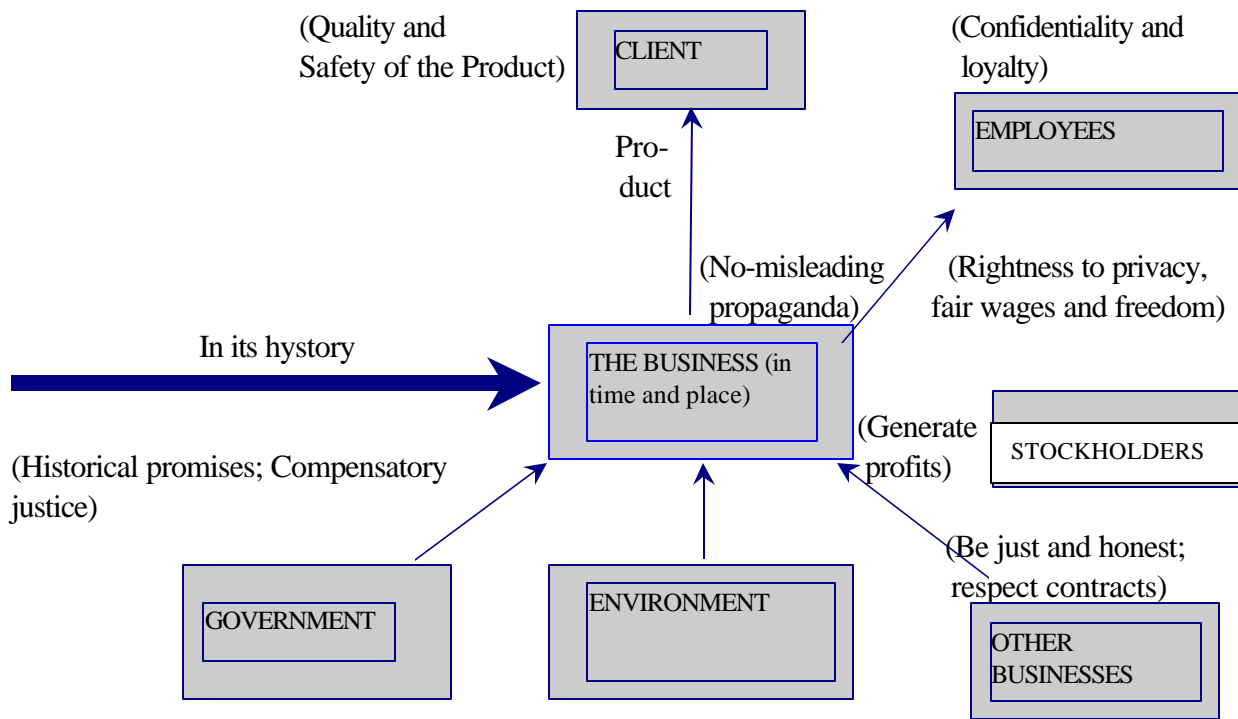


Figure 01 - The business relations and some ethical questions involved (adapted from Bowie & Duska, 1990)

The businesses have relationships with other businesses, with the government and with their employees, too. Anyone of these relationship develops a set of obligations which creates commitment. For example, the questions concerning to the place and its time obligate that the businesses have to resolve the difficulties encompassed with the pollution or, in a extreme way, they will have to close their enterprise.

By its time, the employees strongly argue to the respect of just wages for their labor, decent work conditions, compensations in case of injuries and about their right for a private life. There are two the relationship between the businesses and the government which arises a lot of conflicts with respect to the benefits or no of the governmental rules. There still are many others relationships and facts which have a very strong ethical component in their existence, as those involved with the environment which will be treated in a more detailed way in the next topics.

The Environmental Question in the Contemporary Ethic

In the extreme orient, there is a dominant vision which equalizes the basic purpose of the ethic - the social welfare, with the concept of the harmony. Harmony should be searched with the others and with the natural world - the environment. The social welfare in the vision of the extreme orient is more allied to the adaptation of the most diverse circumstance than properly in following specific ideas to the respect of what is or is not just and sound. To the same extent, there are people whose worries about the environment are very appreciated because they are related to something which are considered sacred or of maternal origin. In a distinct view, there are other people whose worries about the environmental questions are comprehended as threatening to their businesses, in a way that its responsible persons should resist.

There are many tentatives of expanding the structure of the moral reasonings to the nature as a whole and in this way demonstrating for other people that in determined focus, all natural and living beings and even the inorganic components are not barriers to the comprehension of the ethical reasoning. Some authors use the utilitarian theory to support in terms of ethical and moral identity and equality all the considerations with respect to all forms of life existing. To act morally in contact with other living creature requests an empathic imagination, a sensibility about what means and characterize to be a creature of that nature.

Other authors go beyond and argued against the preference of any integrate autonomy of any individual while possessor of a short life in comparison with the dynamic form of life of its species, that genetically persisted through millions of years. The species are had as living only in biotical communities: there is no right to life to species separated of the continuing existence of the ecosystem in which they are inserted and involved.

In this critical comprehension, can be included the traditional solution of the capitalist economical system as the socialist view, once that both advocate the fact that nature is valuated only when transformed by the human action.

The prevalence of the imprudence in the human life is directly connected with what is considered the unique and most important conception in the field of the ethic as in the environment: the long term

consequence that should be considered in the appraisal of business since its early stages. This is one of the fundamental and basic ideas that has allowed the development of diverse contemporary highlights of comprehension about the entrepreneurial and business world, particularly the systemic focus of the sustainable development which schematically is showed in the next figure:

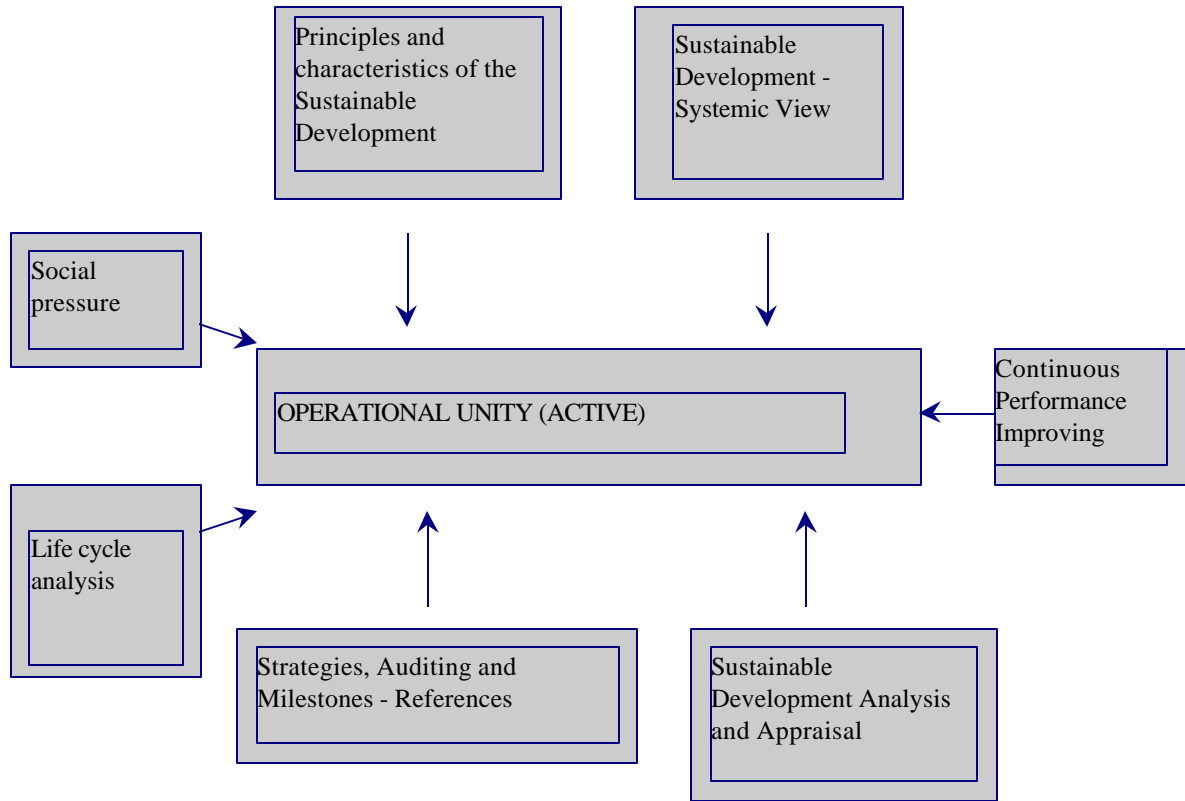


Figure 02 - Sustainable development managing model

The traditional model of open systems for enterprises includes three basic elements: input, transformation process and outputs. Expanded models can include vendors and suppliers and clients. Anyone of the traditional models includes the environment, but at this moment is the environment that should be considered and, attached with the traditional elements of the open systems model they can contribute for a better view of understanding of the sustainable development as former exhibited.

The next figure demonstrates the environment as the context inside which the companies should planning and accomplishing their job. The model show the environment interacting with the three traditional elements of input, process and output. It suggests too that the environment creates a new dimension to the comprehension of the suppliers and clients as they are viewed and managed.

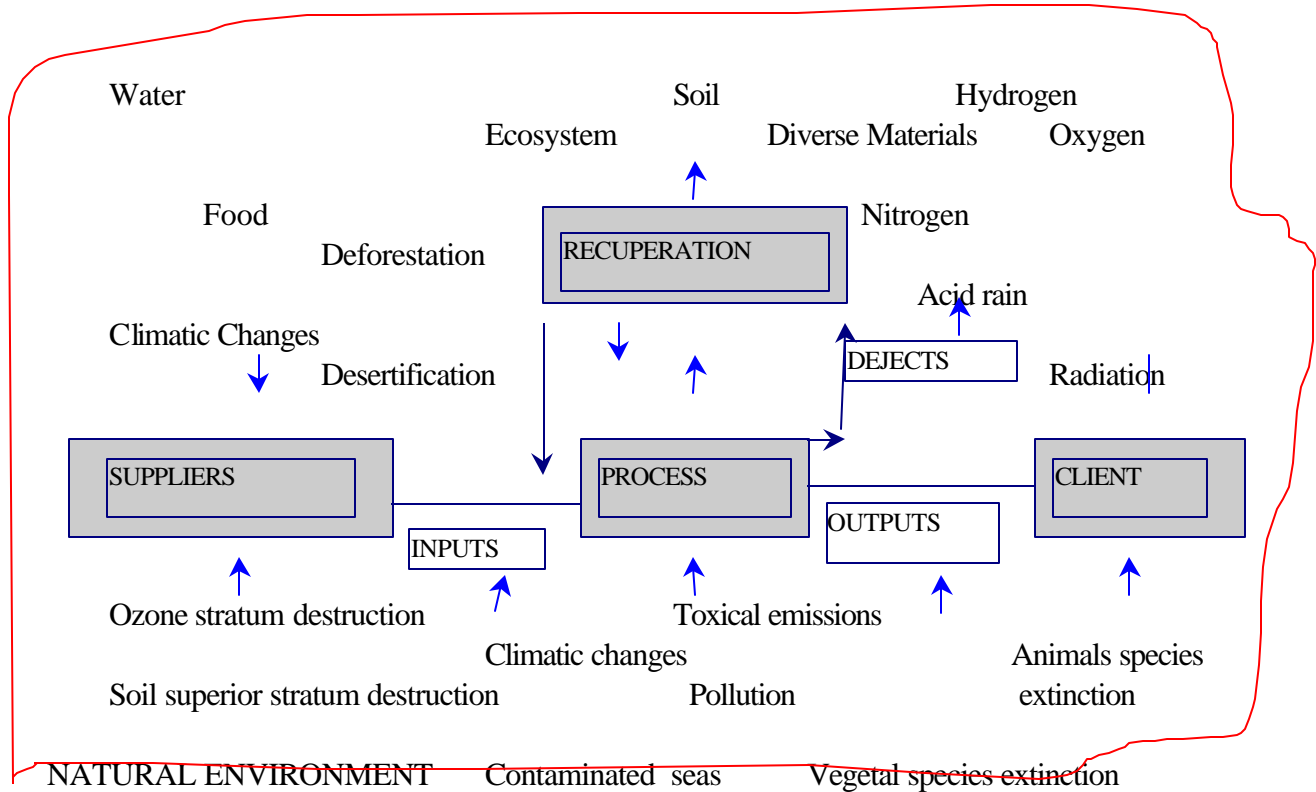


Figure 03 - The sustainable development and the systemic view (adapted of Kinlaw, 1997)

This model contains the following structural elements: natural environment; suppliers; input; process; outputs and client. This model contains too the element 'flow' indicated by the arrows. Materials, water, air and energy flow inside the company. The traditional output of products and services flow to the client. Besides that, potentials residuum, toxic emissions and the pollutants flow to the client too and after to the environment. Such residuum, toxics emissions and pollutants flow too directly to the environment of the processes, products and services of the companies.

The right mode of interpreting such conception is the fact the environment should be perceived as a supplier of a unique fountain that should be compensated and maintained because there is no other disposable supplier; furthermore, the environment as a client is the final arbitrator of the quality.

The Case

The organization

This case study was developed in an enterprise of the manufacturing sector which processes a lot of products utilized in the construction sector, particularly those products done with press wood and

agglomerated in general which are de main group of products of the company, nowadays the second brazilian producer involved in the business of plate processed of pressed wood. Furthermore, the company still has businesses in a lot of distinct industry segments, as by example, in the chemistry industry (tints, paints and varnishes), in the metal components industry (molding and hardware) and in the minerals industry (argyles and correlate).

This company was founded in the decade of the 50's by an Arabian immigrant that worked as a salesman and a deliveryman of diverse merchandise in the country of the states of São Paulo and Paraná. From São Paulo capital he took manufacturing goods to be commercialized in the country of Paraná state, and from there he used to bring native wood to be processed and sold in São Paulo state. In these comings and goings appeared the opportunity of creating an enterprise of his property dedicated to the processing of wood in a lot of products and, with the time going by and the market opportunities, it finally happens of concentrating in plates and sheets of wood pressed, a relatively innovative product to the local market. With the success of the product in distinct segments of the market, the name of the company became the name of the product in the national market.

With the years and with the growing of the company, it became a big exporter of wood manufacturing products and, capitalized, it went into other businesses which are, in a certain view, complementaries as hardware, paints, varnishes, and so on. At the present, the organization has eleven transformation factories located in four cities in the country of São Paulo state, as schematized in the next figure. Furthermore, it has sales offices in more than 70 countries around the world, and actually the company has 43 farmers of their own and/or rented to the planting of distinct vegetal species of woods which they manufacture, with very strong presence of the Eucalyptus, a non-native but a very productive wood in brazilian soil.

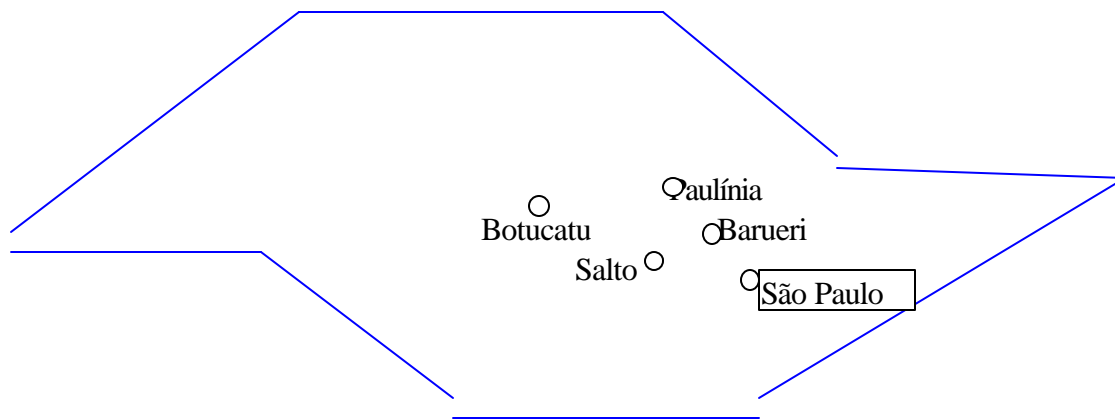


Figure 04 – Localization of the transformation units of the company in São Paulo state.

The present mission

In the administrative and strategic points of view, the studied organization has some specific lines of action turned to the characterization and particularization of itself as it has been developing some uniformity of action along the periods which constituted its history. Exemplifying: there is a single vision for every unity of the organization, a vision that freely demonstrates the interest of the company in the development of practices which can transform itself in a company ecologically correct what can be

understood in the affirmation of the mission of all the units of the company which states the following facts:

- every transforming unit of the company must promote a model of sustainable development;
- any practice of the organization must be adequate to the environmental politics of the company;
- all the operations of every business of the company must be compatible with the natural resources conservation plan of the company;
- there is an environment management system in the organization which must be obeyed and that is the last word in terms of the daily administrative actions.
- every unit of the organization must promote education and training in environmental quality for its members.

The industrial practice and the environment

Practically, all transforming units of the company already had some kind of operational difficulties about their relationship with the environment in terms of accomplishing the mission stated above as well as with the neighbor communities surrounding the operational units, mainly due to the emissions of liquid and air effluents which severely contaminate the environment.

About the relationship between the organization and some governmental entities they were difficulties and for a long time very traumatic, particularly with those entities that have the responsibilities of regulate and control the pollutants agents in the environment notably CETESB – a state agent responsible by the control and punishment of the local polluter agents. During the decade of the 80's, the relationship between them was particularly belligerent and costly: this was the time when the organization had to pay a lot of daily heavy fines to the government.

As time goes by, and with the implementation of new industrial techniques and practices, those kind of difficulties are already assuaged and those so hard transforming activities of the industries, particularly those related with the beneficiation of wood, are not so pollutant and aggressive with the environment as once they used to be.

In the search of a fast technology transformation of the industrial park objectifying being more competitive in the international scenario and less damaging to the environment, the organization directed itself for a very strong investment politics in terms of machines and equipments of last generation, at this moment much more pollutant and aggressive with the environment at the same time less demanding of labor.

In accordance with the most important unions of the workers of the organization, in 1992, the work force was estimated in 5000 persons related with the wood transforming unit. At this moment, less than 1500 persons approximately work at the same unit, with an industry efficiency level of 80% above the stage of 1992 and pollutants levels of less than 60% of those verified and registered in 1992.

In a group of technological motives, it was the acceptance of the sustainable development model which made possible this revision, giving birth to new factory practices, and promoting a maturing of the managers and administrators in an ecological point of view.

Conceptually, the revision of the industrial practice appeared and made possible a comprehension of the importance of the recycling and reutilization of almost every inputs and sub-products of the industrial cycle as showed in the schema that follows:

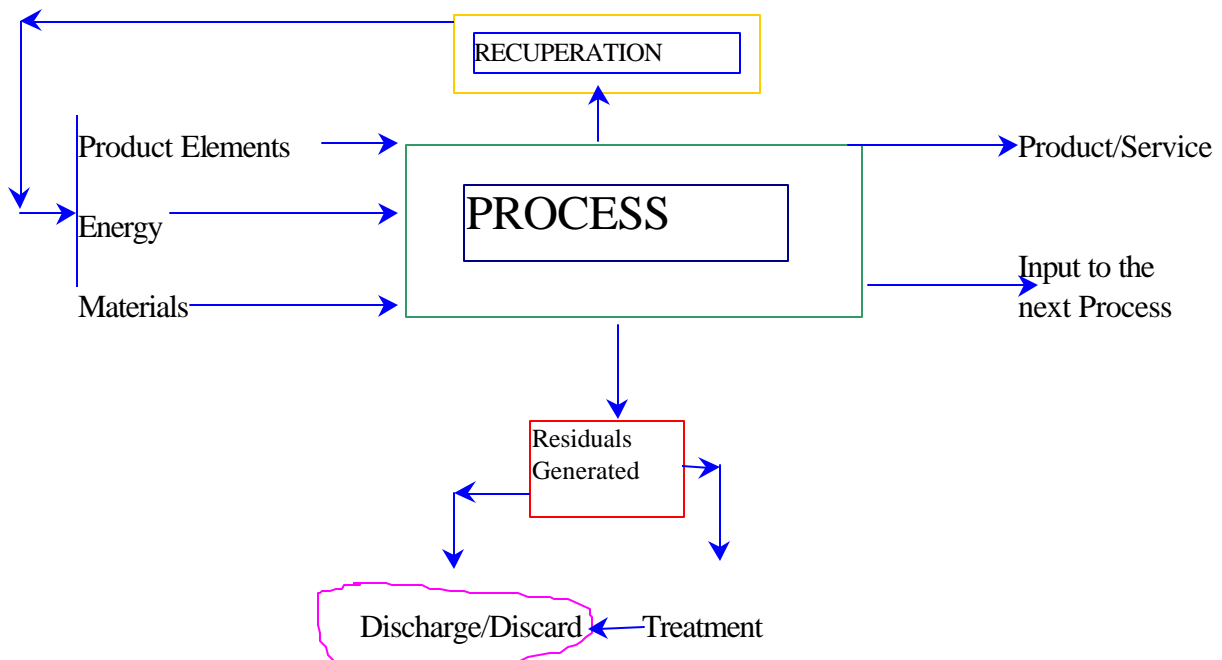


Figure 05 - Effective opportunities of improving the industrial process

The previous figure schematized demonstrates the contemporary organizational worries with the reutilization of the inputs and outputs of a generic process of liquid effluents treatments, where up to 90% of the water utilized in the industrial process of wood transformation is reutilized through the intensive use of new developments of biotechnology in some Dutch laboratories and vendors. It should be noted that in 1992, no treatment for any reutilization of water resources was done. Besides that, it is still possible the identification of more and diverse opportunities of improving the environment which surrounding the company.

This schema is useful too as a tool of performance appraisal of the organization practice and the impacts in the environment due the same practice – in this way, it can make possible a more rigorous analysis about the projects in development and/or in planning. The managers in charge of the company at the present has demonstrated that they are conscious that any industrial process of the company has a lot of opportunities of being improved by the sustentability focus in terms of waste elimination in any phase of the process or in terms of the relationship between the company and the environment.

The green seal

Much earlier than the ecological questions became a world worry, this organization already had its own forests of eucalyptus and pinus. The objective was the provisioning of its factories with the necessary supplement of wood to the production of plates, of energy to the saw mills and to the

protection of the environment too. With the way of thinking of the sustainable development, as with the contemporary ecological conscious, the company has planted annually about 100 thousand native trees as Jequitibás, Ipês, Araucárias and Jacarandás.

This conservation work has been very well appraised by the local communities, besides the fact that those forest are very valuable to scientific research of a lot of universities which has had this privilege. Confirming this fact, the company has just received the green seal of the Scientific Certification System (S.C.S.), entity related with the Forest World Council (FWC) located in the U.S.A., characterizing that the company has developed its activities in a sustainable manner. The environmental concerns has becoming the green seal something almost obligated to the maintenance of the exports to the U.S.A. and Europe, markets extremely relevant to the company.

It should be noted that the organization, in a co-development process with some brazilian entities as EMBRAPA and S.B.C.S., has promoted the development of a lot of distinct practices of vegetal cloning, notably with the eucalyptus species which has permitted productivity gains of up to 21% in terms of useful matter to the industrial process.

The relationship with the local community

With respect to the diverse aspects related with the communities where the organization has its factories located, practically with respect to the unit of transformation of wood that is localized in the city of Salto - S.P., a little town with less than 100 thousands citizen and with a work force of almost 60 thousands people whose unemployment rate is almost in 30% in accordance with de I.B.G.E. (Instituto Brasileiro de Geografia e Estatística), it should be noted the aspects which follow:

- This unit of wood transformation of the company was the main employer of the work less qualified in the community;
- In the period of just seven years, the unit reduced its needs of workforce, naily the less qualified one, in almost 70% with the coming of technological innovation, as well as the improving of its machines and equipments with respect to the environment pollution;
- This is only the second cycle of automation in the unit, and it is already conjectured new possibilities of industrial processes improvement with more and more reduction in the use of manpower work in the factory;
- The local community has been facing a lot of distinct social problems that is characteristic of industrial towns with high levels of unemployment rates, as by example, the vertiginous growing of urban violence;
- The local governments has made disposable just unemployment help for the first six months of the dismissal for the worker without a job. Apparently, the local workers are in the invisible hands of the market and of the liberal rules currently in effect in the country, and those rules are not so favorable to them;
- The industrial organization studied has just started to worry about its image in face of the community, but it has begun to work this image from the exterior to be internalized in the future: they are realizing some huge sales outside the country (by example, 600 thousands of pressed wood plates to Home Depot in the U.S.A.) which are being noticed inside the country.

Final Considerations

This case study is tremendously rich and instructive in a lot of expressive lessons in the perspective of almost every conceptual and theoretical aspect formerly presented. It can be detached:

- In a pragmatic point of view of the agents actives in the world of businesses, it is very remarkable the consequentialism , particularly utilitarianism, in all its most diverse administrative and organizational processes related with the environment question;
- It was demonstrated too, the numberless difficulties faced by the organization with the government entities, particularly those which have the responsibility of verifying, control and punishment of the pollutant agents of the environment
- The current organization practice is strongly based in the sustainable development model formerly presented, including as one of the aspects more relevant of the mission proposed for the organization in the present days;
- The activities of reutilization of the industrial residuum of the liquid and air effluents of the transformation processes of wood are conceptually consolidated in the sustainable development model which has permitted a new comprehension of the activities of the organization that it is perceived as a practitioner since its origins;
- The dissemination of the attainment of the green seal in the national press show how the company has been concerned with the environment, besides the fact that it can be seen as a matter of market demanding than of consciousness;
- The new techniques and technologies which the company has acquired and used in the industrial process has promoted a big increase in the efficiency of the industrial processes, at the same time that has promoted a big reduction in the level of pollutants in the effluents of these processes;
- The huge social costs of this new way of doing the organization job is still not considered as responsibilities of its managers and administrators, and probably not as a responsibility of the local government with his poor unemployment politics. They are just juridical agents and they appear to think they are not moral ones.

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TRACK: 12 – Technology: cultural, social and human issues.