17-20th of June 2012, Tallinn

IASP International Association of Science Parks

29th IASP World Conference 2012

ITGreen: The Experience of Porto Digital Technology Park in order to Contribute to a Sustainable Innovation Habitat

Roundtable 3

STP Services and Regional Needs

Author:

Cidinha Gouveia (cidinha@portodigital.org)

Co-Authors:

Joana Sampaio

Helene Andrade Lima

Bruno Cavalcanti

Francisco Saboya

Porto Digital, Brazil

ITGreen: The Experience of Porto Digital Technology Park in order to Contribute to a Sustainable Innovation Habitat

Executive summary
In today's global context of new technologies and the consumption of technological equipment, the fast obsolescence of these equipment, the few alternatives for electronics waste disposal and treatment, and the finitude of natural resources used its production, it is urgent to integrate sustainable attitudes in innovation environments. Considering that IT clusters are major producers and consumers of ICT, it has the potential to contribute to the sustainable management of ICT. Therefore, Porto Digital, as one of the largest technology parks in the country, created "ItGreen - Centre of Electrical and Electronic Equipment Management", that is designed to act as a mechanism through which Porto Digital offers its contributions to the development of a Sustainable Innovation Habitat, promoting an environmentally friendly entrepreneur culture, contributing to the increase of the companies' competitiveness and to the region development. It is also noteworthy that ItGreen can be easily replicated in other innovation environments.

Key words
Habitat for Sustainable Innovation, Social Responsibility, Sustainable ICT Management, WEEE

1. INTRODUCTION

In recent years, technological advances in information and communication have provided economic growth and improved people's lives in many ways. However, the increasing dependence on electronic products has created a new environmental challenge: electronic waste. The life cycle of such equipment is getting shorter, given the technological development of recent decades. Thus, the use, treatment and disposal of waste of electrical and electronic equipment (WEEE) have become a worldwide concern.

A study of the United Nations Environment Programme shows that in Europe WEEE grow at a rate three times higher than the urban waste. This growth is worrying due to the peculiarities of this waste, such as the volume and weight, which are much higher compared to the common urban waste. In addition, WEEE offer real risks to the public health and the environment because in their composition there are materials that are not easily degradable, such as mercury and lead, for example. These components are found in batteries and cathode ray tubes, amongst other equipments of the information and communication technology (ICT).

The proper management of these kind of equipment and waste is, therefore, extremely important. The main institutions of the environmental area recommend taking action to prevent the waste of resources and, at the same time, promote reuse and recycling of WEEE. Such actions should aim at preserving natural resources and further pollution of air and water, as well as the reduction of greenhouse gas emissions in the atmosphere caused by the incineration of these materials or the manufacturing of new products.

The incorrect disposal of WEEE can directly contaminate water, soil and air, and cause adverse effects to human health, either by improper handling, by water contact, by incineration (inhalation), or others.

According to the United Nations, between 20 and 50 million tons of new e-waste are discarded annually worldwide. It is estimated that this number will triple in the next five years.

In Brazil, the installed base of computers increases each year as points out the 21st Annual Research of Information Technology Use performed by the Getúlio Vargas Foundation (FGV): in 2008 there were 50 million computers in use in Brazil; in 2009, 60 million, and it was expected that by 2010 this number would have reached 77 million, in 2012 should reach 100 million and in 2014 the installed base is estimated to be 140 million computers. That is, from 2008 to 2010 there was an increase of 54% in the installed base of computers in Brazil, while from 2010 to 2012 growth is estimated at around 30% and in the last two following years (2012 to 2014), this growth would correspond to 40%, reaching a total growth of approximately 180% in four years.

Data from the Federation of Industries of the State of Pernambuco (FIEPE) estimate that the number of computers in use in 2010 was 1.728 million units in Pernambuco. The number of disposal for the same year was estimated at 345,600 units (20% of the installed base), considering an average weight of 10kg on a PC, the disposal of such equipment generated a total of 3,456 tons of garbage in the year 2010.

Each year the volume of this type of garbage shoots up and the appropriate forms of disposal are little known and more complex than the destination of the common waste. The dissemination of good practices and the strengthening of a culture of environmentally adequate treatment of these wastes are key points in the environmental agenda of every developed and developing nation, directly related to the volume and intensity of its production technology.

As a Technology Park is a large producer and consumer of ICT, it becomes a potential agent to contribute to the sustainable management of ICT. Given the outlook presented and considering that Porto Digital Technology Park currently employs more than 6.000 people in the ICT sector in the State of Pernambuco, Brazil, and that these people are, in essence, large consumers of electric and electronic equipment, therefore generating technological waste, Porto Digital (PD) has adopted as one of its areas of action the Promotion of Social Responsibility Actions and Digital Inclusion, paying particular attention to the issue of WEEE management.

Thus, in 2010, the Management Unit of Porto Digital (NGPD) created ItGreen - Centre of Waste of Electrical and Electronic Equipment Management. The Centre is designed to act as a mechanism through which PD offers its contributions to the development of a Sustainable Innovation Habitat, promoting an environmentally friendly entrepreneur culture, contributing to the increase of the companies' competitiveness in the park and to the region development.

The ItGreen creation involved basically three steps: (i) Structuring, (ii) Consolidation, and (iii) Operation, where each one had its set of activities and challenges. But today, we can say that the Centre has generated a series of outstanding contributions to sustainable development in the region, to integrate environmental policies and development strategies.

ItGreen presents a model of sustainable ICT management that can be replicated anywhere in the world. The diffusion of knowledge, social mobilization and coordination between strategic actors provided through these actions help not only to promote integrated waste management equipment technology, social awareness and ensure the involvement of ICT business and society as a whole, but also to serve as a tool to bridge the gap between business and society in an act of shared responsibility.

It is believed therefore that the environmentally responsible actions, especially related to technology and the waste it generates, are of fundamental importance in the institutional image of a technology environment, serving as a practical example for other centres and improving access of technology to international markets.

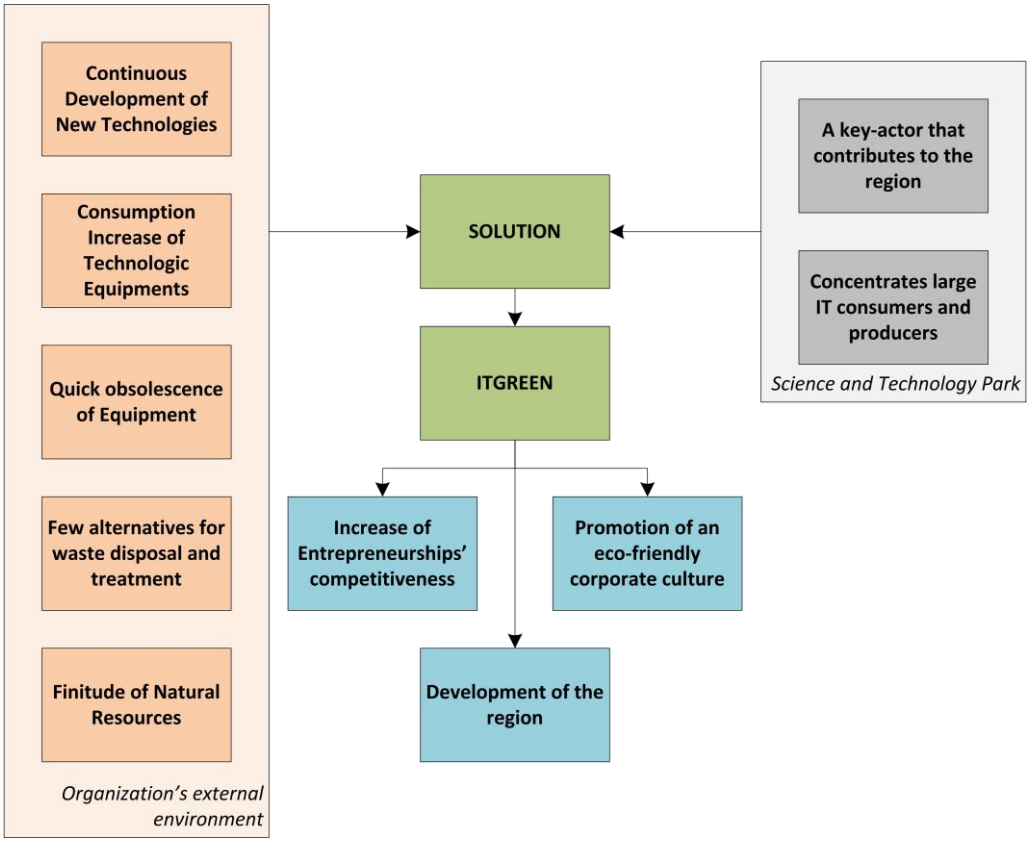

Figure 1 – Environment Flow

2. DEVELOPMENT

2.1. Sustainable Development

The notion of sustainability is associated with stability, permanence in time and durability. It starts from the observation that the environmental compensatory or corrective policies, that aimed at growth symptoms prejudicial, are not enough actions. It is necessary a new approach, in which all nations aim at a kind of development that integrates production with resource conservation and expansion, and that links the goals of giving everyone an adequate livelihood and equitable access to resources. The concept of sustainable development provides a framework for the integration of environmental policies and development strategies [6].

According to [7], Sustainable Development is the development that seeks to meet the needs of the current generation without compromising the future generations to meet their own needs, means enabling people now and in the future, to reach a satisfactory social and economic development level and human and cultural achievement doing at the same time, a reasonable use of land resources and preserve the species and the natural habitats.

The United Nations Conference on Environment and Development (UNCED), held from 3 to 14 June 1992 in Rio de Janeiro, known as ECO-92, contextualized sustainability as an effect on the future, by actions done in the present, in other words, "the consequences of economy have an effect on future generations." In the Earth Summit 2002, discussion forum of the United Nations held between August 26 and September 4, 2002 in Johannesburg, South Africa, were conferred three dimensions, which remains the current approach. An economic, social and ecological dimension as illustrated in Figure 2 [8].

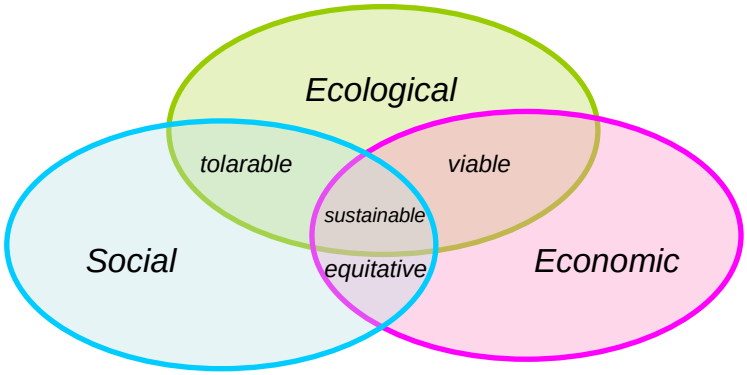

Figure 2 – Representative Schem of the various components of sustainable development
Font: **http://pt.wikipedia.org/wiki/Desenvolvimento_sustentável**

In this context, sustainability begins to take shape of competitive advantage, interacting with management topics, in order to be organized meaning chains, and not only value chains, in a direction that will ensure the survival and growth of the organization in long-term. Sustainability has enabled this competitive advantage, in a clear innovation and market segmentation in the international context.

This concept is closely related to the Social Responsibility concept of the organizations. Thus, it is essential, according to Michael Porter, to build a single strategy, it states that “companies usually have an economic strategy and a social responsibility strategy, and what they must have is a unique strategy” [8].

A sustainable conscience by organizations might mean a competitive advantage, if considered in first hand as a component of one single organization’s strategy, as Porter argues, not as "something" that goes in parallel with the organization strategy, as part of the image or communication policy [8].

2.2. The role of a Technology Park for a Sustainable Habitat

Modern technologies represent the major factor responsible for the disequilibrium in the environment, because they are based on intensive use of energy resources and emission of pollutants, as stated by Andrade [9]. However, technological innovation can also be responsible for developing green technologies and promote behavioral and organizational management changes, reducing the adverse effects on the environment.

According to Oosterhuis (2006) mentioned by Corrêa et al [10], innovation and investment in green technology is the key to the issue of sustainable development, because it has the potential to make a step forward in the dilemma between economic growth and environmental quality. However, environmental innovation is not only associated with the development of green technologies, as stated by Corrêa et al. [10], but also organizational changes that together with environmental technologies, contribute to reducing environmental impacts and increase competitiveness.

As defined by the International Association of Science Parks (IASP), Scientific and Technological Park is an organization whose main goal is to increase the wealth of the community by promoting the innovation culture and competitiveness of enterprises and institutions based on its knowledge. To achieve these objectives, a Science and Technology Park stimulates and manages the flow of knowledge and technologies between universities, research institutions and development - R & D, companies and markets, facilitates the creation and growth of enterprises based on innovation by incubating and spin-off processes, and provides other value-added services and support services of high quality [11].

Being a Technology Park a relevant asset in the production and consumption of ICT, this is characterized as a potential agent to contribute to the sustainable management of ICT, which may encourage the adoption of best management practices of technological equipment (purchase and use) and their wastes (proper disposal), directly impacting the levels of competitiveness of companies in domestic and foreign markets.

The adoption of the sustainable development concept in a scientific and technological park policy can serve as an attraction to partners and customers, and also as a model to be followed by companies in an innovative and competitive market, since the parks are strategic actors influencing this market.

2.3. Porto Digital

The main "hotbed" of knowledge and development of ICT applications in Pernambuco is Porto Digital (PD), a Technology Park located in Recife, Pernambuco, Brazil. PD is the result of an innovation environment in Pernambuco which was consolidated in recent decades along with the coordinated effort of the university, the productive sector and the government, in order to insert the industry of ICT in the economic matrix of the State. Sector of high growth potential, ICT is also the basis for increasing the competitiveness of a region.

Porto Digital is the main component of ICT in Pernambuco. Its goal is to implement public policies for the development of the State, urban regeneration, social inclusion, strengthening of the ICT pole and other poles through the use of these technologies. With 10 years of existence, PD is a leading technology pole of the country. PD has generated for the state more than 6.000 jobs, attracted 500 entrepreneurs and 191 institutions among universities, government agency, research centers and development and technology companies with national and international levels. Companies of all sizes have already been installed in PD and are producing new solutions and new technology products.

As a result of the success of all its actions, PD was elected by AT Kearney [12], one of the largest consulting companies in the world, as the largest technology park in the country in number of companies and sales in 2005. In 2007, PD was recognized as the Best Technology Park and Habitat for Innovation in Brazil by the National Association of Entities Promoting Innovative Enterprises, ANPROTEC [13], which represents the interests of business incubators, technology parks and innovative enterprises in Brazil. The recognition came with the National Award for Innovative Entrepreneurship in 2007. Moreover, in 2008, Porto Digital was the only Brazilian technological park to join the first edition of Learning by Sharing from IASP (International Association of the Science Parks) that featured four parks around the world. And in 2009, the Business Week, the largest business magazine in the world, noted PD as one of the places where the future was being created.

To manage the park, it was created in 2001 the NGPD – Management Unit of Porto Digital, a social, private and nonprofit organization. This organization has a role in the success of Porto Digital. NGPD is the agent for implementation of public policies to promote the structure and evolution of the Technology Park, through the implementation of public and private resources. Their actions are guided by a Strategic Plan, whose essence is to strengthen the competitive capacity of companies to enable them to access the regional, national and international markets in another level of scale and magnitude. This strategy involves actions that are related to the six actions axis of the park, as illustrated in Figure 3: Axis 1 - Strengthening of Productive and Competitive Capacity of Porto Digital Enterprises; Axis 2 - Integrating Porto Digital with other Economic Sectors of the State; Axis 3 - Stimulation of Specific Industries Intensive in IT Applicants, in particular, the Creative Economy; Axis 4 - Strengthening the Image and Institutional Promotion of the PD; Axis 5 - Promoting Social Responsibility actions and Digital Inclusion; and Axis 6 - Strengthening the institutional and governance of PD.

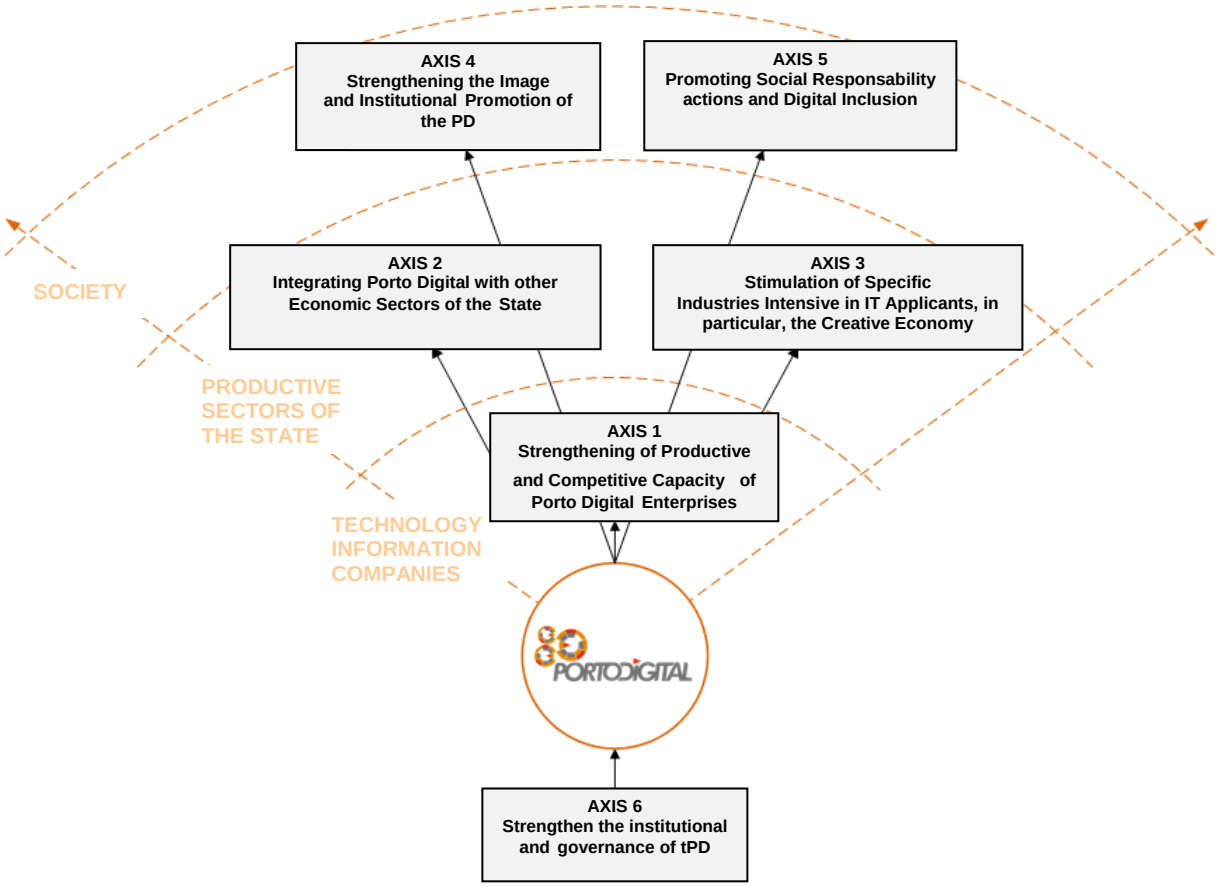

Figure 3 - Porto Digital Action Axis

NGPD main objective is to increase the positive environmental factors (externalities) in order to improve the innovative capacity and competitiveness of enterprises and of the cluster as a whole. To do this, its main roles are: (i) to generate original ideas, (ii) to develop innovative projects, from original ideas, (iii) to joint operating agents, so that projects can be implemented -including sponsors, government, enterprises, universities, and (iv) to attract innovative ICT-based companies.

Given the above, it is understood that PD is a valuable asset of Pernambuco state, with the potential to contribute to improve standards of production efficiency in the sector and therefore to improve levels of competitiveness in domestic and foreign markets.

This view gains strength and foundation on the current market situation, where companies need competitive advantages to stand out and excel facing a strained market. Moreover, given the fact that natural resources are finite, it is inherent the concern to develop in order to integrate the production technology to the conservation and expansion of resources. Thus, given the constant need to increase the competitive potential of enterprises and the global concern for the environment, NGPD created ItGreen, in order to help the park to become stronger as a Habitat for Sustainable Innovation.

In this context, it is noticed the importance of Porto Digital for the economic, ecological and social development, not just for the ICT cluster, but for Pernambuco. One of its various roles is to work in disseminating knowledge and promoting an environmental eco-friendly culture.

2.4. ItGreen

As part of its activities, NGPD through the agreement with the Ministry of Science, Technology and Innovation (MCTI), created "ItGreen - Centre of Waste of Electrical and Electronic Equipment Management" which consists of a reference center for studies and research, social mobilization and articulation of strategic actors

in the life cycle of ICT equipment. It was designed to act as a mechanism through which PD must provide its contributions to the development of a Habitat for Sustainable Innovation.

ItGreen acts as a channel of the Park to support the development of its companies through encouraging the adoption of sustainable practices, which can serve as a competitive advantage for the company and to increase the competitive potential of the park, making it a global showcase of a Technological Habitat for Sustainable Innovation. This way, the Center operates with activities that enable to:

(i) Act in promoting an IT sustainable culture and reuse (metarecycling) and recycling of technology equipment actions, aimed at reducing the environmental impact;
(ii) Structure (and keep updated) a database (on the technological equipment life cycle, management and waste treatment) and reference of relevant actors in the chain;
(iii) Articulate the formation of a social network to promote the sustainable management of waste, with the participation of companies, governments, social organizations linked to social and environmental sustainability;
(iv) Produce and disseminate information to the network and stimulate its functioning through the articulation and promotion of events;
(v) Act in the promotion of social consciousness about the issue of consumption and disposal of electronic equipment in the world, in Brazil and in the State;
(vi) Contribute to the promotion of public policies and the adequacy of the companies to those policies.

The creation of ItGreen involved three steps: (i) structuring (ii) consolidation and (iii) operation, as illustrated in Figure 4. The first step consists of the execution of necessary activities for its composition by setting the physical infrastructure, teamwork and creating a visual identity. The second step consists of developing essential actions for forming a base content to the operation of the center. The third step consists of carrying out activities that provide interaction between the companies of the park and other strategic actors of the network and bringing direct results to them.

Figure 4 – ItGreen Steps

2.4.1. Structuring

The structuring of ItGreen went through three main phases: (i) physical infrastructure, (ii) staff, and (iii) creation of a branding and visual identity.

Physical Infrastructure

The choice of the place where the center should work took into consideration the following aspects: (i) strategic location - it should be a place next to some strategic actors beyond NGPD, responsible for its planning, construction, operation and maintenance, in particular the Secretary of Environment and Sustainability (SEMAS) and the Department of Science, Technology and Innovation (SECTEC), because they represent directly the interests of the State related to the environment and technology, (ii) availability of space and equipment with collective use to perform the Center's activities, it was ideal being situated in an environment that could provide some space and equipment for collective use, such as meeting rooms with projectors and whiteboards, auditoriums with a capacity of at least 100 people to held the events, among others, and (iii) adequate physical area to accommodate the technical staff (researchers, coordinator of the center and other service providers) and to install the appropriate work points, common cabinets and equipment, such as printer and scanner.

Given the established requirements above, ItGreen was located at NGPD, interacting directly and continuously with it. Besides being an articulator agent with the academy, which contributes to the achievement of some of its activities related to research, NGPD also interacts and promotes integration with other national and international parks and incubators, companies, funding agents, government (at municipal, state and federal levels) and with third sector institutions, which optimizes the exchange of information between the strategic network. Therefore, the Centre is in a synergistic environment where networking has strategic importance for the development of its activities and still offers the greatest potential for performance by being cultivated in the innovative agents, opinion makers and actors with power decision.

Adding to this, because it is directly related to NGPD, ItGreen benefits itself by working among NGPD's activities that, among its duties, stands out as an idea generator, formulator of innovative projects and a large diffusion of information and also it has an active and directly channel with the companies in the park, which facilitates the implementation and dissemination of the activities of the Centre. Thus, being at the NGPD, ItGreen can interact with the human capital and also take advantage of their activities.

Staff

To achieve the defined goals and develop ItGreen activities, the leaders of NGPD defined an initial team consisting of: (i) a project manager responsible for managing the financial resources of the project, the technical team, the physical infrastructure , materials and equipment, controlling and monitoring the services provided, prepare reports and performing accountability; (ii) a technical coordinator responsible for conducting joint partnerships with enterprises, public sector, academic and research centers, learning and replicating successful experiences, maintaining a direct and specific relation with NGPD staff, PD companies, media advisor, coordinating research in PD companies, identifying, evaluating and hiring third party service providers, coordinating events (workshop and seminar), performing products quality control; and (iii) a research support technical responsible for conducting research with companies in Porto Digital, conductong research on the Internet (national and international websites) for the identification, registration and mapping the experiences of WEEE management, and supporting the events organizing.

Besides the team described above, it is still intended to hire some consultants as specific activities are being required, such as: developing a website for the Center and for the events promoted, to making reports of the events, among others.

Creation of a brand and Visual Identity

Besides the choice of location and composition of the team, it was envisioned the importance of creating a visual identity for the center that would be able to transmit a concept of sustainability and also to associate the ItGreen brand to the eco-efficient actions, such as conscious consumption, WEEE management, among other environmental actions.

In this way, it was created the ItGreen logo where the sustainable model of waste management was represented by processing the electronic tree element (on / off), by simply giving a change of perception. Colors and fonts were used to show the possible harmony between two such distant contexts: technology and ecology.

2.4.2. The Consolidation

After structuring the Centre, the consolidation stage was initiated. This study seeks to develop activities to enable the acquisition of technical knowledge about the ICT industry and the problem of waste electrical and electronic equipment in order to structure a solid knowledge base and provide subsidies for the operation of ItGreen. This was possible by performing the following activities:

Survey of WEEE Good Management Practices

This activity, directly associated with one of ItGreen goals (ii. designing a database on the management and treatment of its WEEE), aimed to make an analysis of national and international benchmarking on best management practices in WEEE in order to facilitate the use of practices that best fit the reality

of companies installed in the park and therefore add value to products and services and gain competitive advantages.

Throughout the survey it was possible to identify the regulatory framework (legal and normative aspects) of electronic equipment production and management of their waste as well as the management practices of leading manufacturers, retailers and recycling units that are in conformity with the prevailing laws and policies and to sustainability standards.

It was noticed that although there are still a few businesses that have adopted good practices in the WEEE management process throughout the life cycle of electronic products manufactured, marketed and / or recycled, society has increasingly demanded and valued organizational management changes towards more sustainable practices.

Mapping the Life Cycle of Electronics Equipment

Mapping the life cycle of electronic equipment has the aim of meeting the following goal of ItGreen: (ii) designing a database on the life cycle of technological equipment. To achieve this aim a research was done in order to gain a broad perspective of the production chain of the technological equipment (extraction, production, consumption, use, maintenance, reuse, recycling), through statistical data that represent the economic, environmental and social generated at each stage of the life cycle of equipment. This information is important because through the knowledge of the stages of the life cycle of electronic equipment and the impacts generated at each step, it is possible to establish the actions of the Centre for a more strategic and of higher impact on society.

Thus, it was found that despite all the stages of the life cycle of an electrical or electronic equipment being representative from the perspective of the impacts, the production phase can be the more expressive of the chain. This is mainly because it is a phase that can develop more sustainable production alternatives, such as: (i) use of recyclable and recycled raw materials, (ii) ecodesign (to facilitate the dismantling of equipment and access to the parts/components to facilitate the recycling and maintenance of equipment, thereby reducing the need for extracting on-renewable raw materials), (iii) reduce and/or replace the use of hazardous substances, reducing contamination of the environment and humans .

As a result of this activity it was generated a document called Life Cycle Diagnostic Equipment Technology that provides information about the social, environmental and economic impacts generated by each phase of the life cycle of technological equipment.

Registration of Strategic Actors

With the objective of articulate the formation of a social network to promote the sustainable management of WEEE through the exchange of knowledge and the strengthening of existing environmental public policies, a survey was done as well as a registration of strategic actors in the life cycle of electronic equipment represented by government agencies, universities, research centers, manufacturers, companies that use technological equipment, collector cooperatives and experiences of successful management of regional WEEE (PE), national and international level that could serve as a benchmark for the performance of ItGreen and companies in the Porto Digital.

This survey was fueled by previous activities and allowed abroad network of stakeholders (manufacturers, retailers, consumers) and experts (decision makers and decision-makers). The register contains information organized in classification of actors according to institutional, economic activity and performance in the value chain of waste electrical and electronic equipment, organization, name, description of services provided, place of work, email address, and contacts (telephone and email contact).

The register is intended to serve as a reference of key actors in the chain, from which you can identify which institutions provide services for WEEE collection and treatment, or research and development, for example, in a given city in Brazil and abroad. This information can facilitate the creation of environmental policies to be adopted by the Park.

Survey of Porto Digital companies about Management Practices

This activity aimed to identify the characteristics and management practices in IT companies in Porto Digital, to gather information that would support the development of tools to operate in promoting a culture of green IT. For this purpose, an electronic questionnaire survey was elaborated to be filled in online by corporate managers.

The survey results led to the conclusion that the Green IT practices of the companies interviewed are directly linked to reduced use of electricity, namely cost savings and not necessarily with the environment. Still, these actions reflect positively on the environment, economy and society.

The research enabled diagnosing that although 84% of companies are aware of the environmental, social and economic impact from the production / consumption of electronic equipment resulting from the incorrect disposal, only 5% of the companies representatives said they knew any environmental legislation. It was also found that only 37% of companies surveyed reported having a policy and / or procedure for the management of technological waste consumed by the company.

The data reflect the lack of commitment to equipment purchase that comply with environmental legislation (eg. equipment without toxic components) and with extended usable life equipment and with their correct disposal. It also reflects on the little investment in research on Green IT by companies in regard to design, software, computer systems, etc.

The data from the survey served as the basis for conducting the next activities related to the next stage of the Centre operation.

2.4.3. The Operation

The ItGreen Operation stage tried to address the following objectives: (i) to promote the discussion of the problem of WEEE among the common society, experts and practitioners; (ii) to encourage and nurture a network of strategic actors; and (iii) to promote the strengthening of the solid waste national public policy (PNRS). From this perspective, there were three workshops, an International Seminar and two complementary actions of awareness raising and social mobilization, as detailed in the following activities:

Exhibition "History of Computers"

This action was designed to operate in the promotion of social awareness about the issue of consumption and disposal of electronic equipment. The exhibition titled "History of Computers" lasted twenty days and was held from February the 4th till February the 24th of 2011 in Paço Alfândega Mall, located in Bairro do Recife, where Porto Digital lies, exposing parts of the Computer Museum of Sao Paulo and portraying the history of computers by using old and new parts. The event attempted to sensitize the visitors by sampling sequential pieces which, in a short period, have changed several times in size, model and Technology, on the high consumption needs of the parts due to such changes and, therefore, on their discard.

The event attracted nearly ten thousand participants, among visitors to the Mall, groups of public school students, and people interested in information technology.

Donation Campaign / Disposal of WEEE

This action of social mobilization also aimed to act in the promotion of social awareness about the issue of consumption and disposal of electronic equipment and it occurred in parallel with the exhibition "History of Computers", taking place in the same location during the same period. The campaign drew attention to the importance of properly disposing the waste of electrical and electronic equipment and to the benefit of donating equipment which are still in working condition, encouraging digital inclusion and metarecycling.

The action collected 349 parts and components of WEEE, the most significant: 54 CPUs, 44 printers, 42 keyboards, 40 monitors, 23 motherboards, 18 daughter boards, 09 handsets, 16 speakers, 15 CD drives, 10 stabilizers, and others.

The collection and disposal of the received equipment during the campaign were conducted by the Center for Computer Reconditioning of Recife, a local partner who was responsible for refurbishing and routing to subsequent donation and the recycling destination.

Due to the success of the event and understanding the importance of providing a disposal site and destination of WEEE to Recife's society, the Paço Alfândega mall directors released an area, inside the mall, to receive WEEE material as a way of continuing action and to establish the beginning of a partnership, associated with education and social awareness.

Promoting Workshops

Three workshops were promoted between the 18th and 22nd of February 2011, in order to: (i) promote knowledge exchange and practices with regard to waste management technology, (ii) provide the articulation of a network of waste treatment, (iii) promote a culture of reuse and actions of technological equipment (metarecycling) and recycling of such equipment, and (iv) contribute to the promotion of public policies (national) related to the sustainable management of WEEE.

The workshops targeted representatives of the public (government), private (managers) and academic (professors, researchers and students) sectors who work in the environmental area in Pernambuco. Each workshop had a workload of 08 hours, and discussed themes based on the ItGreen's consolidation actions:

- Articulation of Strategic Actors of the Value Chain of the Electrical and Electronic Equipment
- Practice for the Disposal of Waste of technology Equipment;
- Value Chain of Technology Equipment

The realization of International Seminar on Waste of Electrical and Electronic Equipment (SIREE)

The realization of SIREE 2011 conference was a success. The seminar addressed the issues related to legal and normative mechanisms developed in the country and abroad, issues related to the life cycle of equipment, players involved in their management and import / export waste technology, providing the approach of the local public with national and international audience, sharing knowledge and specific experiences and promoting discussion between speakers and participants.

In addition to that the seminar had a different goal: to produce a "Carta Recife" a paper with the summary of the debates held during the panels of the event through the participation of about forty guests, among lecturers, managers of public and private institutions, representatives of academia and society, all participants of the seminar.

The "Carta Recife" - Document of Contributions to the Planning and Management of WEEE" contained action, responsibilities and challenges to be undertaken for an effective management of WEEE in the country. The document considered the effectiveness of the proposed content of the national Law 12.305/2010 [14] and Decree 7.404/2010 [15], about the preparation of Solid Waste Management Plan.

This document was sent to the Ministry of Environment (MMA) in order to contribute as a subsidy to make decisions about the National Solid Waste (under jurisdiction of the Interministerial Committee of the National Policy of Solid Waste) and the model of reverse logistics system (under jurisdiction of the Steering Committee for the Implementation of reverse Logistics Systems).

In June 2011, Porto Digital was invited to formally present the "Carta Recife" at the 3rd Meeting of the Thematic Working Group of Waste of Electrical and Electronic Equipment (GTT-REEE) of the Committee for the Implementation of the System of Reverse Logistics, coordinated by the Ministry of Development, Industry and Foreign Trade - MDIC, in Brasilia, where it was possible to present the results generated so far by ItGreen and expose its contributions on the issue.

The workshops and the Seminar gathered a total audience of about 300 people, of which 65% originated from Pernambuco, 31% of other states of Brazil and 4% from abroad.

Both the participating public and the local and national media have recognized the importance of holding an event with the magnitude of SIREE in Recife, with an explicit statement of interest by all in holding a second edition of SIREE in Recife in 2012. Also in Brasilia, during the meeting of GTT-REEE, there was incentive for a second edition, in 2012, and the interest of some of the participants to speak at the event, thereby contributing to the generation of an active network.

Elaboration of the Good Practice Guide for Sustainable IT Management

This Guide was developed through information gathered and analyzed during the "consolidation" of ItGreen, targeting the needs of companies in the park, and it was intended to serve as a consultation tool for entrepreneurs and managers, in particular for companies in the Porto Digital, but it can be also be used by ordinary citizens.

The Good Practice Guide for Sustainable IT Management presents sustainable IT practices in form of recommendations on what to do and how to do it going beyond the reduction of energy consumption during the use of electronic equipment. Some green IT practices discussed in the Guide are: virtualization of servers and desktop, use of videoconferencing for meetings, saving paper and the correct disposal of electronic equipment (donation and recycling).

Elaboration of a Manual of Replicability

ItGreen was structured in a simple way and is viable to be replicated in other innovation environments, particularly in more traditional models of technology parks, usually installed in universities and research centres. Thus, understanding the importance of ItGreen as a mechanism for sustainability of the innovation environment of Porto Digital and believing in the viability of promoting the replication of other parks, was prepared a "Manual for Replication Centre", which in turn is a product to be consumed by other Brazilian Parks, demonstrating the viability of replicating the idea in other parks of innovation with a focus on promoting sustainability.

3. CONCLUSION

As the main representative of Pernambuco's ICT cluster, the technological park Porto Digital has sought to exercise its role to promote a Habitat of Sustainable Innovation.

Through the creation of ItGreen, it was possible to generate a series of outstanding contributions for sustainable development in the region, aimed at integrating environmental policies and development strategies. Some contributions can be highlighted: the creation of "Carta Recife - Document of Contributions to the planning and management of WEEE," which was taken to the Ministry of Environment to contribute as a subsidy to make decisions about the Solid Waste National Plan (PNRS) and the reverse logistics system; the International Seminar on Waste of Electrical and Electronic Equipment (SIREE) which gathered about 300 people in its first edition; the creation of the Good Practice Guide for a Sustainable IT Management; the availability of a space in Paço Alfândega Shopping to continue the actions of this nature, among others.

The operationalization of ItGreen by NGPD is also within three (03) of the six (06) axis of action of the park. Axe 1 "Strengthening the Productive and Competitive Capacity of PD Enterprises", as the Centre intends to encourage companies to adopt the park sustainable IT management practices, by promoting actions of shared responsibility in WEEE management throughout the life cycle. In this context, by adopting such practices, characterized as actions of corporate social responsibility, companies can use them as part of their competitive strategy, aiming at the survival and growth of the organization in the long run. Thus, NGPD contributes to strengthening the competitiveness of companies in Porto Digital. Axe 4 "Strengthening the Institutional Image and the Promotion of PD", as the contributions provided by the Centre can provide the companies not only an increased competitive advantage, but also an excellent tool to promote the company's image in the community and consumers since environmentally friendly actions are on global debate and are well appreciated by consumers. Axe 5 "Promote Social Responsibility Actions and Digital Inclusion", as many of the activities performed by ItGreen are characterized as acts of Social Responsibility, such as: conducting seminars and workshops to discuss among the strategic actors of the chain issues related to sustainable policy, the publication of materials designed to encourage the adoption of best management practices for sustainable businesses, among others. Moreover, such actions are intended to encourage companies to adopt, as part of their strategies, other actions related to CSR, such as using the manual of good practices of sustainable IT management created by the Centre as a rule of the organization for the acquisition, use and disposal of electric and electronic equipments; to participate and support such events, among others.

ItGreen presents a model of sustainable management of ICT that can be easily replicated anywhere in the world. The performance model gives special attention to conducting research studies, as well as the articulation of a network of actors who must be fed into discussions involving the market and public policy solutions to the impacts generated by ICT. It also has the potential to encourage the development of cleaner technologies, to develop solutions and facilitate the adoption of green practices by society in general.

ItGreen intends to continue its actions through: (i) the creation of a website for the Centre, which should serve as a tool to articulate and supply social network of communication, with news release, access to institutional publications and to document database, to the registration of strategic actors, to the Good Practice Guide, etc..; (ii) the promotion of SIREE's second edition in 2012, which aims to feed the network of strategic actors and disseminate new management practices of technological equipment; (iii) the definition of indicators for monitoring progress and the change of corporate behavior in relation to sustainable IT practices, deepening and updating the business Survey of Porto Digital; (iv) the dissemination of research results and studies, the promotion of the seminar for business entrepreneurs of Porto Digital, which will be encouraged to adopt the "Guide to Best Management Practices for Sustainable ICT" and to use the "Register of strategic actors" as a tool in conjunction with the strategic actors of the network.

The knowledge dissemination, social mobilization and articulation of strategic actors provided by the actions of ItGreen besides being an input to promote integrated WEEE management and social awareness and to ensure the involvement of ICT entrepreneurs and society as a whole, also promotes the reduction of the gap between business and society in an act of shared responsibility.

It is believed therefore that the promotion of environmentally responsible actions, especially related to technology and waste generated by it, are of fundamental importance in the institutional image of the technology environment of a region, serving as a benchmarking example for other parks in the country and improving access of Brazilian technology to international markets.

4. References

[1] UNITED NATIONS ENVIRONMENT PROGAMME – UNEP. *E-waste Volume I*: Inventory Assessment Manual. 2007. Available at: <http://www.unep.or.jp/Ietc/Publications/spc/EWasteManual_Vol1.pdf>. Access on September 2010.

[2] UNITED NATIONS ENVIRONMENT PROGAMME – UNEP. *E-waste*: the hidden side of IT equipment's manufacturing and use. 2005. Available at: <http://www.grid.unep.ch/product/publication/download/ew_ewaste.en.pdf>. Access on July 2010.

[3] FGV/EAESP-SP. *21ª Pesquisa Anual do Uso de TI*. São Paulo, 2010. Available at: <http://www.scribd.com/doc/30187399/FGV-GVcia-21%C2%AA-Pesquisa-Anual-2010-Administracao-de-Recursos-de-Informatica>. Access on September 2010.

[4] FEDERAÇÃO DAS INDÚSTRIAS DO ESTADO DE PERNAMBUCO – FIEPE. Conselho temático de meio ambiente. In: Seminário Internacional sobre Resíduos de Equipamentos Eletroeletrônicos (SIREE),1, 2011, Recife. Available at: <http://siree.portodigital.org/downloads/apresentacoes/anisio_coelho.pdf>. Access on February 2011.

[5] AGÊNCIA NACIONAL DE TELECOMUNICAÇÕES – ANATEL. *Números do Setor*. Available at: < http://www.anatel.gov.br> Access on March 2011.

[6] MOISÉS, H. O Município-Rede - Planejamento, desenvolvimento político e sustentabilidade. In: *O município no século XXI*: cenários e perspectivas. São Paulo: FPFL/CEPAM, 1999. p. 305-324.

[7] DESENVOLVIMENTO Sustentável. Available at: <http://www.cm-amadora.pt/PageGen.aspx?WMCM_PaginaId=42786>. Access on July 2011.

[8] SUSTENTABILIDADE Econômica. Available at: <http://pt.wikipedia.org/wiki/Sustentabilidade_econ%C3%B3mica>. Access on July 2011.

[9] ANDRADE, T. Inovação tecnológica e meio ambiente: a construção de novos enfoques. *Ambiente & Sociedade,* São Paulo, v.7, nº.1, 2004. Available at: <http://www.scielo.br/pdf/asoc/v7n1/23538.pdf>. Access on July 2011.

[10] CORRÊA, C. R. *et al*. Inovação tecnológica e meio ambiente no Brasil. Available at: <http://www.poseconomia.ufv.br/docs/TextoDiscussao09.pdf> Access on July 2011.

[11] MIRANDA, Z. A. I. & NEGREIROS, R. Parque Científico e Tecnológico como mecanismo indutor de desenvolvimento sustentável. *Revista de Gestão Integrada em Saúde do Trabalho e Meio Ambiente*, São Paulo, v.2, n.4, 2007. Available at: <http://www.interfacehs.sp.senac.br/index.php/ITF/article/viewFile/141/163> Access on July 2011.

[12] AT KEARNEY. Desenvolvimento de uma Agenda Estratégica para o Setor de "IT Off-shore Outsourcing". Brasília, 2005.

[13] ASSOCIAÇÃO NACIONAL DE ENTIDADES PROMOTORAS DE EMPREENDIMENTOS INOVADORES. Panorama de Incubadora de Empresas e Parques Tecnológicos 2006. Brasília> ANPROTEC, 2005. Available at: < http://www.anprotec.org.br/ArquivosDin/Panorama_2005_pdf_11.pdf> Access on July 2011.

[14] BRASIL. *Lei Nº. 12.305*. Brasília, 2010. Available at: <http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm> Access on September 2010.

[15] BRASIL. *Decreto Nº 7.404*. Brasília, 2010. Available at: <http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2010/Decreto/D7404.htm> Access on September 2010.