MSc in Technology, Innovation & Entrepreneurship

Report in the:

DISSERTATION (TIE-4720)

Interim Report for the MSc thesis with subject:

Recycling Stock Market Using Information & Communication Technologies: An innovative service to create a micro-trend for the environment

By
ERGEN Evangelos

Thesis' Supervisor: Dr Panayiotis KETIKIDIS

Thessaloniki – 30th of June, 2009

ABSTRACT

In the interim report which follows the dissertation proposal it is intended to clearly connect the aim of the research with the research questions, the literature review and the research methodology to be followed.

Moreover, this effort intends to investigate the possibility of creating a change effect (micro-trend), by placing the individual as end-consumer in a redefined recycling chain. It will be investigated whether such a service could contribute in the increase of recycling percentages in a region while in parallel create growth for the local economy through an innovative approach. The new introduced recycling process is expected to add value in a simple daily task cultivating a different attitude and turning negative impacts to positive values.

The “Recycling Stock Market” is an innovative service which tries to stimulate three different areas -environment-technology-economy- in a progressive way, through jointure of their characteristics and attributes in order to accomplish one target: *To minimize human’s negative impacts to the environment, caused by mass consuming and careless behavior*.

According to the literature review, a gap has been identified in finding alternative ways of achieving waste management and prevention methods. International organizations, researchers and companies, converge in the fact that new methods have to be adopted in order to achieve “green policies”, to face waste prevention and to increase recycling percentages.

This report specifies the research methodology to follow in order to investigate the “Recycling Stock Market” as an idea and service.

SUMMARY

Purpose – The purpose of this interim report is to define the process to follow in order to examine the possibility of creating a change-effect in a redefined recycling chain, by introducing a new innovative recycling service.

Design/Methodology/Approach – This is a technical report, based in scientific resources. Literature taxonomy is followed as the method for the literature review.

Findings – A study made so far, has identified a gap in current services, comparing to the proposed service as a philosophy and as a real utility. This report establishes a way to proceed with deeper research and intends to come up with valuable replies in the research questions.

Research limitations/implications – This report is restricted within the literature of the three investigated areas, environment-technology-economy.

Practical Implications – It is intended this report to consist the pathway to the specific research. Its main purpose though is to investigate whether it is practically feasible to accomplish such an innovative service and make it real in a region.

Originality/Value – This report is prepared as the interim report for the dissertation thesis for the MSc in Technology, Innovation and Entrepreneurship course (University of Sheffield – CITY Liberal Studies).

Keywords – Recycling Stock Market, Information and Communication Technologies (ICT), Reverse Logistics, Recycling, Waste Management

Paper type – Report, Dissertation Interim Report

TABLE OF CONTENTS

TABLE OF FIGURES

CHAPTER 1 Presentation of the topic

1.1 Introduction - The problem

European Commission in its recent findings regarding a survey about waste management *[1]* introduces the relation between wealth and waste within Europe. As European society has grown wealthier it has created more and more waste. In this research *[2]*, it is highlighted that each year in the European Union alone 1.3 billion tons of waste are thrown away - some 40 million tons of it hazardous. According to European Environment Agency statistics *[3]*, this amounts to about 3.5 tons of solid waste for every man, woman and child. Moreover in the same research, it was found that a further 700 million tons of agricultural waste, is a major problem which aggravates and harms the environment.

A review made by the Organisation for Economic Cooperation and Development (OECD) *[4]* highlighted that between 1990 and 1995, the amount of waste generated in Europe increased by 10%. The same organisation estimates *[5]* that by 2020, Europe could generate 45% more waste than it did in 1995.

For European Union and OECD *[6]*, human existence overloads the environment. Different aspects of human actions aggravate and gradually diminish raw materials. According to Meneses and Palacio *[7]* in their research about recycling behavior, they argue that individual follows a behavior that is irrelevant or even hostile to environment's sustainability. Furthermore, such behavior is multidimensional and is affected by different socio-demographic and psychographic factors. They report that, different roles with different causal characteristics influence people, regarding their attitudes towards the environment. *[8]*

George Soros, in his recent book about economic crisis *[9]* distinguishes attitude from behavior. He claims *[10]* that there is a contrast among what people perceive and what actually do in the same sense of the difference that exists among "noesis" and reality.

Anderson and Huge *[11]* in their study about consumer's changing role in the case of recycling, claimed that although there is a general concern about saving the environment

and there are established beliefs that recognize it as global capital, different practices are followed.

In reply to the key question "Do you know that waste damages the environment?" Robinson and Garratt *[12]* approaching the issue from an ethical side, they highlight that when people say: "I know that waste damages the environment", it is questionable if they do really know it or just believe it. According to their study *[13]* this awareness might not be strong enough to penetrate in their personal beliefs' system while on the other side this might be just a surface approach. As Socrates – the ancient philosopher – implied *[14]*, people prefer to earn money and live their lives in an undisturbed routine.

1.2 Motives and Expectations

This research has an initial motive to find an innovative way to contribute in saving valuable resources and minimizing the catastrophes caused by human presence. That is to eliminate human's negative impacts to the environment, caused by mass consuming and careless behavior.

Second, since waste could be administered, it would be a challenge to recover as many of the materials as possible through recycling. According to European Union and the Sixth Environment Action Programme *[15]* recycling and reuse is one of the three principles in the EU's approach to the waste management policies.

Moreover, Donald Blumberg *[16]* argues that, as the reserves of raw materials are decreasing, there is a way nothing goes wasted. He claims *[17]* that a vast number of used products and materials have value that could be recovered through repair, disposition and recycling. Based on his empirical experience and studies in reverse logistics, he highlights that for most of the products there is a return path. *[18]*

The Committee of the Regions, part of the European Commission responsible for the regional policies within European Union countries, organized a series of events *[19]* where a number of significant surveys were presented, regarding the effort of finding a way of cultivating sustainable policies for the protection both of the environment and human health. These policies examine also *[20]* the increase in the quality of life in regional level and the creation of wealth and prosperity.

In addition, Kenney *[21]* stresses in a more empirical study that, since environment is a leading issue, especially during late years, "Reduce; Reuse and Recycle" are the new watchwords. He aims to clarify *[22]* that the adoption of recycling will lead to an overall affection to supply chain processes, looking to set new standards for the years to come.

It is within the scope of this research to investigate, whether it would be feasible to accomplish a change in the recycling percentages in regional level through an innovative service which is purely inspired by the motives. The intention is not only to achieve an increase in recycling percentages in the European region but create growth for the local economies. The proposed service cultivates a different approach that makes the recycling process more effective, trying to add value in a simple daily task, enforcing a different attitude and turning negative impacts to positive values. The challenge is to give real value in certain daily habits and transform a seemingly problematic situation to a fine opportunity for multiple benefits.

1.3 The aim of the research

This research intends to investigate whether an introduction of a service could help European society to achieve better results in waste management and recycling. That means to study the value-action relationship, which is the basis of the new service, and examine whether this may bring tangible results and may achieve a pervasive impact in regional level.

There is clearly one aim and this is to examine the possibility of creating a change-effect in a redefined recycling chain by introducing the service of ***"Recycling Stock Market with the use of Information and Communication Technologies (ICT)".*** By applying such an innovative service which aims to face the factors that postpone the change of recycling attitude, it could be possible to achieve the creation of a micro-trend able to support waste prevention.

1.3.1 "Recycling Stock Market using ICT", Idea generation

Penn Aaron in his study "There is substance to recycling" *[23]* claims that mass production and use of raw materials is not an endless channel. Soon, companies will be obliged, by the circumstances, to use only recyclable raw materials. He clarifies *[24]* that this will happen

for two reasons: (a) the materials will simply no exist and (b) their prices will be extremely high. However, he accepts *[25]* that recycling is growing as a vital component of many business strategies.

According to research made by AT&T and Westech *[26] [27]* they highlighted that recent developments in information and communication technologies (ICT), have cultivated an innovation friendly environment. Such advancements create a positive framework for more tools to be introduced, more combinations to be examined and more potentials either for incremental or radical innovations. In a recent technical report from European Commission *[28]* about the mapping of European wireless trends and drivers, it was reported that new technologies affect people and resources in a catalytic way, through their direct involvement.

In addition, the "Innovision Research Institute", which is specialized in telecommunications and new technologies, presented in a white paper *[29] [30]* its research conducted about the new trends in business telecommunications; it highlights that the new trends in business telecommunications have caused the appreciation of their business value and have defined a new digital business environment. According to the Institute *[31]* the catalytic discovery among the new technologies, was the introduction of mobility, which is applied through the wireless communication and mobile computing. AT&T and Orange, two of the most popular mobile operators have already announced *[32] [33]* new services offered to their customers relating to digital payments through their phones, replacement of credit cards, tickets, even e-commerce solutions.

Several authors *[34] [35] [36] [37] [38]* highlight the introduction of a new mobile technology, called "Near Field Communication", which is an alternative wireless technology that has been deeply spread in individuals and companies creating "cutting edge" mechanisms for people interaction.

Moreover, parallel to technological achievements the financial sector has made an equivalent progress affecting global economy and fostering entrepreneurial initiatives. The jointure of technology and finance gave birth to the what-said new economies. According to Paul Krugman, the Nobel Prize winner, *[39]* technology helped finance to reach the other side of Atlantic implying clearly those new economies emerged due to technological

advancements. Also Costas Simitis *[40]*, former Prime Minister of Greece who succeeded in placing Greece in the Euro zone, and George Soros *[41]*, international investor well-known for his successful forecasts, they both have issued books about the current economic crisis, where they define globalization as a merging of economy and technology.

Stock markets involve people and capitals. Despite their unsteady route, by no means they act as a development lever for any economy. Country economies are depended on them; globalization and technology have facilitated their invasion to daily economic life and as a result, a number of financial tools have been developed to increase money generation. They provide certain know-how and contribute to a region's development since these are the poles of entrepreneurship.

After the World War II there was an increased mobility in people and capitals, with the contribution of stock markets. According to Tourani and Kirkby *[42]* this move affected people's psychological biases, shaping specific types of behaviors and directed investors in the effects of overconfidence, socialization and familiarity. George Soros identified the same results *[43]* in terms of overconfidence, regarding current financial crisis. Moreover Costas Simitis in his most recent book *[44]* highlights that people will change behavior after the crisis.

In addition, the new era has been characterized by the mobility of capitals through stock markets and "carry trade". Aksoy Lerzan and a number of other experts in financial issues *[45]* have stated that globalization has created the suitable environment for the cultivation of stock market mentality among individuals.

1.3.2 What is the proposed innovative service?

It is intended to create a company which will administer recyclable products (aluminum, glass, paper and plastic) incorporating the philosophy of auctioning, using the know-how of stock markets and investing, in order to create a micro-trend and make people recycling. To achieve this, information and communication technologies will be exploited assisting in this effort.

In the proposed service the participants will be:

- people as end-consumers,
- the company which will administer the service,
- the companies as traders and sellers since they sell the products, the recycling industry,
- the environmentalists,
- the governments.

The vision is to create a European region-based prototype cell, which will be supported by the regional authorities and professional associations, will be funded partially or even fully at its start from European Union funds, aiming to create value in the region, contribute in achieving growth through the exploit of current resources and guarantee sustainability.

Based on the literature review which is described later on, we have identified that there is a gap and no similar idea exists in terms of environment and doing innovative things to sustain its value.

1.3.3 How the innovative service will operate (a brief description)

- People buy products to consume;
- Most of these products could be recycled (aluminum, glass, paper and plastic);
- These recyclables will be collected in quantities from certain collection points;
- Consumers in return get a receipt, as a proof for what they have recycled each time;
- Recyclables will be driven in a warehouse;
- A set of procedures will be applied on the recyclables according to specific standards (cleaning, disassembling, unpacking, sorting, counting of quantities etc);
- Quantities of the available recyclables are placed in a private on-line web auction system (like eBay);
- In this system, access has all interesting parts (recycling industry, companies, liaisons etc);
- Everything works in clarity and there is always information of what is available and in which price like the stock market tables;
- Interesting parts place their bids in the specific available quantities. The auctions have specific period of time. Also they may be of free-starting price or with a fixed

starting price, according to the international prices of the specific recyclable (e.g. aluminum);

- The highest price at a given period wins and takes the quantity;
- Everything is done digitally;
- The company receives the payment;
- Shipment of the winning recyclables is sent to the winner;
- There may be more than one auctions within a working day and different auctions that could run in parallel for different recyclables (e.g. aluminum cans and glass bottles);
- This is the standard process;
- Moreover, the company will keep the right to directly negotiate with specific big companies (industries) for the return of their used products (reverse logistics) at a given price, since these recyclables are collected in huge quantities (e.g glass milk bottles of a specific brand directly to the company, coca-cola glass bottles directly to The Coca Cola company etc.);

So far, we have explained the process that covers the inter-companies network. On the other side there is the end-consumer. Consumers keep a receipt of the recyclables that have recycled, and they are registered to the company's central system (information database) as well as the quantities they have given. Since they are considered as the main contributors to this effort, they will be rewarded under the following scheme:

- In the end of each auction and calculating the final price of quantities that have been sold to the winner, each recyclable will get a price, just like the stocks which take prices or change prices according to demand and offer scheme;
- A certain number of recyclables will form a share (for example 4 glass bottles equals to one share);
- The value of each share depends on the current prices of the specific recyclable (e.g glass) and may vary from day to day or from hour to hour;
- Assuming that a share has a price at a given time and knowing what products each end-consumer has recycled he/she will be appointed a number of shares;
- These shares have a value;

- Consumer will be informed in his mobile phone or though other more traditional ways about the number of his/her shares and their current value;
- He can keep the shares as an investment and wait, expecting their value to increase, or he may exchange their value to purchase consuming goods;
- These shares will be valid to super markets and other participating companies and in exchange of a price;
- Consumers will have the opportunity to purchase products through the use of their shares and pay part or a whole of specific products. These products will be the products of the companies that will participate in the whole concept;
- In addition, the company may approach other companies that are interested in participating in the whole concept of recycling, through their Corporate Social Responsibility policies and are willing to direct funds to the auction system;
- In return they will gain access to the network of consumers and secure their brand awareness as well as advertisements on offers on their products;

Below it is given a diagrammatic illustration of the service. It is a one-page idea presentation and intends to give a clear image of how the suggested service works.

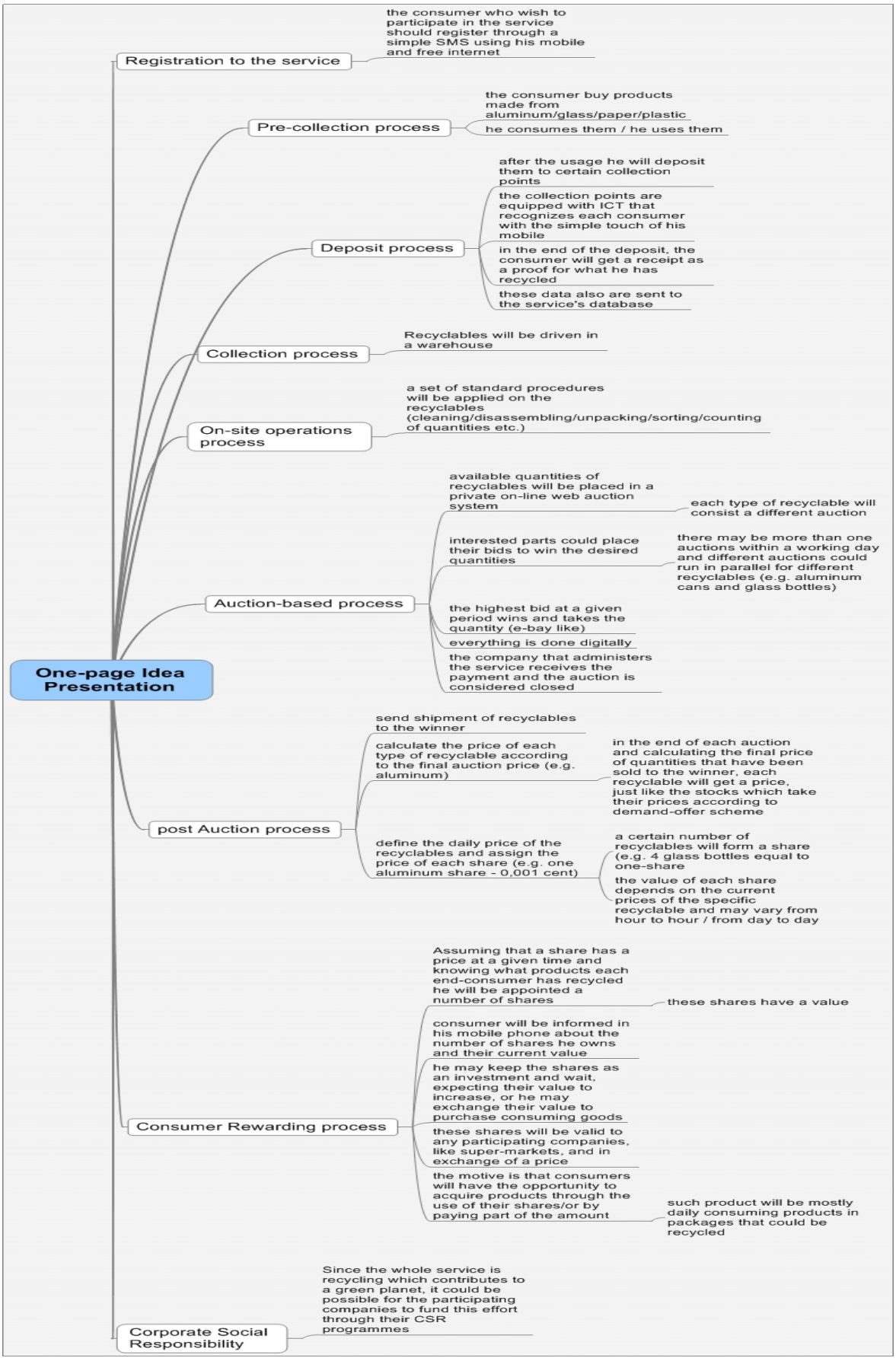

Figure 1. One-page idea presentation

According to Robinson and Garratt *[46]* there is the "anthropic principle" which proves that the universe was structured to allow human life to evolve successfully. In other words, they highlight *[47]* that there is an alternative to find a better balance between economic development and environmental needs.

This innovative service intends to contribute in finding this balance. This model incorporates people actively in an effort that, although operates as an investing game it shapes behaviors and confronts with the recycling avert. Furthermore, through merging different modern tools, is trying to exploit capabilities, knowledge and willingness for achieving the upmost of current environmental resources rather than destroying for making new ones.

Thereby, the idea is ***to make people recycling by getting in return some kind of reward.*** In order to make people recycling, there should give them a strong motive. This motive originates from *the sense of reward*, which is related to the meaning of adding value to a practice, and remunerating an achievement. Therefore, two key parameters comprise the base of this service:

(i) *the possibility to earn something;* and

(ii) *the feeling of participating in a game;*

Besides that, the aim is not to simply offer a new product or service but instead a ***real utility***.

A simple way to communicate the service is illustrated in the figure given below, "The service at a glance".

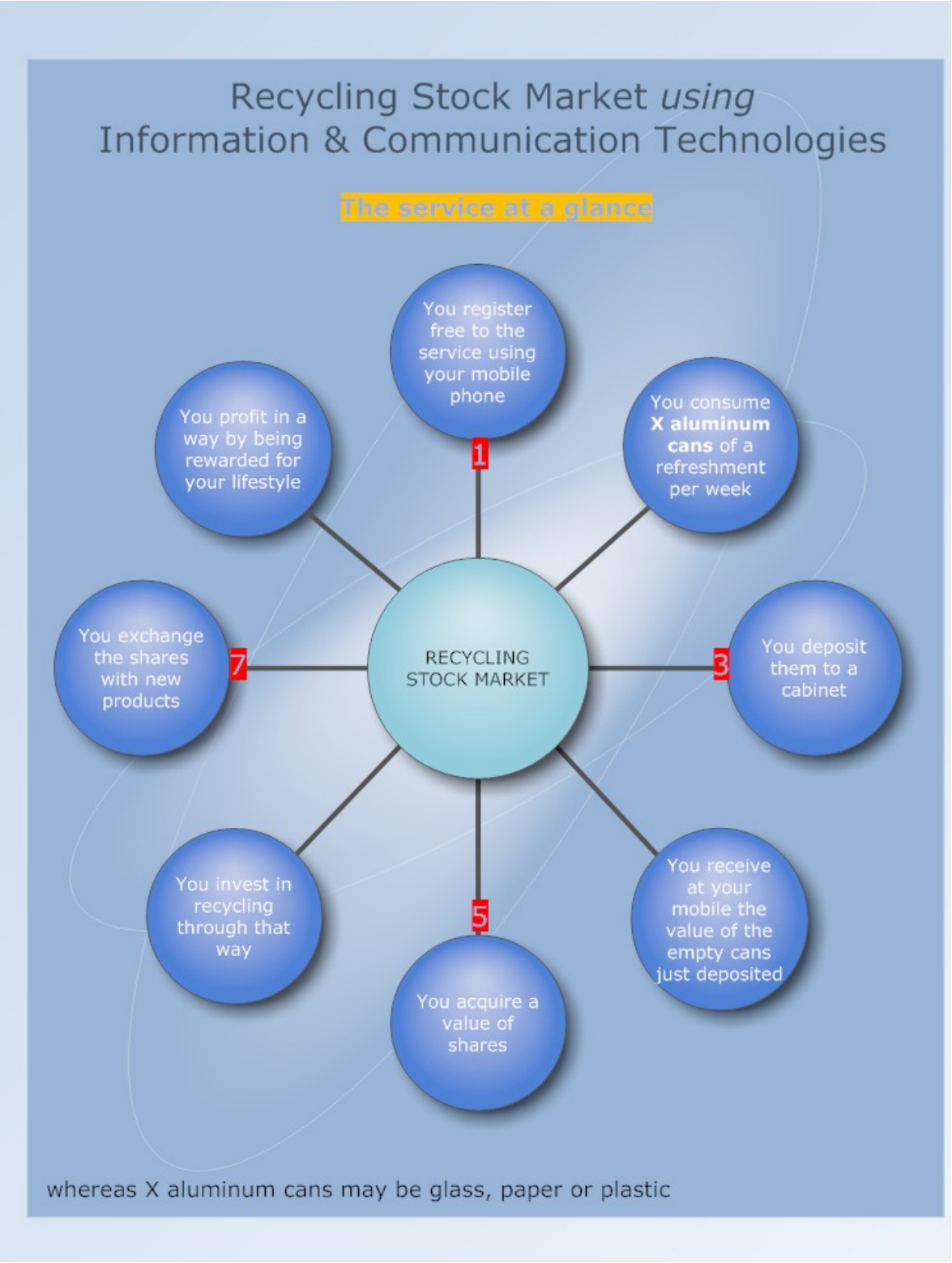

Figure 2. The service at a glance

1.4 Research area

This research combines the three fields of: ***Economy-Environment-Technology,*** which through the creation of an innovative utility is expected to create a micro-trend. Micro-trends find application in "the rule of 1%". It is possible to create a change-effect if we manage to affect a percentage of 1% of people involved, in a manner that this will be sustainable, organized, and with vision. Therefore, literature review and further research will be implemented in the area that is defined by the above three fields and only within the limits that are related with the original idea of "recycling", "stock markets" and "information & communication technologies".

According to the above scheme, bibliography and other literature that has been reviewed and will be reviewed, for this research, is sorted in these three fields.

1.5 Objectives and parameters of the research project

The objectives of this research are clearly connected to the aim as described earlier, and intend to create the framework in order to identify the feasibility of the original idea.

Specifically the objectives of this project are:

- To perform an in-depth literature review,
- To search, find and examine different models through making taxonomy,
- To identify possible gaps in current status,
- To survey other models – if existed – and conclude with similarities, differences and comparisons,
- To adopt a framework to perform this research and this may be an existed, a combination or a new one, and finally
- To make a results analysis.

The intention is to crystal clear the way that this project will run, giving a step-by-step description.

CHAPTER 2 Literature review

Literature taxonomy includes a number of resources that were categorized in three sections, based on the nature of each resource. The aim is to collect findings and conclusions from different studies, in order to get multiple and differentiated feedback.

The first section includes books that are bended to the original idea as well as the research aim. This set of books could be considered as axes that can contribute to the survey of existing models. The second section includes a number of supportive literatures, reviews and articles that are dedicated to studies around the three research areas. The third section includes a list of information and policies mostly from the European Commission as well as other international organizations.

In the Appendix section of this report *(Appendix A)*, it is given the literature taxonomy diagrammatically for each resource, including all resources that have been studied in regards to the objectives of the research as detailed in the previous section. Performing an in-depth literature review, with the help of this taxonomy, below it is presented a series of thoughts and characteristics based on the models found. We have tried to extract meanings in terms of comparisons, similarities and differences remaining always oriented to the aim of this project.

Mark Roseland in his book about sustainable communities *[48]* claims that whenever it is necessary we should not be afraid to mandate changes. He argues that the key to a sustainable future lies not in making us more competitive but rather in making us more perceptive; more able to realize what we have, what we need and what are the long term consequences of our short-term choices. In order of being able to drive towards sustainable communities, competition is not anymore the only driver or at least the major driver. The same author concludes *[49]* that sustainability can mean less as well as more. Therefore, by doing development differently, this could be a challenge. He further argues *[50]* that development may depend in the natural income rather than in the depletion of it.

Actually there is knowledge, information and tools to do development differently and keep on profiting. Donald Blumberg *[51]* clarifies that reverse logistics, modern procurement

techniques, supply chain management and current recycling processes can transform a useless product to a priceful piece. However he identifies *[52]* that anything could get a price if we apply innovative tools that give value to its existence.

A wide research made from the Organization for Economic Cooperation and Development in 2006 *[53]* presented that recycling markets currently seem to face weaknesses and discrepancies considering their primary mission. In the same research *[54]* it is discussed that a possible re-design could help them to overpass failures and barriers and increase their effectiveness in terms of contribution. Alternatively traditional recycling policies and operations could be enriched with more effective tools that take advantage of information and communication technologies. Issues such as: (a) search and transaction costs, (b) quality of recycled goods and (c) penetration of recycled materials in the markets, could be easily coordinated by simply bringing together the involved parts through a communication tool. The Organization concluded *[55]* that this is a desired outcome which currently does not exist according to the literature but is expected to be found.

Investing incorporates a philosophy with social characteristics. John Nofsinger in "The Psychology of Investing" *[56]* claims that learning to invest is a life-long course which may support local communities to overcome difficult situations, especially when changes are mandated either in economic or social level. He further discuss *[57]* that investing leads people to start thinking by developing mental accounting, mental budgeting and by matching costs to benefits. In such a way, he admits *[58]* that they learn to develop risk perception in the real world; they build behavioral portfolios, increase social interaction and develop a social dynamic. Such techniques primarily improve the economic behavior of individuals and in an extent, drain their characteristics in other sectors of life.

At this point, based on the above conclusions, it is identified that the model of "Recycling Stock Market" could involve people in the learning process of building an investing behavior and in the same time contribute in recycling and waste management. Moreover the development of other skills such as self-control, self-obedience and effective decision making may establish a framework within the region that can change the progress.

Each region has its own scalable needs. “Needs” create dynamics and this is to be investigated especially when new investments are about to be introduced. Dynamics is a significant factor that may affect the impact and sustainability of investments. *[59]*
A similar model and framework to the original idea of “Recycling Stock Market” is the “Social Funds Programmes” as introduced and implemented by the World Bank. *[60]*
In the way that “Social Funds” are an innovative, community-based tool, in the same way “Recycling Stock Market” could be an innovative micro-trend for sustainable regions.
The intention is to provide real tangible results in a wide supply chain by making the end-consumer the first link of a reverse green network.

Morgan and Hughes *[61]* have performed a specific survey about recycling behavior in a whole community in USA. They have found that, economical benefits may be a significant factor that affects the recycling behavior. *[62]*

Moreover, Kazunori *[63]* in his study about recycling and international trade theory claims that subsidies in the recycling sector are a strategy that is followed so far, and it aims to strengthen local economies and change the direction to a higher recycling ratio. The waste costs are strictly related to the optimal welfare rates because, through time, such costs aggravate the available resources of the community. *[64]*

On the other side, recycling sector could become a significant factor for a region and its economy, since it is strictly connected with emerging markets. Thus, adoption of simple and effective recycling procedures in combination with minimum obstacles from legislation and paperwork could create a competitive advantage. *[65]*

Recyclables may contribute to the regions’ GDP, since there is an established supply chain and there is interest from huge markets such as China, India and Pakistan. *[66]*

According to Chung Shan-Shan *[67]* there is a value-action gap in waste recycling which could be filled gradually by developing awareness among targeted groups, such as young people. To develop awareness it is necessary to reverse former states of typical action to a new change format.

European Union supports the aid for environmental protection *[68]* starting from waste management and going further to activities such as re-utilization, recycling and recovery. According to "The Sixth Environment Protection Programme" *[69]* waste prevention and management is one of the four top priorities for the Community.

Innovation and innovative approaches may be the answer to the environmental protection. European Innovation Scoreboard *[70]* racks and benchmarks the relative innovation performance of EU member states according to a specific methodology. In addition it compares *[71]* the results with corresponded innovation in USA and Japan. So far, EU is still behind USA and Japan although late years the gap is shorten. Less than half of the EU member states (11 from 27) are above the EU27 mean in 2008 Innovation Scoreboard. *[72]*

Recent analysis confirms the importance of non-R&D innovation. R&D is not the only method of innovating. Technology adoption, incremental changes, imitation and combination of knowledge are some alternate ways of innovating.

"Recycling Stock Market" actually suggests a model of combining existing knowledge and imitation of the three different sectors (economy-technology-environment).

European Union focuses in the application of a cohesion policy *[73]*. It highlights that current era of financial crisis could be a suitable period for investing in energy efficiency, clean technologies and environmental services. Such crises are opportunities for behavioral changes since large group of people are involved and affected; therefore it is easier to penetrate in their mentalities and create micro-trends. *[74]*

Developing new comparative advantages is the answer to crisis, since this may lead to long-term sustainable growth. *[75]*

CHAPTER 3 Primary research methodology

The research objectives of this project, as described in the beginning, have the character of scrutinizing the possibility to create a change-effect in the current recycling sector. The literature review, through its findings and conclusions, intends to examine different models, to identify possible gaps and to survey the possibility of creating a final framework within which, the original idea could be applied.

Research objectives and literature review have framed the projected research methodology to be followed.

Moreover, in the Research Proposal, submitted some months ago, there was a plan of the research methodology to be followed. This plan included a number of different methods in terms of both qualitative and quantitative research. Further analysis and discussion directed us to the necessity of prioritizing these methods and follow a main and back-up plan in order to ensure that necessary information will be collected for the research.

Research methodology

The main plan includes:

A. Qualitative Research

Qualitative research is subjective and it generates mainly text, because the researcher does not use numbers but instead tries to analyze arguments, words and expressions. Current research is primarily related to human's behavior as intends to find ways of creating a micro-trend. Consequently, the adoption of this kind of research is almost mandatory. We will follow one-to-one unstructured interviews. Interviews will be performed in a very restricted number of individuals. It is targeted to be opinion leaders, academicians, and industry experts. There will be six (6) interviews on total, distributed as follows:

- Two (2) to be done with opinion leaders, may be Presidents of Associations, Governmental experts or Local Authorities representatives;
- Two (2) to be done with academicians, preferably with expertise in the three fields that covers the original idea (economy-environment-technology);

- Two (2) to be done with industry experts, preferably from the field of green technologies or similar areas;

It is expected to pump useful information from the respondents, regarding attitudes, behaviors and beliefs. The purpose is to have minimum control of the discussion while giving to the interviewee the opportunity to guide the interview through brainstorming events, behaviors, beliefs and attitudes.

B. Quantitative Research

A major contributing method in this research will be the implementation of a cross sectional survey. For this reason, it will be adopted the questionnaire research tool. The time limit of this survey will not exceed two weeks, and bottom line should be to measure attitudes and opinions. Quantitative surveys are descriptive in nature, their findings are descriptive as well and with the suitable process of software tools (such as SPSS) can provide information that can be generalized.

Data collection and how this will be done is an essential parameter for the whole study. Considering that the distribution, filling and gathering of the questionnaires is an issue of top importance, and in order to accomplish effectiveness, there will be a different design and approach in the idea of it. Since the researcher owns a personal web-page, this will be a web survey taking into account that such method guarantees accessibility, time efficiency, money saving and gives in the respondents the convenience to study more on the given subject. In parallel the on-line questionnaire is intended to be more interactive and impressive.

Regarding the population and sampling, according to the parameters of interest and the research questions explained earlier, it is selected the non-probability sampling. Since questionnaires will be addressed only to individuals, it is considered as right to give equal chance to everybody in the population of being included. Followed by the fact that this is a web survey, the number of expected participants is expected to be more than 50 and will be from different regions of the world. The researcher intends to process as many questionnaires as will be received in a specific period of time which will be predetermined and known.

The web-survey will be addressed to the following participants:

- Researchers, that have developed similar ideas or intend to;
- End-consumers, as citizens that will actively participate in this effort;
- Professionals, in terms of technology and economy;
- Non-governmental institutes, in related areas such as environmental associations;

A number between 50 to 100 questionnaires is considered adequate to extract information regarding the original idea.

The back-up plan in intended to be completely based in qualitative methods and this will be activated fully or partially, in case the information expected from the primary plan will be considered not adequate to perform the research effectively.
This plan includes:
A. Narrative Inquiry: The narrative inquiry will be used in order to get information through storytelling. Then we will write a narrative of the experience. Actually, this will be derived from the combination of interviews and observations, which will be done in a restricted sample, mostly from executives that will be picked up as experts.

B. Short term observations: It is considered that short term unstructured observations, in definite study groups could be a key aspect for this research. Therefore, short term observational studies will be performed, as alternatives, in order to present findings based on recorded observation. Such observations are planned to be done in individuals in their domestic environment, in their professional environment as well as in groups of people within consuming environments.

C. Ethno-methodology: Ethno-methodology is the empirical study of methods that individuals use to give sense to and to accomplish their daily actions: communicating, making decisions, and reasoning. This approach is actually a form of ethnography, which specifically studies activities of group members to see how they make sense of their surroundings. The method of ethno-methodology will be applied in two areas: (a) individuals and (b) companies. It is intended to observe how individuals and companies as entities react and behave in relation to the research questions.

CHAPTER 4 Primary data collection

The intention is to use a common questionnaire for all entities. Its structure will give the eligibility to be adapted according to each case meaning that each question will be translated differently due to the respondent's nature. The questionnaire will be short, easy read and descriptive.

The research questions, as given below, will be the basis to form the questionnaire. They are based in a three-pronged strategy: (a) get feedback on a primary evaluation of the service, (b) get information on the potential value of the idea, and (c) get information on potential obstacles.

A. Get feedback on how this service is evaluated (PRIMARY EVALUATION)

- How individuals as end-consumers would evaluate such a service?
- How companies as the producers of the recyclables would participate in such an effort? Are they willing to contribute through their Corporate Responsibility Programmes or similar actions?
- What is the opinion of the environmentalists and the relevant associations?
- What is the opinion of such an effort within the academic community?

B. Get information on the potential value of this idea (VALUE and SUSTAINABILITY)

- Would the new service create value in the region?
- Would this be a high-quality sustainable investment for the region and its citizens?
- Would this effort add value compared with any existed mechanisms?
- Would it be possible for its results to reach immediately the households and affect their living standards?

C. Get information on potential obstacles (BARRIERS, OBSTACLES and ENEMIES)

- What obstacles may be raised in this service or possible enemies due to the new status that this will create in the recycling industry?

Draft Questionnaire

Section 1: Personal questions

1. Gender

Male		Female	

2. Age

18-29		30-39		40-49		50-59		60-69	

3. Educational background

High School		University		Postgraduate, Master		Doctoral, PhD	

4. Marital status

Single		Married	

5. Family-Living status

Living alone		Living with your couple		Living with roommates		Living with your family	

6. Professional status

Employed		Unemployed	

Section 2: Evaluation of the service

1. How do you evaluate the proposed service “Recycling Stock Market Using Information & Communication Technologies at a first glance?

Very interesting		Interesting		Moderate		Almost indifferent		Indifferent-Neutral	

2. Do you thing that you could contribute through your participation in this service?

Very high contribution		High contribution		Moderate		Almost indifferent to the contribution		Indifferent-Neutral to the contribution	

3. Do you see obvious benefit for the environment with the implementation of “Recycling Stock Market”?

RSM is		RSM is		Moderate		RSM is little		Indifferent-	

very beneficial		beneficial				beneficial		Neutral-Non beneficial	

4. Please indicate the most important characteristic of this service, which makes it more attractive according to you (please choose only one-the most valuable for you):

a) Participants have profits
b) Garbage has value
c) The sense of a game
d) Smart way to recycle
e) Other (please specify) _____

5. Do you see any barriers or obstacles in the implementation on this idea?

a) Conflict with the current situation of recycling industry and market
b) Legislation issues
c) Avery of the companies to participate
d) Other (please specify) _____

CHAPTER 5 Work progress review

The part of literature review has been prioritized during last three months. The central focus was to research and identify possible models that could be imitated or get useful characteristics, in terms of the idea of "Recycling Stock Market".

In addition, much useful information rose throughout the review. This feedback contributed in the overall research especially in the examination of the creation of a framework for the new service.

Literature review was prolonged due to the multiple dimensions of the research queries, as well as the need to scrutinize the feasibility of the new service as proposed.

It is expected the web survey (questionnaires) and the interviews to be implemented by the end of July 2009. In case of not gathering the adequate information, the back-up plan will be activated and is expected to be completed until the 20th of August 2009.

CHAPTER 6 Suggested revisions and readjustment of the remaining parts of the proposal

The main revision introduced in this interim report refers to the research methodology. Since the collection of information is valuable for the progress of the research, two plans were adopted, a main and back-up, in order to ensure that in any case the requested information will be available.

Literature review was prolonged, in contrast to the original expectations, due to the multiplicity of the subject. In any case, it was considered necessary though to further survey alternative resources. The focus was to identify current situation through the existed literature, review and search for possible gaps and useful elements that could match with the idea of the service. Different frameworks researched and same valuation resources examined.

Next phase will include the collection of information, the process and the evaluation.

In case strong literature resources emerged, these are intended to be adopted and exploit their contribution to the overall of the research.

CONCLUSIONS

In this report, there is a different approach regarding the literature review. Main purpose is to bring up what other researchers, both academics and professionals, have highlighted and present their contribution to the issue of recycling. Since the idea of "Recycling Stock Market" includes aspects from technology, environment and economy it was intended to cover these sectors with findings and conclusions from different parts as well.

Literature review created the path to develop and finalize the research methodology to be followed. Main efforts will evolve around web survey and interviews.

Very specific directions given by Dr Ketikidis, the supervisor of this research, were adopted and followed in terms of investigating the possibility of creating a change-effect in a redefined recycling chain by introducing the service of ***"Recycling Stock Market with the use of Information and Communication Technologies (ICT)".***

REFERENCES

[1] [2] [3] [4] [5] [6] [15] Official web site of the European Commission, ***"Environment: Waste",*** http://ec.europa.eu/environment/waste/index.htm

[7] [8] Meneses Gonzalo Diaz and Palacio Beerli Asuncion, ***"Recycling Behavior: A Multidimensional Approach",*** Journal of Environment & Behaviour, Vol. 37, No. 6, November 2005, pp. 837-860.

[9] [10] [41] [43] Soros George, ***"The Financial Crisis of 2008 and what it means",*** First edition, 2008, Livanis Publications *(original book in Greek)*, p. 10.

[11] Anderson Helen and Huge Brodin Maria, ***"The consumer's changing role: the case of recycling",*** The International Journal of Management of Environmental Quality, Emerald Publishing, Vol. 16, No. 1, 2005, pp. 77-86.

[12] [13] [14] [46] [47] Robinson Dave and Garratt Chris, ***"Introducing Ethics",*** Icon Books, UK, 1999, pp. 31-35.

[16] [17] [18] Blumberg F. Donald, ***"Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes",*** CRC Press, USA, 2005, pp. 5-6.

[19] [20] European Commission, Committee of the Regions, InfoRegio, http://ec.europa.eu/regional_policy/conferences/od2008/docu_t2.cfm?nmenu=3&sub=2&smenu=271

[21] [22] Kenney Brad, ***"Green Manufacturing: The Zero How to Green",*** Journal of Industry Week, Penton Publishing, July 2008, pp. 36-43.

[23] [24] [25] Penn Aaron, ***"There's substance to Recycling",*** Journal of Brand Packaging, Ascend Media, pp. 16-17.

[26] AT&T, ***"Emerging Technologies in the enterprise: A qualitative review of survey findings, WiFi, WiMax and RFID technologies to help companies gain a competitive advantage".***

[27] Westech Communications Inc. on behalf of the WiMAX Forum, ***"Can WiMAX Address Your Applications?",*** White Paper, WiMAX Forum, 24 October 2005.

[28] European Commission, ***"Mapping European Wireless trends and drivers: Executive Summary",*** Technical Report EUR 22250 EN, EU Joint Research Center.

[29] Innovision Research & Technology plc, ***"Near Field Communication in the real world – part I, turning the NFC promise into profitable, everyday applications",*** White Paper.

[30] [31] Innovision Research & Technology plc, ***"Near Field Communication in the real world – part III, moving to System on Chip (SoC) integration",*** White paper, March 2007.

[32] Morris Iain, ***"The future is contactless, Orange says",*** Journal of Telecommunications, Horizon House, December 2007, p. 7.

[33] [37] AT&T, ***"The Wireless Advantage: Business Scenarios for Mobile Solutions",*** Industry Brief report.

[34] Birch G.W. David, ***"Near-field is nearly here",*** Journal of Telecommunications Management, Vol. 1:1 (27 April 2007), pp. 55-68.

[35] Ecma International, ***"Near Field Communication",*** White paper.

[36] Balaran Dan, ***"Near Field Communication: When will the breakthrough come?",*** Cards & Payments, SourceMedia, January 2008, pp. 30-35.

[38] Smart Card Alliance, ***"Proximity Mobile Payments: Leveraging NFC and the Contactless Financial Payments infrastructure",*** White Paper, September 2007.

[39] Krugman Paul, ***"Pop Internationalism",*** Massachusetts Institute of Technology, 1996 *(original book in Greek language, July 2000. Polis Editions).*

[40] Simitis Costas, ***"The Crisis",*** Polis Publications, November 2008 *(original book in Greek language).*

[42] Tourani-Rad Alireza and Kirkby Stephen, ***"Investigation of investors' overconfidence, familiarity and socialization",*** Journal of Accounting & Finance, Blackwell Publishing, No. 45 (2005), pp. 283-300.

[44] Simitis Costs, ***"Nothing will remain the same after the crisis",*** Article in Capital Magazine, February 2009 *(original magazine in Greek language).*

[45] Aksoy Lerzan, Cooil Bruce, Groening Christopher, Keiningham L. Timothy and Yalcin Atakan, ***"The Long-Term Stock Market Valuation of Customer Satisfaction",*** Journal of Marketing, American Marketing Association, Vol. 72 (July 2008), pp. 105-122.

[48] [49] [50] Roseland Mark, ***"Toward Sustainable Communities: Resources for Citizens and their Governments",*** New Society Publishers, Vancouver Canada, 2005.

[51] [52] Blumberg F. Donald, ***"Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes",*** CRC Press, USA, 2005.

[53] [54] [55] OECD - Organization for Economic Co-operation and Development, ***"Improving Recycling Markets",*** OECD Publications, 2006.

[56] [57] [58] Nofsinger R. John, ***"The Psychology of Investing",*** Second Edition, Prentice Hall, USA, 2005.

[59] [60] Rawlings B. Laura, Sherburne-Benz Lynne and Van Domelen Julie, ***"Evaluating Social Funds: A Cross-Country Analysis of Community Investments",*** World Bank Research Report – Regional & Sectoral Studies, USA, 2004.

[61] [62] Morgan W. Fred and Hughes V. Margaret, ***"Understanding Recycling Behavior in Kentucky: Who recycles and why",*** JOM, August 2006, pp. 32-35.

[63] [64] Tanigaki Kazunori, ***"Recycling and International Trade Theory",*** Review of Development Economics, Volume 11 (1), 2007, pp. 1-12.

[65] [66] Dalmijn W.L. and De Long T.P.R., ***"The Development of Vehicle Recycling in Europe: Sorting, Shredding and Separation",*** JOM, November 2007, pp. 52-56.

[67] Chung Shan-Shan, Miu Monica and Leung Yin, ***"The Value-Action Gap in Waste Recycling: The Case of Undergraduates in Hong-Kong",*** Journal of Environmental Management, 2007:40, pp. 603-612.

[68] Commission of the European Communities, ***"Handbook on Community State Aid Rules for SMEs (Including temporary state aid measures to support access to finance in the current financial and economic crisis)",*** Study Report (Part of a Commission's proposal for the European Economy Recovery Plan), January 2009.

[69] Commission of the European Communities, ***"Notices from European Union Institution and Bodies: Community Guidelines on State Aid for Environmental Protection",*** Official Journal of the European Union, April 2008.

[70] [71] [72] Maastricht Economic and Social Research and Training Center on Innovation and Technology, ***"European Innovation Scoreboard 2008: Comparative Analysis of Innovation Performance",*** Thematic Report, January 2009.

[73] [74] Commission of the European Communities, ***"Cohesion Policy: Investing in the real economy",*** Communication from the Commission to the European Parliament, Community Publication, 2008.

[75] OECD - Organization for Economic Co-operation and Development, ***"Informal Seminar on Sustainability and the Role of Innovation Policies in the current Financial Crisis",*** Summary and Conclusions of the Seminar, Seminar Report, February 2009.

BIBLIOGRAPHY

- Beatty K.M. Timothy, Berck Peter and Shimshack P. Jay, ***"Curbside recycling in the presence of alternatives",*** Journal of Economic Inquiry, Vol. 45, No. 4 (October 2007), pp. 739-755.

- Brennan Sarah and Ackers Stephen, ***"Recycling, Best Value and Social Enterprise: Assessing the Liverpool Model"***, Liverpool Plus & Energywise Recycling.

- Charles Darvin University, "***Glossary of Landscape Ecology and GIS",*** found at: http://learnline.cdu.edu.au/units/ses501/tools/glossary.html

- Cini Michelle and McGowan Lee, ***"Competition Policy in the European Union",*** 2nd Edition, the European Union Series, 2009.

- Cross S. Candi, ***"Containing the digital age: Case Study Solutions in practice",*** Journal of Industrial Engineer, Institute of Industrial Engineers, July 2008, pp. 50-51.

- Denny Barbara, Escobar Julio and Pingali Venkata, ***"Proximity Networking",*** Report in 3Com Corporation, 2002.

- Di Vita Giuseppe, ***"Renewable resources and waste recycling",*** Journal of Environmental Modeling and Assessment, Vol. 9 (2004), pp. 159-167.

- Economic Society of Thessaloniki, ***"Entrepreneurship, Competitiveness and Growth in South-Eastern Europe",*** Proceedings of the 9th International Congress, Thessaloniki Greece 2004.

- Eichner Thomas, ***"Imperfect Competition in the Recycling Industry",*** Journal of Metroeconomica 56:1 (2005), Blackwell Publishing, pp. 1-24.

- Ergen Evangelos, ***"Internetworked Business Enterprises: New Telecommunication Service",*** report submitted on October 2008 for the course of MSc in Technology, Innovation & Entrepreneurship (University of Sheffield-CITY College).

- Graettinger J. Andrew, Johnson W. Philip, Sunkari Pramodh, Duke C. Matthew and Effinger Jonathan, ***"Recycling of plastic bottles for use as a lightweight geotechnical material",*** The International Journal of Management of Environmental Quality, Vol. 16, No. 6 (2005), pp. 658-669.

- Hatziapostolou Thanos, ***"Internetworked Business Enterprises – Mobile & Wireless Computing",*** MSc in Technology, Innovation & Entrepreneurship, June 2008.

- Huge Brodin Maria and Anderson Helen, ***"Recycling calls for revaluation",*** The International Journal of Supply Chain Management", Vol. 13/1 (2008), pp. 9-15.

- Langenhoven Belinda and Dyssel Michael, ***"The Recycling Industry and Subsistence Waste Collectors: A Case Study of Mitchell's Plain",*** Journal of Urban Forum, Vol. 18, No. 1 (January-March 2007), pp. 114-132.

- ***"Market Trends: Key events that could affect your business",*** Journal of ISO & Agent, Source Media, June 2008, p. 11.

- Mee Nicky and Clewes Debbie, ***"The influence of corporate communications on recycling behavior",*** The International Journal of Corporate Communications, Emerald Group Publications, Vol. 9, No. 4, 2004 pp. 265-275.

- Meneses Gonzalo Diaz, ***"Recycling Behavior: A Multidimensional Approach",*** Journal of Environment & Behaviour, Vol. 37, No. 6, November 2005, pp. 837-860.

- Moczygemba Elena and Smaka-Kincl Vesna, ***"69 per cent recycling rate for waste management in Graz, Austria",*** The International Journal of Management of Environmental Quality, Vol. 18, No. 2 (2007), pp. 126-136.

- Nofsinger R. John, ***"The Psychology of Investing",*** Second Edition, Prentice Hall, USA, 2005.

- NFC Forum, ***"The Keys to Truly Interoperable Communications",*** White Paper, 31 October 2007.

- Paraskakis Iraklis, Stamatopoulou Ioanna and Paunovski Ognen, ***"Infusing Research & Knowledge in South-East Europe",*** Proceedings of the 1st Annual SEERC Doctoral Student Conference, Thessaloniki Greece 2006.

- Parliamentary Office of Science & Technology, ***"Pervasive Computing",*** Postnote, May 2006, Number 263.

- Plastics & Composites, ***"Toastie machine leads to recycling process",*** Journal of Engineering & Manufacturing, Adrenalin Publishing.

- Riley Mark, ***"From salvage to recycling – new agendas or same old rubbish?",*** Journal of Area, Vol. 40:1 (2008), pp 79-89.

- The International Society of Logistics – District Greece Thessaloniki Chapter, ***"Logistics from α to ω: Strategies and Applications",*** Proceedings of the 17th International Logistics Congress, October 2001, Thessaloniki Greece.

- Vicente Paula and Reis Elizabeth, ***"Factors influencing households' participation in recycling",*** Waste Management & Research, Vol. 26: 2008, pp 140-146.

Foreign Bibliography

- Gomez Ortiz Rosa Amalia, ***"Leadership and the technological innovation in small and medium enterprises",*** Journal of Thinking & Management, 4:2008, pp. 157-194 *(original journal in Spanish language – Pensamiento y Gestion).*

- Greek Ministry of Development – General Secretariat of Industry, ***"OECD-APEC Global Conference Results: Removing Barriers to SME Access to International Markets",*** 6-8 November 2006, Athens Greece *(original book in Greek language).*

- Sosa Sierra Maria Del Carmen, ***"Artificial Intelligence in Financial Management",*** Journal of Thinking & Management, 23:2007, pp. 153-186 *(original journal in Spanish language – Pensamiento y Gestion).*

- Velasco Carlos Benavides and Garcia Quintana Cristina, ***"Generation of Technological Knowledge and Innovation Policies: Dimensions & Interrelationships",*** Journal of Global Economy, January 2008, Vol. 18, pp. 283-297 *(original journal in Spanish language – Revista de Economia Mundial).*

- Voulgaris Yiannis, ***"The challenge of the domination: Greece, Europe, USA, Globalization",*** Polis Editions, April 2003 *(original book in Greek language).*

Appendices

Appendix A

Literature Taxonomy

Author (S)	**Roseland Mark**
Title	**Toward Sustainable Communities: Resources for Citizens and their Governments**
Publication Type	Book
Publication Name	New Society Publishers
Pages	239
Date/Year	2005
Thematic Topic	Building a context for sustainable communities involving actively, people and governments. A framework of tools and initiatives.
Concept/Theory	During recent decades there has been developed two movements which focus the attention directly on the state, form and management of human communities. These are the "sustainable communities" and the "Eco-cities" movements.
	These movements share the perspective that the most direct and effective means to protect the environment is to redevelop, retrofit and redesign our own communities.
Methodology	A book which was written based on an on-going research project made by the author the last 16 years. It is a conceptual framework of tested practical suggestions, helpful contacts and essential references to use in setting community planning and development on a sustainable course.
Issue/Challenge	Create the future sustainable communities.
Country	Vancouver, Canada
Contribution	A set of essential information on how to maintain communities and make them focused in a sustainable future through a certain mentality which inspires both people and government. Communities may be regions, countries or even bigger blocks of habitation.
Impact	A strong argument for redesign and reform communities and regions that would like to succeed in a sustainable future following a different path and re-evaluating their willingness to step forward. "Staying in business is undoubtedly necessary but it is no longer enough".
Shortfall	No shortfalls identified in such an on-going research

Future Direction	Do development differently and see the challenge ahead by learning to live on our natural income rather than depleting our natural capital; finding ways to live more lightly on the planet and reducing our "presence" consequences; strengthening our community or region capital; fostering our trust, imagination, courage and commitment for bettering our economic and social well-being.
Contribution thoughts in the current study	Whenever it is necessary we should not be afraid to mandate changes. The key to a sustainable future lies not in making us more competitive, but rather in making us more perceptive; more able to realize what we have, what we need and what are the long term consequences of our short term choices.
	Sustainability can mean less as well as more. Nothing is sustainable if it is not here next year. Do development differently.

Author (S)	**Blumberg F. Donald**
Title	**Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes**
Publication Type	Book
Publication Name	CRC Press
Pages	240
Date/Year	2005
Thematic Topic	The concept and analytical framework, technology and processes for managing closed loop supply chain and reverse logistics service in industry and other sectors.
Concept/Theory	The environmental concerns as well as the economic value in terms of extending the product life, have both created new and emerging business opportunities. The focus on reducing waste and other residues of consuming have contributed in the marriage of the environment and economy through Reverse Logistics.
	"Green laws" although have focused purely on the part of the environment, further to an extensive research, investigation and study they have incorporated and took into account reverse logistics and closed loop supply chain practices, accepting in this way their significance for their positive environmental contribution and impact.
Methodology	A book based on over 35 years of practical industry experience in the development and implementation of productive and efficient reverse logistics and closed loop supply chains.
Issue/Challenge	Focus in reverse logistics practices.
Country	USA
Contribution	An important framework of practices derived from industrial experience. An introduction of a model which grabs the growing business opportunities created by the adoption of the "Green Laws".
Impact	A complete set of techniques on the Closed Loop Supply Chain model as a broaden approach for a product or service, incorporating reverse logistics as its subset or stand alone process.
Future Direction	Adopt certain techniques of reverse logistics and get advantage of the emerging markets that are created by the "green" mentality. Every change creates new opportunities for those who see "outside the box".

Contribution thoughts in the current study	This book proves that there is knowledge, information and tools that could be further developed for protecting the environment and create growth to local regions and clusters.
	It helps us to clearly understand the whole loop of a product or service including: (*) forward logistics, (*) the direct supply chain management, (*) reverse logistics, (*) the disposal, (*) the repair, (*) the recycling of unwanted products and trash.
	This book helped us to capture and perceive the importance of getting back and putting into process useless products, transforming them in that way to priceful pieces.
	Anything could somehow get a price if we apply innovative tools on it and give value to its existence.

Author (S)	**OECD - Organization for Economic Co-operation and Development**
Title	**Improving Recycling Markets**
Publication Type	Report on project' s results
Publication Name	OECD Publications
Volume (No)	
Pages	186
Date/Year	2006
Thematic Topic	Analysis of non-environmental market failures in markets for secondary materials (wastepaper, plastic bottles, metal scrap etc.)
Concept/Theory	Many OECD governments have introduced targeted policies to encourage recycling. Nevertheless results are not optimistic since there are market failures in recyclable material markets as well as a discouragement in substitution of primary materials for recycling materials.
	Targeted policies will not work since further support is not established to change current attitude and perception about recyclables.
Methodology	A publication based in 5 different papers that have been prepared to contribute in the specific project about the current conditions in recycling markets.
Issue/Challenge	Recycling markets should be reformed and adapted to new techniques that will improve their status and effectiveness.
Country	OECD is a global organization with many member countries all over the world including the Commission of the European Union.
Contribution	There is much feedback in current recycling markets' weaknesses and discrepancies especially considering their primary mission. Reformation is necessary since markets for many recyclable products are still growing offering healthy opportunities for parts involved.
Impact	Focus in the nature and operation of the growing recycling markets trying to make them more efficient and evaluate their real contribution to the original idea of recycling.
Future Direction	There should be strong dedication in redesign these markets and develop them, over passing technical weaknesses, information failures and barriers that would restrain their progress.
Contribution thoughts in the current study	Environmental policies should cooperate with industrial and market policies and all these 3 forces could be combined to make strategic alliances and adopt specific targeted policies in each region.

	Markets for many recyclable materials are growing; however market failures and barriers are constraining some markets. Such failures may be information failures, market power that affect prices of the recyclable materials, technological externalities, market barriers such as search and transaction costs. All these undermine the market.
	Initial perceptions and misperceptions concerning the quality of the products that are made from recycled materials can be a problem.
	Search and transaction costs can make it difficult for buyers and sellers to find each other and conclude in a "fair" transaction.
	Power in markets for supporting primary material products may restrict the penetration of recyclable material products in many cases.
	Traditional recycling policies should be enriched with more effective policies that take advantage of information and communication technologies.

Author (S)	**Nofsinger R. John**
Title	**The Psychology of Investing**
Publication Type	Book
Publication Name	Prentice Hall - Second Edition
Pages	116
Date/Year	2005
Thematic Topic	People investment decisions are not always rational and unbiased although financial sector has developed a number of useful totally logical and statistically accepted investing tools.
	This is because psychology affects their decisions more than financial theory does.
Concept/Theory	Decisions are done through mental shortcuts and emotional filters. These are mostly known as psychological biases. Biases affect people's daily lives.
	Although there are logical paths each time to follow or reject people continue to be based in their emotions, especially when serious decisions have to be taken.
Methodology	The book is made on research studies that have been made to show how the bias affects real people. Also this second edition is expanded with new evidences and ideas.
Issue/Challenge	Investing has entered in our social culture and is part of the markets.
Country	USA
Contribution	Clearly understand that traditional financial theories are the lifejacket for the investing. Psychological biases and external affects should be monitored and overcome when investing decisions have to be made.
	This book helps us to identify the existence and the nature of such biases and build strategies to face them and protect our decisions.
Impact	The role of emotions and mood in the decisions-making process place serious obstacles and difficulties in maintaining a rational self-control.
Future Direction	Well-built planning, incentives and rules of thumb are helpful in avoiding common problems caused by the stick to biases.
Contribution thoughts in the current study	Fear, greed and psychological biases are the leverages of stock market and investors. Overconfidence and avoidance of learning through repetitive mistakes have a dramatic impact in decision making.
	Investing incorporates a philosophy with social characteristics. Learning to invest is a life-long course which could support local communities if

	their members are willing to participate in such a course.
	Learning to avoid overconfidence, overestimation of their knowledge, underestimation of risks and exaggeration of personal abilities would probably lead to bettering the region's members and it will be a course of action against poor policies in certain targets, such as recycling ratios.
	Investing leads people to start thinking by developing mental accounting, mental budgeting and matching costs to benefits. Also learn to develop risk perception in the real world, building behavioral portfolios, increase social interaction and develop a social dynamic.
	Such techniques improve financial behavior of individuals and in extent drain these characteristics to other sectors of life.
	Through the Recycling Stock Market, people will learn to develop investing behaviors while in parallel contribute in recycling and waste management.
	As a result, the region will acquire value through its members' status and development which could be externalized in other professional and social activities.
	It is possible through this process to develop self-control and decision-making mentalities that will help them in other sectors and would establish a framework for further progresses.
	Exploiting psychological biases and using them for good is a challenge.

Author (S)	**Rawlings B. Laura, Sherburne-Benz Lynne and Van Domelen Julie (World Bank)**
Title	**Evaluating Social Funds: A Cross-Country Analysis of Community Investments**
Publication Type	Research Report
Publication Name	World Bank - Regional & Sectoral Studies
Pages	1-208
Date/Year	2004
Thematic Topic	Assessment of the targeting, impact, sustainability and efficiency of six social funds in areas of poverty.
Concept/Theory	It is necessary to attend and evaluate such mechanisms (Social Funds) in order to identify their strengths and weaknesses throughout long term development. Impacts and sustainability of such regions in countries with high levels of poverty are crucial parameters to evaluate success and measure results.
Methodology	A Cross-Country study based in sectorial surveys.
Country	USA - Washington D.C.
Contribution	This report consist a guidebook on how to evaluate and measure funding addressed to regions for special purposes.
Future Direction	Exploration of community/region dynamics is a significant factor that may affect the impact and sustainability of investments.
Contribution thoughts in the current study	We have found in this study similar characteristics to our proposed model. Although Social Funds are addressed to issues such as poverty and basic needs coverage, they propose the strategy of small-scale investment for region-led development.
	Each region has its own scalable needs.
	In the way that Social Funds are an innovative, community-based tool, in the same way Recycling Stock Market could be an innovative micro-trend for sustainable regions.
	Do Recycling Stock Market reach regions and their households? Does Recycling Stock Market deliver high quality sustainable results? Does Recycling Stock Market affect living standards of citizens? How cost efficient is the Recycling Stock Market comparing to other alternative mechanisms of recycling?
	We target to the household end consumers. We try to create a performance-oriented utility which will give to people access to the recycling process.

	Some strategies for cost efficiency are: (a) we transfer the responsibility for managing this recycling effort to local level and especially to households, (b) we intend to give direct participation to end-consumers, (c) we require counterpart contributions from the regions, (d) we try to control cost escalation during the whole process of Recycling Stock Market, (e) we require greater input and participation from the regions in a way that can improve the impact and sustainability of this effort and investment.
	We are looking to provide real tangible contribution to the last link of the supply chain (the end-consumer) and make him the first link of a reverse green network.

Author (S)	**Morgan W. Fred and Hughes V. Margaret**
Title	**Understanding Recycling Behavior in Kentucky: Who Recycles and Why**
Publication Type	Journal Article
Publication Name	JOM
Pages	32-35
Date/Year	Aug-06
Methodology	A sample study made through the collaboration of 3 institutes
Country	USA
Shortfall	Small sample; very restricted to a county only (Fayette County of Kentucky);
Future Direction	4 future aims have been established: (a) the recycling programme will be expanded in other states, (b) the demographic attributes that affect the recycling behavior will be established, (c) it must be ascertained whether the economical or the environmental benefits or messages have the most impact on each demographic set, (d) measures of success must be set
Contribution thoughts in the current study	It is identified that economical benefits may be a significant factor that affect the recycling behavior

Author (S)	Eichner Thomas
Title	**Imperfect Competition in the Recycling Industry**
Publication Type	Journal Article
Publication Name	Journal of Metroeconomica
Volume (No)	56:1
Pages	1-24
Date/Year	2005
Thematic Topic	Market allocation in an economy where recyclables are used as raw materials and where a recycling firm has market power.
Concept/Theory	Market failures exist in such special markets therefore different policy schemes should be adopted to overcome them.
Methodology	Development of a model on recycling standards related to product design and solid waste processing. Experiment study which incorporates the relation between the product design and the imperfect competition.
Contribution	Investigation on imperfect competition in a recycling economy and evaluation of efficiency performance of relative recycling standards.
Shortfall	A general approach not based in specific examples but rather in more broaden manner.
Future Direction	Further should be made to identify the appropriate set of policies to be applied in order to result in a good allocation of the market of recyclables.
Contribution thoughts in the current study	Market failures: the product design may affect the recycling market especially where the competition is imperfect.
	An efficient product design may help especially where recycling services are inefficiently low due to imperfect competition.
	Product design is independent of the market structure although there should exist a number of recycling firms.

Author (S)	Tanigaki Kazunori
Title	**Recycling and International Trade Theory**
Publication Type	Journal Article
Publication Name	Review of Development Economics
Volume (No)	11:1
Pages	1-12
Date/Year	2007
Thematic Topic	Recycling and production of secondary materials. Effects of recycling on comparative advantage, trade and welfare.
Concept/Theory	Survey on the relationship between recycling and international trade theory. The recycling sector contributes in a number of parameters that define the region's/country's economy.
Methodology	The author examines whether a specific theorem is valid in the recycling sector. Examine price effects; examine how a recycling subsidy may change the production structure and comparative advantage.
Contribution	Recycling ratio leverages price effects, welfare effects, and may alter the economy of a country/region.
Future Direction	This survey should include an environmental model in the future, since at the moment there was no such reference. A more integrated model of the environment could be investigated.
Contribution thoughts in the current study	Subsidies in the recycling sector could be a direct policy in order to strengthen local economy and change its direction to a higher recycling ratio.
	The waste costs are strictly related to the optimal welfare rates for the economy of a region.
	Comparative advantage can be changed by a subsidy to the recycling sector especially in a globalised environment or even in a closed economy.
	The concept of a recycling tax should not be investigated, since it may create negative impact to end-consumers.

Author (S)	**Dalmijn W.L. and De Jong T.P.R**
Title	**The Development of Vehicle Recycling in Europe: Sorting, Shredding and Separation**
Publication Type	Journal Article
Publication Name	JOM
Pages	52-56
Date/Year	2007
Thematic Topic	Recycling of end-life-vehicles and how this contributed to the global economy.
Concept/Theory	The fast growing consumption of metals in China, has created an emerging market of recycling metals which boosted affected both USA and European Union.
Methodology	Survey
Contribution	This article gives technical information on the resource cycle and explains differences on recycling process among European Union and USA. In addition it makes some suggestions for improvements.
Shortfall	Narrowed to vehicles.
Future Direction	European Union should become more competitive in the recycling processes and should adopt more innovative developments.
Contribution thoughts in the current study	Recycling sector could become a significant factor for a region and its economy since it is strictly connected with emerging markets.
	Adoption of simple and effective recycling procedures in combination with minimum obstacles from legislation and paperwork could create competitive advantage.
	Recyclables may contribute to the regions' GDP since there is an established supply chain and there is interest from huge markets such as China, India and Pakistan.

Author (S)	**Chung Shan-Shan, Miu Monica and Leung Yin**
Title	**The Value-Action Gap in Waste Recycling: The Case of Undergraduates in Hong-Kong**
Publication Type	Journal Article
Publication Name	Journal of Environmental Management
Volume (No)	40
Pages	603-612
Date/Year	2007
Thematic Topic	The discrepancy between verbal and actual commitment in waste recycling and environmental behavior.
Concept/Theory	There has been identified a value-action gap in the behavior regarding environmental issues, therefore the researchers introduce a methodology to measure this gap and try to explain this behavior.
Methodology	Study which introduces a methodology to identify the discrepancies among verbal commitment and actual behavior in terms of waste recycling. It measures this gap and tries to give explanations on an observed group of people.
Contribution	It gives some ideas but is based in one sample. It is interesting that is applied in University students which are considered the future active citizens and decision makers. However this survey does not provide any solutions.
Shortfall	Restricted to a specific group of students at the Hong Kong Baptist University with the hope that the results could be generalized to a wider context (one-sample survey).
Contribution thoughts in the current study	Young people are a good sample to start and to involve in any new recycling policy that intends to attract participation.
	To develop awareness it is necessary to reverse former states of typical action to a new change format.

Author (S)	**Commission of the European Communities**
Title	**Handbook on Community State Aid Rules for SMEs (Including Temporary State Aid Measures to support access to finance in the current financial and economic crisis)**
Publication Type	Study Report (part of a Commission's Proposal for the European Economy Recovery Plan).
Publication Name	European Community publication http://ec.europa.eu/competition/state_aid/studies_reports/sme_handbook.pdf
Pages	1-42
Date/Year	Jan-09
Thematic Topic	State Aid for SMEs - A Framework for effective access to appropriate finance in EU SMEs.
Concept/Theory	A complete proposal for financing the growth and the development of envisaged investments. This proposal is a part of a bigger Recovery Plan which aims to enhance access to financing for SMEs, promote their cash flows and help more people to become entrepreneurs.
Methodology	This is a study report further to the "Small Business Act for Europe" adopted by the Commission in June 2008.
Issue/Challenge	This is a challenge and an answer to the current crisis aiming to strengthen the backbone of the EU's economy, SMEs.
Country Contribution	European Community / Europe "Think Small First"
Supporting	The Small and Medium sized Enterprises (SMEs) are the backbone of Europe's economy.
Future Direction	Transform this proposal to more simplified packages in order to delegate Member States grant certain kinds of aid to SMEs in their regions of authority. Access should be easy without bureaucracy or legislation barriers. This proposal should cooperate with other EU programmes such as "The Competitiveness and Innovation Programme", "The Research Framework Programme".
Contribution thoughts in the current study	In this proposal there is a whole chapter for the "Aid for environmental protection", where there is included a section regarding the aid for waste management describing activities for re-utilization, recycling and recovery. Going beyond Community's standards.

Author (S)	**Commission of the European Communities**
Title	**Notices from European Union Institution and Bodies: Community Guidelines on State Aid for Environmental Protection**
Publication Type	Community Quidelines
Publication Name	Official Journal of the European Union
	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:082:0001:0033:EN:PDF
Volume (No)	2008/C 82/01
Pages	1-33
Date/Year	Apr-08
Thematic Topic	Guidelines for ensuring a sustainable integrated European climate and energy policy.
Concept/Theory	Three objectives: (a) increasing security of supply, (b) ensuring the competitiveness of European economies and the availability of affordable energy, (c) promoting environmental sustainability and combating climate change.
Methodology	Notices and guidelines for Member States derived from their recommendations
Issue/Challenge	Apply policies in sectors that are strictly connected to the environment and its protection.
Country Supporting	European Community / Brussels
	Climate, energy and economy are interrelated and mutually affected. Sustainability may be achieved only through their protection. Negative externalities should be close monitored and faced effectively.
Future Direction	Ensure the higher level of environmental protection
Contribution thoughts in the current study	Waste prevention and management is one of the four top priorities for the Community according to "The Sixth Environment Protection Programme"

Author (S)	**Maastricht Economic and Social Research and Training Center on Innovation and Technology**
Title	**European Innovation Scoreboard 2008: Comparative Analysis of Innovation Performance**
Publication Type	Thematic Reports
Publication Name	InnoMetrics http://www.proinno-europe.eu/EIS2008/website/docs/EIS_2008_Final_report.pdf
Pages	1-58
Date/Year	Jan-09
Thematic Topic	A study on the comparative assessment of the innovation performance of EU Member States for 2008.
Concept/Theory	The European Innovation Scoreboard tracks and benchmarks the relative innovation performance of EU member states according to a specific methodology which includes a number of dimensions.
Methodology	Report on comparisons based in data retrieved from (a) the Joint Research Institute of the European Commission, (b) the Global Innovation Scoreboard and (c) publications by the Centre for Science and Technology Studies- CWTS.
Issue/Challenge	Identify the status of innovation in each member state, as well as comparison on EU-USA-Japan.
Country	Europe / Maastricht
Supporting	The understanding of current situation of innovation, approached by different dimensions and in details for each member state. Benchmarking for reviewing recent developments and attend the balance assessment of the innovation performance.
Future Direction	Identify and analyze the long-term mechanisms that are the root of the innovation performance, analyze and study the relevance and nature of the innovation activities, outcomes and performance at a sectorial level over a long-term period.
	Inno-barometer 2009 will survey how companies' innovation activities have changed and if they have changed their strategies according to future trends, investments and activities.

Contribution thoughts in the current study	EU is still behind USA and Japan although late years the gap is shorten.
	Less than half of the EU member states (11 from 27) are above the EU27 mean in 2008 Innovation Score-Board.
	New analysis in this report confirms the importance of non-R&D innovation. R&D is not the only method of innovating.
	Other methods include technology adoption, incremental changes, imitation and combining existing knowledge in new ways.
	R&D is not the only way for doing innovation. Sometimes the "neglected innovators" who seem to have lower innovative capabilities than R&D firms tend to produce more creative activities combining creativity and innovation.
	A good creative climate may lead to strong overall innovation performance.
	This dissertation aims to suggest such a model of combining existing knowledge and trying to bring imitation of three different sectors to daily life for achieving a target.
	Recycling Stock Market may trigger EU's innovative thought and stimulate local regions to adopt this model to gain benefits and be the first globally in such an initiative.
	First -movers' advantage for the EU will be taking the leading position in innovation and defining future.

Author (S)	**Commission of the European Communities**
Title	**Cohesion Policy: investing in the real economy**
Publication Type	Communication from the Commission to the European Parliament
Publication Name	European Community Publication
	http://ec.europa.eu/regional_policy/funds/recovery/doc/16122008_comm_en.doc
Volume (No)	COM(2008) 876/3
Pages	1-12
Date/Year	2008
Thematic Topic	A Cohesion Policy which aims to contribute in the European Economic Recovery Plan. Cohesion Policy is a plan which will invest EUR 347 billion to strengthen growth and contribute to economic and social cohesion.
Concept/Theory	Cohesion Policy is providing an important input to the real economy through delivery of the EU's growth and jobs and sustainable development agendas. Significant financial investment and decentralized management is focusing on improving public policy making, accountability and control.
	Intends to provide vital support for growth and jobs at local and regional level.
Methodology	Communication
Issue/Challenge	Emphasizing in the value of investments made in the real economy and how the Cohesion Policy investments will contribute in the current economic situation.
Country	European Community / Brussels
Contribution	A plan helping EU to overcome current crisis through development and change.
Supporting	A complete framework on funding smart investing and broaden EU's potentials for growth throughout current financial crisis.
Contribution thoughts in the current study	One of the most important recommendations included in this Communication is the "Directing action to smart investments". For example investing in energy efficiency, clean technologies, environmental services etc.

Author (S)	**Organization for Economic Co-operation and Development (OECD)**
Title	**Informal Seminar on Sustainability and the Role of Innovation Policies in the Current Financial Crisis**
Publication Type	Summary and Conclusions of the Seminar
Publication Name	OECD informal publication http://www.oecd.org/dataoecd/31/34/42230480.pdf
Pages	1-4
Date/Year	Feb-09
Thematic Topic	Development of policies to strengthen growth in the medium and long-term.
Concept/Theory	Innovation policies play a significant role in the economic development and sustainability of OECD countries. Especially in sectors such as: entrepreneurship, research, investments in infrastructure, ICT, human capital and green technologies.
Methodology	Seminar
Issue/Challenge	Innovation policies and how these could be exploited by the regions in order to face current crisis.
Country	France / Paris
Contribution	Useful findings and key messages regarding the importance of innovation as a development tool.
Contribution thoughts in the current study	In this seminar was discussed that short-term stimulus packages can help strengthen innovation and long-term growth.
	Developing new comparative advantages is an answer to crisis, since this may lead to long-term sustainable growth.